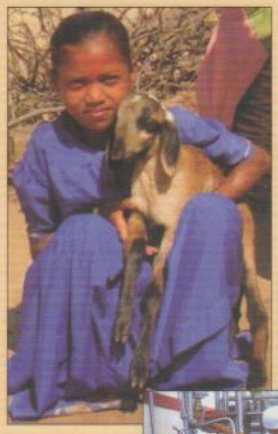
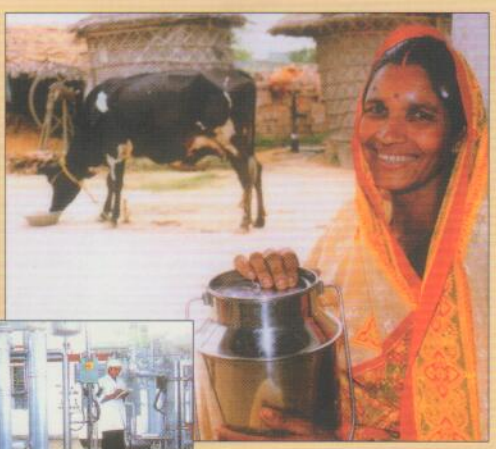
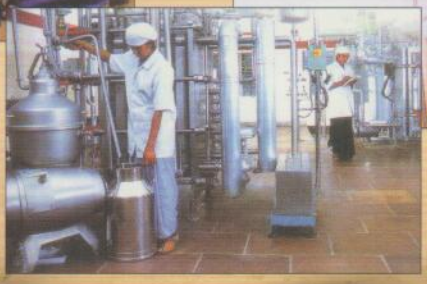
Livestock and Livelihoods

Challenges and Opportunities for Asia in the Emerging Market Environment







Editor
Vinod Ahuja

National Dairy Development Board, India

Pro-Poor Livestock Policy Facility (South Asia Hub)

Acknowledgments

This document, *Livestock and Livelihoods: Challenges and Opportunities for Asia in the Emerging Market Environment*, is an outcome of an international workshop held in Anand, in November 2003 on the same topic. The workshop was organised jointly by the Pro-Poor Livestock Policy Facility of FAO and National Dairy Development Board of India. Their support in organisation of the workshop is gratefully acknowledged.

Over 20 country representatives and about the same number of representatives from various national and international organisations participated in the workshop. They brought together a rich diversity of research, ideas, and experiences from across the world. Some participants contributed invited papers and presented them in the workshop while others shared their experiences and ideas in the working groups and plenary discussions. I take this opportunity to thank all the participants for the very fruitful discussion during the three-day workshop. I would also like to specially thank the facilitators and chairpersons of the plenary and working group sessions who ensured that the discussions remained on track and resulted in a meaningful outcome.

Dr. Amrita Patel, Chairman, NDDB delivered the inaugural address and brought home the point that in a number of developing countries, livestock are an extremely critical element in the livelihood systems of the poor, and can provide an effective pathway out of poverty if appropriate policy regimes are put in place. Indeed these assertions were reconfirmed by the field evidence presented by a number of participants in the technical sessions. The inaugural address was followed by addresses by Samuel Jutzi, Director, Animal Production and Health, FAO and Deepak Tikku, Managing Director, NDDB. Both the speakers outlined the strategic framework and vision of their respective organisations and

how their plans of activities will serve the objectives the organisations have set out for themselves. I am grateful to all of them for their personal commitment and support.

Prof. John Mellor, Vice President, Abt Associates Inc. was the Chief Guest and delivered the Keynote Address. He, very forcefully and lucidly, demonstrated how growth of the smallholder livestock sector contributes directly to poverty reduction and employment growth and over time provides much of the effective demand for the employment intensive rural non-farm sector. He further underlined the need for investment in research and development for the livestock sector to reduce the production cost and investment in physical infrastructure to reduce the transaction costs of market access for livestock products. The keynote address provided the guiding framework for the technical and working group sessions and contributed significantly towards enriching the discussions. On behalf of organisers, I thank Prof. Mellor for delivering the Key Note Address and spending the time with workshop participants and guiding the discussions throughout the workshop.

A team of highly committed professionals from NDDB worked untiringly to make the workshop a success. While it is difficult to mention individual contributions, I take this opportunity to extend my sincere thanks to all officers and staff of the National Dairy Development Board for the very meticulous organisation of the workshop.

Vinod Ahuja

The Setting

There is increasing, though still inadequate, recognition of livestock as an important means of sustaining and supporting the livelihoods of the rural poor in developing countries. According to some estimates, nearly half of the world's 1.3 billion poor depend on livestock for their livelihood and for many of them livestock is the only means of capital accumulation and escaping the vicious circle of poverty and deprivation. Women play an important role in animal production and derive a significant proportion of their cash income from it. A number of observers have, therefore, recently argued that livestock must become an integral part of all interventions aimed at reducing rural poverty and enhancing food and nutrition security.

Globally, the sector is emerging as one of the most important subsectors of agriculture in terms of value added. Further, there is a systematic shift in the geographical location of livestock production with Asia emerging as the primary 'hub' of livestock production. It is estimated that by the year 2020, 31 and 40 per cent of global milk and meat production will be contributed by Asia. Within the developing world, Asia's share is likely to exceed 60 per cent for both milk and meat. This is good news given the structure of livestock production and the distribution of livestock resource in Asian countries. As is well known, a large proportion

of livestock products in Asian countries, specially South Asia, are produced by small and marginal farmers and landless households, who also account for a large share of poor households. Further, the distribution of livestock in a number of countries has been found to be far more equitable than that of land. This would suggest that any gains from enhanced livestock production should have far more direct and significantly larger impact on poverty reduction.

On the other hand, significant changes are taking place in the international and domestic economic environment that affect producers and consumers across the globe. These include changes in rules and regulations that define access to markets, new demands for timely supply of high quality products, increased sanitary requirements with high compliance costs, possible concentration of production in industrial units due to the economies of scale and degradation of land and water resulting from industrialised production endangering the resource base that is so vital to smallholder livestock production. These changes can be particularly threatening as smallholders get exposed to new forces with little time or the means to adapt. This requires an appropriate policy and organisational response based on careful assessment of the risks and barriers faced by smallholder livestock producers in the emerging market and institutional environment.

To formulate an appropriate response to these challenges, the Pro-Poor Livestock Policy Facility (PPLPF) and the National Dairy Development Board (NDDB), India organised an international workshop at Anand in India. The workshop brought together 'critical thinkers and practitioners' from nearly ten countries so as to identify (i) international and domestic policy gaps and distortions that have an impact on livestock-dependent livelihoods of the poor in Asia, (ii) national and international policy making processes including the institutions and organisations through

which policies are implemented, and (iii) a pathway to resolve the critical issues.

The workshop was structured around three themes—smallholder competitiveness of Asia in livestock production, implications of WTO, Codex and SPS on smallholder livelihood producers in Asia, and the livelihood implications of emerging structure of poultry production for poor farmers in Asia. The chosen themes reflected the concern that the existing policy making processes and emerging rules of the game do not provide a fair chance to the smallholder to compete in the market and that an appropriate response is necessary to ensure representation of smallholder interests in national and international policy making processes. The formulation of such a response requires a dispassionate examination of the competitiveness of Asian livestock producers vis-à-vis other regions in both international and domestic markets. Smallholder competitiveness was therefore chosen as the first theme. This was followed by an assessment of emerging opportunities and barriers created by new trading rules and sanitary requirements and the nature of response required both at domestic and international level. The third theme on poultry production was chosen given the livelihood intensity of backyard poultry production as demonstrated by successful experiences both within and outside Asia, and the possibility of that linkage being adversely affected given the rapid growth of highly vertically integrated large scale production units in the region.

This volume brings together the synthesis of discussions, key observations, recommendations and the papers presented in the workshop. Structurally, the volume is divided into five sections. Plenary addresses from the inaugural session are presented in first section. The next three sections present the discussions and papers from technical sessions on each of the respective themes. Each of these section opens with an Editor's Report which attempts to present a synthesis of discussions in the plenary and technical

sessions. The reports in each section are then followed by the papers presented on that theme. A brief chapter titled 'The Way Forward' then articulates some elements of an action plan towards operationalising the workshop recommendations. A number of participants also contributed various kinds of relevant analysis in the form of poster papers. These are made available as Annexures to the main report.

Smallholder Dairying in India: Challenges Ahead

Inaugural Address by Amrita Patel
Chairman, National Dairy Development Board

It is indeed a privilege to welcome you to Anand and to this Workshop. We are particularly pleased that we have so many countries and international organisations participating in the Workshop. Anand, where we are meeting today, is a small town with limited facilities. If there are any shortcomings in the arrangements that have been made, please be assured that it is not for want of every possible effort to make you all as comfortable as our circumstances permit. The Workshop is being hosted by NDDB in association with the Pro Poor Livestock Policy Initiative of the FAO. The objective of this Initiative is to facilitate and support the formulation and implementation of policies and institutional changes that have an impact on the livelihoods of a large number of the world's poor. Recognising the critical role played by the livestock sector in supporting and sustaining the livelihoods of a large number of poor, the project has a distinct focus on this sector. The Pro Poor Livestock Policy Initiative is being operationalised through 'regional hubs' in various regions. The South Asia Hub, the co-host of this Workshop, located in India, is responsible for India, Bangladesh and Nepal.

Dairying in India is an occupation of small farmers. Over 60 per cent of close to 11 million farmer members in about 100,000 village milk cooperatives all over the country are small, marginal and even landless producers. Dairying has not meant just producing milk leading to India emerging as the largest milk pro-

ducer in the world. Dairying has provided livelihoods to millions of the poorest in our country and for many it is the sole source of livelihood bringing cash into their hands, twice a day every day of the year. This is the cash that keeps the home fires burning – cash with which the housewife buys her food, often just rice and salt for the day. Dairying in India is production that results from the efforts of individuals that form our masses and not mass production. In India, as is the case in many other developing countries, the distribution of livestock among the poorest is far more equitable than the distribution of land. Livestock therefore play an extremely critical role in supporting and sustaining livelihoods of a large number of poor. Livestock are often the only livelihood option available to the landless as common property resources are being increasingly captured by individuals for private gain. The average dairy farmer, more often than not the woman of the household, has only one or two animals. Milk is produced on crop residues. The milk is consumed at home, sold to neighbours and thereafter flows into channels that lead beyond the villages to towns, cities and metros. Not more than 20-30 per cent of the milk produced actually moves into market channels. Of this the largest proportion is still handled by small vendors.

India was fortunate that when the first milk cooperative was set up in Anand where we are meeting today, the environment offered by post independent India which was going through dramatic social reform provided a favourable social setting. There was already a sizeable settled agriculture and animal husbandry based rural population. Animal husbandry particularly based on buffaloes at that time complemented land holdings and the farming system. The cooperative as an institution did not pose any social threat. Politically, cooperatives were considered a desirable socialist alternative that provided space for the emergence of a representative democracy at the village level. This phenomenon, when we look at it today, was both time and space specific. There are elements of the structure which continue to be relevant

but the structure in its entirety does not appear to be so. When the Government, in its wisdom, in the 1960s decided that this type of cooperative structure needed to be replicated all over the country, it put in place a national organisation to assume this responsibility – the National Dairy Development Board (NDDB) with policies which would give the farmers the best chance of succeeding in organising themselves into cooperatives – a preferred role for dairy cooperatives including responsibility for the delivery of technical services, canalising the import of dairy commodities through the NDDB. Dairy commodities were sold at prevailing market prices thus protecting the young dairy industry from external competition. This ensured the success and rapid growth of India's milk production from 20 million tonnes in the 70s to 88 million tonnes today and through this provided livelihoods for millions. This achievement can be attributed to a combination of factors – a national institution with a clear mandate, an institutional structure – the village cooperatives federated to district level cooperatives owned and managed by farmer members and not the least appropriate government policies.

Some years later it became evident that this structure also would succeed only under a given configuration of ecological, social, economic and political factors. Today the structure is facing major challenges of the changes within and increasingly those coming from outside in this rapidly globalizing world. We in the Dairy Board are therefore working at meeting these challenges, and looking at alternative institutional structures to contend with the increasingly aggressive competition in the market place. We see the need for a plurality of institutions including cooperatives from the village to the district and state level but ensuring always that farmer interests – smallholder interests are central to all that we plan and do.

Our major challenge in the increasingly competitive environment is also to ensure that the approach we take promotes sustainable

livelihoods and leads to the protection and improvement in the management of the natural resource base. We recognise all too well that fundamental to all the planning and programmes we are now undertaking is the fact that the very life support systems on which all economic progress depends are being rapidly undermined. This threatens the success of the long term outcome of our efforts and consequently the future well being of our farmers. I believe it would be well worth the while of this forum to consider this major long term dimension in all its aspects since it has the gravest implications to the entire livestock industry, particularly to those countries like India that are sustained by the masses.

Over the last 25 years, we have had visits from about a dozen countries in Asia and Africa. These have been at ministerial level in addition to bureaucrats. The visits were undertaken to study our cooperative structure that was growing from strength to strength and to assess the possibility of its application in their respective countries. All were unanimously of the view that there were useful lessons to learn and that they would like to put in place similar structures for the benefit of their smallholders with modifications to suit their environment. A number of governments thereafter signed MOUs with NDDB and we were asked to send our officers to assist them in preparing project proposals or to provide technical assistance. But that is where our association always concluded. There was however one exception. And this was in Ethiopia. When the minister in charge visited Anand we suggested that as is the case in India where we bring groups of farmers from states where cooperatives are to be set up so that they can see for themselves how farmers have organised themselves at the village level and manage their business, some Ethiopian farmers should be given such an exposure. We agreed to meet the cost of 20 of their farmers to spend a week in our villages to see for themselves how our farmers manage their affairs. Their farmers came, spent time with our farmers, asked search-

ing questions and on the last day when we met they assured us that they would try and do something similar when they went home. Some six months later when I went to Addis Ababa for a meeting of the Board of International Livestock Research Institute (ILRI), I received a message from the officer who had accompanied the group of farmers to Anand that the farmers wanted to show me how they had organised themselves. They took me to this place about 20 km out of Addis where in the middle of nowhere the farmers had set up a shed and a queue was forming in front of it. When I went inside the shed I saw a centrifuge where one farmer was testing the samples of milk that were being collected from the milk that each farmer had brought. One farmer, I was told, had made himself the treasurer and kept the cash at home and brought it to the society every morning to pay the members for their milk. In another corner of the room there was a cream separator which was being used to separate the fat. I was told that the skim milk was sold to persons around the society and was used by them to make cheese and the butter which was being sold to traders who sold it in Addis. The farmers knew that they were not getting a fair price for the butter and were pressuring the government to help them market their butter.

And so what I saw was that the seeds of cooperation had been sown. The farmers themselves were much clearer than the Government on what they needed and how they should go about it. They had realised that it was possible for them to organise the collection of milk but the problem was marketing – getting the butter to Addis the closest market which is where the Government needed to help them. What the situation is today I cannot say – whether these efforts have been thwarted or nurtured, but it was clear that a lesson had been learnt.

In my view, although the countries that have visited, recognised that their rural poor have a major stake in the livestock sector, a combination of global, regional and national level policies and

regulations prevented any intervention on a scale large enough to make an impact. And this is where I believe that the FAO's Pro Poor Livestock Policy Initiative can play a key and important role. Policy and programme formulation is a complex phenomenon and requires unbiased, objective and realistic information and knowledge. This becomes all the more important as the wave of globalization intensifies. Livestock policy making even in India, and I imagine in other developing countries, suffers a serious disability i.e., a lack of reliable data and knowledge. In fact more than the policies themselves what requires reform is the policy making process (both national and international) and there is a need to examine what kind of interventions are required to enhance the effectiveness of policy design and implementation. Historically a large number of livestock development efforts have been directed towards improving the availability of technical innovations and services. The relationship between livestock sector programmes and activities and higher level policy aims such as poverty alleviation and economic efficiency is not clear to the different levels of policy makers nor does understanding these relationships form an essential part of the process for developing policy or programmes. The situation frequently gets further complicated by international and regional organisations exerting, or at times opposing, influences at country and regional level, for example when the Government of Sri Lanka asked us to help them organise milk cooperatives and through that stimulate milk production in their country the Asian Development Bank opposed it and withdrew from the dairy development programme that they were going to fund which in fact would have complemented any efforts we would have made. Reaching out to the poorest whose livelihoods depend on incomes from livestock requires an organisation to perform a catalytic role that leads to organising producers into institutional structures that they themselves manage. It is important also to distinguish between institutions and organisations because of their influence on each other. There are hierar-

chies of institutions – international, national, social, local etc. It is possible that projects designed for these countries have been in conflict with existing incompatible institutional frameworks and they have therefore not progressed. Institutional barriers in countries need to be identified and studied. Strategies that result in putting in place a hospitable institutional framework supportive of programmes that benefit the smallholder are essential and it is here again that the FAO's Pro Poor Livestock Policy Initiative can make an important difference and contribution.

We also need to move away from the donor driven 'project' approach. There are enough examples of these which have resulted in marginalising the poor. A subject that should be of even greater concern to all the countries present here is the evolution of the rules of international trade. It is therefore that a whole session has been devoted to this. While developed countries continue to subsidise milk production and the export of dairy commodities, they are also pressing international bodies to legitimise non-tariff barriers that would otherwise be unsustainable scientifically. It is vital for the developing countries to be watchful of these attempts to skew international trade in favour of the North. Fortunately, at the Earth Summit and later at Cancun, the stars have been shining on the poor and the pressure from governments of developing countries and civil society groups by coming together has worked, but for how long? This for now is a triumph for developing countries, but the game plan of the developed countries is far from over. The groups will come up with some new partnerships and reformulate their strategies. This to my mind is the single most obstacle and threat to countries truly desirous of creating the space to enable their smallholders become productive and to help them find the means to a better life.

I sincerely hope that there will be an exchange of ideas, a building of relationships and common themes and common goals will be identified through the deliberations of the Workshop. But most

importantly I hope we will begin to take the first steps to work together, to think together and to speak together as a voice for smallholder livestock development throughout the South. I hope also that a shared agenda will emerge which the South Asia Hub of the Pro Poor Livestock Initiative can take forward. If the NDDB on its part can play a role to support this, we would be happy to do so. This Workshop is in fact a small but positive step in this direction.

FAO's Strategic Framework in Support of Global Food and Agriculture and the Role of Animal Production and Health Division

Address by Samuel Jutzi
Director, Animal Production and Health
Food and Agriculture Organization of the United Nations

I have the honour and pleasure to deliver a short address on behalf of the Food and Agriculture Organization of the United Nations.

This workshop, co-organised by the National Dairy Development Board and the Pro-Poor Livestock Policy Initiative, based at FAO, is expected to explore ways by which the continued strength of the livestock sector development in Asia may be used to enhance social objectives.

In my short intervention, I will not dwell on the features of this development, not only for want of time, but also because there will be expert speakers on this topic to follow me, among others two senior authors of the now globally known study report "Livestock to 2020 - the next food revolution" – a report by the International Food Policy Research Institute, the FAO, and the International Livestock Research Institute.

In Asia we are at the epicentre of this rapid livestock sector development, now generally termed Livestock Revolution, and nobody would certainly fail to be impressed by its features, e.g. by the dynamic development of the dairy sector in India which has not only become the world's largest dairy nation, but also has doubled the average milk intake in as little as thirty years.

Any revolution has its winners and losers, its opportunities and risks, its benefits and damages and it is obviously for all those who matter to make sure that the benefits are captured for enhancing equitable, safe and sustainable development, and that risks are mitigated to the extent feasible.

Key to the success of such a process will be that those who matter will indeed be in a position and empowered to shape the process to this end. Participatory, bottom-up driven, people-centred approaches will be the systematic elements to be developed and observed. That is, institutions closest to the points of action, adequately enabled by a conducive political environment, will have to drive such action.

As I have the privilege to give this address on behalf of FAO and of its Livestock Programme, I will try to give you a short overview of FAO's Strategic Framework which the Member Countries have adopted in 1999 as a guide for its work in support of global food and agriculture and its various objectives for the period up to 2015. Subsequently I will try to outline how FAO's Animal Production and Health Division endeavours to serve this corporate strategy.

When FAO embarked on the definition and negotiation of its strategy, it did that after careful analysis of the most important challenges and trends at the global level, such as the significant changes in the role and functions of the state in food and agriculture, the continuing globalisation and trade liberalisation, the widening gap between the affluent and the poor and between those having access to research and technological progress as well as to information technology and modern communication and those who do not, the changing demands on agriculture in increasingly urbanised societies, changing consumer perceptions and increasing public awareness of food quality, food safety and environmental issues, and increasing pressure on natural resources and competition for their use.

As global goals of FAO for the period in question, and in line with the 1996 World Food Summit Plan of Action, the following statement was agreed:

> *"Access of all people at all times to sufficient nutritionally adequate and safe food, ensuring that the number of chronically undernourished people is reduced by half by no later than 2015. The continued contribution of sustainable agriculture and rural development to economic and social progress and the well-being of all. The conservation, improvement and sustainable utilisation of natural resources, including land, water, forest, fisheries and genetic resources for food and agriculture"*

To achieve such goals, FAO has then identified five corporate strategies which I will quickly mention so as to indicate how FAO's Livestock Programme has chosen to serve this strategy.

The first strategy element deals with the contribution of FAO to the eradication of food insecurity and rural poverty. Emphasis is on sustainable rural livelihoods and more equitable access to resources, on access of vulnerable and disadvantaged groups to sufficient, safe and nutritionally adequate food, and on the preparedness for, and effective and sustainable response to, food and agricultural emergencies.

The second strategy element deals with promoting, developing and reinforcing policy and regulatory frameworks for food, agriculture, fisheries and forestry. Focus is on international instruments concerning food and agriculture, on the production, safe use and fair exchange of agricultural goods; and on national policies, legal instruments and supporting mechanisms which respond to domestic requirements in food and agriculture and which are consistent with the international policy and regulatory framework.

The third strategy element deals with creating sustainable increase in the supply and availability of food and other products from the crop, livestock, fisheries and forestry sectors. Here emphasis

is on policy options and institutional measures to improve efficiency and adaptability in production, processing and marketing systems, and meet the changing needs of producers and consumers, and on the adoption of appropriate technology to sustainably intensify production systems and to ensure sufficient supplies of food and agricultural goods and services.

The fourth element of the strategy deals with supporting the conservation, improvement and sustainable use of natural resources for food and agriculture, and deals with integrated management of land, water, and genetic resources; and with the conservation, rehabilitation and development of environments at greatest risk.

And the fifth strategy element reads: Improving decision-making through provision of information and assessments and fostering of knowledge management for food and agriculture. It deals with an integrated information resource base, with current, relevant and reliable statistics, information and knowledge made accessible to all FAO clients, with regular assessments, analyses and outlook studies for food and agriculture, and places food security at the centre of the international agenda.

FAO's Animal Production and Health Programme, as any other unit in the Organisation, is expected to serve comprehensively and effectively such corporate strategies. We have, after considerable debate, pitched our programme against three international public goods which we believe are most affected by livestock. These are social equality, the sustainability of the natural resources, physical and biological, used in livestock production, and veterinary public health. FAO's livestock programme is therefore designed to help strengthen these public goods and to thereby contribute to the achievement of the Millennium Development Goals, including food security.

The programme portfolio of the Animal Production and Health Division is assembled in such a form that all programme entities

are explicitly related to these public good functions of livestock. There are two basic programme entities supporting the entire programme, i.e. the one on Global Livestock Information and Knowledge Management and the one on Global Livestock Sector Analysis and Strategy Development. The Pro-Poor Livestock Policy Initiative is very closely associated with these two programme entities and strengthens the policy analysis and development capabilities of the Division. It also relates to the other technical programme entities of the Division.

There is the programme entitled "Contribution of livestock to poverty alleviation" which is an inter-disciplinary programme addressing the opportunities for livestock to be a vehicle for smallholder livestock and crop-livestock farmers to generate sufficient income for strengthening their livelihood. While this programme entity focuses its attention on situations at the lower end of the livestock intensification spectrum, and therefore on more marginal and remote production systems, a second programme entity emphasises its attention on the dynamically changing, intensifying, partially also industrialising situations where rapid exclusion of small farmers from sophisticated growing markets and environmental risks of intensive livestock production are addressed. This is where a linkage with FAO's Livestock Environment and Development, the LEAD Initiative, is established. The Division has also established formally a Veterinary Public Health Programme to coordinate F AO's response to that dimension of general Public Health. Associated with this are also the efforts to assess the implications of environmental and production systems changes on the animal and zoonotic diseases situations and opportunities for both disease risk assessment and management. A core programme element of the Division is the Emergency Prevention System for epidemic animal diseases, EMPRES. Finally, as mandated formally by the Member States, the Division also explores opportunities for the improved utilisation and thus conservation of farm animal genetic diversity.

We are convinced that we have configured, in the context of the resources available to us, a comprehensive programme in support of the FAO Strategy as expected by the International Community. It is obvious that this programme can only be effective and efficient in the achievement of its objectives if it delivers on this programme in interaction with those relevant stakeholders in the sector which share such objectives and call F AO in to contribute those products it can best deliver on in complementing the stakeholders' own initiative.

This workshop is an opportunity to explore and possibly agree on complementary and synergistic scenario in the interest of the region's safe, equitable and sustainable livestock sector development. I am grateful to the National Dairy Development Board for having enabled this opportunity.

Indian Dairy Sector and the National Dairy Development Board: An Overview

Address by Deepak Tikku
Managing Director, National Dairy Development Board

Dr. Mellor, Dr. Jutzi, Dr. Gustafson, Dr. Amrita Patel, Dr. Ahuja, participants to this workshop, distinguished ladies and gentlemen and members of the press.

Over the next thirty minutes, I shall attempt to give you an overview about NDDB – how it was set up, what it has achieved and what it proposes to do in future. I will also try to provide an overview of the Indian dairy sector, its characteristics and the issues that confront us.

NDDB was setup in 1964 as a registered society. As many of you know, this came about because the late Prime Minister Lal Bahadur Shastri visited a village to see a dairy cooperative society and wanted the good work done in Anand to be replicated all over the country. The first Chairman of the Dairy Board was Dr. Kurien. He was Chairman of the Dairy Board for over 30 years and imbued NDDB with the values and the work culture that NDDB is known for. For any leader to set up such an organisation requires a lot of support from the employees, which was provided by our present Chairman and other employees, both past and present.

In 1987 the society, NDDB, was merged with the Indian Dairy Corporation, a Government of India Undertaking incorporated to receive and monetize commodities from abroad. The new body, which succeeded the two merged entities, was set up through an

Act of Parliament and retained the name NDDB. Some of the key provisions of the NDDB Act are – i) Recognition of NDDB's status as an Institution of National Importance; ii) Continuation of the freedom and flexibility that NDDB hitherto had and iii) Vesting the superintendence, direction and control of NDDB with the Board of Directors of the NDDB.

The significant functions entrusted to NDDB are: to promote, plan and organise programmes for development of dairy and other agriculture allied industries and biologicals; promote and set up dairy industries; finance any scheme in the cooperative or public sector to stimulate production and marketing of milk; develop and preserve high yielding cattle; adopt the cooperative strategy in an effective manner; cooperate with international organisations; and conduct research and development.

NDDB has its headquarters at Anand. We have eleven technical and six administrative groups. We also have four regional offices and sixteen state offices. NDDB has about 500 officer-specialists in Projects / Engineering, Cooperative Business Development, National Information Network, Finance and Animal Husbandry which includes Breeding, Feeding and Animal Health. Product Development and R&D are the other important areas of our work.

NDDB has four wholly owned direct subsidiaries - a) Indian Dairy Machinery Company which deals in dairy and food processing equipment; b) Indian Immunologicals Limited which deals in veterinary biologicals, drugs and human vaccines; c) Mother Dairy Fruit and Vegetables Ltd. which deals in processing and marketing of milk, milk products, fruits and vegetables; and d) Dhara Vegetable Oil and Foods Company Limited which deals with processing and marketing of edible oils.

As is well known, NDDB was instrumental in implementing Operation Flood programme. Operation Flood programme was the most comprehensive dairy development project undertaken

– it was executed in three phases between 1970 and 1996. The project was financed through commodity aid and loans from the World Bank. In all, about US dollars 1 billion was spent – valued at approximately Indian Rupees 16 billion at the time of implementation, and Indian rupees 45 billion if valued at current exchange rates. About 50 per cent of these funds were on loan which is now being repaid by the cooperatives / NDDB. Of the remaining, about 40 per cent was as commodity aid and 10 per cent was invested by NDDB from its own resources. Under Operation Flood, a large dairying infrastructure has been set up in India- about 175 dairy plants, 45 cattle feed plants, and about 15000 Artificial Insemination centres. We have about 100 rail milk tankers and more than 1500 road milk tankers. More than 100,000 village level dairy cooperatives have been set up during the period with about 11 million farmer-members – these village level societies are federated into about 170 district cooperative unions and 17 state cooperative federations.

From the period 1970 to 1996, when Operation Flood ended, India's milk production increased from 22 to 66 million tonnes. It is currently around 88 million tonnes. This translates into an average annual growth of over 4 per cent. During the same period the population increase in India was around 2.1 per cent. Because of the relatively higher rate of increase in milk production, the per capita availability of milk increased from 40 kgs a year to about 75 kgs a year now. Among agricultural commodities in India, milk is now the largest contributor to the Gross National Product – even larger than rice and wheat, the principal agricultural crops. The value realised by farmers from milk is estimated at about Indian Rupees 950 billion which is about US dollars 22 billion.

To take this work forward, NDDB along with the dairy cooperatives have evolved "Perspective 2010". The Operation Flood programme, has put a dairy cooperative framework in place. The challenge now is to build on this strong foundation, both in quan-

titative and qualitative terms. To set goals for the next decade, dairy cooperatives have worked with NDDB to evolve perspective plans. These plans cover four main thrust areas – a) Cooperatives Business; which includes procurement and marketing of milk; b) Productivity Enhancement, which would include feeding, breeding and animal health; c) Quality Assurance and d) National Information Network.

In the area of Cooperative Business, it is envisaged that cooperatives in the country will procure, process and market a major share of rural marketable surplus of milk. By 2010, we hope to triple both the quantum of milk that is being procured from the farmers, and the quantity of milk being marketed from their levels in 2000. Similarly, we envisage an increase of 50 per cent increase in total membership, and doubling of women membership from their levels in 2000. As you know, women play an important role in dairying in India.

Our plans for productivity enhancement of dairy animals focus on improving access to breeding, feeding and health services for the majority of the dairy farmers in India. For this to be achieved, we expect to double cattle feed production, quadruple both the number of artificial inseminations per annum as well as the number of dairy cooperative societies delivering vaccination and first aid services. One of the important aspects of the productivity programme would also be the preservation of our indigenous breeds.

In ensuring quality of liquid milk and milk products, cooperatives will strive to meet increasingly demanding quality requirements. It is envisaged that by 2010, 90 per cent of the milk delivered to consumers from cooperative plants will be from ISO certified plants. Clean milk production regimes managed by farmer-members will be in place in all the participating unions.

A national dairy industry database is being developed which will attempt to serve information needs at all levels. All participating cooperative milk unions will be linked through an Internet Dairy Information System. Further, many participating unions will use Geographical Information System to monitor their field activities.

To undertake these activities under the Perspective 2010, NDDB will finance dairy cooperatives on relatively soft terms. For setting up dairy plants, the current interest rate for such loans is 8.5 per cent per annum. Further, for other activities like Quality Assurance, Productivity Enhancement and Marketing Support NDDB provides interest free loans. NDDB will also provide grants, up to 50 per cent of the cost, for activities such as Training and Leadership Development programmes and Women's Education programmes, with the cooperatives bearing the remaining 50 per cent of the cost. The effective cost of financing Perspective Plans would work out to an average rate of interest of around four to five per cent. Till now, Perspective Plans have been approved for about 80 unions at an estimated outlay of about Rs. 8000 million.

NDDB's R&D division is currently pursuing research programmes that include molecular characterisation of dairy breeds and their conservation; DNA-marker based selection of the dairy animals, development of vaccines, and development of appropriate feeding solutions including briquetting of crop residues to reduce the costs in handling.

Enhancing the role of women in cooperatives is an important aspect that we envisage to achieve. We expect to increase the women membership of the cooperatives to 50 per cent of the total membership by 2010. Further our plans include education and training of women for empowering them to ensure their greater participation and leadership in the governance of cooperatives.

Reform of cooperative laws is an important agenda that we have been pursuing for quite some time, as the cooperative system in India has been considerably weakened due to political and bureaucratic interference. The Government of India has now brought about, an institutional innovation for rural producers through the amendment in the Companies Act that provides for the formation of a Producer Company. This will hopefully combine the institutional strength of mutual assistance and cooperative principles prevalent in the cooperative framework, with the liberal regulatory framework of the Company Law. Institutions registered as "Producer company" would retain the cooperative principle of one-man-one-vote with membership restricted to only producers.

I shall now attempt to provide a brief overview of the Indian dairy sector. India is the largest producer of the milk in the world and at an estimated 88 million tonnes, constitutes about 13 per cent of the world's milk production. India also has the largest number of milk producers in the world, numbering about 70 million plus as well as the largest number of milking animals, at about 90 million.

The Indian dairy system has certain characteristics, common to many developing countries in Asia. Indian dairy farmers are predominantly small-holder producers with a majority of them owning less than two hectares of land and one to three animals. Unlike many major developed dairying countries where grain / pasture is used for feeding, the dairy animals in India are largely fed on agricultural by-products and residues. Household members carry out most of the dairy farming operations by themselves, with women contributing significantly to these operations.

One out of every two rural households in India owns dairy animals. Dairy contributes more than one-fourth of the gross income of the rural producers and in those households without land it contributes half of the gross incomes. Milk, in India, contributes

to nearly 70 per cent of the total livestock output, amounting to about US dollars 22 billion.

Of the milk produced in the villages, about half is consumed in the villages and the balance half is traded, which means an income of about 10 billion dollars to the dairy farmers in India. Seventy five per cent of India's farmers are marginal or small and while these small farmers own only 30 per cent of the land, they own about 60 per cent of the female bovines. Dairying in India, therefore, represents a more equitable distribution of productive assets, income and wealth than crop husbandry

Farm-gate prices in India are competitive with those in the world and our growth of milk production at around four per cent is quite high. Indian dairy farming is financially sustainable since feed and labour costs, which constitute 90 per cent of operating costs, are low. As I mentioned to you earlier, the feed consists of mostly crop residues and labour is largely drawn from household members. Our dairy system therefore also adds economic value to feed and labour resources that otherwise have limited economic value.

Indian dairying system can be described as a low external input low output system. In this system, land has not been diverted away from producing food for humans, with crop residues alone being used for animals. The use of animal dung for household fuel and animals for farm operations represents the significant use of renewable energy. Further dung is also extensively recycled as manure for crop production. All these widely prevalent practices in India represent environmentally sustainable use of energy and nutrients. Some environmental studies estimate that the total economic value of such environment friendly practices almost equals the value of the main outputs of the entire Indian livestock sector.

I would like to now draw your attention to certain aspects of international trade in the dairy sector. As is quite evident, livestock rearing is important for the farmers in India and many other developing countries. Available documentation indicates that the OECD countries support their dairy sector to the extent of over US Dollars 50 billion per annum through subsidies and related measures. Given that India's milk production is valued at about 22 billion dollars, the value of subsidy for milk being given by OECD countries is nearly two and half times the total value of milk produced in India. I also understand that the eligible quantities for export subsidies represents more than 50 per cent of the current international trade volumes in dairy commodities. When we talk of international trade we have to keep all these factors in mind.

I would also like to remind the audience here about what the President of the World Bank had to say recently about the international trade regime. According to him, agricultural subsidies in rich countries are about 350 billion US dollars a year, which is nearly one billion US dollars per day, and these subsidies undercut poor farmers in developing countries. These subsidies, mainly to large farmers and agribusiness corporations, are nearly seven times the 50 billion US dollars that these countries give in foreign aid to developing countries. Other non-tariff barriers, standards and anti-dumping actions are often applied in ways that impose undue burden on developing country producers and sometimes amount to underhanded protectionism. He adds, developing countries are striving to become competitive and are eager to enter the international marketplace, if given a fair chance. "Give us market access, a level playing field for our products and goods and a trade partnership that is more than just a name": that is what the developing countries and many other nations are saying. The world is watching to see how the leaders of the developed countries will respond.

A few words on this workshop – various studies have clearly demonstrated that livestock development and trade impacts on livelihoods and contributes significantly in poverty reduction. Dr. John Mellor, the keynote speaker at this workshop, would tell you more about it. However, this remarkable promise that livestock rearing has in poverty reduction is being threatened by the changing global environment. In general, the existing international trade policy agreements tend to have provisions that in a sense impose a greater burden on those who can least afford while allowing favourable treatment to those better-off. In addition a wide variety of national interests often preclude development of viable coalitions among developing countries to assert their interests in multilateral policy bodies. It is thus important that not only do we need to be aware of what policies we need to pursue but also identify ways in which we can effectively collaborate, and I am sure this workshop will address these issues.

Thank you.

Agricultural Growth and Poverty Reduction – The Rapidly Increasing Role of Smallholder Livestock

Key Note Address by John W. Mellor
Vice-President Abt Associates, Inc., USA

Here we are at the frontier of experience with smallholder dairy development. The place where massive numbers of very poor women have been directly lifted out of poverty into lives of hope for themselves and their children. The base from which Dr. Kurien won the World Food Prize for his seminal contribution, starting here in Anand, to solving the worlds problem of hunger and poverty through large scale development of smallholder dairy. What can I add to the self-evident truths that surround us in this location?

Unfortunately there is reluctance by governments to allocate resources essential to achieving the Kaira district success on a worldwide basis, or even adequately in India itself. Unfortunately, the influential foreign assistance community has been part of the problem not the solution as it once was. All too often livestock is seen as something prosperous people consume, not something that poor people produce. Dumping of dairy products from high-income countries has put a further damper on the smallholder livestock sector.

Perhaps I can be helpful by stepping back from the wonderful Kaira district example and laying out the nature of the smallholder livestock contribution and the policy needs for enlarging it. Along the way I may make some contributions that enlarge on the Kaira

district experience. The basic argument is simple and therefore too often passed over.

It is agricultural and rural growth that increases employment and reduces poverty; the contribution to poverty reduction of industrial and urban growth is minimal at best. The importance of agriculture is not fully understood for two reasons. First, agriculture's declining share of GDP is most noted, while unnoted is agriculture's far greater contribution to employment growth and poverty reduction. Second, the effect of agricultural growth on employment growth is substantially indirect and thus often understated.

The impact of agricultural growth on employment and poverty reduction comes from its stimulus to the employment intensive, non-tradable, rural non-farm sector. That impact is potentially immense. However, it requires agricultural growth much more rapid than population growth. That rate is not easy to achieve even though many countries have succeeded in attaining such growth rates (Mellor, 1992). Further, large-scale agricultural operations, such as those so common in much of Latin America, do not have this favourable effect on employment growth and poverty reduction. It is small farmers that must be brought to rapid growth. That is a complex task.

High value commodities, of which livestock are the largest element, are now the prime drivers of high agricultural growth rates. That is because in this increasingly prosperous world people demand much more of these commodities as their incomes rise. Demand grows rapidly and the base soon becomes large, with an immense aggregate impact. Demand for and production of high value agricultural commodities can grow at a 6 to 8 per cent rate, whereas it is difficult to sustain growth rates in the heavily land based commodities such as cereals at more then 2.5 to 3.5 per cent.

But, that elastic demand for high value commodities has a down side; high-income consumers also have the discretion to spend on other things. If a poor job is done in reducing the cost and prices of livestock products and other high value commodities, consumers will switch to other goods and services that are becoming relatively cheaper. In general though, alternate goods and services provide fewer stimuli to employment growth than the high value agricultural commodities.

Thus, it is important that the cost of smallholder livestock production be constantly reduced. That requires increasing expenditure on physical infrastructure and on research and extension. Globalisation and resultant competitive pressures reinforce the need for cost reduction.

The policy issues involved in livestock growth are more complex than for cereals growth. Smallholder livestock requires a rapidly expanding agribusiness sector and finance in addition to infrastructure and technological development.

Another point derives from the importance of demand for livestock products. Smallholder livestock will play its role best when industrial growth is also contributing to rapid increase in incomes. It is those rising incomes that provide the demand base so necessary to rapid livestock growth. The synergies from balanced growth are immense.

Thus, if poverty is to be reduced and employment is to grow we must get across to policy makers in low and middle-income countries that they must allocate more to agriculture in total as well as to reallocate those funds. We must also bring foreign aid to playing a lead role in that process, not a foot-dragging role as at present.

AGRICULTURE AND POVERTY REDUCTION

Statistical Relationships

We now have massive statistical evidence to support what many of us have been saying for decades – it is agricultural growth that reduces poverty. And we also have a more sophisticated view than before as to why and how agriculture reduces poverty. That more sophisticated view leads to important policy recommendations.

Martin Ravallion and Gaurav Datt (2002) of the World Bank have analysed the virtually unique data on poverty numbers collected across states and over time in India. These data show clearly that agricultural growth and rural growth reduce poverty drastically, while industrial and urban growth reduce poverty little or not at all. They also show a few years lag between agricultural growth and poverty reduction.

The Ravallion / Datt study follows a distinguished Indian literature from Montek Ahluwalia (1978) and Dharm Narain (published in Mellor and Desai, 1985) that showed that when agricultural production grows poverty declines and vice versa. Those data covered a long period when there was little overall growth in agriculture. Thus the data were based largely on weather-based fluctuations. The Ravallion / Datt studies covered periods with rapid secular growth due to improved technology, at least in some states. Ravallion and his colleagues duplicated the Indian results for several East and Southeast Asian countries, most notably for Indonesia.

Peter Timmer (1997) carried out a large cross-country analysis of data and came out with similar findings, but adding the point that the impact of agriculture on poverty reduction was negligible when agriculture was dominated by very large farms. Thirtle (2001), amongst others, confirmed these results with still another set of data.

Why Agricultural Growth Reduces Poverty

What the data show then is that it is agriculture that reduces poverty, that there is a lag in its effect and that it doesn't reduce poverty when dominated by large farms. Those facts fit with agricultures role in poverty reduction being indirect. It is prospering farmers, spending their increased incomes in the rural non-farm sector that is reducing poverty.

The rural non-farm sector includes on the order of half the rural population. It is highly labour intensive and produces goods that for quality and transaction cost reasons are not salable in international markets – it produces non-tradables that require local demand to grow if it is to expand. The rural non-farm sector produces increased housing, a major expenditure of prospering farmers, local furniture, local garments, and a host of services from transport to household services to educational services.

The demand for the goods and services from the rural non-farm sector is elastic with respect to income. That is as farmers' incomes rise their expenditures on the rural non-farm sector increase far more than proportionately. Thus, as agriculture grows the rural non-farm sector grows faster than agriculture and increases its weight in the rural economy. That agricultural growth reduces poverty through its impact on the rural non-farm sector fits the facts.

There is a lag in impact because it takes time for farmers to spend on the rural non-farm economy, but more important, much of the effect of farmers' expenditure comes from income multipliers. The rural non-farm economy uses some of that extra income from farmers to buy from each other, providing multipliers that double the effect of the farmer expenditure. It does so over time, not instantly.

Rich farmers spend their added income on imported goods and capital-intensive urban goods and therefore have little impact on

the rural non-farm economy and hence on employment and poverty reduction. And, farmers tend to be prosperous. They are not the poor, so it is their expenditure on the rural non-farm sector that has the big impact.

The Special Situation of Smallholder Livestock

The poor tend to be more important in smallholder livestock production than in crop production. Smallholder livestock production is also more labour intensive than crop production. Both those tendencies cause growth in smallholder livestock production to have a more direct impact in poverty reduction than the same increase in crop production.

The gini coefficient is the standard measure of the equality of income distribution. The lower the gini coefficients the more equal the distribution of income. A gini coefficient of around 0.30 represents a relatively equal distribution of income by world standards. The gini coefficient for income from crop agriculture in India is 0.65 – a quite unequal distribution of income (Sarma and Poleman, 1993). That is not surprising. After all crop farmers have income from both their labour and their land and land is quite unequally distributed. That is why the impact on poverty from crop agriculture growth is largely indirect – depending on the expenditure of farm incomes. The indirect effects are of course very powerful and account for the bulk of poverty reduction.

Smallholder livestock is a different story. The gini coefficient for income from smallholder livestock in India is an extraordinarily low 0.16 (Sarma and Poleman 1993.) Not only is the income distribution quite equal among smallholder livestock producers but they also tend to be quite poor. Smallholder livestock is a substitute for land not a complement. Thus increasing income of smallholder livestock producers has an immediate and direct impact on poverty. The indirect effect is less than for crop farmers because low-income smallholder livestock producers spend much of

additional income on increasing food consumption. However, as their incomes rise they spend more and more on the rural non-farm sector further reducing poverty.

Livestock production has its analog of the very large farmer who spends incremental income largely in urban areas and not on goods and services produced by the rural non-farm sector. Very large-scale livestock farms are not uncommon in low-income countries. They are most common in poultry, but where conditions are unfavourable for small farmers they may become important even in dairy production, the livestock sector least suited to large scale operation.

Not only are the large scale livestock producers obviously not poor, but their expenditure also is urban oriented and has little direct impact on poverty reduction. Thus, poverty reduction depends on smallholder livestock. Policies that favour the large-scale livestock sector are inimitable to poverty reduction.

The distinction between smallholder and large-scale is a distinction not of modest differences in size but the difference between the very large who are largely absentee owners whose consumption patterns are not those of rural village people. Thus, for smallholder livestock farmers to increase their incomes by increasing their herd size from one or two animals to 5, 10 and even more does not remove the poverty reduction effect. It simply swings it from direct poverty reduction to the indirect through expenditure patterns. That favourable effect is there as long as those livestock producers are resident in the village and spending like prosperous village people – enlarging their house, buying local furniture, and expanding their use of local services.

This is an important point because, as will be elaborated below, it is important that the efficiency of livestock production increase and the cost of production be reduced. That may occur substantially through expansion by the most efficient of the smallholder

farmers. That should be encouraged on income distribution grounds as well as efficiency grounds. That has important policy implications.

The Commodity Sources of Agricultural Growth

The key to poverty reduction is rapid growth in agricultural production and farm incomes. Since it is farm income that drives poverty reduction, it is the agricultural growth rate per capita that matters. Thus, the agricultural growth rate must be substantially faster than the population growth rate. Fortunately most Asian countries have their population growth rates headed down, many having dropped below 1.5 per cent. It is notable however that a 4.5 per cent agricultural growth rate is only 50 per cent faster than 3 per cent; but on a per capita basis, with 1.5 per cent population growth rate, it is twice as fast.

Picking up the agricultural growth rate to a 4.5 per cent rate has a tremendous impact on poverty reduction. Such a growth rate is not sustainable in cereals production. Yields simply cannot be sustained at such high growth rates and the land area devoted to cereals cannot increase greatly. In domestic markets, demand for cereals grows slowly and eventually declines, further reducing the potentials for continuous high growth rates based on the cereals sector.

The Rising Role of High Value Commodities

What makes possible a growth rate in the 4 to 6 per cent range achieved by the low growth rate countries (Mellor 1992) is the high value commodities. These are livestock, horticulture, and in some countries, tropical export commodities. These commodities produce a large value on a small area of land. It is possible to push the area devoted to these commodities up rapidly without large decreases in cereal area.

Livestock can of course be increased rapidly with no increase in crop area by importing feed, which has been standard in high

growth rate Asian countries such as Taiwan and increasingly so in China. High quality roughage crops such as berseem or alfalfa can be increased at the expense of lower valued cereals. The following exposition will emphasise livestock production partly because I am addressing a livestock oriented meeting, but also because livestock is substantially more important in aggregate than the other high value commodities. It also offers the most substantial potentials for poverty reduction.

The bulk of the demand for livestock and horticulture is domestic. In a low income country domestic incomes are too low to support a large high value commodity proportion. But as incomes rise the relative weight of these commodities increases rapidly. Thus, in Indonesia, only two decades ago livestock comprised only 5 per cent of agricultural GDP. With rapid growth in income that proportion is now 15 per cent. It has the potential to increase to 30 per cent in the next ten to 15 years and in a few more decades to 50 per cent. In India, livestock has traditionally been more important than in East and South East Asia, so the proportion has increased from 15 per cent to well over 30 per cent.

When incomes are growing rapidly, say at 5 per cent per capita, as India is close to achieving, the demand for livestock products grows at between 6 and 8 per cent per year. (1.5 per cent from population growth and 4.5 to 6.5 per cent from income growth.) If production matches that growth in demand, livestock will account for on the order of half of incremental agricultural growth.

In Indonesia, the high value commodities account for a little over half of agricultural GDP (with livestock about one-third of the total), but since the growth rate for these commodities can be twice that of cereals, they would account for 80 per cent of growth in a high growth strategy.

Of course these relationships do not hold if growth in the high value commodities does not keep up with demand growth. Later

sections of this paper deal with the problems in achieving that objective.

Price Elasticities

There is a down side to the highly responsive demand for livestock products. The demand is also highly responsive to price. If the price goes up consumption will drop rapidly as consumers switch to other goods and services. Thus, production growth cannot be achieved through rising prices. That only chokes off demand. Of course, the converse is true as well. If livestock production can be made more efficient and productive, then prices can decline while incomes remain the same or increase and consumption will increase and production will grow faster than the income and population determined demand.

Thus, as rising incomes rapidly increase demand, production must be increased at similar or preferably declining prices. The poverty reducing impact of increased livestock production can be greatly increased by decreasing the cost of production. That must be a major objective of government planning for the smallholder livestock sector.

Investment Issues in Agricultural Growth

Measures to reduce cost of production can be seen as investment issues and are so treated in this section. It is important to recognise that the first burst of the green revolution, the period of accelerated agricultural growth and poverty reduction, was based on cereals. Cereals dominated the area and agricultural production. The policy issues and investment issues were in general simpler than for high value commodities and livestock. These commodities are high value but perishable, that places a heavy burden on improved infrastructure as well as other investments. Technology generation is also more complex, involving interactions between the private and public sectors and national and international research.

Physical Infrastructure

In most countries, the most serious constraint to expansion of smallholder livestock is poor physical infrastructure. Large-scale livestock, produced under highly intensive conditions may grow rapidly within the infrastructure shadow of large cities. Smallholder livestock is likely to occur on more scattered smallholdings amongst medium and small sized peasant farms. To gain high levels of output substantial area must be covered. That requires all weather roads on which trucks can ply at low cost. That investment is of course valuable for other parts of agriculture and is essential to effective provision of social services.

It is notable that social services as well as the key institutions of agricultural growth require that educated people live where farming occurs. Educated people in general will not live in places without good all weather roads. Thus, while infrastructure can be justified on the transport grounds of intensive smallholder livestock it is essential for all aspects of rural development. There must be a plan for bringing good all weather roads to all areas with potential for smallholder livestock production. In passing, rural roads are labour intensive in both construction and maintenance. Thus they contribute greatly to poverty reduction as they are constructed as well in the productive activities they encourage.

Research

In agriculture, cost reduction depends substantially on improved technology. For livestock that means scientific breakthroughs in disease control, in feeding efficiency, in breeding, and in management. There has been a tendency to underinvest in livestock research and for that research to be excessively concentrated in disease control and breeding at the expense of nutrition and management.

Animal husbandry research needs to be associated with the full range of agricultural research so that synergies between feed production and feeding of animals can be developed.

In the modern era, with rapid growth in all aspects of private sector research, particularly in the international realm, it is essential that synergies be developed between public and private sector research.

Livestock research is expensive because of the high costs of maintaining experimental animals. However, it is essential to livestock playing its full role in growth and poverty reduction that expenditure on livestock research be at least commensurate with the importance of livestock in overall agricultural production growth. Normally, low and middle-income countries spend a much smaller proportion than that on livestock research. Keep in mind that very few low and middle income countries devote anywhere nearly the 3 per cent of agricultural GDP to research that is generally considered a reasonable target. It follows that under spending on livestock research is immense.

Agribusiness

As is readily apparent from observation of the growth of the smallholder dairy industry in India, a whole set of new agricultural businesses are essential to growth of the smallholder dairy sector. These include processing, provision of feed, and provision of veterinary supplies. I will not dwell on this since you can see the full picture by simply observing what has been done here in Anand.

It is important to recognise that a public sector or quasi public sector input in the livestock supporting agribusiness is needed to bring about diagnosis of the needs, deal with intervening problems, and to find the solutions. The private sector alone is not likely to come up quickly with the massive expansion needed for a major aggregate impact on growth and poverty. One of the important questions to ask at Anand is what was required of the public sector for Anand to play its full role and similarly how likely is it that the private sector will play the full required role on its own without intercession from the public or quasi public sector?

As for livestock production, the supporting agribusinesses must be constantly improving technology and reducing costs. It is those process that lead to rapid growth.

Credit

The credit requirements of both small farmers and the supporting agribusiness sectors are immense if smallholder livestock is to grow at the 6 to 8 per cent rate that can have a major impact on poverty reduction. In addition, much of the credit required is intermediate term credit, the least well developed of all the credit instruments in low and middle-income countries. Similarly the agribusinesses require large quantities of intermediate term credit, particularly if the more efficient ones are to expand rapidly.

The large credit requirements have two important implications. First, a vast institutional structure must be developed and must grow rapidly. Rapid growth implies that administration of the system will be somewhat lax which, in turn, creates problems of repayment. At the height of the green revolution not much concern was shown about this problem. Now, however, the concern from major government and international backers of credit systems is great. The result is likely to be a far slower pace of credit expansion with a consequent restraint on the smallholder livestock sector and its serving agribusinesses. It must be emphasised that the current slowdown in spread of rural financial outreach is very deleterious to the smallholder livestock industry and to poverty reduction.

Second, the price of credit is also a concern. It is currently fashionable to emphasise that interest rates should be held high to encourage saving. Unlike the situation in high-income countries, however, the supply of savings seems to be inelastic with respect to the interest rate, whereas borrowing is highly elastic (Desai and Mellor, 1992.)

With average inflation rates typically in the 4 to 6 per cent range, nominal interest rates are often in the 15 to 20 per cent range. Of course, the average inflation is not what is relevant to a particular industry. For dairy farms and processors, the relevant inflation rate is that of the livestock output, principally milk and meat. That inflation rate may be lower than the national average across all commodities and services. Thus the nominal interest rate may be close to the real interest rate for a specific sector. With an interest rate of 15 per cent and a rate of return to investment of 30 per cent, by no means a particularly high number, then interest is taking off half the return to capital. Only half of the return is left for absorbing risk and as return on the entrepreneur's capital. That is likely to discourage borrowing to achieve high growth.

Interest rates are high in part because of large-scale government deficit financing with credit constrained to offset the government dissaving. Central banks may also keep interest rates high to strengthen the banking system; which is often weak because of massive uncollectable loans in the industrial sector. While overdues in agriculture, which are often collectible, are deeply criticised, large loan losses to the industrial sector are often accepted as normal and contribute to high interest rates to the smallholder livestock sector.

When the smallholder livestock and its complementary agribusiness suffer from lack of credit and high interest rates agricultural growth and poverty reduction suffer greatly. This is an issue deserving of more attention from those concerned with poverty reduction and smallholder livestock growth.

Policy and Strategy

The Green Revolution, based on high yielding varieties of a few dominant field crops, was quite simple in its investment, institutional development and policy requirements. For the future it will be possible to attain substantially higher rates of agricultural

growth than those achieved in the Green Revolution. However, the faster growth will depend substantially on high value commodities, particularly livestock and horticulture, for which demand grows rapidly. But the investment, institutional development and policy requirements are much more complex for these complex products that are perishable and require processing.

To be sure that the complex requirements are met requires a strategic plan that focuses on the few priorities essential to success. For livestock that requires first class physical infrastructure, policies that encourage large private investment in processing and marketing facilities for complex perishables, and development of complex institutions such as those here at Anand. The key is recognition of the potentials in livestock and the requirements for meeting those potentials and then setting priorities and sequences for meeting those requirements.

International Trade Issues

Many low and middle-income countries have a comparative advantage in producing livestock for the domestic market. The basis for that comparative advantage is low labour costs in labour-intensive types of livestock, particularly dairy production, but to some extent pigs and poultry as well. It is often argued that livestock production is extensive, requiring high land to labour ratios and is therefore unsuitable to high population density countries.

Three points need to be made in response. First, the direct labour requirements for most forms of livestock production are very high. Second, high quality roughage, such as alfalfa or berseem, produces a high value of output per acre and can compete with high value commodities for land and labour. Third, the concentrate feeds can be imported. Indeed globalisation should lead to cheaper feed and thus more competitive livestock production in low labour cost countries.

Particularly in the case of dairy products, high-income countries are major producers. Since these are relatively labour-intensive systems there is strong political pressure to protect incomes of dairy farmers. Heavy subsidisation of exports of dairy products follows. Europe is the primary offender. Subsidised exports of dairy products may help upper income consumers but clearly hurt large numbers of smallholder producers. Subsidised exports of dairy and other livestock products to low and middle income countries must be seen as a major force increasing poverty in the receiving countries.

Subsidised exports of cereal are mixed in their impact. They hurt farmers who are net sellers of cereals, but benefit low-income people who spend a high proportion of their income on cereals. They also benefit smallholder livestock producers by providing low cost feed.

In India a creative path was followed in taking dairy products received under the food aid programme sold to farmer cooperative dairy unions on market prices and then spending the proceeds to in effect develop the domestic dairy sector. However, in the long run low and middle income countries need to recognise their comparative advantage in labour intensive livestock production, invest to bring down the cost of production, and appeal to the WTO to stop dumping. Low and middle-income countries need to pull together on this issue. High income countries need to eliminate subsidised exports, and make income support payments in a manner that does not provide an incentive to increase production. Income payments along with production quotas would be one way of doing that.

Strategy for Donors

Foreign aid donors claim a special interest in rapidly reducing poverty and low and middle-income countries. For that purpose the smallholder livestock sector is the ideal mechanism. It is small

farmers who are short of land and long on labour who benefit the most from expansion of smallholder livestock producers. There is a great need for technical assistance to smallholder livestock, including development of improved, low cost feed, developmental veterinary services and analysis of low cost diets. Unfortunately in an environment of widespread naivete about agriculture in the donor community, the ignorance about the smallholder livestock sector is especially great. It will not be easy to dispel that ignorance.

Thus, the foreign aid community should give special attention to understanding the smallholder livestock sector, and to assist in developing policies favourable to that sector, provide technical assistance in veterinary, nutrition, and management issues, and encourage investment. A major donor focus on the smallholder livestock sector would bring greater understanding of the harm from dumping livestock products into low and middle income countries and would perhaps help end those practices.

CONCLUSION

Rapidly rising income in low and middle-income countries results in demand for livestock growing at 6 to 8 per cent per year. If the domestic livestock industry meets that demand growth it will double in size every 10 years and its share of agricultural GDP will also grow rapidly, soon accounting for over half of agricultural GDP. That will make possible an overall growth rate in agriculture of 4 to 6 per cent.

If the growth is in the smallholder livestock sector it will contribute directly to poverty reduction and employment growth and over time provide much of the effective demand for the employment intensive rural non-farm sector.

If the smallholder livestock sector is to grow rapidly it must constantly reduce its cost of production. Rising costs will choke off demand; which in the face of higher prices will shift to other goods and services. Reducing costs will allow the real price to decline

and production can grow even faster than the 6 to 8 per cent rate stated above.

Decreasing cost of production requires constantly improving physical infrastructure. That is especially important to the producers of perishable products. Cost must also be reduced through rapid technological change based on world-class national research systems. Concurrently the agribusinesses providing mixed feed and marketing output must expand rapidly. The combination of producer and business expansion will require rapid growth of financial markets serving them and attention to maintaining low interest rates.

If the immense benefits from smallholder production are to be realised additional attention must be given to education of farmers and their children including the technically competent extension services that link research with small farmers.

The role of government is critical to success. Governments must have a strategy for developing the smallholder livestock sector. That must include the sequencing of physical infrastructure investment, setting of priorities for research and extension, and appropriation of adequate financial resources. There must also be diagnosis of the agribusiness needs and attention to supplying their needs, including research, infrastructure, financial markets, and market intelligence.

The smallholder livestock sector is not playing its full role in employment growth and poverty reduction because governments are not diagnosing the critical needs for public goods to complement private activities and ensuring that the critical needs are met. The loss in welfare from this neglect is immense.

I hope that this conference will have a major impact in mobilizing national governments, international financial institutions, and bilateral donors to correct these deficiencies.

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Editor's Report

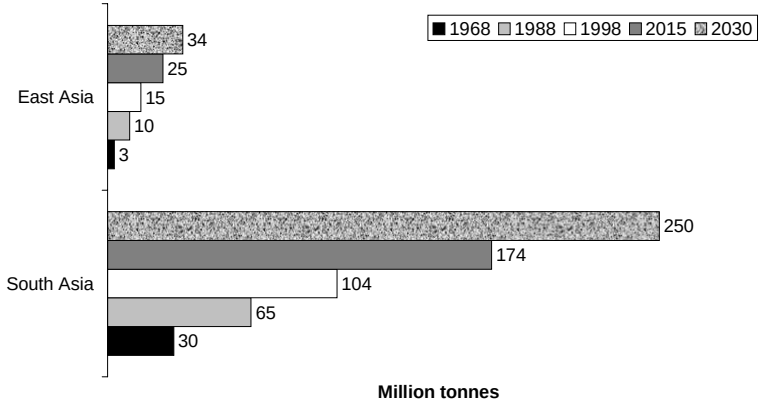
The livestock sector has emerged as one of the key drivers of agricultural growth in the developing countries in recent years. An analysis of trends over the last two decades indicates that growth in pork, poultry and milk production has far exceeded the growth in cereal production. The main drivers of this growth have been urbanisation, population growth, overall increases in income levels and the falling prices of livestock products. Substantial private research, particularly on breeds and feeds related to pigs and poultry has facilitated expansion of supply in response to the rise in demand. The projections further suggest that this demand led 'livestock revolution' is expected to continue such that by 2020 over 60 per cent of meat and 50 per cent of milk will be produced in the developing countries. Within the developing countries, Asia will emerge as a key production hub. China and India are likely to emerge as the primary producers of meat and milk respectively.

This opens new avenues for accelerating the pace of poverty reduction. It is widely acknowledged that the relatively more equal distribution of livestock assets in developing countries (compared to the distribution of land) makes the poor far more important in smallholder livestock production than in crop production. Smallholder livestock production is also less land-intensive and far more labour-intensive than crop production. These characteristics cause growth in smallholder livestock production to have a

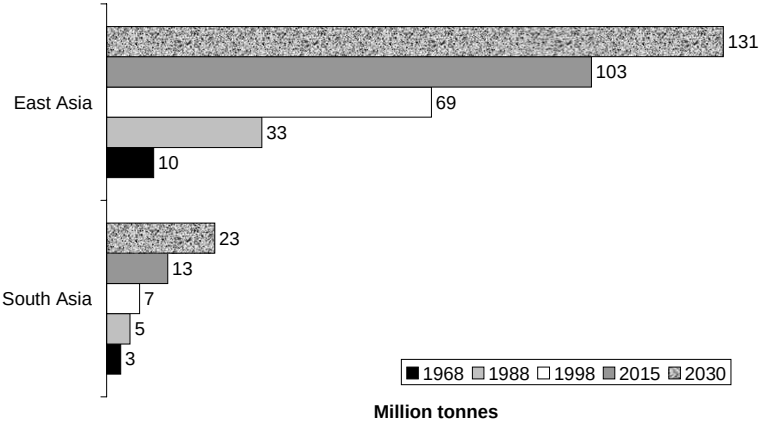
more direct and immediate impact in poverty reduction than the same increase in crop production.

Rapid growth in the demand for livestock products is therefore good news. At the same time, the market environment is undergoing rapid structural changes that pose new challenges for smallholder livestock production. These include increased consumer demand for food safety, quality and consistency, changes in sec-

PAST AND PROJECTED GROWTH IN MILK PRODUCTION



PAST AND PROJECTED GROWTH IN MEAT PRODUCTION

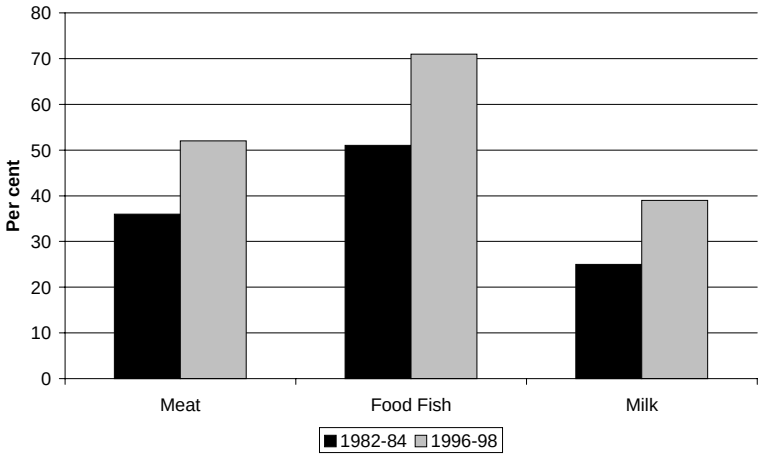


tor organisation including vertical integration and increasing role of supermarkets, geographical concentration of livestock production closer to consumption and feed supply, rising importance and complexity of trade leading to rising stakes in disease control and increased environmental concerns. Some of these trends raise concerns for poverty alleviation and sustainability as they favour the development of industrial systems which could supplant small producers, contribute to degradation of the resource base of the rural poor, and exacerbate pollution. In this emerging environment, the real challenge will be to provide quality products at minimum cost. The costs comprising production costs as well as transactions costs of accessing the markets will largely determine the losers and the gainers.

THE CONSTRAINTS

For care intensive commodities (e.g. milk production) smallholder livestock production in Asia has a cost advantage over large-scale industrial systems due to the availability of low-cost family labour and relatively modest economies of scale in livestock production. But, high feed deficits, scarcity of land, high cost of capi-

SHARE OF DEVELOPING COUNTRIES IN WORLD PRODUCTION



tal, and high delivery costs of specialised inputs such as vaccines and drugs tend to erode the competitive advantage conferred by low labour costs. Further, there are significant problems with product quality, safety, and uniformity, compounded by widespread prevalence of trade-preventing and production limiting diseases. Poor infrastructure and poor access to services such as extension, credit, marketing, health and breeding, and disabling government regulations on producer organisations impose further transaction costs on the smallholder producers, processors and other economic agents and undermine the regions ability to compete in growing markets for livestock products. Thus, the key constraint faced by smallholders is restricted market access (provided by low trust and reputation) which, in turn, results in lower prices for their products.

In the light of these factors, the policy measures to improve sector competitiveness will need to focus on

- improving public and private infrastructure in rural areas
- effective disease control
- enhanced research and development
- creation of a favourable investment framework
- awareness creation and education about product quality, and
- refinement and implementation of sanitary and quality standards that can be met by smallholders.

A POLICY DILEMMA?

But at the same time, these policy measures could trigger rapid structural change in terms of scaling up, vertical integration, technological change, and geographic concentration of production and processing, which could crowd out the smallholder. Thus, striving for the ability to compete in rapidly growing global markets for livestock products poses important strategic choices in terms of speed of development, mitigating measures and exit strategies.

WHAT ARE THE OPTIONS?

While the economies of scale in production are small, there are significant scale economies in processing and distribution. Given the small marketable surplus smallholders produce, and their need for market recognition, promotion and nurturing of appropriate local institutions will be the key for smallholders to stay in the game. Professionally managed cooperatives, contract farming, and producer companies are some examples of institutions that can facilitate overcoming market barriers for the smallholder. While the institutional models will inevitably vary depending upon production and market context, the key issue will be governance and ensuring producer participation in decision-making.

In addition to facilitating market access through collective action at the grassroots level, a number of other measures at the national and international level will be needed to enhance the ability of small producers to compete in the emerging market environment. These include

- Productivity enhancement through promotion of integrated livestock systems
- Better enforcement of environmental regulations. This is because smallholder mixed farming is generally more environment friendly than large-scale livestock production but there is no internalisation of environmental costs in the latter. Better enforcement of environmental regulations is therefore likely to help smallholders
- Improved service delivery including promotion of decentralised community driven village based delivery of essential livestock services. This will require strong policy support from the national governments although the service delivery itself, except the provision of public goods, should remain outside the government
- Promotion of women's self-help groups as thrift and savings societies for meeting the credit needs of livestock farmers and

for providing them instant cash credit for managing their household livestock enterprises. The organisation of these groups will need to be facilitated with the help of credible local NGOs and will require policy and funding support from national and international development agencies

5. Promotion of village based extension mechanisms.

NARROWING THE KNOWLEDGE GAP

Lack of systematic collection, analysis and exchange of information is another important constraint that limits the ability of livestock producers to respond to the challenges of a dynamic market environment. There are a number of distortions in national and international policies the effects of which on smallholders are not fully understood. To support and facilitate the process of informed policy making, therefore, it will be necessary to identify, analyse and address the factors that limit smallholder market access. Among others this will include

- examining the effects of changing level and structure of demand on current marketing chains and responses of producers
- a thorough examination of competitiveness including an examination of production structure and scale economies
- an examination of value chain from primary product to the final market in order to understand where value can be added for smallholder. This will require commodity-specific, survey-based sub-sector analysis looking into the structure of margins and value addition from consumption / retail through processing and marketing to production. This should be a cross-country analysis taking advantage of the experiences across national borders with focus not only on poor producers but also on poor consumers and market agents
- identifying priority public goods at production, processing and marketing levels, and effective ways of supplying them
- analysis of animal diseases and food safety issues

- impact analysis of policies such as import duty on processing equipments, HACCP/food safety standards as barriers to smallholders, collective action legislation such as cooperative and contract laws
- production impact of tariffs on inputs and competing products
- distributional impacts of policies on credit services, health services, breeding services and so on
- examination of alternative markets available to the poor in the context of changing consumer demands (e.g. food safety standards) and costs of compliance

MOVING FORWARD

Making a real impact on the ground, however, requires going beyond the identification of constraints, policy prescriptions/options and institutional models. It requires integrating this analysis with the larger political economy of the countries. A close examination of policy processes, including legislation, will be the first step towards identifying ways of empowering the farmers in the developing countries with political voice and influence. This means securing commitment at the highest political level and nurturing appropriate organisations and leaders. Organisations that can play a catalytic role with the mandate from the government while at the same time building credible alliances with NGOs, CBOs and the private sector. The challenge therefore is to strengthen the triangle of leadership, institutions/organisations and the policy environment and to sensitise the policy makers at very high levels about the constraints faced by smallholder livestock producers. In this context, it is also necessary to take measures to promote regional cooperation through all available official linkages.

This is, no doubt, a very tall order and needs to be addressed in programme mode involving national and international development agencies and donor organisations. Conventional project

mode is not suited for influencing policy processes and outcomes, which requires, among other things, long phases of consultations and negotiations with a large number of stakeholders.

The Competitiveness of Asian Livestock Sectors

Henning Steinfeld and Quan Gao*

Human population growth, increasing urbanisation and rising incomes are spurring a dramatic increase in the demand for, and production of, livestock and livestock products in the developing countries. Livestock production is growing faster than any other agricultural sub-sector and it is predicted that by 2020, livestock will produce more than half of the total global agricultural output in value terms. This process has been referred to as the "livestock revolution" (Delgado *et al.* 1999). Important global livestock sector trends reflecting this 'revolution' are:

- a rapid and dynamic increase in consumption of livestock products in developing countries
- a geographic shift of livestock production from temperate and dry areas to warmer, more humid and disease-prone environments
- a change in livestock production practices from a local multi-purpose activity to an increasingly market-oriented and vertically-integrated business

* Henning Steinfeld is the Chief of Livestock Information and Policy Branch of Animal Production and Health Department of FAO. Email: henning.steinfeld@fao.org

Quan Gao is consultant with the Livestock, Environment and Development (LEAD) Initiative at FAO, Email: quan.gao@fao.org

- increasing pressure on, and competition for, common property grazing and water resources
- more large-scale, industrial production units located close to urban centres, potentially causing severe environmental damage and posing public health risks
- decreasing importance of ruminant vis-à-vis monogastric livestock species; and an associated rapid and large rise in the use of cereal-based feed.

In spite of the above trends, the majority of food, both plant and animal, currently consumed in developing countries, is still produced by semi-subsistence farmers. Therefore, the projected growth in the demand for animal products seems to offer a unique opportunity for the rural poor since they already have a significant stake in livestock production. In addition, the livestock sector presents one of the few rapidly growing markets that poor people could join without a need for substantial resources or training.

The "Livestock Revolution" has been described as demand-driven and as a combined result of population growth, income growth and rising urbanisation. However, price trends of major livestock products and feed suggest that the Livestock Revolution is as much supply driven as demand driven. Over the last 40 years, prices for livestock products have declined steadily and more sharply declined than prices for food or feed grains, and the massive spread of improved technology in the intensive sub-sector has triggered vast efficiency gains. Economic theory suggests that highest growth in consumption of animal products will be in countries where incomes have been rising rapidly from a low base; thus it is unsurprising that the "livestock revolution" is more of an Asian than a Latin American or African phenomenon (Huang and Bouis, 1996).

This rapid expansion of production and consumption of livestock products, associated and facilitated by an even faster structural

change in the livestock sector, as manifested by rapid scaling up and organisational change in the post-harvest sectors, is happening in the context of globalisation, with liberalisation of trade and capital markets. Any consideration of competitiveness must focus on these dynamics, and must consider the value chain as the basic unit of analysis.

PRODUCTION

Production is shifting to the developing countries and by 1997/99 their share in world meat and milk production was 53 and 39 per cent respectively as compared with 40 and 28 per cent only ten years earlier (late-1980s). This was in part due to the collapse of production in the transition countries, but it is a trend even in the absence of this phenomenon. Annual growth of meat and milk production in developing countries is projected at 2.4 and 2.7 per cent respectively. This would raise developing countries' share in world meat production by 2030 to 66 per cent (247 million tons), and in milk production to 55 per cent (484 million tons).

The growth in white meat (pork and poultry) production in developing countries between 1989 to 1999 has been remarkable at more than double the growth of ruminant meat. There are, however, major regional differences. Growth in poultry meat production has been particularly spectacular in East Asia (11.7 per cent per annum) and South Asia (7.2 per cent per annum) and reflects the rapid expansion and intensification of the poultry industry in the region.

Likewise, egg production has increased in the developing countries during the last ten years (1989-99) with similar regional differences. Annual growth rates for East Asia and South Asia were 10.7 and 4.7 per cent respectively. Buffalo and cow milk production in developing countries grew at 4.1 per cent per annum. Over the same period, with the highest annual growth found in South Asia (4.9 per cent) and the lowest in sub-Saharan Africa (1.9 per cent).

CONSUMPTION

Changes are also occurring in the type of food consumed. With increasing incomes, demand for greater food variety and for higher value and quality foods such as meat, eggs and milk, increases. The latter is at the expense of food of plant origin such as cereals. These changes in consumption, together with sizeable population growth and urbanisation, have led and will continue to lead to large increases in the total demand for animal products in many developing countries.

Wide regional and country differences are also evident in the quantity and type of animal products consumed - reflecting the traditional preferences based on availability, relative prices and religious and taste preferences. Some of the more important aspects that are worth noting include:

- In *South Asia* (excluding India), there has been a slow but steady growth in consumption of animal products. This increase is due mostly to an increase in the contribution of milk to diets, already high at a per capita level 50 per cent above the average for developing countries, and an increase in the contribution of poultry meat. The dietary contribution of eggs, however, is well below the developing country average
- In *India*, the contribution of animal products to diets is predicted to increase rapidly up to 2030 largely due to increases in the consumption of milk and milk products.
- In *East Asia* (excluding China) there is also a steady increase in the contribution of animal products to the diet. However, unlike South Asia (except India), this increase is due to the contribution of meat, predominantly pork. In *China*, the projected rapid rise in the contribution of animal products to dietary energy from 15 per cent to 20 per cent between 1997-99 and 2030, will be mainly on account of a substantial increase in the contribution of pork and poultry. Per capita consumption of milk is very low and projected to remain so (from 7 kg in 1997-99 to 14 kg in 2030 against an average increase from 45 to 66

kg for developing countries). Conversely, egg consumption in China is very high (from 15 kg in 1997/99 to 20 kg in 2030) at more than double that of the developing nations average and even above the industrial country average.

TRADE

Trade flows in meat and dairy products among countries are determined largely by the extent and character of barriers to trade, differences among countries in their resource bases, the preference for meat types and cuts, and the structure of livestock sector.

Trade in livestock and livestock products account for about only one sixth, by value, of international trade in agricultural products. Trade in animal products has been growing rapidly over the last decade (Upton, 2001), although in recent years this trend has been interrupted by a series of disease outbreaks in Europe, Asia and Latin America. Meat exports make up about half of the total value, with bovine, pig and poultry meat as the main types. Exports of pig meat have grown in volume by 6 per cent annually over the last decade, while poultry meat exports have grown annually by 14 per cent. Exports of dairy products make up nearly a third, by value, of livestock and livestock product exports and have grown annually by over 3 per cent over the last decade. The developed countries as a group account for about three quarters of world livestock and livestock products trade and are net exporters of virtually all livestock products to the developing countries.

Historically, only a small amount of livestock production in the world is actually traded internationally. This is due to sanitary regulations, and also because meat and dairy are typically highly protected sectors. Together, they accounted for 38 per cent of all Producer Subsidy Equivalents to agriculture in the EU in 1998, calculated at US$130 billion by OECD (2000). The global average agricultural tariff was 17.4 per cent in 1995, compared to over 25 per cent for beef and dairy (Vink and Kleynhans, 2003).

The Uruguay Round Trade Agreement that led to the creation of WTO was a turning point in the evolution of agricultural policy. For the first time, a large majority of countries agreed on a set of principles and disciplines to reduce the trade distortions caused by agricultural policies. Important achievements include the conversion of all non-tariff barriers to tariffs, binding and reducing tariffs, the progressive reduction of other domestic support measures, and the reduction of export subsidies to producers and exporters. Despite these improvements, important protectionist barriers remain, such as complex subsidies, high tariffs and tariff-rate quotas, especially for dairy products and meat. For example the EU has a world market export share of 32 per cent in milk powder and 20 per cent in meat (Cunningham, 2003), for which the presence of agricultural subsidies results in a 30 and 18 per cent higher production for livestock and meat products, respectively than in their absence (Borrell and Hubbard, 2003) while the corresponding figure for grain and milk production is estimated at 50 per cent. In such a case, the EU would become the world's largest importer of agricultural products, and world market prices for agricultural commodities would surge for up to 38 per cent.

Trade related environmental and food safety standards and regulations, as well as related consumer and business preferences may take several forms, such as technical standards and regulations, product-content requirements; sanitary measures; mandatory labelling; and packaging requirements. As tariffs have declined, developing countries are concerned that these increasingly complex standards and regulations in developed countries may adversely affect market access of their products. Environmental and sanitary measures and other technical requirements have been viewed by a number of developing countries as a greater constraint on their ability to export agricultural and food products than tariffs and quantitative restrictions, particularly in the case of their export to the European Union. Due to newly discovered health hazards and newly developed technologies (like genetic

engineering) EU legislation regarding food is constantly changing, in particular with regard to protection of consumer health. This translates into legal requirements on environmental contamination with pesticides, heavy metals and other pollutants, and requirements related to hygiene (e.g. the HACCP system), which are of growing importance. Producers in developing countries often lack the technical and financial ability to comply with the environmental regulations of industrialised nations.

Structural Changes

With respect to structural changes in primary livestock production systems, the strongest trend has been the advent, and subsequent fast expansion, of industrial, vertically integrated, large-scale livestock production, particularly for pig and broiler production in East Asia and of broilers in South Asia, often located close to large urban centres. Similar trends are apparent, albeit to a lesser degree, in dairy and beef production. In East Asia the growth in demand for feed grain associated with industrial production has been accompanied with rapidly increased imports.

Large scale and vertically integrated intensive industrialised poultry and pig production systems, which have increased significantly in the developing world, particularly in East Asia, make use of improved genetic material and sophisticated feeding systems, and require highly skilled technical and business management. They are also dependent on inputs of high energy and protein rich feeds, animal health prophylactics, and consume considerable amounts of fossil fuel, both directly and indirectly. The wholesale transfer of these types of production systems has been facilitated by the relative ease and speed with which the required infrastructure and equipment can be transferred and operationalised in so called 'turn-key' operations. In recent years, industrial livestock production grew at twice the annual rate of the more traditional, mixed farming systems –4.3 against 2.2 per cent—and at more than six times the annual growth rate of pro-

duction based on grazing—0.7 per cent (FAO, 1996). The major expansion in industrial systems has been in the production of pigs and poultry since they have short reproductive cycles and are more efficient than ruminants in converting feed concentrates (cereals) into meat. Industrial enterprises now account for 74 and 40 per cent of the world's total poultry and pig meat production, respectively, and for 68 per cent of egg production (FAO, 1996).

The trend towards industrialisation of primary livestock production is associated with the recent phenomenon of rapid expansion of supermarkets and fast food outlets in developing countries, which have covered much ground already in East Asia and have begun also in South Asia, accompanied by a relative decline of traditional "wet" markets. As is already the case in developed countries, the large scale retail sector is becoming the hegemonic actor in the agro food system also in high and middle income developing countries. These forward linkages increasingly define the terms of the food industry's strategic options.

The increased spending power and changing eating habits, especially in prosperous urban areas, are transforming the food sectors of many Asian countries. The increasingly affluent consumers in urban areas are demanding a wider variety of food products, more meat, eggs, and dairy products, more sea foods, more processed food and convenient food. In response, food manufacturing firms are growing, introducing more new products, investing in modern equipment, and addressing food safety issues. Food retailing is moving from traditional farmers' markets and corner kiosks to supermarkets or modern "hypermarkets", convenience stores, and fast food restaurants. Foreign firms, in particular multinational chains, are playing a leading role in rapidly developing fast food and food retail sectors.

Foreign direct investment was crucial to the take-off of supermarkets (Reardon *et al.*, 2003), which was induced by the policy of full or partial liberation of the retail sector in many countries in

the region starting in the 1990s or later (e.g., China in 1992, Indonesia in 1998, India in 2000). The intense competitive threat from foreign supermarket / hypermarket chains has led to fast improvement in domestic chains. The retail procurement logistics technology and inventory management introduced by global chains is diffusing in developing countries in Asia through knowledge transfer, imitation and innovation by domestic supermarket chains. Substantial savings were thus possible through efficiency gains, economies of scale, and coordination cost reduction. These gains fuel profits for investment in new stores, and, through intense competition, reduce prices for consumers of foods.

Supermarkets are already well established in the middle income countries of South East Asia and are rapidly gaining ground in East and South Asia. For example, in China the number of supermarket outlets increased from a 2,500 in 1994 to 32,000 in 2000 (Hu and Reardon, 2003). The supermarket's share of total retail turnover is estimated to have reached about 20 per cent in the total packaged and processed food retail (Reardon *et al.*, 2003). According to the same authors the share of supermarkets in the retail of fresh foods is about 15 to 20 per cent in South East Asia. Average share of processed / packaged food is approximately 33 per cent in a number of Southeast Asian countries - Indonesia, Malaysia, and Thailand. In East Asia—Republic of Korea, Taiwan, and Philippines—the share is over 60 per cent. The shares of supermarkets in fresh food are estimated at about 15-20 per cent in South East Asia and 30 per cent in East Asia outside China. In China, the share is about 20 per cent (Reardon *et al.*, 2003). Supermarkets have spread from big cities to intermediate towns, and in some countries, already spread to small towns in rural areas. India is cited to still have a comparable low share of 5 per cent.

Increasingly consumer-driven agriculture poses great challenges to the vast Asian farm sector. The large number of small scale farms makes it difficult to organise, monitor and standardise the

quality of products. Conflicts have arisen as suppliers to food retailers and restaurant chains have begun contracting with farmers unaccustomed to producing goods of high standards. For example, suppliers to foreign fast food supply chain have had difficulty procuring agricultural products meeting the chains' quality standards (Gale, *et al.*, 2002).

Several studies indicate that supermarkets' procurement systems involve purchase consolidation, shift to specialised wholesalers, and tough private quality and safety standards (Weatherspoon and Reardon, 2003; Reardon and Timmer, 2003). To meet these requirements, producers have to make investments and to adopt new practices. To keep pace with the demands of buyers, farms also have to adjust by specialising in a particular commodity, consolidating fragmented land holdings to achieve scale economies and fostering strong links with wholesalers, processors, retailers and exporters, which is hardest for smallholders. The increasingly maturing retail sector will stimulate the commercialisation, modernisation and specialisation of farms. However, there is a danger that independent smallholders will be forced out of the markets.

DETERMINANTS OF COMPETITIVENESS

Competitiveness can be defined as the "sustained ability to profitably gain and maintain market share" (Agriculture Canada, 1991). Firms and, to some extent, countries compete to supply meat and milk to consuming markets. Meat and milk producers and suppliers in exporting countries compete both against domestic rivals and suppliers in the importing country. In general, global competitive advantage is determined by numerous factors related to the *entire value chain*. The value chain involves a number of stages (production, collection, processing, distribution, etc.), which could be performed in more than one location (Roekel, *et al.*, 2001; Boselie, 2002). Through the modern value chain of animal products

- products move from producers to consumers
- payments, credit and working capital move from consumers to producers
- technology are disseminated among producers, packagers and processors
- ownership rights pass from producers to processors and ultimately to marketers
- information on current customer demand and preferences pass back from retails to producers.

To a large extent, success in competition results from keeping prices low by minimising input costs (low cost strategy). Producing and distributing meat and milk involves phases from the farm, processing / packing plant to the retail outlet, and each phase requires inputs. If the inputs are available at low cost, the final output can be offered at a low price. At the end of the meat and milk supply chain, competitiveness not only depends on low unit output prices, but also on the ability to supply large quantities at consistent and high levels of quality, in compliance with food safety standards and satisfying consumers preference. To realise these final competitive advantages, along the supply chain from production to marketing process, main factors are unit scales, technology, good infrastructure and supporting services, as well as sector organisation and coordination.

Costs of Production

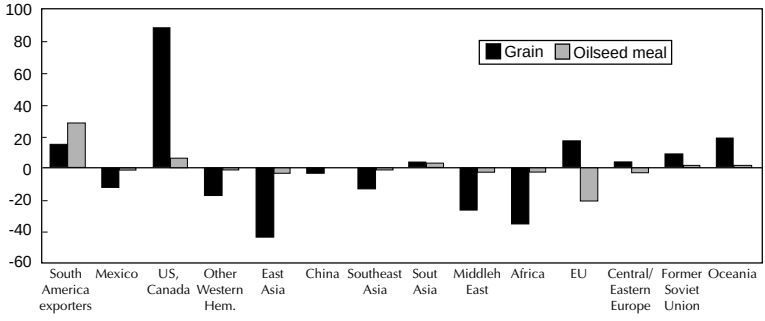
The cost and quality of basic resources and their best use in potential producing countries determine comparative advantage in international trade theory. Traditionally, costs of production were largely a function of the match between animal type and agro-ecological potential. However, less and less livestock products are generated on locally available resources only, but rely increasingly on external or purchased inputs.

Major cost components for livestock production include feed, land, labour, other specialised inputs, and costs of capital. In intensive systems, feed is usually the largest cost item ranging from 40 per cent for dairy production (including the costs for land used for feed) to 70 per cent for pig and poultry production (Delgado and Narrod, 2003; IFCN, 2003). Labour cost would range from 8 (monogastric meat production) to 25 per cent (in dairy production). Capital recovery for machinery and equipment can reach 20 per cent of total cost in highly mechanised operations. In less intensive systems capital recovery would be lower and the labour and feed costs component higher.

Feed: most Asian countries have a scarcity of land and do not have large surpluses of grains or oil crops that could potentially be used as feed (Dyck, *et al.*, 2003). Since feed costs are the largest cost component of primary livestock production, regions that have abundant, low-cost feed available have an advantage in animal production. Transportation costs for grains and oilseed meals raise feed costs. Parts of North and South America have considerable surpluses in grains and oilseed meals, the two largest components of feeds. In the future, this provides a solid, initial advantage for those regions in producing more animal products for export.

South Asia, until now, makes limited use of grains for feeding animals, and by-products such as oilcakes and cereal bran still cover about 80 per cent of total concentrate feed. In contrast, many East Asian countries use grains in the diets of pigs and poultry, and have become net importers of concentrate feed. Looking at feed cost, feed-deficit Asian countries face higher feed prices and would therefore not have a competitive advantage over feed-surplus countries in the America and in Oceania. Part of this disadvantage can be outweighed by abundant supplies of cheap labour, like in South Asia and China. However, increasing incomes have already led to growing levels of mechanisation in places like Malaysia and Thailand.

FIGURE 1: GRAIN/MEAN SURPLUS AND DEFICITS – PRODUCTION MINUS CONSUMPTION, 1998-2002 AVERAGE (excluding rice)



Source: USDA Production, Supply, and Distributor database

Japan, Korea and Taiwan together, as a region, has the largest deficit in grains of any region, as well as a deficit in oilseed meals. These countries, especially Japan, are burdened by higher feed cost, relatively higher labour cost, land scarcity for animal production and processing, high population density and related high risk of environmental problems, and usually cannot compete against imported meat and milk from North America and Oceania. In fact, it is the world's largest meat-importing region and Japan is the largest importer of beef and pork. Southeast Asia, Africa, the Middle East, and Mexico all show significant deficits in non-rice grains as well as smaller deficits in oilseed meals. China shows smaller deficits in both. South Asia shows small surpluses in both. In terms of domestic resources for intensive animal feeding with grains and meals, these regions do not appear well-positioned to generate meat exports. However, South Asia, Africa and the Middle East each have a large endowment of pasture land. If that endowment could be made more productive or used more intensively, production of sheep and cattle meat and milk from grass-fed animals might increase (Dyck *et al.*, 2003).

Labour costs in the farming, slaughtering, processing, and distribution phases are an important part of the total costs of provid-

ing meat and milk to consumers. Low labour costs are a reflection of low wages or high labour productivity achieved through economies of scale. Many developing countries in Asia have abundant, low-cost labour which gives these countries a wage advantage in livestock production and processing.

Capital is another key input. For instance, farms for intensive livestock production require housing, efficient feeding and cleaning systems, environmental controls, and monitoring systems.

Disease control also needs large and consistent investment from both public and private sectors. Meat slaughter, processing, and distribution require large capital investments due to their industrial nature. The large scale of slaughter and packing plants necessary to achieve economies of size implies a large initial investment, often beyond the means of small firms and small economies (Dyck *et al.*, 2003). Well-developed banking systems, insurance systems, and investment funds can effectively improve the access to capital and lower the cost of financing the building and operation of animal product production and processing. High interest rates, macroeconomic uncertainty, lack of transparency, lack of innovative microfinance programmes and policies historically biased in favour of urban areas can deter local investment in livestock farming and processing.

There appear to be increasing returns to size at several levels of the meat and milk products supply chain. Increasing the sizes of meat production units, slaughterhouses and dairies, as well as other processing plants and distribution systems lower the costs per unit of output through spreading capital costs over more animals as well as improved feed efficiency and labour utilisation.

Attributes of Animal Products

For animal product suppliers to become and remain competitive in the changing context of a rapidly consolidating and concentrating retail sector, they must deliver products that meet quality

and safety requirements. They must also provide bulk or volume, and be consistent in meeting all these criteria. This narrows down the range of possible suppliers to a few and tends to exclude smallholders from accessing these rapidly growing outlets.

With rising incomes and the advent of a middle class in many Asian countries, consumers' preference for product quality is rising. A study conducted by the Vietnam Agriculture Science Institute indicates that 86 per cent of households in urban areas in Vietnam have a preference for high quality meat despite the relatively higher price (Lapar, et al., 2003). Environmental and safety concerns are also beginning to play a role in food consumption. In China, a growing number of consumers pay price premiums on organic food items, with certified low use of chemicals from a low pollution production environment. Newly discovered health and illness hazards caused by food-borne pathogens have raised concerns about food safety standards and their enforcement.

Under these circumstances, compliance with food safety and quality standards will become of paramount importance. These standards, however, are not the international and national SPS standards but corporate standards established by companies, often operating at multinational levels. These standards reflect consumer preferences and preoccupations, and are based on the sophisticated logistical and technical requirements of a consolidating and concentrating retail sector.

Production and marketing process

At the level of processes, applied technologies, unit scales, supporting infrastructure, availability of private and public services, and sector organisation are of particular importance.

At high levels of intensity, most technology employed serves to optimise the use of feed, representing the largest cost component. In addition, technology in breeding may be a factor affecting a country's productivity at the farm level and product quality

throughout the value added chain. Unit scales are an important determinant of competitiveness. Except for dairy, there are significant economies of scale in livestock production and are particularly pronounced in broiler and egg production

As has been shown from examples outside Asia, private services can be of vital importance in achieving smallholder competitiveness within a changing market. In Poland, foreign companies are providing bank guarantees for farmers who are otherwise unable to provide collateral thus enabling farmers to enlarge their herds and finance other investments, often targeted at improving milk safety and quality (e.g. cooling tank). They also provide extension and quality control services. These multiple private services have resulted into higher farm survival rates than for farms who do not supply their milk to foreign companies (Dries and Swinnen, 2003). This may serve as an example that foreign competition and heightened quality standards do not inevitably lead to small farm extinction.

Vertical integration of the livestock production

Processing and marketing process allows not only to gain from economies of scale but it also secures benefits from market ownership and from control over product quality and safety by controlling the technical inputs and processes at all levels. Large multinational firms are dominant in the meat and dairy trade. Their strength is linked to achieving economies of size and scope, and by sourcing supplies at different levels and across national boundaries.

Weak sector organisation is a major obstacle to enhanced competitiveness in most Asian countries. Public sector services, in most cases, have focused on enhancing production and productivity, but often have not targeted market development. In most cases, public policies have turned a blind eye on the fundamental organisational changes accompanying the rise of the supermarkets, and have not started to address the ensuing requirements.

Compared with the situation in developed countries, animal food products in Asian developing countries are far less standardised by the governments, procedures are less predictable, reputation and trust are more important and institutions for assuring quality and safety are still deficient in many places. In Vietnam, for instance, producers, processors and distributors do not pay particular attention to the hygiene and sanitary conditions of their products because of the lack of product certification and labelling that would give a premium to products that conform to accepted levels of safety and quality standards (Lapar, *et al.*, 2003). Moreover, there is no mechanism in place (or if there is, the implementation appears to be scarce) within Vietnam that closely monitors the adherence to quality and safety standards by producers and processors. This has implications on farmers' motivation to produce quality and safety pigs because in the absence of strict quality monitoring, quality does not command a premium in the market price. Furthermore, consumers will not be prepared to pay for quality if quality differences across products are not easily discernible. In addition, there is a lack of clarity in existing government regulation and standards in Vietnam. Meat-processing plants usually have difficulties sorting out low quality meat versus high quality meat due to lack of pre-determined standards (Lapar *et al*, 2003).

Infrastructure is another determinant of sector competitiveness. Animal source foods are highly perishable products which need to be either swiftly processed and marketed, or refrigerated. Both requires basic infrastructure. All Asian countries have taken measures to improve the domestic transportation, distribution, and marketing network. Progress, particularly in coastal China and parts of South East Asia is quite impressive, but there are still major deficiencies elsewhere. In China, transportation and logistics account for 20 per cent of the retail prices of goods (and even higher for perishable foods), about five times the transportation share of food costs in the United States (Gale, et al, 2002). The

lack of temperature-controlled transport facilities and logistic problems make the transport of perishable foods costly across the region.

The efficiency of the domestic transportation, distribution, and marketing network in inland areas of Asia will determine, to a large extent, whether local producers are able to compete with foreign suppliers in accessing consumers in the wealthy urban areas. The potential of competitiveness, particularly in inland rural areas, is limited by poor road infrastructure and lack of transportation / storage facilities, many layers in the marketing chain, lack of timely market information and the inability to analyse the information. If the cost of transporting feed to inland locations remains high, livestock production may shift closer to coastal and densely populated regions due to better access to both final markets and imported feeds, resulting in an increase in land and labour costs and environmental problems.

The animal disease status of a country or territory is part of its basic livestock infrastructure. The presence of animal diseases, in particular those of the List A of OIE provide a strong deterrent for foreign and domestic investments in the livestock sector. These diseases cannot only wreak havoc on existing stock but essentially prevent international and domestic trade altogether. This is why there is little by way of intensive or industrial livestock production in areas where, for example, the Foot and Mouth Disease (FMD) is present. The same applies to Classical Swine Fever, Haemorrhagic Septicemia, and other List A diseases.

Therefore, for example, the distinction between countries or regions recognised as free of FMD, and those judged not free, largely defines world trade flows in fresh, chilled, or frozen beef and pork. Most trade in uncooked beef and pork has occurred among the FMD-free countries. FMD is endemic in most Asian developing countries and severely limits the regions ability to participate in international trade. Annex maps 1 to 3 give exam-

ples of the disease occurring of the most important trade related diseases of cattle (FMD), pigs (Classical Swine Fever) and poultry (Newcastle Disease).

Strict controls on plants that process meat and milk products for export are also linked to concerns about human health, such as microbial contamination, antibiotics and other residues. Major importing developed countries sometimes inspect and certify plants in exporting countries, and allow meat and milk products imports only from certified plants.

THE COMPETITIVE POTENTIAL OF ASIAN LIVESTOCK

There are a number of factors that would generally limit the competitive position of many Asian countries, in particular:

- The unfavourable factor endowment, in particular land scarcity
- High input costs because most Asian countries need to rely on imports of feed concentrates for an expansion of their livestock sectors
- The animal disease status with many List A diseases prevalent in a majority of Asian countries preventing them from participating in international trade

Against these disadvantages, there are a number of fortes that enhance the competitive position of Asian countries, in particular:

- Low labour costs which is relevant for commodities with a high labour costs component (dairy) and for different stages in the post harvest food chain (processing of specialised cuts and meals)
- Low environmental standards and related costs of compliance;
- Rapidly improving infrastructure, particularly in coastal China, parts of South East Asia and South Asia
- Long tradition of keeping animals in mixed farming systems, and related knowledge
- Burgeoning demand for livestock products.

On balance, and compared with the main livestock exporting countries in the world (US, Canada, EU, Australia, Brazil and Argentina), most Asian developing countries are not currently competitive in international meat and milk markets. There are important exceptions to this statement, notably Thailand's poultry exports and China's exports of specialised food products. Many and diverse international trade flows exist in livestock products in Asia, but tend to be regional, and at lower prices.

Meanwhile, Asian developing countries continue to benefit from lower labour costs and proximity to a large and growing domestic and / or regional market. It is also important to note that several aspects of meat processing are labour intensive; hence meat preparing, packing and processing in Asian countries for export may grow based on the labour cost advantages. Japan is importing prepared (ready to heat or serve) meat entrees from China, Thailand, Brazil and the United States. China's poultry industry, which has used frozen US broiler meat as an input for further processing and re-export to Japan, demonstrates this competitiveness. Furthermore, cooked (or thermo-processed) meat can be exported from countries without disease-free status and this also opens more opportunities.

The decision for an Asian country to compete in a much broader international livestock product markets or to simply focus on domestic or regional markets is influenced by the possibility to overcome the constraint of high cost of imported feed, as well as the challenge of complying with international standards of disease control and hygiene proposed under the SPS Agreement. Since compliance with disease control and standards entail costs, governments and private sectors need to assess both the costs and benefits before beginning a programme.

CONSTRAINTS TO SMALLHOLDER COMPETITIVENESS

For dairy and small ruminant production, farm-level production costs at smallholder level are often comparable with those of large scale enterprises, usually resulting from cost advantages emanating from the availability of low cost family labour (Hemme *et al*, 2003). However, the expansion of smallholder production beyond a semi-subsistence level is constrained by a number of barriers, lack of competitiveness and risk factors. Access to land is also an increasing problem. In many parts of Asia smallholder livestock producers need access to common property resources; these are, however, becoming more limited as demands on land grow. The absence of innovative forms of targeted small to medium-scale credit is restricting the involvement of poor in the commercialisation of livestock production and product processing. The combined effect of these constraints is that much of the livestock sector growth occurs without significant impact in terms of poverty reduction potential. Worse still, the structural changes, triggered by growing demand, tend to marginalise smallholders.

Recent studies (Delgado and Narrod, 2003) confirm the substantial impact of hidden and overt subsidies that facilitate the supply of cheap animal products to the cities, to the disadvantage of small-scale rural producers. There is often no public support to adapt or disseminate new technologies for small-scale use. Furthermore, diseases can substantially add to increased production costs. Various types of diseases have different effects on production systems and their capacity to step up production as described by Leslie and McLeod (2000). List A diseases (African horse sickness, African and classical swine fever, bluetongue, Newcastle disease, Peste des Petit Ruminants, sheep and goat pox, rinderpest and Rift valley fever) all result in high mortality rates— between 50 and 90 per cent. Foot and mouth disease in cattle may not cause high mortality but often entails important losses of milk and draught power, and in fertility. From a production viewpoint, helminthosis and tick-borne diseases are particularly important.

Helminths (worms), while rarely fatal, can seriously affect productivity and profitability.

Production costs are higher at the smallholder level because of both market and production risks. Market risks include price fluctuations for both inputs and products and are often exarcerbated at smallholder level because of a weak negotiating position. Many small-scale producers evolved from subsistence farming with sound risk coping mechanisms but lack the assets or strategies to sustain full exposure to market risks. The absence of safety nets in the face of economic shocks, invariably present in such markets, will restrict the full participation of smallholders. Production risks relate to resource degradation and asset control, to climatic variations such as drought and floods, and to infectious diseases. Although both small-scale and intensive livestock production systems are at risk from the predations of epidemic diseases and droughts, the poor are particularly vulnerable to these types of shocks due to their limited assets and the lack of insurance schemes. Public and private services in disaster-prone poor countries almost invariably lack the capacity to plan for such risks, or to respond in a timely manner.

Technical barriers further constrain small producers from efficiently supplying a safe and relatively uniform product to the market. Technical barriers exist in the form of sanitary requirements (including animal welfare) as a prerequisite to trade. A perceived or real low animal health status may exclude countries or groups within countries from international, regional and local markets.

The issue of technical market barriers is connected with transaction costs. Even in traditional markets, these are often prohibitively high for small-scale producers because of the small quantities of marketable surplus and the absence of adequate physical and market infrastructure in remote areas. Transaction

costs are also high where producers lack negotiating power or access to market information and remain dependent on middlemen. Moreover, the lack of facilitation in the formation of producers associations or other partnership arrangements makes it more difficult for smallholder producers to reduce transaction costs through economies of scale. Sometime, unfavourable tax regimes are further hindering the competitiveness of independent producer, such as in the case of poultry producers in Andhra Pradesh (India) where sale taxes are imposed on feed when acquired through the market. Integrators, acquiring their feed from subsidiaries are not taxed. The combined effect of economic gains out of lowering transaction costs from vertical integration, and favourable tax regimes tend to severely disadvantage independent and small scale producers.

The "retail revolution" discussed above adds an entirely new dimension to the struggle of smallholder trying to gain or maintain market access. Procurement by supermarkets, and by fast food chains, relies on a limited number of suppliers, exerting a strong pressure via their forward linkages, for the agri-food system to consolidate and concentrate. Further, they impose private safety and quality standards which smallholders are usually unable to meet due to poor access to capital and knowledge.

POLICY OPTIONS AVAILABLE TO STRENGTHEN COMPETITIVENESS

At both the sector and the smallholder level, there are a number of policy options available to strengthen the competitiveness of Asian livestock producers. However, the countries with large numbers of smallholder engaged in livestock production face a formidable policy dilemma—many policy measures that have the potential to improve sector competitiveness tend to nurture large-scale competition for smallholders, and can sometimes lead to smallholder exclusion from emerging markets altogether.

At Sector Level

In order to improve Asian developing countries' competitiveness in meat and milk markets, the policy emphasis should be to strengthen the capacity of the actors in the food supply chain, in particular those of farmers, to respond to dynamic changes. The following general strategies for public sector are suggested.

Investing in agricultural research and technology dissemination

In developed countries, the development of science and technology accounts for 70 per cent of agricultural growth contribution, while the figure remains low in Asian developing countries. For instance, it is only 40 per cent in China. With a limited amount of farmland, the way to increase feed output is to improve unit feed production yield. Revolutionary progress can be made by upgrading seeds with the decoding of genes. Increasing efficiency and effectiveness in livestock input utilisation through upgrading science and technology will reduce the cost of production and enhance the product quality.

Investing in Rural Infrastructure

Poor rural infrastructure needs to be addressed through (i) increasing farm credit by promoting innovative microfinance programs and developing credit networking among farmers' organisations and private entrepreneurs, (ii) improving agricultural market infrastructure at all levels and enhancing the timely information dissemination of market demand, prices and prediction; (iii) increasing investment in rural roads, storage and collection facilities, and (iv) improving the effectiveness of livestock services with adequate trained staff and data collection, storage and retrieval systems.

Establishing Sustainable Agricultural Products Standards Through all Supply Chains

The main problems with foodstuffs in Asian developing countries are in production and processing. Legislation should be pro-

moted to set up laws and standards related to food safety. The governments should define the standards suitable for every stage of the food supply chain, and avoid adopting standards that may prove unsuitable within their countries. Ecologically sound agriculture should be advocated while the borders should be well protected from unqualified foods and animal feeds. To signal product quality, governments need to set up the standards for product labelling and certification.

At Smallholder Level

As we have seen, smallholders can be competitive in terms of production costs at farm level due to the availability of low cost labour. This is particularly so in dairy and small ruminant sector where the technical economies of scale in production are small.

Investing in Agricultural R&D Targeted to Smallholders' Production

Special attention should be given to the development and application of technology (e.g. in breeding, feeds, veterinary, etc.,) appropriate to smallholder production to meet heightened food safety and quality standards. In hog production, for example, upgrading local breeds can help smallholder farmers to develop pigs with a high proportion of lean meat. The exotic breeds require conditions that are much more demanding than those of traditional local pig breeds. The requirements concerning hygiene, diets, prevention and elimination of epidemics and disease of exotic often are beyond the ability of most smallholder farmers to handle. The shift from traditional to keeping exotic strains requires appropriate training and extension methods including veterinary technology targeted at smallholder farmers.

Facilitating Private Sector Activity and Large-scale/ Small holder Partnership Schemes

In order to enhance access to input and output markets, reduce transaction costs and facilitate technology transfer, it is necessary

to promote integration among smallholders by facilitating the formation of cooperatives and large-scale / small holder partnership schemes.

Meeting upgraded standards in quality and food safety often increases the production cost substantially. On the other hand, if only a few smallholders scattered in different places are involved in upgraded production, it is difficult for them to bargain for a good selling price based on the higher quality of their products due to the limited quantity.

Approaches such as "enterprises plus farmer households", "contract farming", etc. can be encouraged to combine the farmers and production bases into big company groups so that value-added livestock product supply is promoted. Processing and marketing enterprises and products with competitive edges need to be enhanced to promote the radiation effect of leading agricultural enterprises and foster good combinations between enterprises and farmer households. This strategy emphasises links between farmer and processing and marketing companies to strengthen farmer connections with the market and to raise farm incomes. Developing processing and vertical coordination in the supply chain could also play a role in promoting capital investment and technology transfer in rural areas.

CONCLUSIONS

The conventional distinction between the global and export markets on one side, and the domestic and local market on the other has been disappearing rapidly over the last decade, a process that is likely to continue at an increasing rate in most Asian countries. Small town and rural markets are likely to get linked to the international economy through the emergence of supermarkets (FAO, 2003). While much of the public debate focuses on public domestic and international standards with much focus on WTO and its SPS measures, an increasing share of the action is in the domain

of private standards set by large multinationals and large domestic firms. These standards often go much beyond the traditional reach of public standards which focus on sanitary requirements. Private standards relate more to food quality. The equipment, knowledge, management and accounting practices and investments implied by them are costly, and often out of reach for small farmers. These changes necessitate sharpening the focus on value chains created by vertical integration with supermarkets at the driving end.

These changes in the retail sector have been so rapid that they have, so far, not entered the public debate and the policy implications have not been discussed at a wide level. Berdegué *et al* (2003) suggest a number of policy measures that could help mitigate the impact of the "tidal wave" about to hit small farmers, traders and processors. If left unaddressed by public policy, market concentration and consolidation, they argue, will result in a rapid exclusion of small farmers, traders and processors, in a greater polarization between favoured and unfavoured rural regions, and in greater concentration of wealth. To counter these effects, Berdegué *et al* suggest policies that *simultaneously* address market and inclusion. Measures could include:

- promoting competition in food systems
- modernising traditional markets
- revamping public services to provide extension targeted at quality and safety, third party certification and market advisory services
- reinvigorate rural financial markets to deal with issues like higher market risks and changing commercial practices of supermarkets
- improving public and private infrastructure
- revamping legal and regulatory frameworks
- promoting a new generation of farmers' organisation

This requires a number of adjustments in the focus and the role of public services. The focus has to shift from the farm as the unit of analysis to rural territories as the social construct in a region occupied by social conglomerates. This shift in focus needs to take into account the complex linkages and the dynamics of specialisation. Given the speed of change, time is another critical dimension.

As has been shown, the majority of countries in the region face major drawbacks stemming from resource endowment, sector structure and disease status, limiting their potential to participate in international trade in animal products. Countries need to weigh the expense at which rapid improvements of their competitive position can be achieved. The policy measures available to improve sector competitiveness such as effective animal disease control, creation of favourable investment framework in agro-food systems and improving infrastructure will result in an accelerated structural change. In all likelihood, this will negatively affect competitiveness of smallholders who lack the capital, organisation and knowledge to adjust quickly.

TABLE 1: LIVESTOCK PRODUCTION BY COMMODITY: PAST AND PROJECTED

	1967-69	1987-89	1997-99	2015	2030	1969-1999	1989-1999	1995/97-2015	2015-2030
	million tons					per cent per annum			
TOTAL MEAT									
World 92	166	218	300	376	2.9	2.7	1.9	1.5	
excl. China	84	142	162	218	277	2.1	1.3	1.8	1.6
Developing countries	28	66	116	181	247	5.2	5.9	2.7	2.1
excl. China	21	41	60	98	147	3.8	3.9	3.0	2.7
excl. China and Brazil	18	34	47	79	123	3.5	3.3	3.1	2.9
sub-Saharan Africa	3	4	5	9	16	2.3	2.2	3.3	3.5
Latin America	10	19	28	43	58	3.5	4.5	2.6	2.1
excl. Brazil	7	11	15	24	33	2.5	3.1	2.7	2.3
Near East / North Africa	2	5	7	13	19	4.4	3.8	3.5	2.9
South Asia	3	5	7	13	23	3.7	2.8	3.6	3.9
East Asia	10	33	69	103	131	7.1	7.6	2.4	1.6
excl. China	3	8	13	21	32	5.1	4.1	3.0	2.8
Industrial countries	46	71	85	99	107	1.9	1.8	0.9	0.5
Transition countries	17	29	17	20	22	0.0	-6.4	0.8	0.8
Bovine meat									
World	38.0	53.7	58.7	74.0	88.4	1.4	0.8	1.4	1.2
Developing countries	11.8	19.3	28.0	41.2	55.0	3.0	3.8	2.3	2.0
excl. China	11.7	18.4	23.2	33.5	44.1	2.5	2.2	2.2	1.8
excl. China and Brazil	10.0	14.4	17.3	25.2	34.1	2.0	1.5	2.3	2.0
sub-Saharan Africa	1.6	2.2	2.6	4.3	6.7	1.5	1.7	3.0	3.0
Latin America	6.8	10.4	13.1	18.2	22.5	2.5	2.1	1.9	1.4
excl. Brazil	5.1	6.5	7.2	9.9	12.5	1.4	0.4	1.9	1.6
Near East / North Africa	0.7	1.3	1.8	2.8	4.1	3.2	3.4	2.4	2.6
South Asia	1.7	3.1	4.0	5.7	7.4	3.1	2.3	2.1	1.7
East Asia	1.0	2.3	6.4	10.1	14.4	6.4	11.5	2.7	2.4
excl. China	0.8	1.4	1.6	2.5	3.5	2.1	2.3	2.6	2.2
Industrial countries	19.1	23.8	25.0	26.6	26.5	0.6	0.6	0.4	0.0
Transition countries	7.0	10.6	5.7	6.3	6.9	-0.3	-7.5	0.5	0.6
OVINE MEAT									
World	6.6	9.1	10.8	15.3	20.1	1.9	1.4	2.1	1.8
Developing countries	3.0	5.0	7.4	11.2	15.4	3.4	3.7	2.5	2.1
sub-Saharan Africa	0.6	0.9	1.3	2.2	3.4	2.8	3.5	3.1	3.0
Near East / North Africa	0.9	1.5	1.8	2.6	3.5	2.3	1.9	2.2	2.0

	1967-69	1987-89	1997-99	2015	2030	1969-1999	1989-1999	1995/97-2015	2015-2030
	million tons					per cent per annum			
South Asia	0.6	1.1	1.3	2.1	3.1	3.5	1.42	.6	2.6
East Asia	0.4	1.1	2.5	3.8	4.8	7.0	8.1	2.6	1.5
Industrial countries	2.4	2.8	2.7	3.1	3.5	0.6	-0.8	0.9	0.8
Transition countries	1.3	1.3	0.8	0.9	1.1	-1.0	-6.4	1.3	1.1
PIG MEAT									
World	34.1	66.3	86.5	110.2	124.5	3.2	2.7	1.4	0.8
excl. China	28.1	46.2	48.1	57.9	66.2	1.7	0.4	1.1	0.9
Developing countries	9.7	28.0	49.3	69.5	82.8	6.1	5.7	2.0	1.2
excl. China	3.8	7.9	10.9	17.2	24.5	3.7	3.4	2.7	2.4
Latin America	1.8	3.0	3.9	6.0	7.8	2.1	3.9	2.5	1.8
excl. Brazil	1.1	1.9	2.3	3.4	4.4	1.7	2.8	2.3	1.8
East Asia	7.6	24.2	44.3	61.6	71.9	6.8	6.0	2.0	1.0
excl. China	1.6	4.0	5.9	9.3	13.6	5.1	3.3	2.8	2.5
Industrial countries	16.6	26.0	29.3	32.3	33.1	1.8	1.4	0.6	0.2
Transition countries	7.7	12.3	7.9	8.4	8.6	-0.1	-5.3	0.4	0.1
POULTRY MEAT									
World	12.9	37.2	61.8	100.6	143.3	5.2	5.4	2.9	2.4
excl. China	12.1	34.6	51.2	81.4	117.5	4.8	4.1	2.8	2.5
Developing countries	3.3	13.2	31.3	59.1	93.5	7.9	9.4	3.8	3.1
excl. China	2.5	10.6	20.7	39.9	67.7	7.4	7.2	4.0	3.6
excl. China and Brazil	2.2	8.6	15.6	31.9	56.4	6.9	6.4	4.3	3.9
sub-Saharan Africa	0.3	0.7	0.9	1.9	4.1	3.8	2.6	4.3	5.1
Latin America	1.0	4.7	10.5	18.2	27.3	7.8	9.0	3.3	2.7
excl. Brazil	0.7	2.7	5.4	10.2	16.0	6.7	8.4	3.8	3.0
Near East / North Africa	0.4	2.1	3.2	7.1	11.6	7.7	5.2	4.7	3.3
South Asia	0.2	0.5	1.1	3.9	10.6	7.7	7.2	7.9	6.9
East Asia	1.5	5.3	15.5	27.9	39.9	8.5	11.7	3.5	2.4
excl. China	0.7	2.6	4.9	8.7	14.1	7.3	6.1	3.4	3.2
Industrial countries	8.1	18.8	27.7	37.5	44.1	4.0	3.9	1.8	1.1
Transition countries	1.5	5.2	2.9	4.1	5.7	1.6	-6.7	2.0	2.3
MILK (whole milk equivalent)									
World	387	528	562	715	874	1.3	0.6	1.4	1.3
Developing countries	78	149	219	346	484	3.6	4.1	2.7	2.3
excl. China and Brazil	69	128	189	301	425	3.5	4.1	2.8	2.3
sub-Saharan Africa	8	13	16	26	39	2.7	1.9	3.0	2.8
Latin America	24	40	57	81	105	2.6	3.9	2.1	1.8
excl. Brazil	17	26	36	52	69	2.2	4.0	2.1	1.9
Near East / North	14	21	28	41	56	2.3	3.1	2.2	2.1

	1967-69	1987-89	1997-99	2015	2030	1969-1999	1989-1999	1995/97-2015	2015-2030
	million tons					per cent per annum			
Africa									
South Asia	30	65	104	174	250	4.5	4.9	3.1	2.4
East Asia	3	10	15	25	34	6.9	4.5	2.9	2.2
excl. China	1	4	5	8	12	7.3	3.2	3.0	2.4
Industrial countries	199	236	246	269	286	0.7	0.5	0.5	0.4
Transition countries	110	144	97	100	104	-0.3	-4.6	0.2	0.2
	EGGS								
World	18.7	35.6	51.7	70.4	89.9	3.4	4.2	1.8	1.6
Developing countries	4.9	16.2	33.7	50.7	69.0	7.0	8.0	2.4	2.1
excl. China	3.2	9.5	13.5	24.6	37.8	5.0	3.4	3.6	2.9
sub-Saharan Africa	0.3	0.7	0.9	1.8	3.4	3.7	2.6	4.0	4.1
Latin America	1.2	3.6	4.6	7.3	10.4	4.5	2.5	2.8	2.3
Near East / North Africa	0.4	1.5	2.2	3.6	5.3	6.0	4.1	3.0	2.6
South Asia	0.3	1.4	2.2	5.7	9.9	6.3	4.7	5.8	3.7
East Asia	2.6	9.1	23.8	32.1	40.0	8.3	10.7	1.8	1.5
excl. China	0.9	2.4	3.6	6.0	8.8	5.0	3.5	3.0	2.6
Industrial countries	10.7	12.8	13.7	14.8	15.5	0.6	0.9	0.5	0.3
Transition countries	3.1	6.5	4.3	5.0	5.5	0.7	-4.7	0.8	0.7

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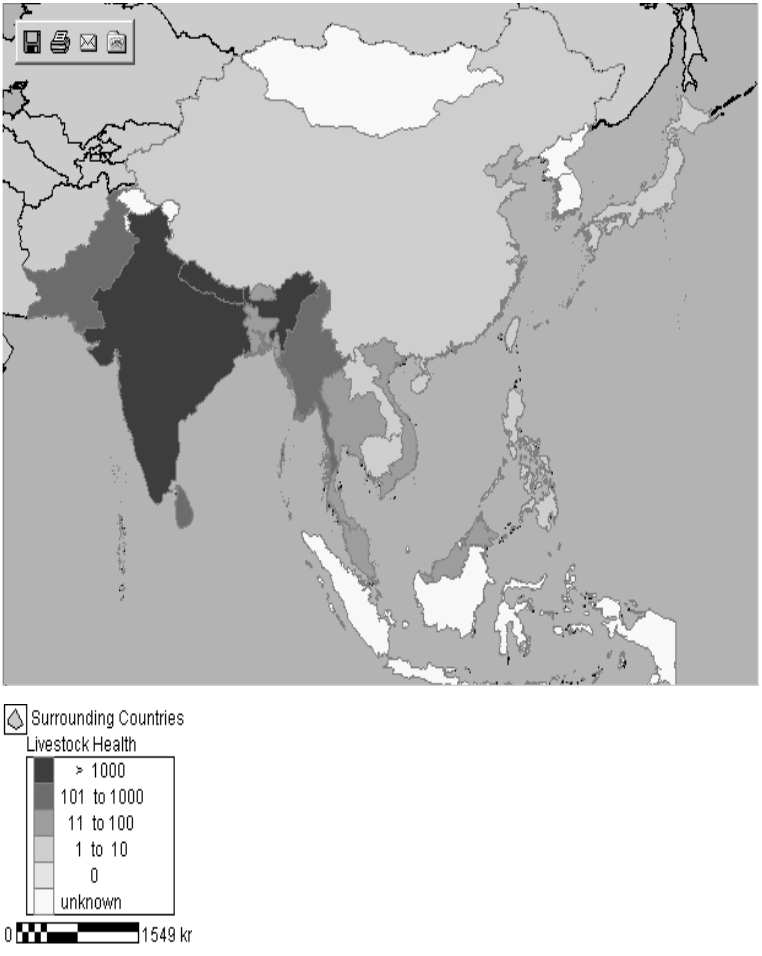
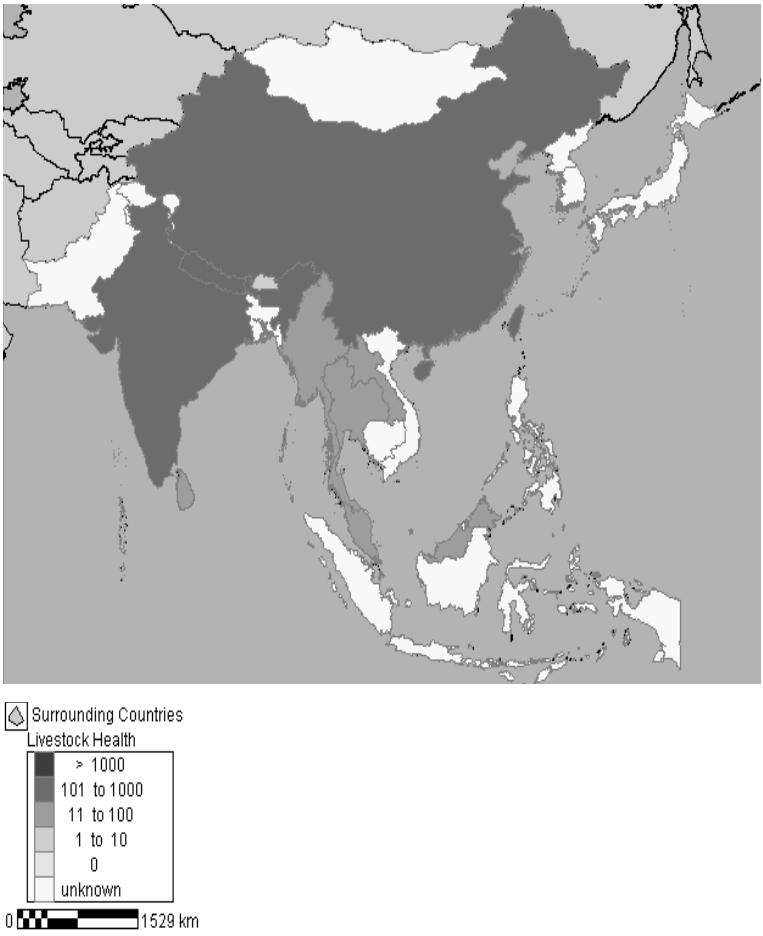
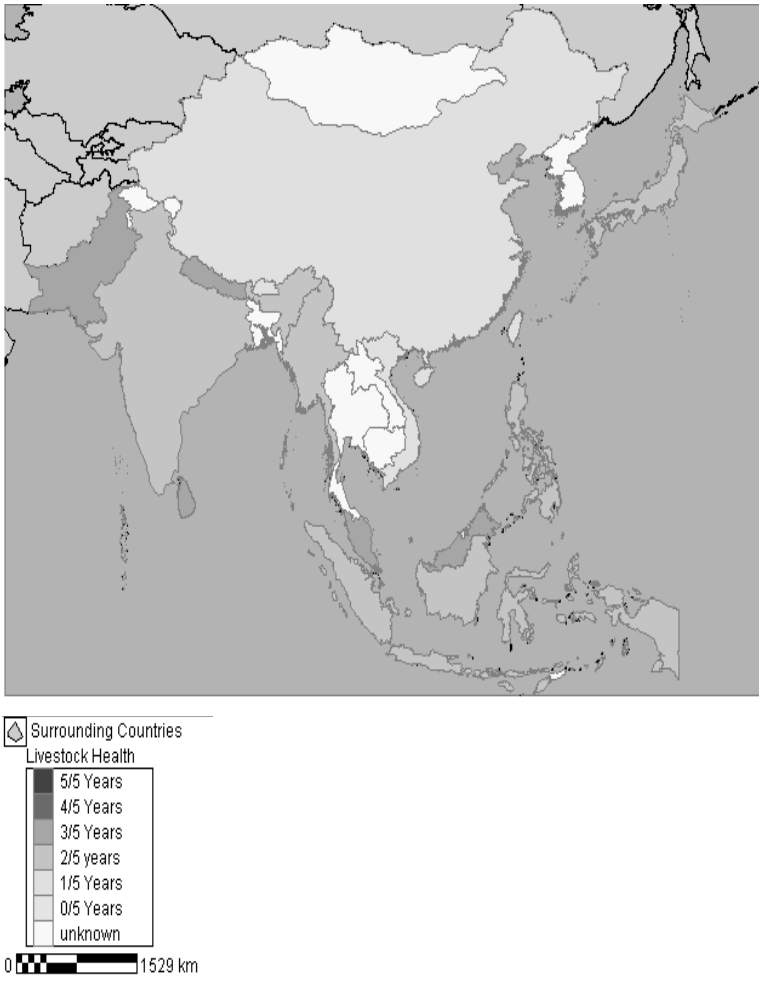
ANNEXE 1: CATTLE, FOOT AND MOUTH DISEAS OUTBREAKS, TOTAL, 1997-2001



ANNEX 2: PIGS, CLASSICAL SWINE FEVER, __OUTBREAK, TOTAL, 1997-2001



MAP OF NEWCASTLE DISEASE MAP



Implications of the Scaling-up of Livestock Production in a Group of Fast-growing Developing Countries

Christopher L. Delgado, Clare A. Narrod and Marites M. Tiongco*

The world is entering a period of rapid change in how animal products are produced, processed, consumed, and marketed. Increasingly, the trends that have been observed in developed countries—scaling-up of production and increased concentration of large-scale operations with increased environmental problems—are becoming apparent in the developing countries. With this trend, there has also been a movement of many small-scale producers out of the livestock sector. It is likely that developing countries will also experience the circumstance unless policy makers can understand the negative consequence of allowing growth to occur in the same manner. It has been suggested that the reason for this is that small-scale producers can-

This paper draws directly from Delgado and Narrod (2002) and Delgado, Narrod, and Tiongco (2003) and five underlying country reports by Costales *et al.*, (2003), Mehta *et al.*, (2003), Sharma *et al.* (2003), Poapongsakorn *et al.*, (2003), and Camargo Barros *et al.*, (2003). These reports were produced under an FAO-IFPRI Project carried out through the Livestock, Environment and Development Initiative (LEAD), entitled: "Policy, Technical and Environmental Determinants and Implications of the Scaling-Up of Livestock Production in Four Fast Growing Developing Countries". Financial support for the project was provided by the European Commission, the United Kingdom Department for International Development , and the core programmes of FAO and IFPRI, and is gratefully acknowledged.

* Christopher Delgado is Director of the Joint ILRI-IFPRI Program for Livestock Market Opportunities. Clare Narrod is Livestock Economist-Risk Assessor, Office of Risk Assessment and Cost-Benefit Analysis, USDA; and M. Tiongco is Research Analyst, IFPRI; the underlying research was conducted while Delgado was full-time at IFPRI and Narrod was at FAO.

not be competitive with the larger operations that benefit from economies of scale.

The research underlying this paper investigated factors affecting scaling-up of livestock production in the Philippines, Thailand, Brazil, and India with particular attention directed at understanding issues impacting small-scale producers. Of particular interest is understanding 1) the extent to which this displacement is due to policy distortions such as scale-variant subsidies per unit of output; 2) the role of differences across farms in the capture of environmental externalities; and 3) the role of higher transaction costs facing smallholders in reducing their competitiveness. The objective is to assess implications for poverty reduction and environmental strategies. If small-scale producers are at a disadvantage due to distortions or a policy failure to facilitate the emergence of institutions that help small-scale producers adjust to rapidly changing market conditions, it is hoped that effective recommendations will come out of this work that will lead to creating policies in the future that will aid small-scale producers to enjoy a more level playing field where their inherent assets are best used.

THE LIVESTOCK REVOLUTION IN THE CONTEXT OF SCALING-UP OF PRODUCTION

Amazing Numbers and High Stakes

From the beginning of the 1970s to the mid 1990s, consumption of meat in developing countries increased by 70 million metric tons (MMT), almost triple the increase in developed countries, and consumption of milk increased by 105 MMT of liquid milk equivalents (LME), more than twice the increase that occurred in developed countries. The market value of that increase in meat and milk consumption totalled approximately $155 billion (1990 US$), more than twice the market value of increased cereals consumption under the better-known “Green Revolution” in wheat, rice and maize. The population growth, urbanisation, and income

growth that fuelled the increase in meat and milk consumption are expected to continue well into the new millennium, creating a veritable Livestock Revolution. As these events unfold, many people's diets will change, some for the better, but others for the worse, especially if food contamination is not controlled.

A critical issue raised by these trends is that for once a sector that the poor are heavily involved in is growing. If the poor fail to participate, they are condemned to even worse immizeration. If they participate, farm income could rise dramatically, but the conditions under which this could occur are still undetermined. Much anecdotal evidence, most of it based on experience in the developed countries, suggests that the poor and small-scale operators will quickly be displaced from growing livestock sectors as individual farms scale-up. Furthermore, whether the seemingly unstoppable growth of livestock products is a good or bad thing for the poor will also depend on the environmental and public health impact of rapidly rising livestock production in close proximity to population centres (Delgado *et al*., 1999).

The Role of Demand

The Livestock Revolution, particularly in developing countries, is fundamentally propelled by demand. Though people in developing countries are increasing their consumption from the very low levels of the past, they have a long way to go before coming near developed country averages. In developing countries, people consumed an annual average in 1996-98 of 25 kg/capita of meat and 44 kg/capita of milk, one-third the meat and one-fifth the milk consumed by people in developed countries. Nevertheless, the caloric contribution per capita of meat, milk and eggs in developing countries in the late 1990s was still only a quarter that of the same absolute figure for developed countries and, at 10 per cent, accounted for only half the share of calories from animal sources observed in the developed countries (Delgado, Rosegrant and Meijer, 2002).

Per capita consumption is rising fastest in regions where urbanisation and rapid income growth result in people adding variety to their diets. Across countries, per capita consumption is significantly determined by average capita income. Aggregate consumption tends to grow fastest where rapid population growth augments income and urban growth (Rae, 1998). Since the early 1980s, total meat and milk consumption grew at six and four per cent per year, respectively, throughout the developing world.3 In developing countries as a whole—where income grew at 4-8 per cent per year between the early 1980s and 1998, population at 2-3 per cent per year, and urbanisation at 4-6 per cent per year—meat consumption grew between four and eight per cent per year. Generally, urban growth has played the key role in promoting livestock demand. The impact of this on scaling-up cannot be dissociated from accompanying changes in the nature of demand. The new middle classes of developing country cities want food safety, and the processors and supermarkets serving these areas increasingly require a reliable supply of product with predictable taste, texture, and safety.

The Supply Side and Prices for Meat, Milk and Feed

Claiming that the Livestock Revolution is propelled by demand does not mean that it was not also shaped by the supply side. Productivity breakthroughs in animal agriculture, and particularly for poultry and swine, have made certain forms of industrial organisation the most likely response to a surge in consumer demand for meat. These changes in the industrial organisation also helped to determine who would produce the new meat demanded by growing cities and export opportunities. Events on the supply side are also critical to resolving some of the emerging environmental and public health impacts associated with increased livestock production. Furthermore, and most importantly for present purposes, supply-side events may not be scale-neutral.

Supply-side events, such as improvements in the efficiency of production of large-scale pork and poultry operations clearly keep pork and poultry prices lower than they would be otherwise. Much of the initial growth of poultry production in the U.S. was attributed to rapid technological progress in poultry from the 1950s onwards which led to chicken meat—a luxury good in the U.S. up to that time—becoming cheaper than beef and until recently the staple meat in the U.S. Such a change in world prices did occur, but the trends have changed since 1980 as illustrated in Table 1. Results clearly suggest the decline in prices for agriculture since 1980. Between the first five years of the 1980s and the last five years of the 1990s, average deflated maize and beef prices declined by 44 and 54 per cent respectively, relative to the base period. Real prices of poultry and pork, however, declined by only 25 and 28 per cent, respectively, over the same period. Real milk prices declined 11 per cent. Understanding the impact of these changes on poor producers in poor countries requires not only understanding the forces driving higher meat consumption, but also the forces shaping supply response.

A CHANGING WORLD FOR LIVESTOCK PRODUCERS

There was a time in developing countries – when livestock could be considered a multi-purpose activity from which food was only one of several outputs, and whose products were largely non-tradable once the animal was slaughtered. Livestock were kept for traction power, for skins, as a store of wealth, for important family asset transfers, for manure used as fuel and fertilizer, for prestige, and so forth. This world is changing rapidly, into one where livestock are part of a globally integrated food production enterprise. Understanding the impact of these changes on poor people in poor countries requires not only understanding the forces driving higher meat consumption, but also the changing nature of the global market for meat production.

Forces Promoting Vertical Coordination

Changes in industrial organisation have been associated worldwide with significant scaling-up of livestock production enterprise, particularly for poultry and hogs. Assessing the impact of global changes on social, health, and environmental outcomes in developing countries requires an understanding of the motives of vertical coordination. Martinez (2002) suggests that some of the reasons for such integration in the pork and poultry sectors in the United States was that "Contracting and vertical integration produced a means for reducing transaction costs associated with relationship-specific transactions, especially in regions of expanding production. Contracts would provide some safeguards against opportunistic behaviour, and vertical integration eliminated the exchange relationship. For attributes that are difficult to measure, gaining additional control over related production inputs may reduce measuring costs by reducing the need to measure quality." (Martinez, 2002, p.iii).

Increased Demand for a Improved Animal Health, Food Safety, and Minimal Environmental Impact

There are a number of diseases associated with increasing intensity of production and concentration of animals on limited space. Many of them pose a threat to human health; industrial and intensive forms of animal production may be a breeding ground for emerging zoonotic diseases, with unknown consequences. Intensive animal production can also amplify a number of potential human pathogens, increasing the risk to public health. Large-scale production, especially of pigs, can result in environmental pollution due to the large quantities of effluents produced, particularly if they are released untreated into waterways or leach from soils into subterranean water supplies. Animal manure is likely to harbour a variety of pathogens, but only a few have been identified as having zoonotic potential (Stauch and Ballarini 1994). In addition, effluent consists of feces, urine, and unconsumed feed

and waste water. It can contain heavy metals, antibiotics, antimicrobials, and possibly hormones used to improve feed conversion efficiency and reproduction rates.

All scales of livestock production have the potential to contribute to animal and human disease by virtue of harbouring these pathogens. In developing countries, small- scale family farms are typically characterised by close human / animal contact and frequent movement of both humans and animals between farms. In many situations, animals are kept in and around human dwellings; this is especially true for pigs and poultry. This creates a high risk for direct transfer of pathogens from animals to humans. The risk is worsened by the fact veterinary services are often minimal and animals are not routinely treated for pathogens that can affect humans such as internal parasites, or vaccinated against common zoonoses such as brucellosis and leptospirosis. Manure volume, handling, and disposal become important issues with social and economic implications for farms and communities as animal densities per unit area increase. Livestock enterprises are coming under increasing social pressure to control odours and other contaminants from their operations.

While it is well known that food safety standards are high in developed countries, it is also the case that many of the same concerns are held by consumers in the high-end markets of developing countries, especially in the major cities. Gomez *et al.* (2001) point out that global trends in food safety are also affecting food industries in developing countries, where domestic items compete with foreign-produced products in local markets and the safety certification of the foreign product is felt to be more credible. Food safety is thus not just a matter of medical suitability for human consumption; it is also an attribute of effective demand in the marketplace that had, as much to do with the credibility of the safety certification the product posses as it does with the actual safety. Smallholder-produced products that are not credibly cer-

tified as having been produced and handled through safe processes cannot compete in these markets, even if many of them are quite safe most of the time. Food safety certification has a cost to deliver and requires a price premium to elicit the requisite supply for the marketplace. It may not be a scale-neutral process. A key question is whether smallholders can continue to compete for growing urban markets in developing countries without the requisite institutional support to develop, certify and enforce standards for their products.

The Increasing Complexity of Livestock Trade and Rapidly Rising Stakes in Animal Disease Control

Historically only a small amount of livestock production in the world is actually traded internationally. Excluding intra-EU trade, only 4 per cent of meat products were traded across international borders in the early 1980s (FAOStat, 2002). The figure at the present time is closer to 10 per cent. This is in part due to the high cost of transportation and the existing health and hygienic regulations, but it is also because meat and dairy are typically highly protected sectors. Together, they accounted for 38 per cent of all Producer Subsidy Equivalents to agriculture in the EU in 1998, with the latter calculated at $130 billion (OECD, 2000). It is small wonder that many developing country meat exporters perceived tariff reduction or subsidy elimination in the OECD countries as the main constraint on their livestock sectors during the GATT negotiations of the late 1980s and early 1990s

Historically, countries not free of major livestock disease were not allowed to ship fresh products, due to the concern of spreading disease. Major changes occurred in the 1990s, in addition to the growing realisation that the expanding export market to be captured was in the South, not the North. With the advent of the WTO / SPS agreements in 1994 / 1995, environmental, animal welfare, and health issues entered a trade negotiation domain previously focused on elimination of export subsides and tariffication

of quantitative restrictions. At the same time, the World Animal Health Organisation (OIE) agreed to the principle of regionalisation of certification of disease-free status. This meant that countries that had areas where List A diseases such as Foot-and-Mouth disease were endemic and impossible to control without vaccination could nevertheless have other areas designated as vaccine-free, disease-free export zones.

In the process, sanitary barriers to animal product exports from developing countries have become much more complex. Products that were formerly excluded because of prohibitive duties, quotas, or country of origin were now sometimes being excluded through more involved sanitary procedures related to the specific shipment in question. Although many developing countries have benefited from global or regional agricultural trade liberalisation through better access to nontraditional fruit and vegetable markets, few have been able to increase access to the dairy and fresh meat markets because of animal health and food safety concerns. Most developing countries do not have disease and food safety control and certification programs in place that are credibly equivalent to those of the developed countries, preventing them from participating in the high-value end of exports. The potential gain is high enough for some countries to begin to develop the necessary institutions for market participation, but smallholders are typically not involved. How this institutional development in fact occurs is critical to the equity impacts of the livestock revolution.

WHY SCALING-UP OF PRODUCTION MATTERS FOR PRO-POOR AND SUSTAINABLE GROWTH POLICIES

In general, poor rural households are characterised by small farms, low levels of education, lack of liquidity, modest use of agricultural inputs, low opportunity cost of labour, and limited access to markets. Agricultural development will need to be part of any development solution to both poverty and environmental

sustainability, not only because of its direct impact on incomes, but also because of indirect effects in rural areas on demand for local items produced by the poor.

Because high-value agricultural commodities are the only part of developing country agriculture growing faster than one per cent per capita per annum (meat and fish demand have grown at about 3.7 per cent per annum per capita over the last 20 years), there is in an average sense not much future for smallholder agriculture if smallholders cannot participate in livestock and fishery activities.

Furthermore, small farmers often have some cost advantages in producing high-value meat, egg, and milk commodities relative to large-scale producers (Delgado and Minot, 2003):

- Small farmers have a lower opportunity cost of labour, implying that the implicit wage rate for family labour is generally below the prevailing wage rate for agricultural labour in low-income countries.
- The family labour used by small farmers is more motivated and requires less monitoring than hired labour used by large-scale farms, so that small farms are better able to apply careful husbandry and respond to problems in the field.
- Small farms usually grow a mix of crops, livestock and fish (depending on location) and a dispersed pattern of production impede the transmission of animal or crop-specific pests and diseases compared to large-scale production.
- Small livestock producers may face lower waste-disposal costs (or generate lower environmental costs) if production is dispersed enough to allow natural absorption.

On the other hand, rising market share in developing countries for larger-scale producers of pork, eggs, and poultry meat (Delgado and Narrod, 2002) suggest that other factors may be prevailing in determining who in developing countries is able to capture the fast expanding market:

- Small farmers may not have the technical skills needed to produce these commodities. Even if they are familiar with producing chickens or vegetables for home consumption, the production techniques may be different for commercial production.
- Lack of credit or liquidity makes it difficult to purchase specialised agricultural inputs or to make investments needed to produce these commodities.
- Small farmers are less able to bear the risk associated with producing highly perishable commodities. Not only do perishable commodities experience greater price fluctuations and risk of spoilage, but also once the commodity is ready for sale, perishability puts the farmer in a weak bargaining position relative to the buyer.
- Small farmers frequently do not have access to information about market demand needed to make production decisions. The problem is not just lack of price information, but also lack of information about the relationship between price and product characteristics such as colour, size, shape, texture, fat content, freshness and so on.
- Buyers may not have access to information about the quality of output from specific smallholder farms, which makes them less willing to purchase from any smallholders at any given price level, compared to buying from a well-identified large-scale provider.
- Larger farms may be more able to secure policy subsidies such as subsidised credit or better infrastructure, as compared to smallholders.
- Larger farms may be relatively more able to get away with creating negative externalities through pollution than smallholders.

GROWTH OF THE LIVESTOCK SECTOR IN STUDY COUNTRIES

The research underlying this paper investigated factors effecting scaling-up of swine production in the Philippines, Thailand and

Brazil; broiler production in Thailand, the Philippines, Brazil, and India; layer production in India, Brazil and Thailand; and dairy production in India, Brazil and Thailand livestock production in Thailand, Brazil, India, and the Philippines based on household surveys and analysis. The commodities chosen for analysis in each country stemmed from the desire to stick with a manageable task, but to observe the production of those items that had the following characteristics: (a) production was growing rapidly at the national level; (b) the commodities were important for the country concerned, (c) small-scale operators had traditionally and recently been involved in producing these commodities, and (4), there was at least anecdotal evidence that smallholders were being displaced from the sector in the sense that they were losing market share to larger operations, or would soon do so.

Robust growth in the demand for meat in the last two decades in the Philippines has been propelled mainly by continued high population growth rates, at about 2.3 per cent per annum (NSCB, 2000) and rapid urbanisation, particularly in the provinces around the National Capital Region (Metro Manila), covering the regions of Central Luzon and Southern Luzon. There are also major urban centres in the south, Metro-Cebu in the Visayas islands, and Metro Davao in the southern island of Mindanao. Demand growth for meat has been impressive, even with modest and often interrupted improvements in per capita incomes. Small-scale egg producers have virtually disappeared in the Philippines. Although small-scale broiler producers are now also becoming harder to find, medium-to large-scale independents continue to compete with large integrators. Small-scale swine producers continue to grow in number, and still represented about 70 per cent of hog production by weight in the Philippines in 1998. However, large-scale vertically-coordinated production is growing much faster and is reducing the market share of small-scale producers (Costales *et al.* 2002).

In India, milk production is the most important agricultural activity in the agricultural sector. At national level, around 17 per cent of the total value of agricultural production is derived from this sector. The other livestock sectors (meat, poultry, wool and hair, etc.) account for a further 8.3 per cent of agricultural value-added. The milk sector generates an especially high proportion of agricultural output in the northern and western parts of the country. Milk production in India increased from 17 million tons in 1950-51 to 84.6 million tons in 2001-02 (Sharma *et al.*, 2003).

Although cultural and religious factors have meant that India has not followed the path of most other developing countries into red meat consumption, the Indian poultry sector has undergone a thorough transformation from backyard rearing to commercial farming in the short span of three decades. Poultry is today one of the fastest growing segments of the agricultural sector in India. While production of agricultural crops in the country has been growing at a rate of 1.5 to 2 per cent per annum during the last two decades, that of poultry has been rising fast, 6 to 7 per cent per annum in the case of eggs and around 18 per cent in the case of broilers. India ranked fifth in the world in egg production in 2000: producing 37 billion eggs. Similarly, India produced around one billion broilers in 2001.

The number of broiler hatcheries too has grown: around 750 in the year 2000 against 77 in 1980. Capital investment in the poultry industry in 1999-2000 is estimated to be around Rs.13,000 billion, and the industry contributed Rs.102.34 billion to India's gross domestic product during 1999-2000. The industry has also made significant progress in the areas of breeding, nutrition, management, and health care. Some of its major achievements include availability of several world known brands of commercial hybrid chicks, essential equipment and machinery, medicines and vaccines, compounded poultry feed, disease diagnostic services,

poultry training programme, and technical and skilled manpower (Mehta *et al*., 2002).

Brazil has witnessed many of the same high growth trends for milk, pork, and poultry products. Yet in Brazil more than in the other countries studied, many of the small and medium size farmers have been increasingly being replaced by large operations that are supplying the agribusiness sector. Two important technological changes in dairy marketing and processing affected the dairy industry, particularly since the mid-90s. The first one was the bulk collection of refrigerated milk; the second technological change was the substitution of pasteurised milk (especially Grade C) for sterilised long-life milk. Both these changes impacted on the desire of processors to procure from smaller farms, and have helped promote scaling-up in Brazil.

Swine and poultry have also grown rapidly in Brazil in recent years, and have become increasingly vertically coordinated. Differences in the structure of production have stemmed in a large part from differences in demand: swine production has traditionally gone for domestic consumption because of the animal disease status (although this is now changing because of the FMD (foot-and-mouth-disease)-free zones in the south, and broiler production has been driven by exports. The most dynamic growth sectors have been in the traditional smallholding areas of the south, where much scaling-up has been observed, and in the newly settled lands of the central mid-west, where the new farms are typically larger-scale (Camargo Barros *et al.,* 2002).

Thailand has been characterised by rapid growth in consumption of meat over the past 20 years, but much more rapid growth in production, at least for broilers, which have been one of the stars of Thai export-led growth. Thailand has just begun to export broilers slightly more than two decades ago and has become one of the leading exporters worldwide. Broiler develop-

ment has been largely undertaken by the private sector. Many private firms claim that, technology-wise, Thailand's broiler industry could compete with anyone in the world. Although small-scale operations can be found, especially outside designated export zones (exports of fresh swine meat has not been possible because of their FMD status), Thai poultry and swine production operations have been scaling-up at a rapid pace. Dairy remains small-scale, but is heavily protected and directly subsidised throughout the country.

Taken together, the four country cases yield rich insights into both the determinants of growth and the supply response important to better understanding the scope for a future role for smallholders.

HYPOTHESES AND SURVEYS

The following seven hypotheses were developed and household surveys were designed in all four countries and carried out in 2002-2003 so to enable testing of these hypotheses.

- **Hypothesis 1:** Small-scale producers have lower profits per unit of output than do large producers.
- **Hypothesis 2:** Large-scale producers are more efficient users of farm resources to secure profits, other things equal.
- **Hypothesis 3:** Small-farmers expend a higher amount of effort/investment in abatement of negative environmental externalities per unit of output than do large farmers.
- **Hypothesis 4:** The relative profit efficiency of large-scale farms is more sensitive to environmental externalities than is the case for small farms.
- **Hypothesis 5:** Profits of small-scale producers are more sensitive to 'transaction costs' than are those of large-scale producers.
- **Hypothesis 6:** Contract farmers have higher nominal profits per unit compared with independents of similar scale.
- **Hypothesis 7:** Contract farmers are more profit efficient than independent farmers for comparable scales of operation.

Table 2 shows the size and composition of the final household survey samples for each country (details are presented in each country report). The samples were stratified according to scale of operation (small-scale, medium-scale, and large-scale or commercial) and type of production arrangement (independent and contract). The details of the surveys, the descriptive statistics and comparisons are found in Delgado, Narrod, and Tiongco (2003) and the four country reports Costales *et al.*, (2003), Mehta *et al.*, (2003), Sharma *et al.* (2003), Poapongsakorn *et al.*, (2003), and Camargo Barros *et al.*, (2003).

In the case of Thailand, the sample was representative of both old and new major livestock-producing areas from the last 15 to 20 years. The coverage of the new areas was chosen for the purpose of assessing the impact of expansion of modern livestock production on the smallholders who practice traditional technology. The areas covered were the key areas of broiler, swine, layer, and dairy farms, and were also the largest livestock producers in the country. The farms sampled represented the types of activities per livestock commodity. For example, in swine, the types of activities considered were growing piglets, raising fatteners, or a combination of both activities. In the case of layers, representative samples for farms growing chicks for hens or feeding hens for laying eggs, or a combination of both were well taken. Contract farming is dominant in Thai poultry production, and different types of contractual arrangement were also represented in the samples taken.

In India poultry, the sample represents the two states of India where industrialisation of poultry has been expanding its scale of operation. These two states cover the spectrum of poultry development and scales of activity, and both have considerable potential for future development. The regions covered in for dairy production are well-developed milk-producing regions in India that reflect significant differences in organisational structure.

In the Philippines, the dominant practice in broiler production is through commercial contracts with the large integrators. There are still, however, smaller-sized contracts with the smaller integrators (with 6,000–10,000 birds), while smallholder independent broiler production is disappearing. Independent commercial broiler operation is also becoming scarce. In hog production, smallholder independent operations are still present in the regions chosen, but the level of commercial hog production activities is high (except for Northern Mindanao). Smallholder contracts were not found in Central Luzon, but are present in Southern Tagalog (Luzon), where few feedmills engaging in contract production with smallholders exist. Commercial-sized contract production arrangements exist, but there is great difficulty in obtaining production and marketing information. Large independent commercial hog production farms also exist in all three regions, and are mostly managed by Chinese businessmen who were generally unwilling to be interviewed. The type of activities engaged in by hog producers was well represented by the samples taken—namely, farrow-to-wean (piglet production) operations, farrow-to-finish activities, grow-to-finish, or a combination of farrow-to-wean and farrow-to-finish operations.

The farm samples in Brazil represented the main producing states in livestock industry. Some study sites chosen, which are not highly industrialised, have great potential for expansion in animal production. For instance, samples for dairy farms (mostly large-scale farms) were taken from Minas Gerais for the reason that it is a main milk-producing state, other samples from Rio Grande de Sul because of the high proportion of small-scale farms, and some from Goias because of the presence of milk production based on mixed herds (producing both milk and beef).

The types of activities such as complete cycle, piglet growers, and finishers in swine were considered in the selection of the sample. Distribution of samples was also based on production arrange-

ments, such as independent, integrated with companies, or integrated with cooperatives.

RESULTS

The details of the methodology for obtaining these results can be found in Delgado, Narrod, and Tiongco (2003). For space purposes only the results are discussed here.

Comparative Unit Profitability By Class of Farm

The results from the country studies are intriguing. In most cases smallholders made higher profits per unit than larger scale farms, if family labour is not costed for either group. The unit profit advantage of smallholders tended to disappear if family labour is costed at market rates. In the Philippines and Thailand, contract farmers for broilers did better than independents at comparable levels of scale, because their forward price guarantees served them well in the face of falling world prices. This was not the case in India, however, where different power structures and greater isolation from world markets (at least for broilers) may be the explanation. There was a remarkable similarity in returns to contractors at all levels of scale, except for Indian broilers, where large scale-contractors did significantly better.

In India, small-scale dairy producers have higher profits on average, at 2.45 rupees per litre without costing family labour, than large-scale farms at 0.52 rupees per litre. Similar results with a small gap hold if family labour is costed at market rates. In Thailand, medium-scale dairy farms made more about 20 per cent more profit, at 6.25 Baht per litre, than either small or large-scale dairy farms. In Brazil, there was no significant difference in profit per unit of output between small and medium dairy farms, both of which just failed to cover costs; large dairy farms just broke even at 0.05 Reals per litre positive profit.

Results on unit profitability of broiler farming are especially interesting for two reasons. First, broilers are traditionally thought

of as the area of livestock farming with the largest inherent "economies of scale", in the sense that unit costs of production are supposed to be lower for quite a while beyond smallholder levels as scale rises. Second, broilers are the area where contract farming is most prevalent, and thus where there is the most information on the costs and benefits of the vertical integration of smallholders.

In India, independent small-scale broiler producers actually made a little more profit per unit than did large-scale independent broiler farms, without costing family labour, at 13.1 versus 10.9 Rupees per bird, respectively. But small-scale contractors did much worse, at 1 Rupee per bird, compared to large-scale contractors at 3.2 Rupees per bird. In the Philippines, independent smallholders also had higher profits per kg than large-scale independents, at 1.6 Pesos per kg versus 1.1 Pesos. Contrary to India, small contract broiler farms in the Philippines had higher per unit profits than large contract farms, but interestingly there was virtually no difference between small and large contractors: 4.1 Pesos versus 4.0 Peso per bird, respectively. In Thailand, large independent broiler farms, at 2.5 Baht per kg average profit, did better than medium-sized independent farms at 1.6 Baht per kg. On the other hand, independent smallholders failed to cover costs, at 0.15 Baht per kg average loss. If family labour is not costed, fee contract farmers in the Thai broiler sample had similar per unit profits for large and small-scale (1.6 versus 1.5 Baht per kg, respectively), but the medium-scale contractors had only 1.1 Baht per kg profit. The medium-scale farmers had to employ labour, which cut their unit profits relative to smallholders, but were not in the same cost structure as the larger farmers. In Brazil, small and large and broiler farms have surprisingly similar, profits per unit: 0.05 Reals per kg versus 0.06 Reals. Smallholders maintain their unit profits at big farm rates by not costing family labour.

Among Indian layer farmers, smallholders had higher profits per unit than larger farms if family labour is not costed, at 0.23

rupees per egg versus 0.17 rupees. If family labour is costed at market rates, smallholders have net losses per egg, while large-scale farms continue to have positive profit. In Brazil, both large and small layer farms had net losses in the survey year, although the large-farms almost covered their costs at a net loss of 0.01 Real per egg, compared to a net loss for smallholders of 0.04 Reals per egg, not costing family labour.

In the Philippines, independent smallholder swine farmers had higher profits per kg than large-scale independents, at 26.6 Pesos per kg live-weight versus 19.8 Pesos. Most of the difference comes from not costing family labour, and medium and large-scale independents had essentially similar per kg profit rates. In Thailand, small-scale independents had average profits of 11.5 Baht per kg, compared to 20.0 Baht for medium-sized farms and 15.4 Baht for the largest farms. In Brazil, smallholders lost on average 0.25 Reals per kg of swine, compared to losses of 0.15 Reals per kg for large farms.

Thus hypothesis one is not supported: there is no basis in the data to the view that smallholders make smaller per unit profits than do large farms, as long as their family labour is not costed at market wage rates. The pattern of good performance for independent smallholders versus large-scale independents above is encouraging, but should be kept in perspective. In the Philippines for example, the total average annual income from swine-raising for farms in the independent smallholder sample was US$309 per farm, whereas for the larger farm sample it was US$9,650 per farm. The latter does not include the profits of the largest farms, belonging directly to integrators and not surveyed here. Even more pronounced gaps could be observed between the incomes of large and small farms in Thailand and Brazil. Thus despite the better per unit profit of smallholders, large-farms might still drive them out if they are more efficient users of resources for production. Another uncertainty is whether large farms have

an unfair cost advantage in terms of environmental externalities that they capture.

Comparative Capture of Environmental Externalities

Two approaches are used to get at scale-differences in the capture of environmental externalities (or, in other words, having someone else incur costs while one gets the benefits). The first is from calculations of nutrient mass balances. The second is from a more indirect measure of environmental impact in terms of expenditures on environmental mitigation.

Mass balances

The utilisation and disposal of animal manure and dead animals has become a concern recently as the structure of the industry has shifted toward fewer but larger operations, and the percentage of animals raised in confinement has increased. Traditionally, farmers applied manure to agricultural land to promote plant growth, thereby recycling much of the nutrients. With fewer but larger operations, manure has become more concentrated in localised areas. When application rates exceed the carrying capacity of the land to assimilate nutrients, repeated applications can lead to a buildup of nutrients in the soil.

Following the first prong of our double approach to this issue, mass balance calculations were performed to get a rough estimate of actual nutrient balances. They serve to indicate systems with potential problem areas, as well as where further research and technology transfer may be the more productive for certain size households. They also to serve to indicate why some households have active involvement with manure markets. A negative mass balance implies that excess nutrients are likely to accumulate in soil and water, leading to sustainability problems.

The mass balance for swine production showed a similar range of excess nitrogen and phosphorus across countries. For each of

the three countries in which the swine population was sampled the larger producers show larger deficits, indicating a greater need to find adequate disposal methods for manure. Each country has some households with sufficient land to assimilate nitrogen produced. Smaller producers are much more likely to have positive balances. Brazil, with its larger land availability, has households with positive balances in every size category. Conversely, Thailand's large producers all have large negative nutrient balances.

Nutrient balances for poultry show wide variation between countries. Large producers are likely to have large nutrient absorption deficits, while smaller producers are more likely to have small deficits. Small producers in the Philippines have the largest number of households with positive mass balances. Thailand shows a similar range as India and the Philippines, but there are a few observations with relatively large negative nutrient balances. Only India has small producers with nutrient balances at less than minus 10 metric tons. Also India shows no households with a positive balance. This is indicative of the higher degree of households producing on relatively small plots of land in India. For smaller production households with lower excess nutrient balances, informal mechanisms to dispose of manure may be sufficient as long as they meet environmental requirements. In all the countries surveyed there appears to be an active market for poultry manure to aid this. Large producers may require systems that guarantee that excess manure is disposed of in a controlled manner.

Relative to other livestock production, the mass balances for dairy production are comparatively in balance. Dairy production by its nature requires land. Thus producers, may have sufficient land to properly dispose of manure, or may have access to nearby land. It is possible that small-scale producers in place like India or Thailand may not warrant sophisticated manure disposal mechanisms if they have adequate land.

Thus, the mass balance calculations show clearly and by a direct approach that smallholders are creating less of an environmental problem per unit of output than is the case for large farms. This result stems from the fact that in most cases smallholders have relatively more cropland available to them per animal to dispose of manure and dead animals. However, experience in Southern Luzon, the Philippines, suggests that if enough animals congregate in the same place, and that is close to cities, this relationship may change over time. For the time being, the mass balance approach indicates that smallholder production is more environmentally friendly.

Environmental mitigation effort per kilogram of output

A second approach yields a per farm-specific measure of environmental mitigation in money units of effort per unit of output. If one can assume that negative externalities within a country and commodity group are equal for each unit of output (a heroic assumption), then this approach gives an indirect alternative approach to estimating per farm differences in the amount of advantage gained from environmental externalities per unit of output. Farmers that make an effort, financial or otherwise, to prevent problems by spreading manure or otherwise cleaning up, or compensating their neighbours for problems created, are by definition internalising a portion of the negative externalities created per unit of output. If externalities are the same per unit of output, then greater mitigation effort (measured in money terms per unit of output) means greater internalisation, other things equal.

For broilers, smaller producers mitigate more per unit of output in each country. This difference in mitigation effort by size is striking. In each country except Brazil, smaller producers score on average over 5 times more in environmental mitigation effort per unit of output than large farms. In Brazil, the difference is a factor of 2. For layers, the relative difference is less. For Brazil and Thailand, the mitigation efforts per unit for layer households are higher

than for broiler producing households. In Brazil, the opposite holds. In the Philippines, small contract producers make less effort than independents, but larger contactor make more effort.

Small-scale swine producers also make a larger effort per unit of output than larger producers, except in the Philippines, where larger independent producers expend more than medium-scale independent producers, but less than small-scale producers. Larger producers in Thailand expend considerably less per unit than smaller producers.

In India, dairy environmental effort per litre of milk output declines with increasing size. Efforts are relatively constant across scales in Brazilian dairy. Small producers expend very little on environmentally related costs in Thailand, but medium producers expend five times more than large producers.

On the whole, the indirect approach to capture of negative externalities through mitigation behaviour is completely consistent with the mass balance approach. Smallholders make a significantly greater effort to mitigate negative environmental externalities than larger-scale farms. **Thus, hypothesis 3 is supported by the data.** However, the absolute orders of magnitude do not suggest that this is a major explainer of scaling-up, although it may be one factor.

Comparative Profit Efficiency

Unlike profit per unit, which is a descriptive variable, profit efficiency per farm is an analytical result from a modelling effort. Profit efficiency in the current context is a measure for each farm of the percentage that the actual unit profit performance of that farm is of the ideal computed for that farm, given that farm's resources and facing the same input and output prices as that farm. Typically farms in the overall sample may be at 60 to 80 per cent of computed maximum obtainable profit per unit for that farm. Averages across farms are computed for classes of interest, such as independent smallholders.

The overall results from comparing relative profit efficiency across countries, commodities, and degree of vertical integration are that small farms are not less efficient at securing profits per unit of output when family labour and environmental externalities are not costed. **Hypothesis 2, that large-scale farms are more profit efficient, is therefore not supported by this study, with the possible exception of the largest producers of broilers and finished hogs. It is clearly not the case for dairy. Given higher unit profits and higher profit efficiency, smallholders at least have a chance in livestock farming.**

Second, the efficiency advantage of smallholders increases when going from the backyard to the smallholder commercial model, but disappears fairly quickly with increasing size of operation, as the unit cost advantages of a "free" stock of family labour become less important. The smallholder commercial model, which is really an improved version of the backyard model, would seem to be a viable target for technology and institutional development.

Dairy production clearly is most efficient at small (not tiny) scales, consistent with 20 to 30 cowherds. Dairy clearly is a smallholder activity, and there is potential for keeping smallholders involved in poultry and swine, particularly with vertical coordination. All this abstracts from possible economies of scale in collection, processing and distribution of products such as milk and poultry, where transaction costs on the marketing (not production) side are major.

Third, vertical coordination such as contract farming and dairy cooperatives clearly improve the relative profit efficiency of smallholder farmers, even if in some cases (e.g. India broilers), unit profits were lower for contract farmers. Hypothesis 7 is supported by the results above, although there is more work to do in this area. Contract farming works to improve efficiency (and thus competitiveness) by reducing transaction costs. The next section

gives insights on which transaction costs and other factors explain why specific farms are profit inefficient.

Why Are Some Farms More Efficient at Making Profits than Others?

The same analytical approach that yields the results on efficiency levels in the previous sub-section also permits assessing the determinants of relative profit efficiency across farms. In effect, we are simultaneously explaining why some farms are less profit efficient than others in terms of cross-farm differences in environmental mitigation behaviour, differences across farms in access to information and assets, and differences (if any) in access to policy subsidies per unit of output.

The role of environmental externalities

Hypothesis 4 posits that the relative profit efficiency of large farms is more sensitive to the capture of negative environmental externalities than is the case for small farms. In other words, the competitiveness of large farms is helped more by negative externalities associated with livestock production than is the competitiveness of small farms. **Results on this are mixed.** Monetising a measure of environmental mitigation, or internalisation of negative externalities, helps explain why some farms are more or less profit efficient in the majority of cases. However, the issues are different within the separate categories of large and small farms. Furthermore, differences in environmental mitigation do not seem to be strong explainers of differences in profit efficiency across sizes of operation. The brunt of evidence is that **within the class of large-scale operations for swine and poultry, greater effort for mitigation of environmental externalities seems to be associated with greater relative profit efficiency**. This is clearest in the case of broilers in and swine in the Philippines and layers in India. Interestingly, these tend to be mostly independent operations that are transitioning towards more industrial production, at least as compared with other samples studied. Results for small-

holders are more mixed, especially if contract and independent sub-samples are considered together. Most fee (or wage) contractors have to follow a standard set of environmental practices as part of their contract, and they resemble larger scale farms in this respect more than other smallholders.

The environmental mitigation variable did not seem to have much influence on relative profit efficiency in the Thai sample. Egg and swine producers in Brazil, smallholder swine producers in the Philippines, and large-scale broiler farmers in India that spent relatively more on environmental mitigation tended to have lower relative profit efficiency at the end of the day, other things equal. It is interesting to speculate whether these sub-samples operated in conditions where it was relatively easier to ignore environmental issues, or perhaps harder to follow environmentally sound practices because of land scarcity.

The role of access to information and assets

With regard to **hypothesis 5, farm-specific transactions costs seem to matter greatly to explaining relative profit efficiency across farms in most of the sub-samples studied. This means that relatively greater difficulties in securing access to assets and information for smallholders is a prime explainer of differences in relative profit efficiency within their group, and between them and large-scale farmers**.

The most notable exceptions—where farm-specific differences in transaction cost proxy variables did little to explain differences across farms in relative profit efficiency—occurred for dairy farms. It is likely that transaction costs for dairy almost all occur in the marketing chain and not at the level of production, at least in the Indian and Thai contexts. Feed is mostly forage (avoiding the high credit and quality-related transactions costs packed into using concentrate feeds) and the timing of sales is a foregone conclusion, viz. daily. This is quite unlike farmers of monogastrics, where

the timing of sale is more discretionary (requiring information), much less frequent, but critical to profit margins. For those cases where transaction cost variables matter most to smallholder producers, the main issues appear to be access to telephone service and the market information that goes along with this, and access to credit.

What Then Is the Outlook for Independent Smallholder Livestock Farming?

What does all this mean for smallholders? Summarising in informal and general form the empirical results of the hypotheses tested, we conclude: (a) smallholders have higher profits per unit; (b) they are more profit efficient, at least within the range of production where there family labour input per unit of output is still high; (c) smallholders have less of a negative impact per unit of output on the environment than do large farms; (d) large farms that are more environmentally responsible are also more competitive within the class of large-farms, but reverse is true for smallholders; (e) the competitiveness of smallholders is largely determined by farm-specific abilities to overcome barriers to information and assets; among thee, credit and market information are especially important; (f) contract farmers have higher profits per unit of output than do independent farmers in some but not all cases; (g) contract farmers tend to be more profit efficient that independent farmers at all scales.

From (a) and (b) we conclude that smallholders have a chance; they are actually more competitive for low-end local markets than are large-scale farmers, and the low-end has expanded enough in recent years to allow them to expand production rapidly. As markets gravitate to higher end concerns of quality and safety, smallholders will need help competing by being associated with institutions that can both supply the necessary technology, inputs, information, and accreditation for competing in higher-value markets.

From (c) and (d), we conclude that environmental concerns are not incompatible with promoting small-scale livestock production; and that large-scale producers have an incentive to clean up their act. It seems plausible that over time enforcement of environmental regulations will be more similar to enforcement of health regulations, both as a way for large producers to force small ones to bear the same costs that they do, but also to promote a public good for all producers. From (e) we conclude that the key to pro-poor livestock development is institutional development that overcomes the disproportionately high transaction costs that smallholders face in securing quality inputs and getting market recognition for quality outputs.

From (f) and (g), we conclude that contract farming has real potential to help better incorporate smallholders in high-value supply chains that require specialised inputs and sell to markets for specialised outputs. However the country studies revealed that contract farming covers a multitude of arrangements, some of which are more beneficial to smallholders than others. The concluding section will reflect further on what to do here, along with other insights for environmental policies.

Implications for Policy Intervention

Prompting pro-poor vertical integration of small-scale livestock farming

Contract farming allows small-scale producers to reduce the transaction cost of selling a perishable product in uncertain or thin markets, and to get higher prices from a buyer who is fairly certain that the farmer will deliver a fresh, quality product on time. The institution also shares risks and captures economies of scale in bulk purchasing of inputs. Properly done, contract farming can leave more wealth to share between producers and processors through the reduction of transaction costs that are a net loss to producers, processors, and consumers combined.

Five things drive potential advantages of contract farming. First, the changing needs of markets require changing product attributes, and these changing attributes may not be observable at the time of sale (such as food safety). Contracting may permit processors a higher degree of quality control under these circumstances than employer-employee relationships would do. Second, different commodities embody different types of transaction cost, and thus require different forms of institutional solutions. The information asymmetries between market participants in milk sales are fundamentally different than those for swine sales, for example. Dealing with these asymmetries is one of the biggest advantages of contract farming. Third, contract farming is a sharing of risks and benefits between seller and buyer. As such, the precise form it takes depends greatly on the distribution of power (market and political) between buyers and sellers, as does enforcement of contracts. Fourth, some risks may be much easier for large numbers of small-scale producers to bear jointly than one large farm by itself; the risk of environmental pollution penalties are a typical case. Fifth, contract farming shares the benefits of extension of technology between the integrator and the contractor. Extension rates are typically much higher within contract farming schemes than outside them.

Public policy that has a useful and widespread impact on keeping smallholders involved with the livestock sector needs to harness the resources of the private sector, as in contract farming, but ensure that the form it takes is beneficial to the growers as well as the integrators. This will require a much better understanding in the study countries and all developing countries of what contract farming does, can do, how, and what the costs and benefits of extending and modifying it are.

Environmental institutions and regulations

Different rules and regulations have been developed in the different study countries to control potential environmental prob-

lems from livestock. Brazil, Thailand, and the Philippines have the most comprehensive set of rules of the four countries. India has minimal environmental rules regarding livestock. Details are given in the country studies. The gist is that general regulations and institutions for protecting water quality and reducing air pollution have been amended over the years to apply to livestock, and particularly to the discharge of wastes from large operations. Furthermore, major livestock product exporters such as Thailand and Brazil have already implemented many changes in rules affecting animal health and made sure that they were complied with. State institutions with the full support of large-scale producers, who have a stake in export markets, did this. It seems probable that this trend will continue and will be extended to environmental concerns.

At the same time, all four-study countries report problems with environmental enforcement. Although a large number of rules and regulations on wastewater management have been developed in Thailand, and some incentives are offered to the livestock farms in investing in waste treatment technology, there has been a lack of enforcement even here. The Department of Livestock and Development (DLD) is expected to be a key institution to enforce environmental protection laws, as it currently does animal health regulations. Yet while DLD has the full support of Thailand's large poultry producers and exporters in order to keep foreign markets open through disease control, the consensus might breakdown on environmental issues. The latter may be less clearly linked to export goals and have the potential for pitting producer interests against the general population. Thus, it seems likely that responsible environmental management will require building a broader consensus and using an institutional base that is not subject to conflicts of interest through its current strong identification with producers.

Similarly for Brazil, though laws exist, there are problems with the enforcement of environmental laws due to lack of agreement

on the part of farmers with government policies in this area. In a survey done in Brazil in 2001 of 3,505 agricultural producers, 76 per cent considered the environmental issue as a theme that must be dealt with, yet only 5 per cent of the producers approved the current environmental plan of the government.

As the livestock sector has been more industrialised, livestock farms tend not only to be larger in size, but also run more as big businesses. As such, they tend to be under closer scrutiny by national, state, and local authorities than is the case for smallholders. In Thailand, for example, most attention has been paid to large swine farms, both in regulation and enforcement. In the Philippines, regulatory agencies that have in the past cracked down on large farms have only recently begun contemplating issuing regulations on pig waste disposal by small farms. One such agency in the high density Metro Manila livestock zone is the Laguna Lake Development Authority (LLDA) in Southern Luzon.

The institutions necessary to the enforcement of environmental standards for smallholders are quite different that those for large farms. It is not reasonable to expect an environmental impact statement from backyard farmers, nor is it easy for a centralised government agency to monitor compliance where tens of thousands of small producers are involved. Instead, management will have to be community-based, with common technical guidelines from a central agency. There also needs to be a means of appeal to a legal authority outside the local community, to protect both producers and inhabitants of regions dominated by powerful producers.

Trade policies and market-regulation

Much of the discussion in this study has taken the overall trade environment as given, and has focused on internal competition between large and small-scale producers. However no sector is more due for globalisation than livestock in the next twenty years. Opening up of livestock markets to outside competition, as is

required over the next six years in the current GATT agreements in the Philippines, for example, will restructure incentives the livestock sector. How this restructuring occurs will have much to do with the impact on small-scale producers. Current incentives are largely in favour of integration, but much of this has to do with protection on inputs (corn, day-old-chicks), as well as on outputs. Similarly, taxation of feedgrain sales in parts of Southern India has provided a strong incentive to integrate, as vertically coordinated feedmill/producers do not pay the tax. Liberalisation in one area without changing others will change the bottom line and the incentive to integrate.

The happiest picture for pro-poor smallholder livestock farming in developing countries is probably Indian dairy production over the past two decades. Yet changes may soon occur in this picture of dairy in India. As a part of domestic economic reforms and commitments to the WTO, the private processing portion of the Indian dairy sector was liberalised in a phased manner, starting with partial opening-up in 1991. However, a key rule passed soon thereafter ensured that large-scale private dairies could not procure milk in the same milk-sheds where cooperative societies were active. In March 2002, the government revoked these restrictions. It is too soon to tell how this will impact small farmers. On the one hand, only 11 per cent of milk is currently handled through the cooperative sector. On the other, the impact of deregulation of procurement in Brazil suggests that an incentive for scaling-up of dairy may now exist. Large-scale private dairies may prefer to contract with larger scale farms to provide milk, cutting procurement costs and possibly enforcing on-farm chilling of milk. The impact on the cooperatives and their members is still to be seen.

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TABLE 1: PAST TRENDS IN REAL PRICES OF SELECTED CROP, FEED, AND LIVESTOCK PRODUCTS

Constant 1990 US$/ton

	Maize	Beef	Pork	Poultry	Milk
1980	191	861	275	337	1,990
1981	181	705	280	306	2,066
1982	141	642	328	275	1,841
1983	171	631	272	287	1,256
1984	165	566	268	305	1,097
1985	132	520	238	271	958
1986	101	495	267	296	1,045
1987	84	547	261	240	1,163
1988	115	559	212	275	1,816
1989	116	549	207	278	1,879
1990	109	527	247	248	1,293
1991	104	529	214	226	1,436
1992	98	476	181	224	1,613
1993	94	495	190	231	1,401
1994	97	432	162	227	1,391
1995	109	346	168	225	1,809
1996	142	318	209	240	1,695
1997	99	324	197	226	1,492
1998	85	298	123	239	1,426
1999	75	312	125	219	1,221
2000	71	322	163	206	1,495
2001	71	346	n.a	212	1,541

Maize: $/ton, US #2 yellow, fob Gulf of Mexico. Source: IMF (http://www.imf.org/external/np/res/commod/index.asp)

Beef: $/ton, Australia/New Zealand frozen, U.S. import price. Source: IMF, same as above.

Pork: $/ton, USDA 5-market average hog prices. Source: (http://www.cattle-fax.com/data/files/hogs/b11.xls)

Poultry: $/ton, USDA Avg. 12-City Broiler Price, Broiler Composite and Georgia Dock Price.

Source: (http://www.cattle-fax.com/data/files/poultry/prices.xls)

Milk: $/ton, whole milk powder, fob Western Europe. After 1994, midpoint of prices reported by NZ Dairy Board.

Normal prices in U.S. $ are deflated by the U.S. Consumer Price Index.

Sources: FAO Commodity Review and Outlook 1982-1991, FAO Commodity Market Review 1995-2000, (http://www.ams.usda.gov/dairy/mncs/international/intpr2000.pdf)

TABLE 2: SAMPLING DISTRIBUTION BY COUNTRY/REGION/PROVINCE AND TYPE OF LIVESTOCK FARM (NUMBER OF FARMS)

Country/Region/ Province	Swine			Broiler				Layer				Dairy				
	Small	Large	All	Small	Medium	Large	All	Small	Medium	Large	All	Small	Medium	Large Peri-Urban	Commercial/	All
Thailand	131	43	174	125			170	41	32	23	96	35	38	19		92
Eastern province	75	32	107	75			97	31	26	19	76	15	14			29
Central province	39	9	48	37			52	4	6	4	14	7	14	15		36
Northeastern province	17	2	19	13			21	6	0	0	6	13	10	4		27
Philippines	110	97	207	62			116									
Central Luzon	24	35	59	31			61									
Southern Tagalog	47	29	76	31			55									
Northern Mindanao	39	33	72	-			-									
India												200	148	108	64	520
North Zone												100	68	58	34	260
West Zone												100	80	50	30	260
India				110			159	63		98	161					
Andhra Pradesh				71			80	22		58	80					
Haryana				39			79	41		40	81					
Brazil			193	90	118	27	235	41	26	22	89					160
South				66	51	0	91	14	5	1	20					72
Southeast				13	14	8	61	27	21	21	69					60
Centre West				11	53	19	83	0	0	0	0					28

Source: Compiled from A. Costales, *et al.*, 2003; R. Mehta, *et al.*, 2003; V.P. Sharma, *et al.*, 2003; N. Poapongsakorn, *et al.*, 2003; G.S. Camargo Barros, *et al.*, 2003.

Production Structure and Cost Competitiveness of Livestock Production in Asia

M.P.G. Kurup*

Livestock is germane to the farming systems in all countries across Asia. Traditional food habits determine the relative importance of the species farmed, as also the composition of livestock populations in each of them. In most countries livestock is extremely livelihood intensive and are owned predominantly by the small holders, although wide regional and national differences exist in their ownership pattern and holding size. The three major regions in Asia in the livestock context are: (1) South Asia: India, Pakistan, Bangladesh, Nepal and Sri Lanka; (2) East Asia: China, Japan, North and South Korea, Taiwan, Hong Kong and Philippines; and (3) South-East Asia: Thailand, Indonesia, Vietnam and Malaysia. Milk and milk products consumption is a traditional habit in the cultures of all countries in South Asia, whereas milk consumption beyond infancy is not a tradition in East and South-East Asia, where meat is traditionally the more favoured livestock product in the daily diets. India and China can be the classical examples for illustrating the traditional differences in food habits between regions: per capita consumption of milk in India and China in 1997 was 62 kg and 8 kg per year respectively, while meat consumption for the same year was 4 kg and 43 kg (Staal, 2001). Livestock populations in the two countries reflect these traditional differences (Table 1). In coun-

* M.P.G.Kurup is Consultant (Livestock and Dairy), Anand, India

TABLE 1: LIVESTOCK POPULATION

Species	China	India
Cattle	105 (12)	204 (43)
Buffalo	23 (3)	83 (18)
Sheep	131 (16)	51 (11)
Goat	148 (18)	115 (25)
Pig	438 (51)	13 (3)
Total	**845 (100)**	**466 (100)**

Figures in parentheses are percentages to total

Source: Wettiaus, *et. al,* 1992

tries where milk is consumed traditionally, much of the demand is for fresh milk for direct consumption or in tea and coffee, and to a lesser extent as fermented domestic products like curd, fermented milk drinks or fresh home made sweets. Some 45 per cent of all milk produced in India is consumed as liquid milk. Because of this overwhelming demand for fresh milk, domestic producers in these countries have considerable advantages over international competition, as fresh milk is difficult to trade internationally. Consumption of dairy products in East and South-East Asia however is growing under the influence of habits and products introduced by developed nations, driven by growing urbanisation and affluence, as well as government policies promoting consumption of milk (child nutrition, school feeding programmes etc.). Bulk of this new found demand is fulfilled by burgeoning imports of milk solids, mainly in the form of milk powder. For example, Vietnam now consumes some 460,000 tonnes of liquid milk equivalent annually and over 93 per cent of this demand is met by imports (Suc, *et. al*, 2001). This is true of most other countries in South-East Asia.

LIVESTOCK PRODUCTION IN ASIA

Among the regions of the world, Asia has the fastest developing livestock sector. Asia is by far the biggest region in the world in terms of human and livestock populations. Asia's human population is currently growing at 1.7 per cent per annum, with the

highest growth rate of 2.1 per cent in South Asia. Growing human populations, rising incomes and progressive urbanisation are fuelling the demand growth for all livestock products in the region. A Livestock Production System study by Mäki-Hokkanen (1998) establishes that in Asia, livestock production is predominantly associated with mixed farming systems and that in terms of output these systems show phenomenal annual growth rates. India is the largest milk producing country in the world and China the largest pork producing country. The major production systems identified by the study are:

- irrigated humid and subhumid tropical and subtropical mixed system (MIH)
- irrigated arid and semiarid tropical and subtropical mixed system (MIA)
- mixed irrigated temperate zones and tropical highlands (MIT);
- rainfed humid and subhumid tropical and subtropical system (MRH)
- rainfed arid and semiarid tropical and subtropical system (MRA), and
- landless livestock production system (LL)[1]

Growth in milk and meat consumption in global terms is modest (expected annual global growth rate between 1997-2020: 1.7 per cent for milk and 1.8 per cent for meat) compared to the Asian situation (overall milk consumption is projected to grow at the annual rate of 2.8 per cent in China and at 4.3 per cent in India). Projected annual growth rate for meat consumption during the same period is 3 per cent for China and 3.5 per cent for India.

[1] Defined as intensive landless monogastric or ruminant production system in urban / peri-urban areas not based on land (distinctly different from the landless production systems of the poor in South Asia). These intensive landless livestock production systems in 1993 produced 12.8 million tonnes of meat in Asia, more than double the total meat production from all land based rainfed mixed farming systems in Asia (Mäki Hokkonen, 1998).

TABLE 2: ANIMAL PRODUCTS–ANNUAL GROWTH PERCENTAGE IN ASIA, 1983-93

Product	MIH System	MIA System	MIT System
Beef	10.8	7.3	15.1
Buffalo meat	6.4	6.3	19.1
Sheep & goat meat	7.5	7.6	9.2
Dairy milk	7.3	6.5	3.0
Pig meat	4.8	4.6	4.4
Poultry meat	5.4	6.1	3.7

Source: Mäki - Hokkonen, 1998

These increases are from comparatively low initial levels of consumption; and in terms of per capita consumption the growth rates are lower, illustrating the impact of population growth, income levels and urbanisation. Milk production and consumption projections in Asia in 1993 and 2020 are given in Table 3; and meat production and consumption in 1996/2001 in Table 4, to illustrate the growth over time, in production and consumption in these countries.

TABLE 3: MILK PRODUCTION AND CONSUMPTION IN ASIA: PROJECTIONS 1993-2020

Region	Annual Growth Rate (per cent)		Per capita (kg) in 2020	
	Production	Consumption	Production	Consumption
China	3.2	2.8	13	12
Other East Asia	3.9	1.7	29	20
South-East Asia	2.9	2.7	5	16
India	1.6	4.3	135	125
Other South Asia	3.1	3.4	92	82

Source: Adapted from Delgado *et. al* , 1999.

LIVESTOCK PRODUCTION ORGANISATION

In the whole of Asia, South Asia stands out as drastically different in its livestock production organisation. Though mixed crop-livestock farming (mostly rainfed and to a small extent irrigated), is the preponderant farming system, production takes place in millions of small holdings scattered across the length and breadth

TABLE 4: MEAT PRODUCTION AND CONSUMPTION IN SELECTED COUNTRIES IN ASIA – 1996 AND 2001

(tonnes)

Country	Beef				Pork				Broiler			
	Production		Consumption		Production		Consumption		Production		Consumption	
	1996	2001	1996	2001	1996	2001	1996	2001	1996	2001	1996	2001
India	2752	2890	2730	2840	435	595	435	595	479	595	472	550
Indonesia	472	476	510	509	—		—		—		—	
Thailand	—		—		—		—		840	1230	654	823
Malaysia	17	20	119	148	—		—		660	813	668	846
China	3557	5488	3458	5448	31580	41485	31408	41764	5000	5200	5315	5184
Korea	236	221	459	521	865	1077	872	1158	416	413	427	494
Japan	555	458	1438	1371	1266	1245	2196	2269	1130	1074	1736	1772
Philippines	162	215	231	342	933	1064	942	1073	—		—	

Source: USDA (www.fas.usda.gov)

of the Indian Subcontinent. Over 70 per cent of these production units comprise sub-marginal or marginal holdings of less than one hectare in size.[2] Livestock holdings too are small, often a mix of more than one species.[3] Even the definition of "small holder" is substantially different for South Asia (over 80 per cent of them less than 1 hectare), compared to other regions. In all South Asian Countries livestock ownership pattern is more or less similar, with the smallholder group (landless, marginal and small holders together) owning 50-80 per cent of all species and accounting for over 60-80 per cent of all livestock outputs. Low productivity and large numbers are the hallmark of livestock populations in South Asia. Ruminants, both large and small depend on grazing and crop residues for the bulk of their nutrient intake, marginally supplemented with crop by products in the case of large ruminants. Some features of the milk production organisation in the South Asian region are presented in Table 5. Livestock ownership pattern in India is presented in Figure 1.

TABLE 5: SOME FEATURES OF MILK PRODUCTION ORGANISATION IN SOUTH ASIAN COUNTRIES

Feature	Bangladesh	India	Nepal	Pakistan	Sri Lanka
Livestock owners (million)	9.70	70.00	2.98	5.50	0.43
Total Cattle Population (million)	23.40	209.49	7.03	18.00	1.60
Total Buffalo Population (million)	0.85	91.78	3.40	21.21	0.72
Milch Animal per household	3-4	1-2	3-4	3-4	2-3
Milk production 1997 (million tonnes)	2.16	72.00	1.08	20.96	0.26

Source: Singh and Pundir, 2001

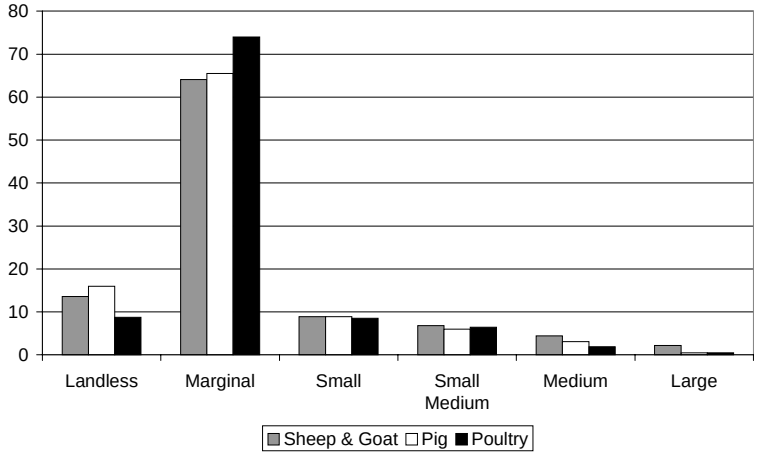
Notes: Smallholder made up of landless, marginal and small holders, over 80 per cent of them with less than 1 hectare of land.

In South-East Asia too smallholders dominate in livestock production, often in mixed livestock holdings: large ruminants, pigs,

2 With the exception of Pakistan where land holdings are slightly larger.

3 Except in the migratory herds / flocks of the transhumant tribes.

FIGURE 1: LIVESTOCK OWNERSHIP PATTERN IN INDIA



Source: NSSO, 1992

poultry and fish; all in mixed crop-livestock farming units. Over 95 per cent of the dairy farms in Thailand are smallholder enterprises, many of them upwardly mobile though, into some amount of specialisation. Pork production too takes place in mixed farms and is predominantly in the smallholder domain. Crop residues continue to be the main stay of the ruminant feeding practice in Thailand. In Vietnam, livestock production moved into smallholder households (95 per cent) from 1985 onwards, when small holders were encouraged to increasingly participate in livestock farming. Livestock holdings are small, scattered in the seven major production zones in the country, with some amount of species specificity among regions (buffaloes, beef cattle, dairy cattle, pig, poultry and duck), mainly determined by geographical compulsions and markets. Livestock production organisation in East Asia (China) is distinctly different from the systems prevailing in South and South-East Asia. Since 1978, with the reforms in land tenure, private ownership of livestock rapidly grew in China. Dairy production in China is concentrated in specific provinces and periurban areas. By 2001, livestock production organisation (pre-

dominantly pork production) in China was made up of varying sizes of mixed farms with several livestock species and crops: (1) subsistence livestock farmers in the pastoral / agricultural regions with small herds of indigenous cows, dairy goats and pigs, primarily for home consumption and small surpluses for local markets, (2) small holders with 5-10 medium yielding Chinese Holstein cattle, 10-20 pigs, 20-30 fowls and crop production; with modest sale of produces, (3) medium and large private farms with commercial dairy / pig production, (4) very large periurban private farms both dairy cattle / pig, with industrial scale operations and (5) the former city / state owned animal complexes now functioning as industrial scale farm corporations (Wattiaux, *et al.*, 2002). Livestock of all species in China are medium to high producers and they are managed in all farm types, efficiently, using inputs of quality: cultivated green fodder, hay and silage; high quality corn for grains and silage; and balanced concentrate feed; all comparable to or even better than systems prevailing in developed countries.

LIVESTOCK AND LIVELIHOOD

Livestock Sector in Asia is extremely livelihood intensive. Traditionally livestock provide the much needed supplementary income to farmers all over the region. In the mixed crop-livestock farming systems, animal husbandry is the second most important income generating activity in farm households in South Asia, supplementing livelihood. Over 70 per cent of the rural households keep livestock of one species or the other and earn incomes out of them. A nation wide study in India by the National Council of Applied Economic Research (NCAER) in 1999, for example, reported that sale of milk alone, accounted for the bulk of the contribution to the rural household income from livestock. The share of household income from dairy production in different zones in India and in different land holding categories, are presented in Tables 6 and 7. One of the most documented schemes in

India on household incomes from livestock is the "intensive mini dairy project" (IMDP) of the Uttar Pradesh Dairy Development Department. This is primarily a rural employment scheme enabling eligible milk producers in dairy cooperative society villages, access to commercial credit for replacing their nondescript milch animals with 2 to 4 crossbred cows and/or improved milch buffaloes, enabling better household resource utilisation. A comprehensive review of the project carried out by the Institute of Cooperative and Commercial Management, Research and Training (ICCMRT), Lucknow, in 1994, shows that income from dairy production increases dramatically without altering the quantum of income from other sources, in response to introduction of two cross bred cows into the household farm (Figure 2)

TABLE 6: ANNUAL HOUSEHOLD CASH INCOME BY SOURCE (PER CENT)

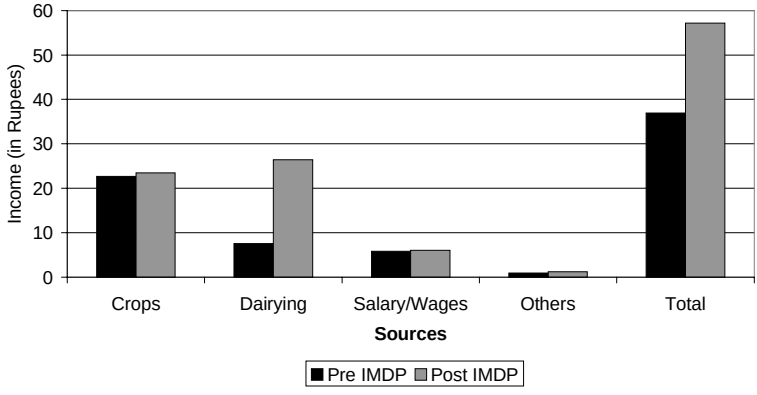
Zones	Dairy	Crops	Others
East	40.43	29.04	30.52
North	31.57	48.65	19.79
West	34.33	44.91	20.76
South	20.91	65.24	13.86

TABLE 7: ANNUAL HOUSEHOLD CASH INCOME BY SOURCE (PER CENT)

Category	Dairy	Crops	Others
Landless	53.08	0.00	46.92
Marginal	30.14	46.55	23.30
Small	29.17	53.75	16.58
Semi-medium	26.25	58.98	14.76
Medium	25.33	62.77	11.91
Large	19.02	71.48	9.50

Domestic prices for animal products in South Asia are determined by market forces and are reasonable enough to stimulate production. Markets for livestock products are traditional and unorganised (except for urban milk supply), but are efficient; producers find no difficulty in disposing of their produce. All livestock products are price and income elastic and expenditure elasticity of

FIGURE 2: IMPACT OF IMDP ON FARM INCOME IN UTTAR PRADESH



demand among the low income groups is high. None of the livestock products in south Asia has reached its per capita consumption potential. Rising incomes all round, therefore, portend burgeoning demand growth for all livestock products (Table 2). Import of livestock products in South Asia is very small, except for milk products in Bangladesh and Sri Lanka, where imports account for over 50 per cent of the total consumption.

TABLE 8: INTERNATIONAL TRADE VOLUMES OF KEY LIVESTOCK PRODUCTS

Commodity	Developing Countries		Developed Countries	
	1985	1995	1985	1995
Exports				
Meat	1902	3459	8911	15621
Milk	30	55	1287	1335
Imports				
Meat	2438	4296	8233	13612 *
Milk	482	390	1038	952

* out of the total 13.1 million tonnes of meat traded in 1995, Asian Countries' Import accounted for some 3.2 million tonnes, almost double the quantity imported in 1985.

Source: Mccalla and de Haan, 1997.

In South-East Asia livestock products, milk as well as meat face stiff competition from imports from developed countries and domestic prices are often depressed by imports of comparatively

low priced products of much higher quality. In spite of such economic deterrence, household livestock enterprises in all South-East Asian countries (particularly Thailand and Vietnam) however, are increasing in numbers. Governments of all countries in the region lay considerable emphasis on promotion of household livestock enterprises as a major tool for poverty alleviation. In China, private ownership of livestock as an economic option for small holders grew rapidly after the 1978 land tenure reforms and the government promoted smallholder household livestock enterprises primarily as the means for (a) sustaining livelihoods and household incomes and (b) improving animal protein intake in family diets. With the exception of milk products the availability of animal products to the Chinese diet now is above world averages (Wattiaux, *et. al,* 2002).

INTERNATIONAL TRADE IN LIVESTOCK PRODUCTS

An understanding of the international trade in livestock products, particularly the size of the trade and countries involved is essential to appreciate the competitiveness of smallholder production systems in developing countries. Annual international trade in meat is some 15 million tonnes and 10 million tonnes in milk and milk products, roughly 10 per cent of the global production of these commodities. Unlike trade in grains and oilseeds, livestock products need processing, special transport and sophisticated storage for international trade, limiting the volumes traded to small proportions of the output volumes. Main exporting countries are all in the developed world, both for meat as well as milk: Australia, New Zealand, European Union and North America. The main importers are the Asian countries: mainly Japan, Korea, China (including Hong Kong), Thailand, Indonesia, Malaysia and Philippines both for milk and meat; Sri Lanka and Bangladesh mainly for milk products. Meat export is booming, growing at 6 per cent per annum over the nineties and milk less so at 3 per cent (Mccalla and de Haan, 1997). Central and East

Europe too are major meat importers since early nineties. Increase in import in Asian countries is on account of fast growing demand, driven by population growth, increasing affluence and growing urbanisation on the one hand and lack of local resources like feed and fodder for further expanded home production and growing environmental concerns on the other (in countries like Japan and Philippines).

Table 9 gives the value of imports and exports of milk and meat from south Asian countries in 1998, presented in order to illustrate the current status of South Asia's involvement in international trade in livestock products. India is the only country in South Asia keen on export of livestock products, though quantities exported so far are small and constitute only a fraction of the global trade in these products. In 1998 India produced 74 million tonnes of milk, nearly 180,000 tonnes of milk powders, some 5,000 tonnes of cheese (other than paneer / cottage cheese) and roughly 1.48 million tonnes of ghee / butter. Total meat production in the same year was some 4.45 million tonnes and egg production 31 billion. India imported in 1998 less than 300 tonnes of milk powders, 4,600 tonnes of butter oil and 47 tonnes of cheeses or in other words a total import of some 100,000 tonnes of liquid milk equivalent: less than 0.02 per cent of the country's total milk production. Meat import in India is of recent origin and is confined to poultry meat: the quantities imported are very small. India's export of livestock products in 1998 was: milk powders including infant foods 1,550 tonnes, table butter 75 tonnes, ghee 200 tonnes, cheese 27 tonnes and malted milk 3,820 tonnes: total liquid milk equivalent of some 75,000 tonnes or a little over 0.01 per cent of total production. Meat export in 1998 was: buffalo meat 150,000 tonnes, mutton and chevon 176 tonnes, poultry meat 225 tonnes and eggs some 200 million: together some 3 per cent of the total production in case of meat and less than 1 per cent in case of eggs.

TABLE 9: INTERNATIONAL TRADE IN LIVESTOCK PRODUCTS IN SOUTH ASIA

('000 $)

Feature	Bangladesh	India	Nepal	Pakistan	Sri Lanka
Annual export of milk & milk products	—	6541	1051	1149	812
Annual import of milk & milk products	111717	1690	3416	52762	186722
Annual export of meat & other livestock products	41	783015	0	664	3124
Annual import of meat & other livestock products	10938	82	0	20	7038

Source: Singh and Pundir, 2001.

South-East Asia is already a major importer of livestock products, both milk and meat. Projections on production and consumption growth rates by Delgado *et al.* (1999) indicate that the region is not likely to reach self-sufficiency levels even by 2020. Over 90 per cent of the demand for milk products in Vietnam is met by imports. Indonesia imports over 25,000 tonnes of beef annually and Malaysia over 100,000 tonnes of beef and nearly 200,000 tonnes of poultry meat. In East Asia, China in 1998 produced 11.46 million tonnes of milk and 64.44 million tonnes of meat. Milk imports in China in 1998 included liquid milk and milk powders adding up to some 385,000 tonnes of liquid milk equivalent (3.35 per cent of the total milk production in China) (Wattiaux, *et al.*, 2002). Meat imports during the same year included some 11,000 tonnes of beef, 427,000 tonnes of poultry meat and 46,000 tonnes of pork adding up to a total import of some 484,000 tonnes of meat: some 0.75 per cent of the country's total meat production. China is the largest producer of pork in the world and is self reliant in beef. Pork imports are mostly pork offal, a product in great demand in China. Growth in beef and poultry meat production in China has still not been able to match the growing national demand for these meats. China also exported milk (liquid milk and milk powders mainly) as well as meat (beef 88000 tonnes, poultry meat 323,000 tonnes and pork 143,000 tonnes) in 1998.

These exports added up to a liquid milk equivalent of 156,000 tonnes in case of milk and 554,000 tonnes in case of meat, some 1.35 per cent and 0.85 per cent respectively of the milk and meat production in the country. Japan and Philippines import both milk and meat in large quantities, primarily on account of limitations in feed availability for further enhanced home production. Japan as a matter of policy prefers to cut back on livestock production to rationalise land utilisation pattern and to ameliorate environmental problems arising from animal wastes. Philippines too has similar problems for increased home production and is inclined to satisfy increasing national demand for livestock products partly through imports.

INTERNATIONAL COMPETITIVENESS OF ASIAN COUNTRIES

By and large livestock production in Asia across all regions, takes place in the smallholder domain, in mixed crop-livestock farming systems. Livestock production in most cases is the second most important economic activity in farm households apart from crop production and provides the households with supplementary incomes, food, farm power and farmyard manure. In all countries these production systems depend on family labour, make full use of the available crop residues for animal production and utilise the manure for crop production. Hired labour and external inputs are seldom employed and overheads are either absent or are minimal. A vast majority of these are subsistence farms, rainfed, and with livestock of low productivity across all species. Across the countries and the regions, one finds a great deal of variation in almost all aspects of farming: land holding, stock holding, species farmed and outputs: from the landless stock holder in India to the intensive industrial scale pork and dairy enterprises in China, but with over 60 per cent of all holdings conforming to the description above. With increasing market opportunities, farm households are increasingly getting integrated into both input and output markets, leading to increasing use of

crop by-products and coarse grains as animal feeds. The feature central to all of them is that the activity is livelihood intensive and those involved with it have little or no alternatives. Outputs from these production systems: milk, meat and eggs though modest individually, aggregate to very large volumes and quantities: like milk in India (84 million tonnes in 2001) and pork in China (44 million tonnes in 2001), or the back yard poultry system in India, made up entirely of free ranging indigenous fowls, nearly 180 million of them accounting for 70 per cent of all fowl in India, producing 30 per cent (9 billion) of India's total annual egg production and nearly half the poultry meat consumed in India.

TABLE 10: PROJECTED GROWTH IN TOTAL MEAT AND MILK CONSUMPTION

Region	Meat (million tonnes)			Milk (million tonnes)		
	1997	2020	AGR %	1997	2020	AGR %
China	53	104	3.0	10	23	3.5
India	4	9	3.5	60	132	3.2
Developing countries	111	213	2.9	194	372	3.3
Developed countries	98	114	0.7	251	276	0.4
World	208	303	1.8	445	654	1.7
Per Capita Consumption (kg)						
China	43	71	2.8	8	16	4.3
India	4	7	3.3	62	104	3.0
Developing countries	25	35	1.7	43	61	1.8
Developed countries	75	84	0.5	194	203	0.2
World	36	44	1.0	77	87	0.6

AGR = Annual Growth Rate

Source: Staal, adapted from Delgado *et al* 1999.

Staal (2001) has analysed the competitiveness of smallholder livestock production in developing countries including Asia, using the global food model constructed by Delgado *et al* (1999). The discussion on competitiveness in this paper in general follows his observations. Driven by increasing affluence, growing urbanisation and population explosion, consumption of animal products will increase in all Asian countries. Much of the growth in

meat consumption is likely to be in pork and poultry meat although growth in consumption of beef, mutton and chevon too will be dramatic. In monetary value term these dramatic changes in overall livestock production is already underway: "the livestock revolution", will be larger than the green revolution of the 1970s. This phenomenon is centred almost entirely in the developing world and consumption levels in developed countries are expected to remain unchanged.

Increasing consumption will necessitate increased supplies and the increases in production will occur generally in the same areas where the demand exists, provided local resources can accommodate such increases in production. This confirms the existing pattern in international trade in livestock products. Only a small proportion (10 per cent) of the global production in livestock products are internationally traded, as extensive transformation or high costs to preserve and transport such products limits their international trade to far flung locations. Where possible, therefore, import of feed stuffs and coarse grain will be the choice to home produce the needed livestock products, unless land use/waste disposal become major social/environmental concerns as in Japan. This applies to most Asian countries and the small holders who currently produce most of Asia's milk and meat could be well placed to capture the opportunities presented by the livestock revolution.

As already discussed, smallholder livestock production is generally a labour intensive activity relying on family and less frequently on hired labour, rather than on mechanisation. Almost all chores related to livestock are handled manually. Livestock products are high value products and the labour used to produce them usually has no alternate opportunity for employment, better or worse. The low opportunity cost for labour is perhaps the primary determinant for smallholder competitiveness locally. Where wages and employment opportunities are low, smallholder

livestock production systems are likely to be more competitive and successful than more organised, larger units. In Asian countries, livestock holding by households often involve several species: in India – cattle / buffalo, goat and poultry; in South-East Asia – cattle, pig, poultry and fish and in China – cattle, pig and poultry. Smallholders often manage to capture value from non-dairy outputs of their enterprise such as manure (for food or fodder crop production), feed and fodder residues, replacement stock and meat stock.

INTERNATIONAL COMPETITIVENESS OF INDIAN LIVESTOCK PRODUCTION

Supply and demand forecasts for milk and meat in India by both International Policy Research Institute (IFPRI) and Indian Agricultural Research Institute indicate that there will be modest surpluses even in 2020 in spite of the burgeoning local demand fuelled by population growth, growing urbanisation, increasing affluence and changing lifestyles, enabling limited but significant international trade. Much of this trade however, is likely to be regional rather than global. Livestock production in India is entirely labour intensive, relying on the use of family labour in the smallholder production systems. Major changes in the production organisation (widely scattered family owned small and tiny holdings) are unlikely over the next one or two decades, or at best slow. The local competitiveness of the small holder production system depends on the low opportunity costs for labour in India, the value captured from non-food farm outputs like crop residues and manure and the opportunity for capital accumulation in the form of livestock (stock increment as savings). Where labour opportunities are low and where land and soil nutrients are scarce, smallholder livestock producers successfully out-compete larger more specialised producers locally (Staal, 2001).

A study on the local competitiveness of milk production in India (Saxena, 2000) concluded that local competitiveness is high in case

of indigenous cows and buffaloes, while in the case of crossbred cows with higher inputs and overheads, it was less so. Almost 90 per cent of all milk produced in India comes from indigenous cows and buffaloes. Beef and buffalo meat production in India is not purposive, but merely an adjunct of the milk system: surplus male and unproductive animals ending up as meat animals, except for the very small beef / buffalo meat export business (selected healthy animals bought from farmers). Beef production, consumption and export is prohibited under government policy while buffalo meat is not under any such constraints. Nevertheless large quantities of beef and buffalo meat are produced and consumed in the country: 1.5 million tonnes of beef and some 1.4 million tonnes of buffalo meat in 2001. Beef and buffalo meat are the least expensive meats in the country and is undoubtedly the poor man's meat in India. Pork, mutton and lamb and chevon too are produced in traditional systems and are entirely based on grazing in common property resources, with very little private costs. However, this imposes enormous social costs on the country which is not reflected in the market. Official estimates report meat outputs for 1999 as: Beef 1.4 million tonnes; Buffalo meat 1.4 million tonnes; mutton and lamb 0.20 million tonnes; chevon 0.46 million tonnes; pork 0.45 million tonnes and poultry meat 0.54 million tonnes: total meat production some 4.44 million tonnes. Since much of the slaughter takes place in villages and is not properly accounted for, total meat output in India could as well be twice as much as the official figures. Meat production in India, except in the case of broiler industry and the meat from culled layers in organised farms in the poultry industry, are all in the traditional production systems with little out of pocket expenditure.

International competitiveness of Indian livestock products – particularly milk and milk products – assessed on the basis of Nominal Protection Coefficient (NPC) indicate that ghee (clarified

butter) is highly competitive while milk powders are not (Saxena, 2001). This calculation however does not take into account market distortions on account of overt and covert export subsidies by the major exporting countries. Meat prices in India and their NPC indicate fairly high international competitiveness. However, they lose out on SPS standards and have only limited markets confined to West, South and South East Asia.

CONSTRAINTS IMPEDING INTERNATIONAL COMPETITIVENESS OF INDIAN LIVESTOCK PRODUCTION

International competitiveness in livestock product will be influenced considerably by the preparedness of individual countries to take advantage of the opportunities opened up by the agreements under the Uruguay Round. National policies to take full advantage of the special provisions made in the agreements for developing countries can considerably add to the competitiveness of individual countries, particularly in terms of domestic support measures, market access and SPS measures. Ensuring quality standards and freedom from animal epidemics are preconditions for the guaranteed market access. India is yet to set in place policies and mechanisms to effectively manage the UR Agreements. Serious inadequacies exist in India's ability to comply with the SPS Standards.

Smallholder production systems often face difficulties in capturing the economies of scale in marketing, input supply and services delivery. A variety of producers' bodies can be thought of to bring them together in economic cooperation and to enable them to collectively manage their business interests. These institutions can then address the issues regarding infrastructure, processing and value addition, and marketing. The governments' role would be promoting such bodies, affording them positive discrimination and enabling them full autonomy. A role not on the priority agenda of the Indian Government.

Farm level credit is perhaps the most important input for smallholder production systems and in India one of the most critical areas for reform. Lack of credit support circumscribes the potential of the smallholders for livestock production. Adequate credit and access to good quality credit will enable a good many of them to break free of subsistence farming and improve their productivity and output, improving the overall competitiveness of the country in livestock trade. Even at the beginning of the 21st century, less than 5 per cent of the total agricultural credit is what the livestock sector gets.

There is also an urgent need to rationalise the large ruminant populations. With waning dependence in draught animals for farm power in most countries, the overall size of the bovine populations can be brought down. Astute policies to promote alternatives for farm power can harmonise livestock production with ecological stability. Current Policies of the Government do not address these concerns.

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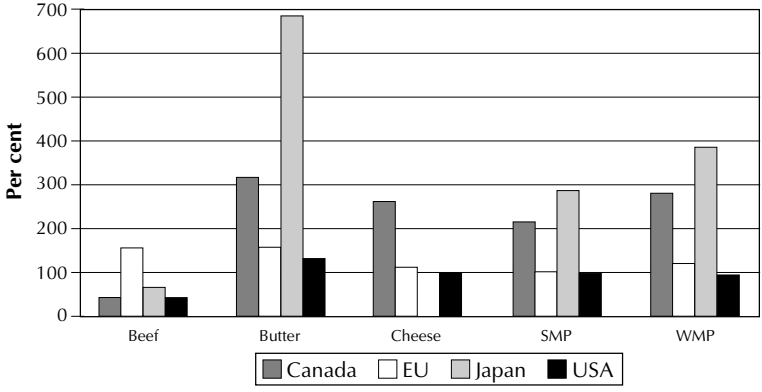
Editor's Report

An important feature of the Uruguay Round of trade negotiations was the 'Agreement on Agriculture' wherein the WTO member countries agreed to a series of measures to reduce distortions and promote free and fair trade relating to agricultural products. These included reduction of export subsidies and agricultural support for domestic producers and improving access to foreign markets through the removal of non-tariff barriers, such as quotas, and reduction of tariffs. These measures were predicted to provide an expanded market base for developing country exports.

Despite various commitments, however, overall progress has been slow. Tariffs on farm products in general, and livestock products in particular, remain very high. This has been partly due to the unrepresentative base period chosen at the time of commitments and partly because countries have selectively brought down the tariff levels to meet the *average* commitment without reducing the tariffs for sensitive commodities. Similarly, export subsidies remain high and a large proportion—nearly 50 per cent—go to dairy and bovine meat sectors, which thus continue to be the most protected sectors. In addition to the export subsidies, there are official export credit programs (average about USD 6 billion per year with the US providing half of that), credit guarantees, interest rate subsidies, insurance subsidies, domestic farm support (nearly 90 per cent of domestic support being given by EU, US

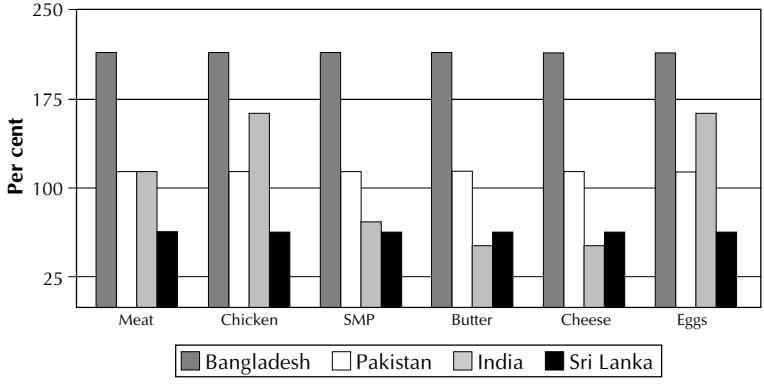
and Japan). Further, increasing concern about food safety resulting in high quality standards imposed as SPS measures, much more stringent and sometimes arbitrary testing procedures imposed by many countries, shift from consignment wise inspection to focus on entire chain, harmonisation requirements, and emphasis on traceability and transparency impose additional barriers for developing countries to gain access to developed country markets.

BOUND TARIFFS VERY HIGH: SELECTED COUNTRIES



Source: OECD (2002)

BOUND TARIFFS FOR DAIRY AND MEAT PRODUCTS IN SOUTH ASIA



Potential gains from liberalised trade are, no doubt, quite substantial. According to some estimates, total potential gains for free world trade is likely to be around $56 billion dollars by 2015 and nearly half of that could potentially flow to the developing countries. In livestock and livestock products, the liberalised trade is estimated to result in an increase in world market prices of these products by over 20 per cent. But, the gains for the poor livestock keepers are not clear. Relatively few studies are available on these aspects and the available limited evidence suggests that the gains for poor producers may be modest.

The key distorters in the world market are EU, US, and Japan. During 1999-2001, for example, total export subsidies were over US$4 billion and approximately 90 per cent of these were provided by the EU. According to some studies, the milk production in EU is likely to be 50 per cent lower in the absence of subsidies. The estimate for beef was approximately 17 per cent. On the exports side, it is estimated that the common agricultural policy (CAP) of the EU actually leads to a hundred and fifty fold increase in its exports of milk products and meat respectively. The main effects of these policies are felt in the dairy sector, specially milk powder where the EU accounts for nearly one third of world trade. This has important implications for poor countries where the powder milk not only has an effect on the emergence of powder milk industry but also on liquid milk market. It was pointed out in the workshop that in Senegal and Vietnam the presence of subsidised powdered milk is preventing the emergence of domestic dairy industry. In Jamaica it has undermined an existing domestic dairy production system, and in South Asia, these subsidies have hurt India's attempts to export within the region.

It was abundantly clear from the papers presented at the workshop that the rules of international trade are not necessarily driven by considerations of fairness or by the desire of developed countries to contribute towards global economic development and

poverty alleviation. They are very much driven by country self-interest and it is therefore necessary for the developing countries to think strategically in this context. Strategy formulation will require a much enhanced understanding of the various economic and political forces in the decision making process in the developed countries, identification of appropriate entry points and the nature of likely changes in the short and the long run.

UNDERSTANDING PROTECTION DYNAMICS AND IDENTIFYING ENTRY POINTS FOR CHANGE

A study of protection dynamics in the EU presented at the workshop, for example, suggested that the source of EU protection lies in the strong lobby of EU farmers because of historical corporatist ties between farmers and the political system in Europe. This makes it relatively easier to mobilise farmers in defence of their interests. In general, there is far more defence of farmers interests in the EU and US, despite they being a small proportion of the population. This political equation, for a number of historical reasons, is so well developed and strong that even Oxfam has been unwilling to oppose subsidies for small farmers in Europe. While they have opposed export subsidies and other trade distorting measures, they continue to take the position that small farmers in Europe need to be supported.

The study also reflected on the structure of decision making in EU and pointed towards the interpenetrated nature of various interests. It was pointed out that within the European decision making process, the European Commission (EC) sets the agenda and makes proposals whereas the Council of Ministers formally decides on those proposals[1]. The European Council of heads of state can take over when there are differences at ministerial level. At both council levels, unanimity is usually needed, as any state is permitted to veto if its "vital interests" are threatened. Within

[1] In case of CAP, for example, it is the Council of Agricultural Ministers who makes the decisions.

the EU, generally, the French-German agreements have a very strong influence on the matters relating to CAP. Based on an analysis of various interests and forces, the study identified the following possible forces that may be utilised to bring about the change in the CAP.

- Interests of *non-agricultural* producers. Substantial shifts with respect to CAP are only likely to occur in conjunction with international trade negotiations. It is the trade issues related to information technology, intellectual property rights, biotechnology, etc. that may bring some pressures for change in CAP.
- There could be some real conflicts of interest between food processors and primary producers in European countries which could act as a force for change. In addition to primary producers, the EU also subsidises its food processors to compensate for high costs of their inputs due to protection. Indeed, it will not be possible for those processors to compete in absence of those subsidies. On the other hand those subsidies perhaps do not enjoy as much political support as the farm subsidies. If one can create a force to stop subsidies to these processors, there is good likelihood that processors will themselves create a force for putting an end to farm subsidies.
- Small farm interest in 'multi-functionality'. The MacSharry reforms introduced in 1992 recommend subsidising farmers for things that are not directly related to the levels of agriculture production (environmental and food safety issues, for example). These tend to disproportionately benefit the small farmers and their effects on international trade are indirect and far less serious.

As change in EU policy making is most likely to occur only under the pressure of international trade negotiations it is important to build pressure on the developed countries to resume the trade talks, which broke down in Cancún. In this context, it was pointed

out that countervailing duties may be effectively used as an instrument. Even then, however, the developing countries will need to identify forces outside the agriculture sector within the developed countries who would push for changes in agriculture in order to get the things that they want out of international trade. To build on the momentum achieved in Cancun, the G21 countries will need to consolidate their position as the EU and the US have immense capacity to pick developing countries to support their own interests. In this context, the group of ACP (African, Caribbean and Pacific) countries is of significant importance. Almost all these countries have a patron-client relationship with the EU or the US and all these countries have interests that may be very different from those of the G21. In this scenario, the G21 countries will need to influence ACP countries in their favour by organising them and by recognising, acknowledging and protecting their interests.

PLAYING THE KNOWLEDGE GAME

While it is clear that high subsidies in the developed countries are an important element in the trade distortion, it is necessary to be far more sophisticated in the analysis of the production impact of these subsidies. It is not clear what production gains are to result from the removal of subsidies and how those gains are likely to be distributed within and across countries and country groups. This analysis is necessary to inform the negotiators and to prepare public opinion in both developed and developing countries.

Second, and perhaps more important, research and advocacy on effects of trade distortions on poor households must come much earlier in the process—at technical and problem definition stage as opposed to final negotiation stage. For example, in Europe it is the EC that sets the agenda and is perhaps most amenable to change. The officials setting the agenda are mostly technically-oriented and interested in the 'facts'. It is therefore important to provide timely studies and use them to influence the agenda

before it makes it to the negotiating table. The capacity to carry out detailed analytic work on the impact of distortions already exists within the G-21 countries. Mobilising this capacity and enhancing the analytical content of the negotiations and analytical capacities of negotiating teams will need to be a critical element of the strategy.

FOCUSING ON THE ACHIEVABLE

Significant increases in farm support payments in the EU are unlikely and subsidies are likely to move away from export subsidies and price supports toward 'multi-functionality' payments. However, SPS standards are likely to grow in importance as trade barriers. Thus, one would expect a reduction of EU competition in developing country domestic markets and regional markets but entry into the EU markets for the developing countries will continue to be difficult. Indeed, new SPS measures could get introduced whenever developing countries get closer to penetrating the EU markets. These measures have widespread political support in both EU and US and are easier to implement for the governments. Strategically, therefore, developing countries will be better advised to focus on domestic and regional markets and on setting a trade regime that will work well in these markets.

In the context of SPS measures and other trade related issues, there may also be some merit in examining the role of the private sector in bringing about change in standards and buying patterns. The private sector normally has tremendous impact on these aspects, particularly as far as technical standards are concerned, and it will be worthwhile to direct thinking in that direction.

FOOD SAFETY AND DISEASE CONTROL

While it is important to have a market and negotiation strategy, it is equally necessary to take a close look at the domestic systems and processes including safeguards for food safety without losing sight of the need to reduce costs of production and improve

product quality. Indeed, these issues are likely to be important in regional trade as well given that countries are at different levels of development. Thus, it would be necessary to give general attention to the institutions that provide services such as certification, harmonisation of rules and standards, creation of an enabling institutional environment for building trust and reputation about the products, strengthening regional institutions and making accreditation more consistent across areas, and retargeting research to make them more demand driven. In the context of regional trade it will also be necessary to enhance cooperation on disease control programs and exploiting opportunities on trade in breeding stock and production inputs such as feed, vaccines, semen, pharmaceuticals, etc. and developing a common understanding for food safety requirements, control of important zoonotic diseases (particularly TB and brucellosis).

ENHANCING COMPETITIVENESS

In addition to addressing the imbalances and asymmetries in trading rules, Asian countries need to implement a series of measures to prepare themselves to face the challenges of emerging market environment. The group debated on the strengths and weaknesses of current systems and processes in place and made the following recommendations.

- Significantly enhance the investment into physical infrastructure and research. These investments have significant returns and bring down the production costs as well as the transactions costs of market participation. There is significant imbalance in this respect between developed and developing countries. Developing countries are not investing enough in those areas to enhance their competitiveness and it is necessary to correct that imbalance. Further, there is need to pay attention to specific aspects of research and development and innovative research that is targeted towards poor producers.

- Reorientation of extension and livestock service delivery systems as these, in a number of Asian countries, are not geared towards meeting the challenge of new market environment.
- Appropriate institutional framework to overcome information barriers at the producer, consumer and research level. This means putting in place structures that will (a) facilitate flow of market information to the producers and producer information to researchers and other decision makers, (b) aid policy formation and trade negotiations, and (c) improve monitoring international prices and taking corrective actions like appropriate import and anti-dumping duties.
- Provision of reliable inputs and branding of products as farms scale up in the region. In this context, there is need for much more collective action on supply of quality inputs, ensuring proper advice, and services and branding for the product to gain recognition in the market. The successful example is AMUL where smallholder milk is branded and is recognised for its quality.

FOCUS ON POLICY PROCESSES

A number of negotiations at the WTO go through the commerce ministry and the latter may not adequately discuss or assess the interests of agriculture sector. In this context, it is necessary to improve the representation of agricultural interests in policy making. That will also require much clearer understanding and analysis of the policy processes in our countries. Once these processes are identified, appropriate entry points at appropriate time will need to be identified. This will also require a much better regional networking including coalition with NGOs and strengthening the dialogue between and within SAARC and ASEAN countries. It should involve a component of information management so that WTO rules and procedures as they are formulated and changed are made available and become common knowledge.

At a more general level, policy making in a number of countries in the region continues to be characterised by *ad hocism* and a top down approach that often bypasses the poor and other significant stakeholder groups. The agendas are set at the Ministry level or at the level of government bodies, commissions/committees constituted by the government with little consultation or participation of other stakeholders. As a result, policies often get dictated by the biases and beliefs of decision makers. By and large, the overall policy framework in the region is more restrictive than liberating. In order to formulate policies that truly address the needs of the poor, it would be necessary for the governments to open up these processes and enhance stakeholder participation in policy design and implementation.

WTO and Smallholder Welfare: Implications for Dairy and Meat Producers in Asia

Vijay Paul Sharma*

Production of livestock products grew rapidly in many developing countries during the last few decades. Total milk production in South Asia increased at an annual compound growth rate of 4.97 per cent between 1985-88 and 2000-02 (Table 1), which is substantially higher than the world average.

The highest growth rate for milk production occurred in Pakistan where total milk production increased by 7.64 per cent per annum (higher than South Asian average). Other countries also witnessed growth in milk production, growth rates varying from 0.74 per cent in Bhutan to 4.23 per cent in India. The share of India in total milk production of the region declined from 76.3 per cent in 1985-88 to 69.8 per cent in 2000-02, while share of Pakistan increased sharply from 19.6 per cent to 27.1 per cent during the same period (Table 1).

Total meat production in the region increased at annual compound growth rate of 3.03 per cent between 1985 and 2002. Sri Lanka witnessed the highest growth in meat production (5.60 per cent), followed by Pakistan (3.60 per cent) and Bangladesh (3.39 per cent). The meat production growth rate was low in case of India (2.79 per cent), Nepal (2.36 per cent) and Bhutan (1.07 per cent)

* Vijay Paul Sharma is Faculty, Centre for Management in Agriculture, Indian Institute of Management, Ahmedabad 380 015, India. Email: vijays@iimahd.ernet.in

TABLE 1: TRENDS IN PRODUCTION OF MILK AND MEAT IN SELECTED COUNTRIES OF SOUTH ASIA, 1985 AND 2002

('000 tonnes)

Country	Total milk production					Total meat production				
	1985		2002		CAGR	1985		2002		CAGR
Bangladesh	1310.6	(2.3)	2112.0	(1.7)	3.18	259.9	(5.7)	427.9	(5.7)	3.39
Bhutan	30.5	(0.1)	41.7	(—)	0.74	6.5	(0.1)	7.8	(0.1)	1.07
India	44020.0	(76.8)	86320.0	(69.9)	4.23	3127.7	(68.5)	4917.3	(65.1)	2.79
Nepal	805.2	(1.4)	1232.6	(1.0)	2.55	166.5	(3.7)	243.3	(3.2)	2.36
Pakistan	10856.0	(10.9)	33559.0	(27.2)	7.64	946.8	(20.8)	1838.6	(24.3)	3.60
Sri Lanka	288.5	(0.5)	298.0	(0.2)	2.62	55.4	(1.2)	119.6	(1.6)	5.60
South Asia	57310.8	(100.0)	123563.3	(100.0)	4.97	4563.5	(100.0)	7555.5	(100.0)	3.03

CAGR: Compound annual growth rate (per cent/annum)

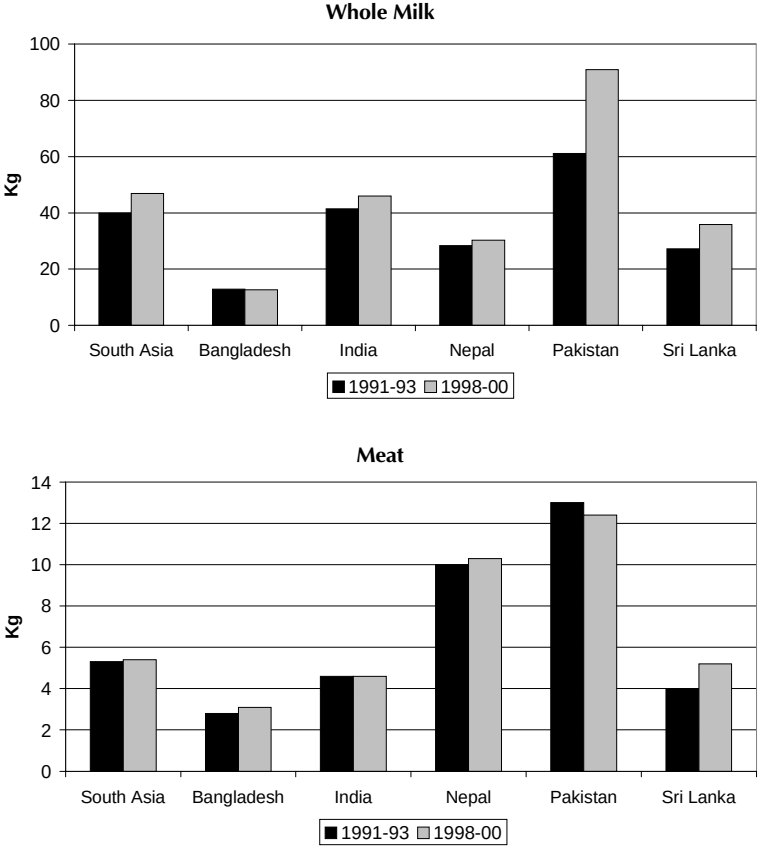
Figures in parentheses are percentage to total production in South Asia.

Source: FAO (2003)

mainly due to large vegetarian population in these countries due to socio-economic and religious factors.

The per capita availability of milk and meat has increased in most of the countries in South Asia (Figure 1). Between 1991-93 and 1998-00 annual per capita availability of milk increased from 40 kg to 46.9 kg in the South Asia. During the same period per capita availability of meat increased marginally from 5.3 kg to 5.4 kg. In

FIGURE 1: PER CAPITA AVAILABILITY OF MILK AND MEAT (KG/CAPITA/YEAR) IN SOUTH ASIA, 1991-93 AND 1998-00



Source: FAO (2003)

ACCOMPLISHMENTS OF WTO AGREEMENT ON AGRICULTURE

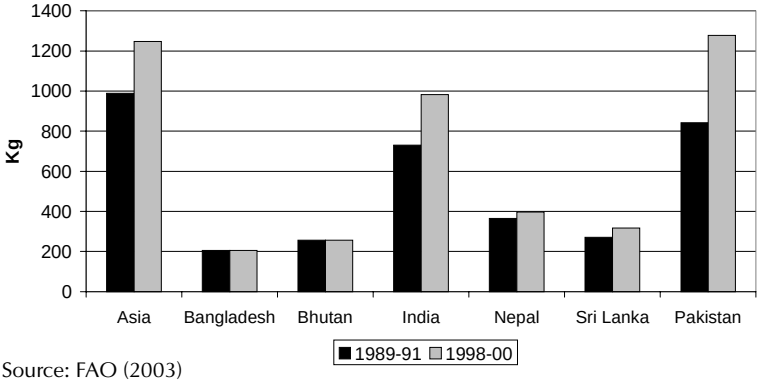
1. **Market Access/Tariffication**
   - Converted non-tariff border measures to tariffs and bound all tariffs (i.e. can not be increased without negotiation with other countries.
   - Reduced tariffs by 36 per cent (on simple average) over 6 years from a 1986-88 base and a minimum reduction of 15 per cent per tariff line for developed countries (24 per cent reduction on average with 10 per cent minimum reduction per tariff line for developing countries over 10 years).
   - Established rules for the application of additional (safeguard) duties (up to one-third of normal duties) if there is surge in imports or if world prices fall below preset trigger price levels for commodities subjected to tariffication.
   - Created minimum market access commitment as share of domestic consumption for products subject to tariffication (1-4 per cent for developing and 2-5 per cent for developed countries).
2. **Domestic Support**
   - Reduced domestic support – as measured by total Aggregate Measure of Support (AMS) from 1986-88 base – by 20 per cent over six years for developed countries and 13.3 per cent over 10 years for developing countries.
   - Domestic support considered minimally trade distorting (green box) not included in the AMS and direct payments for production-limiting programmes (blue box) also not included in AMS reductions under certain conditions.
3. **Export Subsidies/Competition**
   - Banned new export subsidies and introduced constraints on existing subsidies.
   - Budget expenditure for export subsidies reduced by 36 per cent, and volume by 21 per cent from 1986-90 base over the 6-year implementation period for developed countries (24 per cent reduction in budget expenditure and 14 per cent in volume terms over 10 years for developing countries).
4. **Special and differential treatment**
   - Developing countries subjected to only two-thirds of cuts in tariffs, domestic support, and export subsidies and over a long period of 10 years.
   - Under special and differential treatment, developing countries allowed to provide support/subsidies to resource poor farmers.
5. **Other WTO Agreements**
   - New SPS Agreement established a framework to reduce trade-distorting aspects of animal, plant, and human health measures.
   - Measures that stipulate production and processing methods are now disciplined by the revised TBT Agreement.

Source: IATRC (2001); WTO (2002)

India per capita availability of milk rose from 41.4 kg to 46 kg. Per capita availability of milk also increased in other South Asian countries except Bangladesh. The availability of milk increased from 61.1 kg per year per person to 90.9 kg in Pakistan. In South Asia, per capita availability of meat stagnated or declined in many countries. Per capita availability of meat increased marginally in case of Bangladesh, Nepal and Sri Lanka. The projections of future demand and supply of milk and meat to 2020 show that per capita consumption of meat is projected to remain low in India and other South Asian countries, while the per capita consumption of milk is expected to increase (Delgado, *et. al.*, 1999).

Smallholder producers are vulnerable to fluctuations in both input and output prices. Relative to other countries in the world, South Asian countries have very low productivity levels. The productivity levels of cow showed some improvement in most of the countries in South Asia during the last decade. The average productivity of cow increased from 989 kg per year in 1989-91 to 1247 kg per year in 1998-00 in Asia (Figure 2). In case of India the yield increased from 731 kg to 982 kg per year between 1989-91 and 1998-00. Pakistan and Sri Lanka also witnessed a significant

FIGURE 2: PRODUCTIVITY OF MILK PER COW FOR MAJOR COUNTRIES OF SOUTH ASIA, 1989-91 AND 1998-2000



Source: FAO (2003)

increase in productivity levels during the same period while the yield levels remained stagnant in Bangladesh and Bhutan.

WHAT HAS BEEN ACHIEVED UNDER THE WTO AOA?

The Uruguay Round Agreement on Agriculture (URAA), which effectively brought agriculture into the WTO fold, mandates negotiations in agriculture. Trade policy reforms of the WTO AoA fall under three main categories: market access, domestic support and export competition. Of these three categories, export subsidy provisions are mainly applicable to developed countries. At the same time, existing production subsidies are consistent with domestic support provisions in South Asian countries, without requiring any further policy adjustments.

South Asia's commitments to the WTO AoA, therefore, relate to mainly market access provisions. In addition, other WTO Agreements, particularly, the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) and the Agreement on Technical Barriers to Trade, have an important bearing on trade in agriculture. In the following, I consider briefly accomplishments in each of the three areas of liberalisation.

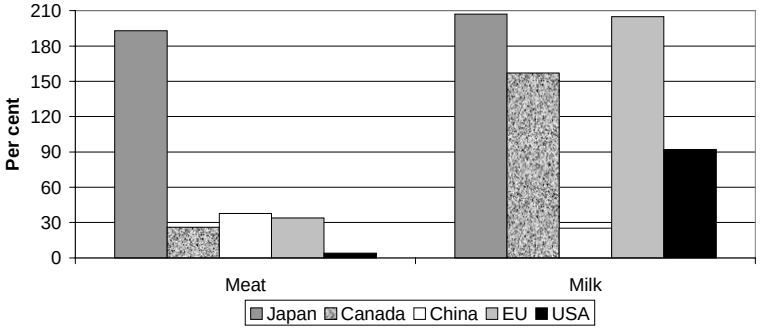
Market Access Conditions

Disciplines on market access were significant accomplishment under the WTO AoA, although its shortcomings are obvious. In many instances tariff bindings on agricultural products in general and livestock products in particular remain very high and hinder market access. The global average of post-WTO bound agricultural tariffs is estimated at 62 per cent (Gibson, *et. al.*, 2001). Regional average tariffs for the WTO members range from an ad valorem tariff equivalent of 25 per cent in North America to 113 per cent in non-EU West Europe and South Asia.

The average tariff for dairy (about 85 per cent) and meat (75 per cent) products exceeded the average for all products. Moreover

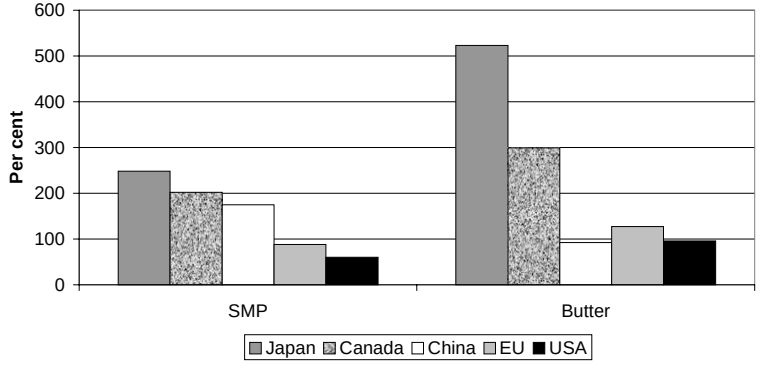
the average tariffs for meat and dairy products are very high in most of the developed countries (Figures 3 and 4).

FIGURE 3: AVERAGE BOUND RATES OF DUTY FOR MILK AND MEAT IN SELECTED COUNTRIES



Source: Panagariya (2000)

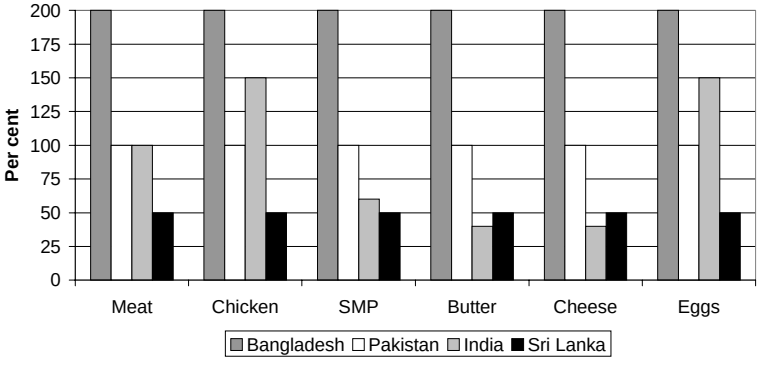
FIGURE 4: FINAL URUGUAY ROUND OVER-QUOTA TARIFFS FOR SMP AND BUTTER IN SELECTED COUNTRIES



Source: USDEC (1999)

In OECD countries as a whole, the simple average tariff protection is very high in many sectors including dairy (116 per cent) and livestock products (82 per cent). In South Asia, there are large variations in bound rates of duties for meat and dairy products (Figure 5).

FIGURE 5: BOUND RATES OF DUTY FOR MILK AND MEAT PRODUCTS IN SELECTED ASIAN COUNTRIES



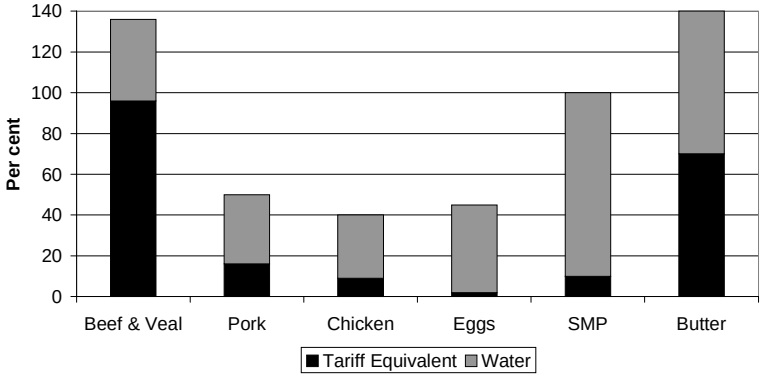
Source: AMAD (2003)

In many countries there is a considerable gap between the levels of tariff bound in the WTO Schedules and that which is actually imposed on the imports. This has been called "watery tariff policy" and gives the country concerned some flexibility to raise tariffs within the constraint of bound rate.

A comparison of EU tariff equivalents with applied tariffs during 1995-97 (Figure 6) reveals a substantial margin of "water" in the EU's tariffs for dairy and meat products. Between 1995 and 1997, the EU import tariffs were very watery (i.e., much larger than necessary to bridge domestic-world price gaps) for skim milk powder (SMP), butter and eggs.

For SMP, this stems from a small price gap (tariff equivalent) and high tariffs, whereas for butter, although the price gap was large, the applied tariffs were in excess of 130 per cent between 1995 and 1997. Removing such water would improve transparency and reduce the discretionary element of protection that countries were able to build in to the URAA tariff bindings for their own flexibility. To remove some of this "water" some approach should be considered.

FIGURE 6: WATER IN THE EU TARIFFS FOR SELECTED COMMODITIES, 1995-97



Source: USDA, ERS (1999)

One could for instance eliminate directly the present gap between the bound and actual rates, but this approach can have problems. For example, it would appear to reward those countries that have kept their tariffs as high as possible within the bound rates and punish those which have imposed low imports tariffs may be because of regional preferences.

It is important to note that tariffs actually applied are considerably lower than the bound rates in the WTO schedule in many countries. Available evidence also suggests that tariffs tend to increase with the level of processing (tariff escalation), although tariff escalation greatly varies across countries (Sharma, 2000). Moreover agricultural tariffs are not transparent. Transparency and comparability of agricultural tariffs are impaired by the use of non-ad valorem tariffs, such as specific or mixed tariffs. Twenty-five WTO member countries have non-ad valorem tariffs on more than 50 per cent of their agricultural tariff lines.

Although tariff-rate-quotas (TRQs) were designed to improve market access for agricultural commodities that previously faced quantitative restrictions, high tariffs (in-quota and over-quota) show that TRQs have restricted trade significantly. Although

TRQs cover only six per cent of tariff lines, they are prevalent in sensitive sectors such as meat and dairy products (Sharma and Sharma, 2002). Only 37 of the 144 WTO members use TRQs and use different methods for administering TRQs such as first-come first-service, auctioning, historical allocation, state trading, applied tariffs, producer groups. The fundamental issue in not the existence of TRQs per se but rather the predominance of very high over-quota tariffs.

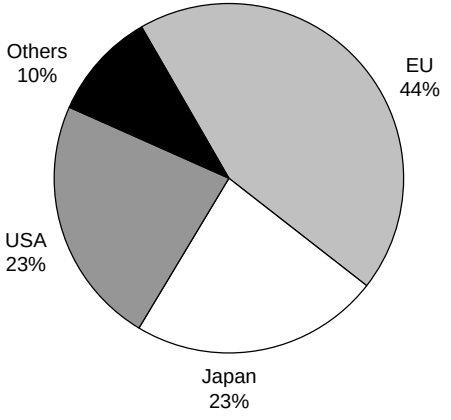
The SSG provisions allow the imposition of an additional tariff when certain criteria are met – either a specified surge in imports (volume trigger) or fall in import prices below specified reference price (price trigger). However, out of 144 WTO members only 38 reserved the right to use SSGs in their URAA schedule of commitments. The number of tariffs that could potentially be protected by SSGs ranges from 10 for Australia to 961 for Switzerland. The coverage of products reflects the degree of sensitivity to liberalisation in each country. Product coverage is concentrated in dairy for United States and meat and dairy products for the European Union. The United States has used the price trigger to place additional duties on dairy products.

Domestic Support

The disciplines on domestic support commitments, although deemed a major achievement, proved to be the least binding in most of the developed countries. Of the current 144 WTO members, only 30 have total AMS reduction commitment. Domestic support is highly concentrated in few countries and commodities, with the Unites States, European Union and Japan accounting for 90 per cent of total domestic support for the OECD countries as a whole (Figure 7).

Total AMS reduction commitments have not been binding as the total current AMS has been kept far below commitment levels. One way in which countries have been able to reduce their AMS levels to meet their URAA commitments is by shifting domestic

FIGURE 7: DOMESTIC SUPPORT BY COUNTRY IN THE OECD—1995-97

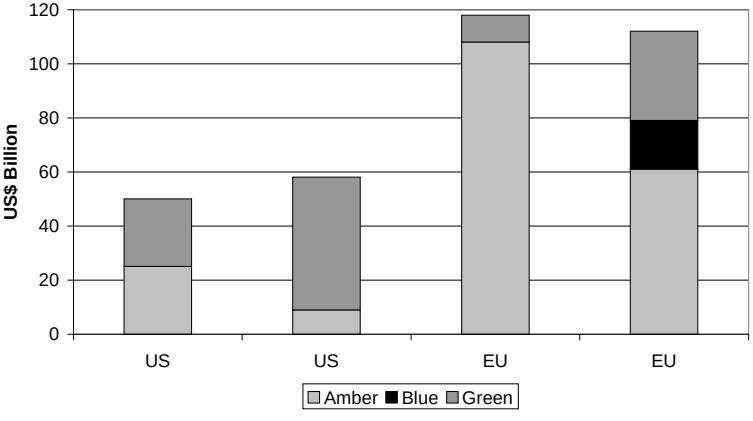


Source: OECD (2001)

support from non-exempt categories (green box and blue box policies) to exempt categories (Figure 8).

Annex 2 (Green Box) subsidies have increased for the EU from about US$10.2 billion in 1986-88 base period to US$25.1 billion in

FIGURE 8: SHIFTING OF DOMESTIC SUPPORT FROM NON-EXEMPT TO EXEMPT CATEGORIES: BASE AND POST-WTO PERIOD



1996. For the US, these subsidies have likewise more than doubled, from US$ 24 billion in 1986-88 to US$ 51 billion in 1997.

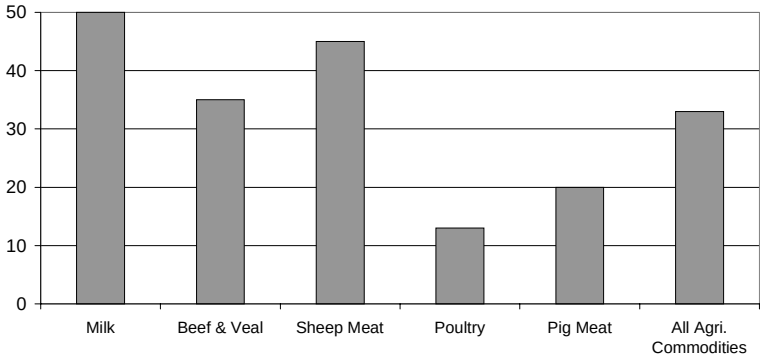
The dairy and meat sectors are major offenders and continue to receive considerable support in a number of developed countries. The OECD data shows that the share of dairy sector in the total support to agricultural products amounted to nearly 16 per cent in 2000 marginally lower than 18 per cent in 1986-88 (OECD, 2001).

The Producer Support Estimate (PSEs) for dairy was 50 per cent in 1995-2000 and for beef and veal was 45 per cent (Figure 9). There are large disparities in the level of support for agricultural commodities and milk is one of the most protected commodities (OECD, 2001). In the case of milk, Japan, European Union, and United States have very high levels of protection and New Zealand has relatively low protection (Figure 10).

Export Competition

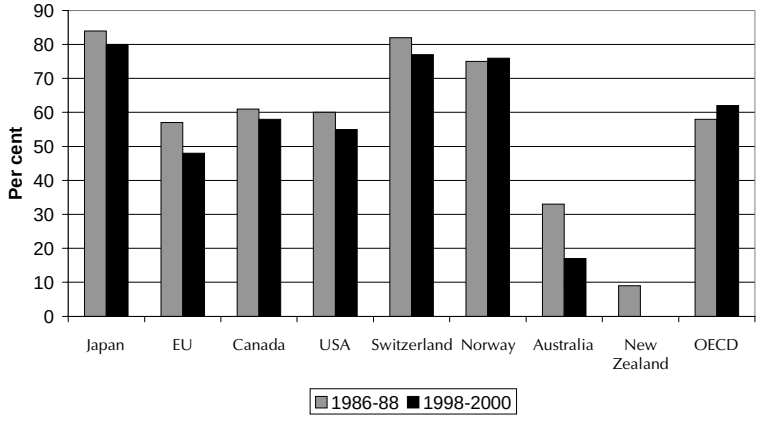
Between 1995 and 1998, WTO members spent over US$27 billion subsidising exports. The European Union accounts for nearly 90 per cent of the expenditures, Switzerland for 5 per cent and the U.S. for nearly 2 per cent (Figure 11). The EU is the largest user of export subsidies in both value and volume terms.

FIGURE 9: PRODUCER SUPPORT ESTIMATES (PSES) FOR MILK AND MEAT PRODUCTS IN THE OECD —1995-2000



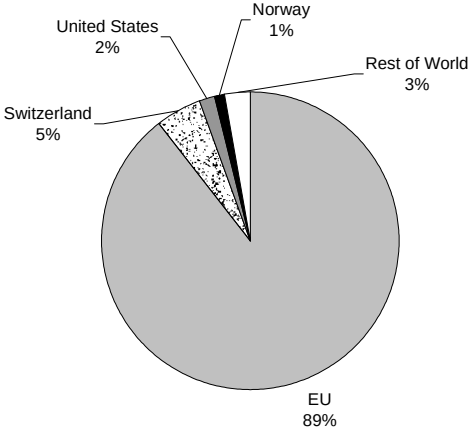
Source: OECD (2001)

FIGURE 10: PRODUCER SUBSIDY ESTIMATES FOR MILK IN SELECTED OECD COUNTRIES, 1986-88 AND 1998-2000



Source: OECD (2001)

FIGURE 11: SHARE OF DIFFERENT COUNTRIES IN EXPORT SUBSIDIES IN 1995-98



Source: OECD (2001)

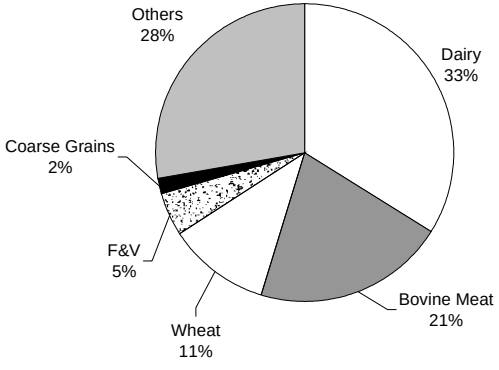
In case of dairy products, more than two-third volumes of exports in the OECD countries were subsidised over 1995-98 (OECD, 2001). The comparison of subsidised dairy products with other agricultural products indicate that the share of subsidised exports

to total exports is one of the highest for dairy products in the OECD countries in the post-WTO period.

The EU subsidised nearly all of its exports of dairy products, namely SMP, cheese and butter and butter oil during the same period (OECD, 2001). Dairy products accounted for 65 per cent of Swiss subsidy expenditure and nearly 80 per cent of subsidised export volumes, averaging nearly US$230 million and 59,000 tonnes per year. Similarly, nearly 98 per cent of US export subsidy expenditures have been for dairy products (Dairy Export Incentive Programme) (IATRC, 2001).

Global expenditure on export subsidies by WTO members has been highest for dairy products, accounting for 34 per cent of all export subsidy expenditures followed by bovine meat (20.8 per cent) for 1995-98 (Figure 12). Beef is the single commodity with largest subsidy expenditures – 21 per cent of subsidies averaging US$1.4 billion per year. Overall, there is high concentration of subsidies to a few countries and a few commodities.

FIGURE 12: SHARE OF DIFFERENT COMMODITIES IN GLOBAL EXPENDITURE ON EXPORT SUBSIDIES BY WTO MEMBER COUNTRIES



Source: OECD (2001)

ISSUES FOR NEXT ROUND OF WTO NEGOTIATIONS AND DOMESTIC REFORMS

The meat and dairy sectors remain the most distorted and highly regulated particularly in the EU, US, Canada and Japan and government interventions play a significant role in formulating world dairy policies and trade flows. The WTO AoA was expected to impose disciplines on the trade distorting domestic and import policies as well as export subsidies in the dairy sector, however, the experience shows that it has not yet led to strong changes in meat and dairy sector policies and still remain highly protective. The high import tariffs, large export subsidies, and domestic supports are still part of the dairy policy around the world.

It is also clear that development of dairy and meat sector in South Asia during the last few decades has been largely policy induced and has occurred in a closed economy environment. This situation is fast changing and countries in the region will find it difficult to maintain a closed economy framework due to commitments made to the WTO and domestic macro-economic reforms.

As the countries move towards globalisation of livestock sector, the success of white revolution in achieving self-sufficiency in milk production through millions of rural producers in India and some other South Asian countries is likely to be threatened due to distortions (high domestic support and export subsidies) in the world markets.

Would this mean that smallholder producers in the region lose prosperity they gained during the past decades? Should not government continue to safeguard the interest of smallholder milk and meat producers and processors in these countries from competition of subsidised imports of these commodities? What should be their strategies in the international trade negotiations and more importantly domestic reforms? These are difficult questions as they have many dimensions, however, some of options on trade policy front and domestic policy reforms include:

On trade policy front there is a need to negotiate for:

- Reduction and eventual elimination of export subsidies in dairy and meat sectors particularly by the EU and the USA;
- Putting maximum ceiling on export subsidy per unit rather than on total value and volume of subsidised exports
- Restriction on carry forward and roll-over of un-used export subsidy provisions
- Reduction in import tariffs through Swiss formula / weighted average / cocktail formulae to increase market access,
- Eliminate complex tariffs and convert to ad valorem for all WTO member countries, establish transparent procedures for quota allocation and apply tariff cuts to both in-quota and over-quota tariffs
- Consider elimination of SSG or make SSG available to all commodities and countries uniformly
- Collapsing all support boxes (green, amber and blue) into one to eliminate / reduce the existing loopholes and bring rationale and structure to the Agreement and allow a common level of support say 5 per cent or 10 per cent for all member countries

More importantly, there is a need to undertake major domestic policy reforms in the following areas:

- The countries should have an effective and efficient market intelligence system to monitor developments in the world markets (price, subsidy levels, demand and supply) and link import tariffs to world prices (variable tariff within bound rates of duty)
- The productivity levels in the South Asian countries are quite low, hence there is a need to improve productivity levels in meat and milk sectors to remain competitive in the open economy environment
- In most of the cases low productivity is due to inefficient system of provision of different inputs and / or services such as feeds and fodder, animal health care facilities, artificial insemi-

nation, which requires institutional reforms to make delivery / extension system more effective. The role of government, private sector, farmers' organisations, local bodies, NGOs, etc. needs to be re-defined in the light of new economic environment and make delivery of inputs and services more effective and efficient.

- Finally, even if tariff barriers, domestic support and export subsidies were reduced / abolished in the developed countries, the real challenge for countries in the South Asia would be from SPS and TBT related issues. In order to meet these requirements both domestically as well as in the world markets, modernisation of whole supply chain starting from producer to end consumer is required. Are these countries prepared for this? Will it be feasible / viable to adopt new technologies and practices (cold chain, HACCP) in view of smallholder production system and what would be the impact of these changes on the structure of production and processing sectors? These are some of the issues / questions, which have not been addressed in this paper and need an empirical investigation.

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Will the Common Agricultural Policy be Reformed to Accommodate the Interests of Poor Livestock Producers in the Developing World?

Michael Nelson, Michael Halderman and David Leonard*

The negative effects of trade distorting agricultural policies on the welfare of the world's producers and consumers are substantial. A study for the U.S. Department of Agriculture finds that if these policies are continued in their present form by 2015 they will cost the world economy $56 billion a year (Burfisher, 2001, p. 5). The International Food Policy Research Institute estimates that "Protectionism and subsidies by the industrialised nations cost developing countries about US$24 billion annually in lost agricultural and agro-industrial income…." (IFPRI, August 26, 2003). Under liberalisation the prices of agricultural products on the world market would be 12 per cent higher and those of livestock and livestock products (LLP) would gain 22 per cent (Burfisher, 2001, p. 5, 8). By and large these higher prices are ones that farmers in developing countries would collect.

On average, the poor in developing countries probably are less severely hurt by the distortions of current agricultural policies than the preceding figures suggest. If one looks at what the future impact of full liberalisation in agricultural trade would be

* Michael Nelson is a graduate student in Political Science at the University of California, Berkely. Email: mbnus@socrates.Berkeley.EDU

Michael Halderman is an independent consultant based in Berkely. Email: 2mhalderman@compuserve.com

David Leonard is Dean of International and Areas Studies, Institute of International Studies, University of California, Berkeley, USA.

on food security in the 67 low-income countries, estimates by the USDA suggest that the improvement would be modest[1] (Sharpouri and Trueblood, 2001). If one's primary concern is welfare of the poor, careful case-by-case analysis and policy prescription is required (IDS, August 2003). Thus we take no position on whether or not simple global agricultural liberalisation is in the interests of the poor. It is clear, however, that the resistance of the major industrial economies to changes in their agricultural policies was and is not based on a concern for the welfare of the disadvantaged. Developed countries would have to have a very different political relationship to those policies if they were to negotiate pro-poor outcomes.

Whatever the general picture, the effects of specific distortions in world markets for livestock products can be quite damaging. We give three examples:

EU Destabilisation of Beef Production in West and Southern Africa

The cases of the EU dumping beef in (a) West Africa in the 1980s and early 1990s and (b) South Africa in the mid-1990s are well known (Eurostep, 1993, 1999a). Beef production in the EU grew rapidly in the 1980s and by the early 1990s the EU had become the world's largest beef exporter with 26 per cent of total exports. The Middle East and Eastern Europe were the most important markets for the EU, taking nearly 70 per cent of its exports in 1990.

Beginning in 1984 exports of EU beef to coastal West Africa increased rapidly. Between 1984 and 1991, exports increased sevenfold to 54,000 tonnes. Most of the meat was low grade "capas" frozen or chilled boneless side meat with high fat content. In Cote

[1] The estimates are conservative because they do not consider any technological changes in poor countries liberalization might bring and therefore may understate the benefit to the poor.

d'Ivoire, the biggest market for beef at the time, imports of frozen and chilled beef (nearly all from the EU) jumped from 18 per cent of beef consumption in 1984 to 44 per cent in 1990. EU export support for this beef was two ECUs per kilo in the early 1990s, four times the reported value of the beef itself! In 1991 the EU reportedly provided 100 million ECU to European companies to export EU beef valued at 27 million ECU to West Africa.

The EU beef was sold in West Africa at one-third to two-thirds below the price of local fresh beef. Within the EU itself, beef was far more expensive than EU beef sold in West African markets. The very low prices at which beef was sold in West Africa created a major problem for the normal suppliers of beef to coastal West African countries as these suppliers were undersold. For decades livestock producers in Sahelian countries (Mali, Burkina Faso, Niger, Chad, Central African Republic) had provided live cattle for beef consumption in coastal West African countries from Cameroon to Senegal. This pattern continued until large quantities of low cost EU beef rapidly increased in the mid-1980s. By the late 1980s, the Club du Sahel estimated that regional cattle trade had dropped by 30 per cent from the early part of the decade. In Cote d'Ivoire the share of beef from the Sahel in the country's total beef supply dropped from more than two-thirds in 1975 to 28 per cent in 1990. The EU significantly reduced subsidies for beef exported to West Africa in 1993-1994. This decision was in part a result of protests and an advocacy campaign against the dumping led by European NGOs.

At about the same time as the EU reduced its dumping of beef in West Africa it found a new market for low quality beef in South Africa. The EU beef exported to South Africa in the 1993-1996 period also was primarily low quality, frozen de-boned "C grade". During the 1994-1996 period beef imported from the EU dominated these markets comprising, for example, 70 per cent of supplies in the canned meat sector. EU exporters made most of their

profit from the export refund, not the price of the beef itself. Export refunds rose from about 1.5 times the FOB price of the beef in 1993-1995 to 2.5 times the price of the beef in 1996. In spite of a 28 per cent devaluation of the Rand between January 1994 and December 1996, EU beef was imported at prices substantially below the prevailing wholesale prices of beef.

In regard to the impact of EU dumping of beef on local producers, South Africa has been the major market for Namibian beef exports since the 1950s. Because of the drop in prices, in 1996 there was a 40 per cent reduction in livestock marketed in the Northern Communal Areas of Namibia in spite of severe drought conditions. An estimated 95 per cent of the NCA population is dependent on livestock production, and livestock are the principle source of cash income. The Namibians affected by the subsidised exports of EU beef to South Africa include the poorest sections of the population.

There were a number of protests against the EU's dumping of beef in South Africa. The government of South Africa officially protested in Brussels, and NGOs focused attention on the issue. Representatives of farmers' organisations from South Africa and Namibia also protested in Brussels. The bovine spongiform encephalopathies (BSE) crisis in Europe had a significant financial impact on the EU budget, and from January 1997 the total volume of export refunds and the payments per tonne of beef exported from the EU were reduced. Apparently for all of these reasons, export refunds for beef going to South Africa were reduced by 70 per cent by 1999, leading to a 76 per cent drop in exports from the 1995 peak. Note, however, that the reduction in EU beef exports was due to a significant disease-driven drop in production in Europe, not to a change in policy. The dumping of beef in the developing world could easily recur.

EU Milk Powder Undermines Dairy Production in Jamaica and Elsewhere

Jamaica is frequently identified as a developing country where the domestic dairy industry has been seriously harmed by the import of subsidised EU dairy products. It is reported that in 1992 Jamaican import tariffs on milk powder were reduced while a parallel subsidy for local dairy farming was abolished as a result of conditions attached to a structural adjustment loan negotiated with the World Bank. One result has been a nearly fourfold increase in the import of milk solids since 1992, with the EU as the source of two-thirds of the imported powdered milk. Eurostep estimated in 1999 that the EU annually spent four million euros on subsidised milk powder exported to Jamaica. With cheap imported milk powder readily available, Jamaican food companies have shunned Jamaican fresh milk. Before 1992 small scale producers in rural areas had been part of and benefited from the national dairy industry, aided by infrastructure and a system that enabled milk companies (with government assistance) to collect, process and sell milk (Eurostep, 1999a, 1999b).

Under pressure from the Jamaican dairy industry, in 1996 the government raised tariffs on milk powder from 30 per cent to 50 per cent. This has not been effective as there is a tariff of only 5 per cent for importers who can classify themselves as "manufacturers." This category is loosely defined. In addition to major milk companies in Jamaica, this category also includes a new group of importers who emerged to profit from the advantageous situation. Jamaica is reportedly reluctant to take trade measures against the EU because it depends on Europe for preferential access for its exports of bananas and sugar (Cafod, 2002).

Our research has found similar evidence of the negative impact of EU subsidised milk powder on the domestic dairy industries of Senegal and Vietnam and the potential for the same in India (Gning, 2003; Vu, 2003; and Turner, 2003). It is true that most world

milk production is not milk powder. And only 0.1 per cent of all milk production was traded. However, the proportion of milk powder production traded is very high: 48.2 per cent and the net EU share of world milk powder exports was 32.5 per cent in 2000. However, the US also occasionally exports significant quantities of milk powder to the developing world. Although the current distortions in world milk markets cannot be corrected without the cooperation of multiple developed countries, it also is true that the role of subsidised EU milk powder is such that the problem cannot be diminished without the EU's taking a lead role (See also the European Court of Auditors, Special Report No 9/2003 on Export Refunds; July 2003).

Impact on regional markets

Exports of subsidised livestock products from the EU can have indirect as well as direct effects. EU exports of beef to south and south-east Asia compete and lower the prices for bovine meat (water buffalo, etc.) exported from India to the region. EU subsidised beef also has largely displaced eastern African exports to many countries in the Middle East.

India has a well-developed dairy industry. Between 1970 and 2000, its annual milk production increased four-fold. India's efforts to increase exports to Bangladesh and the Middle East confront heavily subsidised, lower priced exports from the EU. Further, the Indian dairy industry has complained that local milk producers are unable to compete with imports of subsidised EU butter and milk powder (Oxfam, 2002a).

The Overall Effects

The distortions in world agricultural prices come from the policies of many different countries, including developing countries. The industrialised countries are guilty of creating the greatest distortions and have been loath to change, however. The USDA estimates that "The EU accounts for 38 per cent of world (agricul-

tural) price distortions, compared to Japan plus Korea (12), the United States (16) and Canada (2)" (Burfisher, 2001, p. 5). The United States is hardly a disinterested observer of these effects. Its reintroduction of agricultural subsidies while the Doha Round of WTO negotiations were already underway and its unwillingness to budge on cotton subsidies despite their devastating effect on West African producers contributed heavily to the collapse of the Cancun meeting (The Economist, September 20, 2003). Still, the International Food Policy Research Institute estimates on the relative impact of the EU's CAP is similar to that of the US (IFPRI, August 26, 2003).

The effect of EU policies on world prices for livestock and livestock products (LLP) is greater than on crops. The EU leads in the production of dairy products such as milk, butter, skimmed milk powder (SMP) and whole milk powder (WMP), as well as in sheep meat. The EU is a clear second in production of beef / veal and pig meat, and third in poultry production. According to the WTO (2002) milk is the EU's "single most important agricultural product category, accounting for 13.8 per cent of EU agricultural production."

A simulation by Borrell and Hubbard found the EU production of milk products 51.5 per cent higher and meat products 17.6 per cent higher than they would have been without the CAP. Production of non-grain crops would have increased the most (809 per cent), with grains increasing by the same proportion as milk products. The enlargement of the EU agriculture sector is found to have been at the cost of all other sectors of the economy. The increased agricultural production has resulted in huge structural surpluses within the EU which were dumped on world markets. The increases in exports found by the simulation study are extremely high, as without the CAP the EU would not export these products. Instead, the EU would significantly increase imports of agricultural products. The increase in the export of milk products (as well as of grains and non-grain crops) is reported as 9900 per

cent, and of meat products 4900 per cent. The dumping of EU agricultural exports on world markets and reduced import demand has in some cases lowered world prices substantially. It has also led non-EU agricultural exporters to reduce production. (Borrell and Hubbard, Institute of Economic Affairs, 2000.) There is no doubt, then, that the EU must be a central focus in any consideration of an improved policy climate for the LLP of poor producers.

An additional reason for our focus on the EU in this paper is a more positive one. Whereas the United States has been reintroducing agricultural subsidies, the ideology of the Republican administration to the contrary notwithstanding, the EU has been under great pressure in recent years to reform the CAP and the financial strains of EU expansion could increase those pressures.[2] Thus we want to examine the politics of change in the CAP not only because the EU is a key actor but also because it is one that might more readily yield to change.

EU DOMESTIC POLICIES

Why should the member states of the EU defend the basic contours of the CAP so aggressively? All the economic analyses suggest that the gains from liberalisation of global agricultural trade would hugely benefit the citizens of the EU (Burfisher, 2001, p. 5). How is it that the interests of a tiny percentage of the EU population can outweigh a vastly larger number of citizen consumers, not to speak of other farmers throughout the world? Why should the EU invest the largest amount of its tax euros in the interests of so few?

Thinking about EU Policy-making in General

Relevant EU policy-making, especially the recent efforts to achieve CAP reform, shows clearly that both domestic and international

[2] The CAP budget has been a problem for a long time but expansion could increase pressures on it still further.

politics are important in understanding EU policy outcomes. In fact, one can think of three relevant levels of analysis.[3] The first level involves politics internal to Member States (MS). We are most concerned here with actions of MS governments, although interest groups play important roles. The second, "EU level" involves at least two aspects of EU politics—interstate bargaining and the EU institutions that both mediate such bargaining and play their own active role. The two most important EU bodies are the Council of Agricultural Ministers and the European Commission, especially its Directorate-General for Agriculture. Finally, the third level involves the actors and forces in the international environment that influence and are influenced by the EU. These include not only EU trading partners and the WTO but also the NGOs that provide development assistance and the poor countries that receive NGO and EU aid. It is important to note that the lines between these different levels are extremely fuzzy. For example, groups within individual Member States often draw on the international context to influence their own government's positions on EU policies. This is what occurs whenever UK Oxfam staff or the UK's Department for International Development (DFID) argue against EU policies they allege harm developing countries. But also we consider interest groups—broadly defined to include business interests and advocacy groups—within the EU and within individual Member States as operating in an increasingly trans-European (and international) environment. Oxfam is international and in recent CAP reform aligned itself with other trans-European groups (such as the European Consumer's Organisation [BEUC]). Also, the timing of policy-making does not follow any neat, logical movement between these different levels. While individual policy events might follow a sequence of sorts — some describe pricing policy in the CAP as a two-stage sequence of

[3] Here we are self-consciously borrowing from Patterson (1997) who in turn is strongly influenced by Andrew Moravcik's work on liberal intergovernmentalism and Putnam (1988).

national preference formation followed by EU-level inter-state negotiations (DeGorter et al., 2000) — broad-level policy change is a much more complicated affair. The end result are processes with much great inter-penetration than traditional international relations theory about bargaining between states would allow but greater autonomous influence for the formal levels of government organisation themselves than is found in US state and federal politics.

The Common Agricultural Policy (CAP)

Background

The official objectives of the CAP, as stated in the 1957 Treaty of Rome, are all related to domestic concerns. The controversies surrounding the relationship between these policies and the rest of the world that are publicised today were hardly thought of when the CAP was created. Instead, several internal factors appear to have contributed to the creation of the CAP. One, European agriculture was not always in the healthy state it is in today. The traditional story told about the CAP refers to post-WWII food shortages and concerns that European agriculture needed to recuperate from that war. There were very real concerns about European food self-sufficiency. And it is clear that the CAP helped build a strong agricultural sector. Two, in its early years one could say that the European Economic Community (EEC) needed the CAP. Rieger (2000) reminds us that 'only with regard to agriculture did the scale of political governance reach proportions resembling those of a federal government'. Agriculture dominated early discussions within the EEC and the prevailing dominant position of the CAP in the EU budget supports this view. The third, and related, internal factor may have been the need to 'integrate the national farming population into both the transnational and the national polity.' Reiger (and others) argue that this is part of a welfare state explanation that is more important than the traditional story told above.

The 1988 and MacSharry Reforms: The 1988 and MacSharry (1992) reforms signalled the end of an early phase of the CAP and the beginning of the current reform-oriented phase. The 1988 reforms focused on stabilising a rapidly increasing budget. The measures had little to do with real reform of the structure of farming support. The MacSharry reforms were different, however. While many of the old mechanisms for maintaining the internal market stayed in place, several changes did occur. Most importantly, price supports were replaced with direct payments linked to production (measured by historic yields). Additionally, a 'second pillar' of agricultural support was introduced. This second pillar emphasised what is popularly called in today's debates the 'multifunctionality' of agriculture. That is, the idea that what happens in agriculture has impacts on things other than agriculture, such as the environment, animal welfare, and rural landscape. In the MacSharry reform, multifunctionality came in the form of incentives to comply with new agri-environmental regulations.

The main target of the MacSharry reforms was the arable crops sector. The overall level of price support for this sector was reduced; although there was little change for small producers and some received compensatory payments conditioned on compliance with set-aside requirements. Minor changes were made with regard to milk quotas but no real reform was made here. Regarding beef, intervention prices were reduced, but premiums to producers were increased. The variance in treatment of different sectors was in no small way linked to the Uruguay Round of trade negotiations occurring at the time.

Agenda 2000 and the June 2003 'Luxembourg Agreement': Both the earlier 1988 and the more recent Agenda 2000 reforms followed the beginnings of new rounds of international trade negotiations, each round focussed more than any other previous international negotiations on liberalisation of trade in agriculture. Also, both the 1988 and Agenda 2000 reforms were regarded as

being relatively uninteresting compared to the reforms that followed them

In sharp contrast, both the MacSharry and the June 2003 reforms have been associated with a change in direction for the CAP. In 1992, the use of direct payments was considered revolutionary, increasing the transparency of the entire system. The 2003 reforms are similarly considered important for their moves toward decoupling support from production. If implemented fully this means payments producers receive should have no correlation to the amount they produce. While it is still far too early to know for certain, it would seem that the move toward decoupling aid to farmers from production might be the most important change ever to the CAP. This may be true even though the Luxembourg Agreement watered down many of the original reform proposals presented in Commissioner for Agriculture Franz Fischler's June 2002 Mid-Term Review.

Current EU Support for European Livestock and Livestock Products

As mentioned earlier, the CAP now has two pillars of funding. Pillar I refers to the traditional payments to farmers. Pillar II, begun with the MacSharry reforms of a decade ago, refers to payments linked to farmer compliance with certain criteria regarding the environment, food safety, food quality, animal safety and health and rural development. Funding for these second pillar items will be increased with the new reforms. As President Prodi was often quoted as saying, this is part of how the EU citizen will now get better 'quality' for the money. However, it is the first pillar of support that is most directly linked with large production levels.

EU 'first pillar' support for its agricultural products varies. Beef has been called the 'most protected meat in the world' and in the European Union this is definitely the case (MLA, 2003). Animal

products accounted for 24.5 per cent of the EAGGF Guarantee Section budget. Almost 75 per cent of those monies were earmarked for beef and veal products in 2002. It is important to note that almost all the expenditure supporting beef can be classified as domestic aid paid to producers. This is in direct contrast to EU support for dairy which relied far more heavily on export subsidies. Almost 70 per cent of export subsidies for LLPs in 2001 went to 'milk and milk products'. The market is allowed to fluctuate with a minimum of intervention for pigmeat and poultrymeat. All receive some form of import protection and export subsidies (WTO, 2002; OECD, 2003). It is partly due to the greater amount of state intervention in the beef and dairy sectors that they receive greater attention in this report.

Internal MS Politics and MS Relations

There are at least three general reasons that internal Member State politics are important in understanding CAP policy and reform. A first reason to consider MS politics is that MS also provide support for agriculture beyond that provided by the CAP. The WTO (2002) estimates that this number was € 14.5 billion in 2000.[4] That figure is almost a third of the total amount spent by the EAGF Guarantee fund. A second reason is that EU politicians are primarily accountable to their Member States and generally take their cues from domestic supporters. This is especially important in considering decisions made by the Council of Ministers.

[4] The WTO Trade Policy Review continues: "Although national expenditures have remained at about the same level since 1995, this is mainly the result of a steep decline in national expenditure by Germany since then (down 40 per cent), as national expenditures rose rapidly in Ireland (up 322 per cent), Portugal (122 per cent), the Netherlands (74 per cent), Sweden (67 per cent), Belgium (64 per cent), and the United Kingdom (60 per cent). The trend to increasing national expenditure is likely to have continued in 2001 as a result of emergency funds granted to agricultural producers affected by FMD, BSE, and the crisis in confidence in meat."

The third, newer reason Member State politics is important is that current CAP reform grants higher levels of 'flexibility' in implementation of CAP Reform. The most publicised aspect of this is the timing of decoupling. In its current form, the recent Luxembourg Agreement allows states to choose when to decouple, from almost immediately to 2007. MS decisions on timing are heavily influenced by domestic politics and generally correlated with their stance on CAP reform generally. Thus, it is expected that France will wait until the last minute to implement reforms whereas the UK is making plans to start decoupling as soon as possible. Member States are also given some flexibility over the amount of decoupling allowed, especially in the beef sector. The ramifications of this flexibility for internal and external markets are still not well understood.

It is interesting and important to note that the farm ministries of Germany, France, the Netherlands, and the UK, for example, have mandates that were much broader than agriculture. And for most of these states this is a rather new development. Concerns about the environment, food quality, animal welfare and rural development have all led to the transformation of these ministries, not just in name but also in function. This may be a symptom of a decline in agricultural interests' influence over European policy-making.

In the recent June 2003 reform, EU Member States largely followed their traditional—that is, well known— stances regarding CAP reform. The UK, Sweden and Denmark were generally in favour; France and Ireland were strongly against; others were somewhere in-between. Germany has continued to move closer to a pro-reform stance (a move begun in the early 1990s due to changes in its internal politics), even though it aligned itself with France in negotiating the June 2003 outcome.

Some aspects of EU MS divisions over CAP reform can be explained by primarily internal factors. Thurston (2002) cites sev-

eral characteristics of state agricultural sectors that are correlated with such divisions. Countries with higher shares of agriculture in their GDP (such as France) and which specialise in commodities favoured by the CAP (such as Ireland) may resist reform. Countries with larger rural populations, and thus larger portions of their electorate interested in agricultural issues may also be against reform.

However, all EU-15 Member States share several long-term trends. Share of agriculture in the GDP is falling; share of agriculture in employed civilian working population is falling; and the total number of agricultural holdings is declining, even as the total area used for agriculture may be increasing in some countries, meaning that the average agricultural holding is getting larger. In terms of livestock specifically, there is evidence that livestock holdings are either staying steady or increasing across the EU (DG Agriculture, 2002a).

States that are pro-reform, tend to be net contributors to the CAP and the EU budget overall. States that are against reform tend to have the opposite position. This does not describe the whole picture, however. Although France is a major beneficiary of the CAP it is a net contributor to the overall EU budget. Thus if CAP subsidies for France were ended it would not be unreasonable for it to call for a renegotiation of other EU costs and benefits. This could be exceedingly complex and difficult.

More than just aggregate or average economic interests are involved, however, in establishing what member states consider to be in their "national interest." The pull of territoriality tends to lead to the over-representation of rural voters in most of the world's legislatures. EU farmers also are unusually well-organised politically and have a tight corporatist relationship with the state that gives them an advantage in decision-making. All of these factors contribute to making EU farmers "disproportionately enfranchised" (in the phrase of Peter Evans). In addition, farmers

usually are important to the electoral base of conservative and centre parties (Keeler, 1996). Thus, it is no accident that a Gaullist president defines France's interests as being against CAP reform, while Labour Britain takes the opposite position and Socialist Germany appears to have backed away from CAP reform only in support for French concessions on industrial concerns. Unless and until all the large, pivotal EU states have socialist governments, it may be difficult to forge consensus for deep reform of the CAP.[5]

Lasting political relationships between Member States also may be a factor. While much of the negotiation on details of CAP reform took place in the Agricultural Council, Heads of State were also involved. Especially important is the role played by two heads of state (much to the chagrin of many others). During the past year Chirac and Schroeder made two important agreements regarding the CAP. The first was at the end of 2002, when Germany abandoned its insistence on immediate reform in return for an agreement that the cost of the CAP would be capped. Describing that agreement, Chirac stated: "if there is no Franco-German accord, Europe grinds to a halt" (The Economist, November 2, 2002). The second was an agreement in June 2003 on the specific proposals for reform they would both accept. It was reported by several European newspapers that Germany offered to move to support a common position with France if France backed German opposition to an EU plan on mergers and takeovers (unrelated to agriculture) [Both Germany and France deny this (Agra Europe, June 13, 2003)]. Franco-German cooperation is evident in other policy areas as well. Notably absent from this continental alliance is UK, a long-time pro-CAP reform state. The UK has often found itself sidelined by France and Germany, and not just

[5] The uniformity of centre-right support for the CAP may be weakening. Most of the parties in the European Parliament supported reform, as do many smaller farmers. The electoral dynamics for EU elections and national ones are different, however, and the European Parliament has little influence on this issue.

in terms of the CAP. France's pivotal position on CAP negotiations in the EU is likely to continue under EU expansion and might even grow as the other states experience strongly divergent interests and difficulty in organising their larger numbers for reform.[6]

EU Institutions

MS negotiations regarding the CAP do not occur in a vacuum; the role of EU institutions is extremely important. The Council of Minister's role is one of making final decisions, but those decisions must be based on legislative proposals given to it by the European Commission.[7] In fact, the Council of Ministers cannot formally consider any suggestion that has not come from the Commission. The European Parliament's (EP) role, by contrast, is limited to advice.

Despite the key roles played by the French and German Heads of State, it was the European Commission that (a) set the agenda and (b) pushed Member States towards an overall direction of reform they might not have otherwise taken. The Commissioners and the bureaucracy they preside over also represent a variety of disparate interests. And some, arguably, have more clout than others. One example of this is the recent banana dispute where DG Agriculture supported EU producer interests, DG Trade supported the GATT regime interests, and DG Development supported ACP country interests (Rieger, 2000). Such divergence in policy views is part of the current European debate on coherence –the idea that policies ideally should complement and definitely not work against each other.

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6 At a formal level changes in the Constitution of the EU (which are currently under negotiation) might weaken the position of France, particularly on the CAP. The informal political dynamics of the EU, however, suggest that France still will remain pivotal.

7 The Council of Ministers cannot formally consider any suggestion that has not come from the Commission (Article 43 of the Treaty of Rome).

The Council of Ministers makes the final decision on reforms to the CAP, acting on European Commission proposals. Occasionally, such as when issues appear inescapably intransigent, it defers to the advice of the European Council (a body made up of European Heads of State). Some Council decisions require unanimity, but most require qualified majority voting, as is the case for CAP reform. In practice, however, consensus is the norm. Under the present constitution EU Member States also have the option of veto on any measure they consider a threat to their 'vital interests.' It was reported that France used such a veto threat during the June 2003 negotiations.

While there is one Council in principle, there are in fact several Councils dealing with separate policy areas. Each acts with equal authority. Of these, the Council of Agricultural Ministers has ultimate responsibility for CAP reform. This Council, in turn, often creates committees, or working groups, to help with its heavy load. The most important committee is the Special Committee for Agriculture. The Council of Agricultural Ministers has been described as "locked into a clientelist relationship with farmers" (Laffan and Shackleton, 2000; Swinback and Tanner, 1996). However, there are several other Councils that often act to rein in their spending: the Budgetary Council, General Affairs Council, and Council of Economic and Finance Ministers.

Interest Groups

Beyond the governmental actors, other EU actors—collectively called "interest groups" in this paper— influence EU policy-making. Perhaps the most common interest group strategy is lobbying. There is a debate about whether or not such lobbying is most effective at the MS level or the EU level. In part this is an academic question and its answer depends on one's view of the policy-making process. Some view the primary driver in EU politics as intergovernmental bargaining. Such a view would lead one to focus on pressure at the MS level. Others see the Commis-

sion's role as agenda setters and proposal-makers as more important. Such a view would lead one to focus on pressure at the EU level. However, in practice both levels matter for agricultural and trade policy. And not only is it important to lobby at both levels, argues Kohler-Koch (1997), it would also "be a short-sighted strategy just to concentrate on one EU institution."

One tool that might be useful in considering where interest groups should (and do) concentrate their lobbying is considering when they lobby. Three relevant phases in a policy's life are: (1) the problem-defining and agenda-setting stage; (2) the actual creation of the policy, which in the EU's case involves some intergovernmental bargaining; and (3) the implementation of the policy. This is similar in conception to Finnemore and Sikkink's (1998) "norm life cycle" stages. They find that, other things being equal, the influence of transnational advocacy networks (the focus of their research) is generally greater during the first, agenda-setting phase. They also have some impact in the third phase but it is more difficult for them to influence policy-makers during the actual creation phase. During implementation (as Risse, 2002, also notes) the expertise and cooperation of such groups is often needed for working out the details of a policy, gathering information, and monitoring behaviour. Mazey and Richardson (1996) argue that "it is at the problem-identification and options-search stage of the policy process that lobbying has always been most effective". They cite one DG official as saying that "a contact at a late stage of the policy-making process is disturbing and completely useless."

The Commission is also an important actor following the Council's decisions. In a phase of policy-making that rests between the bargaining of EU Member States and actual implementation, the Commission is responsible for putting together all the details of the agreement into a legal form. Most interest group concerns are technical and detailed and this is precisely where the Commis-

sion plays its other important role – in filling out the details. Indeed, there is an implied symbiotic relationship between Commission and interest group here as well, as the Commission staff is relatively small and often "depends on organisations such as interest groups for its expertise" (Mazey and Richardson, 1996).

Business Interests

In general, three trends among EU LLP producers are important to highlight. The first is the increased division among farmers regarding the CAP. Farmers do not benefit equally from the CAP. The Commission's own figures suggest that roughly eighty per cent of the funding received by farmers is received by only 20 per cent of the farmers. In some member states, such as the UK, there seems to be clear evidence that larger farms do better with current policy. Rabinowicz (2000) notes that in the past, large and small farmers shared preferences for the CAP as an instrument of price support. Moves away from such price support and toward direct payments "makes this coalition weaker and redistributional conflicts among different groups of farmers more pronounced." Small farmers might also fear the growing prevalence of large farms. As fewer and fewer Europeans are employed in agriculture, the average size of farms is increasing. Many small farmers came out in favour of CAP reform, not because they wanted to see the CAP undermined or abolished, but because they sought a more favourable outcome. In many parts of Europe they allied themselves with rural groups and environmentalists who saw in these small farmers a way to 'preserve the landscape'.

The second important trend is increased vertical integration. Vertical integration refers to the process of increasingly sharing economic and financial interests along the food processing chain, from farmer to consumer. Connor (2003) has found evidence of increasing ownership concentration in "food retailing, food manufacturing, and selected inputs purchased by agricultural producers." Connor finds that this has important ramifications for price-set-

ting. One economic reason to do this is that it can reduce transaction costs. It can also lead to "an improved ability to differentiate products and to market them under a brand name, and more bargaining power for the brands" (Keyzer and Merbis, 2000). Intellectual property rights issues might also be more reasonably settled, encouraging technological innovations. From a regulatory point of view there are other benefits as well. Quality verification, especially in meat and especially with requests for labelling that includes farm of origin, can require high levels of vertical coordination. However, Keyzer and Merbis (2000) also cite some of the disadvantages which include the "lack of competition and flexibility as well as dulled incentives, especially at the farm level". One result may also be increased use of contract farming, with the effect of farmers losing bargaining power while being forced to accept terms offered by processors. In France, Glaz (2003) notes, this trend is already evident in the beef sector.

Vertical integration also confronts the different interests of farmers, first stage and second stage producers (Swinback and Tanner, 1996). Under the GATT, rules on export subsidies were different for primary agricultural products than they were for processed products. Also within processed products there were some differences in treatment between first and second stage processing. Second stage processors – such as those manufacturing pasta – were not necessarily supposed to receive export subsidies, but the EU had done so anyway. Part of the EU's logic has been that the processors have to be compensated for the high prices of raw materials created by the CAP. The Uruguay Round tacitly allowed the EU to continue using such export subsidy arrangements, but under the current Doha Round this protection could end. Processors facing reduction of export subsidies, then, have reason to desire changes in the CAP that (a) lower domestic prices and (b) secure for them stable access to raw materials from overseas markets.

That the EU Commission may be supportive of the food and beverage industry should be no surprise. EU trade in 'transformed' agricultural products tends to run at a surplus, whereas trade in primary agricultural products is at a deficit. Food manufacturing interests, importantly, can run counter to those of farmers. Specifically, it is in the food processing industry interest to secure low-cost inputs. Falling prices in agricultural products is a good thing for them. However, so is a stable market environment.

As buyers of agricultural products retailers also benefit most from any policy change that decrease prices. In France, large retailers (the largest being Carrefour) serve three-quarters of household consumption. And many of these large retailers have connections to abattoirs and beef farmers themselves, a result of increasing vertical integration in the sector and a sign of the increasing influence of retailers (Glaz, 2003).

A third trend often cited in the literature is that the influence of farmers is declining. Such a decline is probably inevitable, as smaller and smaller percentages of the population are engaged in farming as an activity and as agriculture's contribution to the EU's GDP continues to decline. Recent food safety issues, in particular the BSE crises, also have had a considerable effect. Signs that fragmentation of unions is beginning may be a symptom of this decline or a contributing factor, or both.

Countering the above forces working for change is the fact that land has relatively low mobility as a factor of production, i.e., that only in peri-urban areas is it easily converted to non-agricultural uses. Hiscox (2001) has demonstrated that in those parts of Europe where the factors of labour and capital are relatively mobile, political conflict is more likely to be organised along class lines. But where they are less mobile political organisation occurs along industry lines – for the owners of those factors are locked into a mutual dependence from which they cannot easily escape. France has had almost constant low inter-industry factor mobil-

ity and this is likely to be true for at least some other countries involved in agricultural production elsewhere in Europe as well. Thus the processor-farmer alliance protecting agriculture may not fall apart readily, even if its terms shift more in favour of the processors, who enjoy greater factor mobility.

Advocacy Groups

Unlike business interests, advocacy groups tend to exist to maximise their ability to influence policy-making to fit with their typically ideological goals regarding the common good (Risse, 2002). Another important difference is in their orientation toward what Kohler-Koch calls the "functional segmentation" of the EU system. That is, business interests tend to be fixed features in policy-making in a given issue area whereas advocacy groups tend to be more broad-based. Such a difference could give business interests an advantage according to Kohler-Koch's argument. Advocacy groups include consumer groups, animal welfare activists, environmental groups, and pro-developing country activists.

In previous periods of CAP reform, consumers were a relatively unheard interest. The recent CAP reform complicates this picture a little, however, as consumer voices regarding food safety concerns appear to have been heard. While there is little evidence that the recent reform package will lead to lower food prices, there is reason to believe it will lead to safer food supplies.

The costs to the consumer are several. One, European consumers pay prices that are regulated at above world market levels. Two, producer incentives to differentiate quality produce are fewer, meaning consumers may have less choice than in a more market-oriented system. Three, as taxpayers consumers also pay for EU budget expenditures on the CAP. Estimates of the total cost to consumers range from € 50 – 90 billion for the EU-15 (DEFRA, 2002; Thurston, 2002). Some would argue this is not yet a complete figure for EU taxpayers as the CAP might be responsible for negative environmental damage.

Consumer interests are not well organised around agricultural issues; they tend to have greater difficulty influencing policy-makers (Young, 1997). It is rational for farmers to invest their energy in defending a policy regime that provides them with such substantial benefits. The costs to consumers and taxpayers, on the other hand, are more diffuse and difficult to quantify. (Thurston, 2002; Colman, 2001).

An important exception to this regards food safety issues. Several consumer interest groups, such as the European Consumer's Organisation (BEUC) and UFC-Que Choisir (France) seem to have had success in this specific area (Glaz, 2003). Whether it is consumer groups or whether it is retailers and food processors seeking to increase the level of vertical integration within the food industry as a whole driving the recent increase in food safety regulations is difficult to know. But it is clear that consumer interests became mobilised around this issue and became more knowledgeable about agriculture and the food industry as a result.

Environmental groups have had somewhat more success than consumers in achieving their CAP reform goals. Groups such as BirdLife International, Friends of the Earth, European Environment Bureau, Greenpeace and the World Wildlife Fund are active. In Europe there is a larger built-in base of political support for environmental concerns than is found in the United States. Largely due to the nature of their electoral system, Green parties have voices in most EU MS and in the EP. The leader of the German farm ministry, Rene Kunast, is a member of this party. Environmentalists' first direct success in CAP reform came with the MacSharry reforms of 1992 which created the second pillar of the CAP. Agri-environmental policy has received continued development in the Agenda 2000 and June 2003 reforms. Rural development groups such as the Society for Rural England and Ecovast hold similar positions to those held by environmentalists. These organisations also tend to be pro-small farms (Rabinowicz, 2000).

Relevant political actors supporting animal welfare include a host of non-governmental organisations including advocacy groups committed to the issue, environmentalists, religious leaders (including one who has calls cows our 'brothers and sisters'), and consumer groups.

Pro-developing country activists largely regarded recent attempt at CAP reform as a failure. For several groups, even Commissioner Fischler's original proposals did not go far enough and the resulting compromise agreement is viewed with general disapproval. Oxfam called it a "disaster for the poor" (International Herald Tribune, June 28, 2003). However, these activists – especially Oxfam – were successful at making their message public. And advocacy groups do make an impact. Most, if not all, of the individuals contacted during the course of this research were aware of the Oxfam et al. views.[8] Oxfam is very organised compared to many advocacy groups (and perhaps better funded). It is active at the Member State, EU, and international levels. Oxfam has been especially adept in its use of the media.

The International Environment and International Actors

The third level of politics is international. It cannot be overemphasised that the most significant reforms of the CAP – in 1992 and again in 2003 – were deeply tied to concerns about progress in multilateral trade negotiations. It is notable that during the June 2003 CAP negotiations UK agricultural minister Margaret Beckett commented on Commissioner Fischler's compromise proposal: "if he says he has a good enough package to get a good deal at Cancun, then it is something I can live with (European Report,

[8] It is not known whether they got their information from the newspapers or from Oxfam reports. During interviews, it was clear that some EC staff were stung by the attacks of advocacy NGOs, especially Oxfam. Others asked, if there were no Oxfam or other European advocacy groups, who would effectively advocate for the rights of the poor in developing countries vis-à-vis the powerful in developed countries?

June 21, 2003, European Information Service). Yet it is also significant that, despite large external pressures to address market access and export subsidies with the CAP reforms, almost nothing was done in either area.

The collapse of the Doha Round of WTO negotiations at Cancun illustrate both the prospects and problems of increased international leverage on the EU's position on the CAP. If the Doha Round were not to be resumed or if it were to disintegrate into purely bilateral negotiations, the interests of poor agricultural producers in developing countries would not be well served. Poor countries do have a good deal to gain from a reduction in distortions to agricultural trade (The Economist, September 20, 2003). Only if trade negotiations are linked to other issues that are of vital importance to the industrial and service sectors of the developed world is there likely to be sufficient leverage – both against the US, the EU and Japan and by business interests against agricultural ones within these units – to gain change. The unity and technical sophistication of the Group of 21 in its negotiations and its decision to walk out of the meeting in response to the lack of responsiveness of the EU and US teams raised the ante in WTO talks and increased the likelihood of industrial country concessions in later meetings.

On the other hand, ACP countries (African, Carribean and Pacific states with colonial ties to Europe) were notable for their absence among the Group of 21 and in the walkout. Because of the concessions the ACP countries have been able to negotiate with the EU, universal liberalisation of agricultural trade holds less promise for them and their interests are different from most of those in the Group of 21 – which are in a position to take advantage of liberalisation. The ACP also effectively establishes a dyadic, patron-client relationship between these very poor countries and Europe (Note the reluctance of Jamaica to defend its dairy industry because of these ties, as discussed above). In the classic pat-

tern of clientage, they have more difficulty in acting collectively against their EU patron, effectively trading off the concessions of "special relationships" against the larger interests they have in common with each other and the Group of 21.

Enlargement

The EU is currently in its fifth phase of enlargement. As stated earlier, the enlargement process can be seen as one of the driving forces of recent CAP Reform. Accession States, especially Poland, have significant agricultural sectors. They could well become future net-beneficiaries of CAP payments and the EU budget overall. To address enlargement concerns accession partnerships have been negotiated, including provisions for 'accession aid' under the Special Accession Programme for Agriculture and Rural Development (SAPARD) (DG Agriculture, 2002b). In 2001 this aid totalled 3,240 Meuro of which 540 Meuro was directly targeted at agriculture (European Commission, 2003a).

Many aspects of the impact of enlargement on the LLP sectors are uncertain. There is evidence that the new member states would not add to the surplus, but this may change if their farmers become more productive (EIU, 2003).

Prior to negotiations during the past year, several academic articles suggested that enlargement will have the general effect of reducing the support given to farmers through the CAP. The primary reason for this is that politicians of the current EU members will have lower preferences for agricultural protection in the new and expanded CAP than in the current CAP (DeGorter *et al.*) Indeed, with the October 2002 Chirac-Schreoeder deal capping the CAP, support will likely be reduced as the CAP will not allow current levels of support to be extended to accession countries.

IS THE CAP ON ITS WAY OUT?

> "This is the end. We're destroying the CAP."
> - Jean-Michel Lemetayer, head of the French Union FNSEA, on recent

Some individuals interviewed in the course of this study spoke of the inevitably of the end of the CAP. And after the recent agreement in Luxembourg, several observers questioned whether the way might be paved for future abolishment of the CAP. While it is unlikely that the CAP will be completely abolished, there does seem evidence of a gradual evolution towards a policy regime that will, in many ways, be fundamentally different from that of its early years. In particular there are several general ways in which recent reforms might undermine the CAP. The first has to do with the increased flexibility granted to Member States. Some interpret this as a sign of renationalisation, something Commissioner Fischler has been quick to deny. It also is considered to pose serious problems for maintaining a 'common market' in this area, especially if some Member States (e.g. UK) decouple well ahead of other Member States (e.g. France).

A second general way in which recent reforms may undermine the CAP is related to the process of decoupling income from production. The Mac Sharry reforms were significant in that, through granting direct aids, they made the entire process more transparent. Recent reforms may not add to the transparency, but will change the political economy around production.

Third, if larger, more efficient farms increasingly dominate European agriculture, some of the political and economic rationale behind the CAP may become obsolete. Social welfare concerns tend to focus on small farms and efficient farms tend to need less financial support.

Fourth, the processors of food products are moving down the vertical chain of agricultural production and already are showing

signs of interests in tension with those of farmers. EU processors have higher costs of production because they must buy agricultural commodities within the EU at prices inflated by the CAP. Many are able to export only by receiving CAP subsidies themselves. If these subsidies were to end and / or manufactured foods from outside the EU were able to be marketed there more easily, the processors would face stiff price competition and want to press for a reform in the CAP to reduce their own costs.

Fifth, with every passing year the importance of agriculture to the economy of the EU diminishes. By itself this does not threaten the CAP, for as farmers diminish in numbers it becomes more affordable to subsidise them. When the interests of farmers in the CAP collide with the interests of industries and services in a still more liberalised global trading regime, however, agriculture becomes more vulnerable. Thus if different types of reform in international trade remain linked to each other – as they are in the Doha Round of WTO – the pressure to lessen the hold of the CAP will become irresistible.

For all the above reasons, there are good reasons to hope that the era of the CAP and its distorting effects on world trade in LLP may be coming to a close. If this development is not undermined by the other states distorting agricultural markets, especially the United States, regional developing country markets will open up to their neighbours, with profoundly positive effects for agricultural production in many poor countries. Hopefully it will be managed in a way that also benefits poor producers and farm labourers themselves.

But it is unlikely that the end of the era of subsidised EU LLPs chasing developing country markets and forcing down local prices will lead to an opening of the EU itself to significant import of poor country LLPs. As we noted above, the EU already is well along the path of stressing quality and safety in its food markets.

It will be very easy for the EU to raise its own food safety standards and use the consensual, technocratic processes of the World Animal Health Organisation *(Organization International des Epizooties)* to defend itself against developing country LLP imports. Thus we predict that EU livestock production will remain protected but without the same distorting effects on the rest of the world's trade as now exist.

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Codex Standards and SPS Measures: Consumer Safety or Trade Barriers for Smallholder Dairy or Meat Producers in Asia?

Shashi Sareen*

The international food trade scenario has changed significantly in recent years with rapid growth in world food trade, increasing access for all countries, big or small, to global markets. Consumers all over the world have become conscious of quality and are showing their preference for high quality products while at the same time governments have realised their role in protecting the health and safety of their populations by imposing stringent requirements relating to pesticide residues, contaminants, microbiological parameters, pests, disease as well as various aspects of hygiene controls.

With the establishment of the WTO, the global trade in the food sector is increasingly being governed by quality and safety aspects. In such a scenario, there is a likelihood that countries may impose standards and regulations not only for protection of consumers but also as non-tariff trade barriers. This does not seem too far-fetched as observed from the following FAO's report on implications for India of SPS Agreement:

> *"There is a significant level of concern in India regarding the real or perceived replacement by some countries of tariff barriers to trade with sanitary and phytosanitary barriers and other technical barriers to trade. These concerns may be well founded based*

* Shashi Sareen is Director, Export Inspection Council of India, New Delhi

on the increased emphasis that is being placed on food safety and other SPS measures by many countries and the increased emphasis being placed on the inspection and control of imported food and agricultural products."

To ensure that standards and regulations do not create unnecessary barriers to trade, certain rules and disciplines are required to be maintained, which are being taken care of through the WTO non-tariff agreements, which basically lay down the rules with regard to standards and conformity assessment procedures for international trade. The SPS Agreement is the most important in the area of food and stresses on the health and safety aspects and permits member countries to impose measures to protect the health and safety of their population within certain rules. This Agreement recognises use of Codex standards for human health and the OIE standards for animal health.

In this paper, the international food trade scenario with implications of Codex and WTO for export of food commodities, non-tariff related issues of concern and actions to address the concerns for gaining access to global markets have been presented.

INTERNATIONAL FOOD TRADE SCENARIO

In the food and agriculture sector, governed by the SPS Agreement, the emphasis has shifted from end-product testing to installation of food safety management systems comprising HACCP / GMP / GHP in the processing units based on international standards developed by the Codex Alimentarius Commission.

There being increasing world-wide concern about food safety, the importing countries are not only prescribing stringent standards regarding quality of incoming food products but also specifying the methods of test and are further having norms on destruction of consignments not found to be meeting those norms. The use of risk assessment is further governing the standards setting process and as per the SPS Agreement, any standard more

stringent than the standards referenced need to be based on a risk analysis.

The need to participate in international standards work has been clearly highlighted in the SPS Agreement, which is very significant to ensure that Asian conditions are reflected in development of international standards. To ensure effective participation by developing countries, capacity building is important in terms of strengthening the regulatory framework, and upgrading testing facilities to meet requirements of international as well as importing country's standards and the same has been recognised in the SPS Agreement as well as by FAO/WHO.

Taking shelter of the SPS Agreement, all countries right from the developed ones like EU and USA to the less developed like Nepal and Sri Lanka are imposing stringent requirements on food imports which cover pesticide residues, contaminants, microbiological parameters, pests, disease as well as various aspects of hygiene controls. In addition to end product criteria, importing countries are also increasingly requiring that the food items are produced and processed taking into account critical factors to ensure quality and safety throughout the food chain from primary production till final consumption i.e. the concept of traceability is increasingly becoming important.

However, the concept of equivalence having been recognised in the SPS Agreement as well as being encouraged at the international level by the Codex Alimentarius Commission, there is a provision to address such requirements of importing countries through Equivalence Agreements/Mutual Recognition Agreements rather than duplicating inspection and testing at both importing and exporting end, which would further enhance global trade with major trading partners. To assure health and safety of domestic population while at the same time the safety and quality of foods entering international trade, it becomes necessary to

have not only the required infrastructural facilities but also a legislative framework as has also been laid down in Codex standards. Such requirements are also a pre-requisite for equivalence agreements and MoUs.

ISSUES OF CONCERN AS RELATED TO EXPORTS

Although Asian Countries are significant producers of food products including dairy and meat products, the exports from the region are relatively low. Some of the basic problems being faced in accessing overseas markets or other issues hampering exports are highlighted below.

Harmonisation

The SPS Agreement provides for harmonisation of the SPS measures of member countries with the Codex international standards. The Agreement, however, allows members to lay down more stringent standards than those of Codex, provided they can be scientifically justified. It has been experienced that certain countries are at times imposing norms more stringent than those specified by Codex without any scientific basis. These may be in terms of specification requirements which are at times unduly stringent and difficult to meet; or the test methods specified require a very high degree of accuracy which may not be justified as a result of which the cost of testing becomes disproportionately high. Further, exporters may at times not be clear about the specific requirements prescribed by the country of destination which may in turn lead to rejection of the product.

Transparency

The SPS Agreement requires governments to notify other countries of any new or changed sanitary or phytosanitary measures which affect trade. They also allow for a reasonable interval between the publication of such regulations and their entry into force in order to allow time for producers in exporting members and particularly developing country member to adapt their products

and methods of production to the requirements of the importing members. To be able to meet the SPS requirements of various WTO member countries, there is a need to have access to the norms laid down by them. It has often been observed that there is absence of information and lack of transparency on the procedural norms and regulations of various countries as related to specifications as well as methods of sampling, inspection and test. New regulations are brought out and implemented without even giving the producers in the exporting country a chance to get familiar with these. Often the standards are available only in the language of the importing country or are presented in a very complicated manner. The result is that exporters are, at times, not clear about the specific requirements prescribed by the country of destination, which has led to rejection at the point of import.

Access to International Markets

The entire aim of WTO is globalisation and gaining international access for products subject to their meeting international or the requirements of the importing country. In the case of India, although a large producer of dairy products with capability to meet the most stringent requirements laid down, exports are insignificant. The reason is that importing countries are denying access for one reason or the other. The EC expects a residue monitoring plan to be first approved, Australia feels that this is a high risk product and the issue needs to be taken up at a later date, and other countries would give different reasons. However, none of the reasons seem scientific and countries like India continue to address each issue and carry on prolonged dialogue with importing governments.

Safety Management Systems Approach

In addition to end product criteria, it is increasingly becoming necessary that food items are produced and processed taking into account critical factors to ensure quality and safety throughout the food

chain from primary production till final consumption. HACCP, a food safety assurance and management system, has been recognised by the Codex Alimentarius Commission as a tool to assess hazards and establish control systems with focus on preventive measures instead of relying primarily on end product testing for health and safety aspects. The HACCP-based approach is currently being implemented by many countries including USA, Canada, Australia and many members of the European Union both in the domestic as well as overseas trade for more risk prone products such as marine, meat, poultry and dairy.

Although under this system, flexibility of implementation has been provided for, some countries are insisting on installation of certain infrastructural requirements such as milking machines for milk production, a large number of change rooms etc. Another significant issue is implementation of such systems at the primary production level, which is being initiated in certain sectors such as dairy, marine, meat and egg products.

Rejection and Destruction of Consignments

Certain Health Authorities have recently started destroying the contaminated consignments (either due to biological or chemical contamination) instead of returning them to the exporting countries as requested by the exporters/importers. Further, they are not even providing full details of the methods of sampling, analysis and results obtained. It is important that before taking a decision on destruction of the consignment, the exporting country is consulted whereby the competent authority of the exporting country can retest the consignments and ascertain whether it is contaminated and if so analyse the cause.

It has also been observed that on a number of occasions, the importing countries are adopting different methods for sampling and testing and also testing for parameters/contaminants which are not notified in their standards, which at times become rea-

sons for rejections. For example, countries like Italy are rejecting the consignments testing positive for all strains including non-pathogenic ones for Vibrio cholerae, whereas only the '01' strain is pathogenic. Destruction of such consignments may not be justified. There are examples of consignments that have tested positive in one lab of the importing country and negative in another lab. Therefore unless there is uniformity in methods of testing being followed, such rejections would not be justified.

Further, in certain cases, contamination can be taken care of through reprocessing as in the case of Salmonella contamination.

Technical Assistance

To comply with the requirements of developed importing countries, capacity building is important. Article 9 of the SPS Agreement provides for extending technical assistance to developing country members to enable them to comply with the SPS measures needed to achieve the appropriate level of SPS protection in markets of the importing countries.

Some of the areas identified for capacity building by India to meet requirements of importing countries especially of the EU include, upgrading testing facilities (very important today in the area of residue analysis); upgrading or empowering human resources in areas of testing, risk analysis, development and auditing of HACCP plans etc.; development of GMP/GHP/HACCP modules for implementation at national level as well as for exports; establishing databases on requirements of importing countries. Such assistance has so far been very minimal. Although importing countries are coming forward to offer assistance, this is either coming too late by which time the exporting country has already lost out on its markets or has spent significant resources of its own to upgrade its facilities.

Equivalence Agreements with Individual Countries

The SPS Agreement encourages members to accept the sanitary or phytosanitary measures of other members as equivalent through bilateral and multilateral agreements provided the equivalence is demonstrated. The concept of equivalence has been recognised in the SPS Agreement and is also being encouraged at the international level by the Codex Alimentarius Commission with a view to using pooled resources more effectively, avoiding duplication of inspection and testing, and ensuring that health and safety requirements are met effectively.

Negotiating bilateral agreements is, therefore, an important means of facilitating trade by recognition of our systems by the importing country. This would ensure that duplication of testing at importing end is reduced and rejections with high cost of product recalls avoided. It has, therefore, become of paramount importance to have Equivalence Agreements between Export Inspection Council of India, as the official export certification body of India, with adequate regulatory mandate, and the health authorities of various countries.

The Government of India is emphasising on development of Equivalence Agreements with the health authorities of major trading partners. EIC, as the Official Certifying Body of the Government of India, has already been designated as Competent Authority by the European Commission for marine products and basmati rice, and is awaiting recognition for egg products and milk products although the Residue Monitoring Plan (RMP) has been cleared. EIC has also finalised an Equivalence Agreement with AQIS, Australia and the Agreements with Sri Lanka and Italy are in an advanced stage. EIC has also entered into dialogue for the purpose with USA, Canada, Argentina, Japan, South Korea and other countries including those of the EU. Under such agreements, in addition to recognition of our certification, it is proposed to cover exchange of information on standards; meth-

ods of sampling, inspection and test, and also to have a provision of retest and appeal in case of rejections, return of rejected consignments etc. These would serve as an important means of facilitating trade by recognition of our standards and our certification systems to provide for an equivalent level of protection against health risks as those of the importing countries and also lead to reduced rejection rates and provide for reduced inspection of our products in overseas markets.

Such Agreements are being encouraged under both the SPS Agreement and Codex standards, and the SPS Agreement states that "Members shall upon request, enter into consultation with the aim of achieving bilateral or multilateral agreements or recognition of the equivalence of specified SPS measures."

However, members often avoid such Agreements even after receipt of a formal request as either the administrative burden of entering into these is not justified or they do not want to lose their control over imports. India has been requesting USFDA for the past 2-3 years for recognition of the certification of EIC; however, USFDA has indicated that this is not an area of priority for them. It may be mentioned that such Agreements would benefit exporters in a developing country as financial burden as well as risk of rejection would be reduced. Some countries have even expressed that import controls is a means of their income and by signing such Agreements they would lose financially and, therefore, are not interested to enter into such 'Agreements'. At times it is seen that important components are not addressed in such Agreements as these are not in the interest of the importing country such as provision for retesting and appeal in case of rejections.

Conformity Assessment Issues

There have been cases of rejections due to use of test methods which are different to those specified internationally, that is by Codex. An example can be cited in the case of chloramphenicol in

different food products where the international method is by HPLC, which has sensitivity at a level of ppm whereas the European Commission is using HPLC MS which has a sensitivity to the level of ppb. This very high level of sensitivity may not be justified as the cost of testing becomes disproportionately high. It has also been observed that the method used by Norway for Vibrio cholerae is a non-validated method and is different than the Codex method, which has resulted in consignments showing different test results when tested in their laboratory as compared to the results obtained in Indian laboratories.

Due to differing test methods, rejection of consignments is increasing, and this issue needs to be looked into. One solution would be to provide for joint testing with involvement of the Competent Authorities of both the importing as well as exporting country. Such provisions are available with some developed countries. Equivalence Agreements would also help minimise such issues as these would result in acceptance of the certification system of the exporting country.

ACTIONS TO ADDRESS ISSUES OF CONCERN

Scientific Data Collection

The SPS Agreement allows Member States to lay down standards more stringent than Codex but these need to have a scientific justification. In view of the fact that countries are laying down norms more stringent than those specified by Codex and without any scientific basis which are difficult to meet, it would be useful to take up the issue with them as well as at international fora such as Codex, WTO etc. jointly. This would necessitate carrying out R&D activities jointly to develop a scientific base and suitable justification to take up the issue.

Databases on Requirements of Importing Countries

To have regulations and requirements of countries in an easily understandable form, it may be useful to computerise the require-

ments of different countries and made accessible to all concerned. It is therefore proposed that a database of these requirements is created at the regional level. Standards available in foreign languages would also be translated and then put into the database.

Safety Management Systems Approach

It is necessary to implement HACCP in dairy and meat sector as required globally. It would be useful to build up programmes within the region to address:

- Study of the HACCP systems being implemented in the developed importing countries
- Develop HACCP modules for various important sectors
- Arrange regional trainings for industry as well as Competent Authority

Joint Participation in International Standards Formulation

Participation in each Codex and OIE meetings becomes very difficult due to cost constraints. It has also been experienced that getting the view point of a developing country incorporated requires a lot more effort including lobbying and having a coordinated approach with other like-minded countries. Joint participation and a single point of view of all countries of the region would be more effective. It may, therefore, help in working together on issues of common interest at Codex forum.

Human Resource and Quality Development Centres

Training is an important activity to develop and upgrade skills of all personnel of industry to implement quality and safety as per international requirements and also of the inspection and testing personnel dealing with the area of certification in each country. It may be useful to set up a regional 'Human Resource and Quality Development Centre' to address the training activities for which funds or other forms of technical assistance could be sought from the developed countries. This would address the needs of all

member countries for imparting trainings and empowering manpower.

Equivalence

The concept of equivalence having been recognised in the SPS Agreement and also being encouraged at the international level by the Codex Alimentarius Commission, it would be useful to negotiate such bilateral and multilateral agreements. A single such Agreement could be signed between the importing country and the SAARC countries – a form of regional agreement for recognition of the equivalence of specified SPS measures.

Through such Agreement, the financial burden for each member would be reduced and the importing country may agree to enter into such Agreements if jointly pursued.

Risk-based Approach and Harmonisation at Regional Level

There is a strong need to work towards harmonising standards within the country as well as at regional level. It is proposed that standards formulated at regional level are based on joint risk assessment studies by utilising the strengths of respective countries. The data generated could further be used to take up the regional viewpoint at international level.

Laboratory Upgradation

It is essential to strengthen laboratories not only to provide backup to certification but also to ensure that the raw material procured by processing units meet their requirements to be able to lead to a safe food item. Laboratories need to be strengthened in terms of equipment, manpower and systems to meet the requirements of importing countries. In addition, recognition and networking of laboratories within the region may be useful with accreditation of these on common international criteria. The facilities in one country could be utilised by other countries so that the facilities are not unnecessarily duplicated while at the same time are available to all in the region.

Certification to Extend within Region

Facilities of Certification in different areas such as export certification, HACCP, ISO 9000 etc. should be recognised within the region irrespective of which country operates them and in addition a country which has additional strengths such as India in the area of export certification, should assist by operating certification system in the other countries of the region till they set up their own facilities.

Dialogue with Developing Countries

Rejections need to be critically examined and if need be, both technical and other issues taken up with the importing country. Such issues would include provision for appeal in case of rejection, absence of proper standards in the importing country's regulatory regime, use of non-validated test methods, prescribing unreasonable standards not based on scientific basis, return of rejected consignments for re-examination etc. In effect, developing countries need to speak with one voice for any problems that exporters may face with the regulatory regime of any importing country in respect of standards and conformity assessment systems prescribed by it.

CONCLUSION

The emergence of WTO regime is intended to dismantle barriers – tariff and non-tariff – by giving impetus to adoption of international standards by member countries both for product quality as well as conformity assessment procedures, thereby ensuring free flow of trade across borders. However, importing countries are at times imposing conditions that are not in the spirit of the SPS Agreement. Asian countries need to take advantage of the provisions of the SPS Agreement and international standards and address their concerns jointly through active involvement in international standards development fora, mutual sharing of infrastructure, capacity building, and dialogue for problem solv-

ing and development of equivalence agreements. This would go a long way in increasing developing country presence in global markets and would ensure that the products exported from this region conform to the requirements of the importing countries and trade is facilitated.

SPS Measures and Non-tariff Barriers: Perspectives of Small Holder Livestock Producers in Developing Countries

Rajesh Mehta, and J. George*

There is an urgent need to take a close look at the institutional and legal framework enshrined in the multilateral trade agreements under WTO. For this arrangement to be effective and functional such an exercise has become imminent. It is so especially after the Fifth Ministerial Conference of WTO held during 10-14 September 2003 in Cancun, Mexico failed to fully address expectations of about three-fourths of its members. While much is written, commented upon and talked about the "Cancun setback", the simple fact that a coalition of about 20+ developing countries, now referred as G20+ (Mehta, George and Agarwal, 2004), were together in their resolve is the most important outcome of Cancun. That this coalition was able to successfully survive all overt and covert influences to yield to the developed countries' palliatives is indeed the most important good news for smallholder producers in these countries.

The agricultural sector ever since being brought under the Uruguay Round of negotiations has posed complex challenges. The

* Rajesh Mehta is Senior Fellow and J. George is Senior Consultant with Research and Information System for the Non-Aligned and other Developing Countries (RIS), New Delhi, India

The views expressed in this paper are personal, and not necessarily of organisations to which they belong. This paper draws from authors' previous writings.

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complexity arises from the fact that the economy of a majority of the WTO members is predominantly driven by the agricultural sector. The linkages between disparate agricultural landscape with processing sector and export segment are weak or non-existent. Notably, the agriculture production landscape is dominated with smallholder producers.

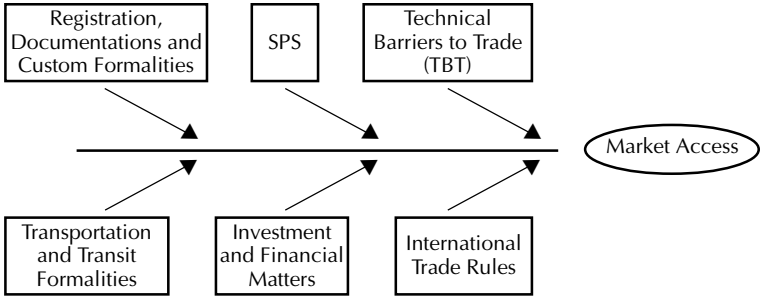
The incorporation of food safety regulations as part of the broader Agreement, hence, needs to be situated accordingly. The sanitary and phytosanitary (SPS) agreement precisely concerns, as we well know, with the application of food safety, and health regulations (WTO, 1998). This, indeed, is integrated with the Agreement on Agriculture (AoA). The three pillars of AoA, namely, domestic support, market access and export subsidy, understandably, have key linking dimensions (Mehta, George and Agarwal, 2004). The fear that the SPS measures may be used for crafting trade distortion and protectionist ends, the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) came to lay added emphasis on institutional and legal mechanisms within the SPS agreement.

Having recognised that many member countries would face exogenous roadblocks and hindrances on account of food science and food safety considerations among others, each Article of SPS Agreement and the Annex suggests a basic foundation for formulation and application of regulatory mechanism within the national territorial boundaries. Therefore, issues of harmonisation, equivalence, transparency, technical assistance and processes for dispute settlement have been specifically addressed albeit on the existing institutional and legal endowments in a member country. Here it is important to bear in mind that the smallholder producer dominated agriculture has to specifically address the HEART of SPS. The acronym stands for H-harmonisation; E-equivalence; AR- assessment of risk and T-transparency. In addition, the dispute resolution mechanism (Article 11) and the

administrative issues (Article 12) hold important guidelines for the developing countries.

Truly stating, primary objective of WTO Agreement being removal of market distorting measures and enhancing market access, the SPS Agreement is perceived to be one of the six non-tariff barriers to market access (Figure 1). In this paper we examine the implications of this agreement from the perspective of smallholder livestock producers.

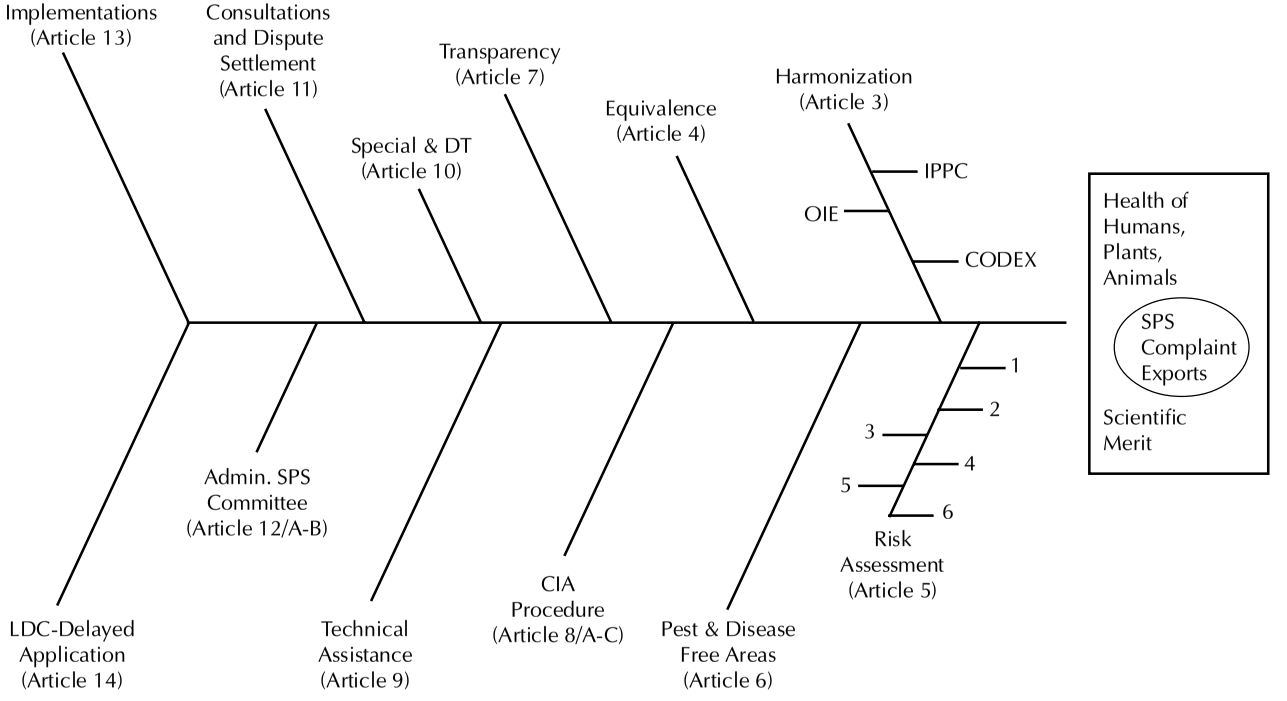
FIGURE 1: NON-TARIFF BARRIERS TO MARKET



It has become mandatory to become SPS compliant if market access to many members in the developed countries is sought. Thus, various Articles of SPS Agreements come into force. A graphical representation is provided in Figure 2 as a quick recap. The finer contextual details of these Articles are presented in Mehta and George (2002).

This paper is organised as follows: We begin with an analysis of agriculture export to examine as well as properly situate the challenges confronting small holder producers and their expectations to access foreign markets in a SPS compliant manner. A set of case studies on select livestock products are discussed to further elaborate the question of how do small holder producers make

FIGURE 2: WHAT IS SPS COMPLIANCE



engagements and fare where non-tariff measures like SPS are on the ascendancy. The concluding observations focus on impact on smallholder producers and explore few strategic options.

AGRO-FOOD EXPORTS: TRENDS, PATTERNS AND ECONOMIC SIGNIFICANCE

Growing importance of 'meat and meat products' in the agricultural exports in recent times requires to be underscored and clearly delineated in order to properly situate this segment as examined in Athukorala and Jayasuriya *(*2003) and Mehta, Saqib and George (2002). Data on exports of principal agricultural products from India during 1998-99 and 2001-02 is presented in Table 1.

TABLE 1: EXPORTS OF PRINCIPAL AGRICULTURAL PRODUCTS FROM INDIA

(per cent)

Principal products	1998-99	1999-2000	2000-01	2001-02
Tea	8.9	7.3	7.2	6.1
Coffee	6.8	5.9	4.3	3.9
Cereals	24.8	12.9	12.4	16.5
Tobacco	3.0	4.2	3.2	2.9
Spices	6.4	7.3	5.9	5.3
Cashew	6.4	10.1	6.8	6.4
Sesame & Niger seeds	1.3	1.5	2.2	2.2
Guargum Meal	2.9	3.4	2.2	1.4
Oil Meals	7.7	6.7	7.5	8.1
Processed fruits & vegetables	3.0	3.7	4.1	5.1
Fruits & vegetables	1.1	1.5	2.0	3.5
Meat & meat preparations	3.1	3.4	5.4	5.5
Marine products	17.2	21.1	23.2	20.8
Others	7.4	11.0	13.6	12.3
Agricultural exports	100.0	100.0	100.0	100.0
Per cent of Agri to total exports	18.5	15.6	13.8	13.43

Note: (1) Only principal agricultural products shown in column (1).
(2) Share estimation carried using US dollar values of exports.

Source: *Economic Survey 2001-2002,* Ministry of Finance, Government of India. Economic Division, Ministry of Commerce, http://commin.nic.in and India Trades

The Table reveals that the value addition to primary agricultural produce incorporated through some processes does show a positive pattern albeit in the selected three-year period. For illustration, 'Meat and Meat preparations' share in the export basket goes up from 3.1 per cent in 1998-99 to 5.5 per cent in 2001-02. The 6 percentage point increase during 1998-99 to 2000-01 in the share of marine products during this period is also significant. The processed fruits and vegetables, as well as the fresh fruits and vegetables have shown similar increasing patterns of the share during this period.

Notably, these positive trends, especially in the meat and meat preparations are taking place against the backdrop of (a) a decline in the ratio of agri-exports to total exports, and (b) while SPS measures compliance are strictly enforced. This provides at least the preliminary justification to examine this group both due to its contribution to the export basket and due to strong linkages with production and livelihood strategies of small holder livestock producer.

In the following section an attempt has been made to refine these concepts with case studies of certain select products that are perceived to be most relevant.

CASE STUDIES OF SELECT LIVESTOCK PRODUCTS

The global demand for animal protein is rising and therefore the importance of the livestock sector along with the fisheries is imminent (Delgado *et al.*, 2003). In what follows, we attempt to draw out lessons from a number of studies in the sector. This has gained relevance for the developing countries due to potential threat to the livelihoods of smallholder under the new liberalisation and globalisation regime.

Relevant to our discussion also is the ground reality of SPS measures. These have become an essential and integral part of the multilateral trade arrangements for agricultural products. A spe-

cial mention, however, needs to be made about the trade concerns on account of the application of SPS measures. Though the agreement is based on the cardinal principle of most favoured nation (MFN) treatment, SPS measures are supposed to be 'least trade distorting' and always based on 'scientific merit'. The case studies appended below explore some of these concerns.

Poultry

We begin with a factual examination of features characterising the poultry sector in India. India produced 37 billion eggs in the year 2000-2001 and ranked fifth in the world in egg production. Similarly the country produced more than 1000 million broilers in the same year.

A distinctive feature of Indian poultry is that it is self sufficient in terms of availability of several world renowned brands of commercial hybrid chicks, essential equipment and machinery, medicines and vaccine, compound poultry feed, disease diagnostics services, poultry training programmes, and technical and skilled manpower (Mehta et al., 2002). A strong genetic base supports the industry, where the productivity levels of broilers and layers are equal to the productivity levels observed in developed countries like EU and US. India is also one of the few countries in the world, which has put into place and sustained specific pathogen-free (SPF) egg production project.

The size of broiler farm has in general increased. During the eighties, broiler farms have had on an average a few hundred birds per cycle. Today, units with less than 5000 birds are rare, and instead units with 10 to 15 thousand birds per week cycle is common. In terms of technology absorption too, farmers have tended to adopt newer technologies of feeding and watering system including management of health and hygiene. Small units are at a disadvantage because of high feed and transport costs, expensive vaccines and veterinary care services, and non-availability of

credit. Some small units are reported to be shifting from layer to broiler production because output in broiler units can be realised in six weeks. And slowly a system of contract farming is seen emerging in these small broiler units where integrators will supply chicks, feed and medicines.

India's participation in world trade of poultry has so far been negligible. The world trade in poultry in 1998 on exportable basis amounted to 5750 thousand tonnes (valued at $10,000 million). However, India's poultry exports amounted to a meagre 407 tonnes ($21 million). But the country has significant potential in the near future.

Eggs and egg-based products account for most of India's poultry exports. Exports of hatching and table eggs have increased dramatically due to higher demand from the Middle East and South-eastern countries – from 500 metric tons (Rs. 6.11 million) in 1985 to more than 65000 metric tons in 1998 (Rs. 608 million). Similarly exports of egg powder increased from a meagre Rs. 0.4 million in 1990 to more than Rs.500 million in 1996. After 1996, however, exports of egg powder have tended to fall by 16 per cent in 1997 and 20 per cent in 1998. The factors affecting its exports are reported to be the SPS measures of the European Union. India also supplies SPF eggs to the European Union for pharmaceutical purposes.

In 2002-03, UAE, Kuwait, Qatar, Oman, Bahrain and Maldives have been major importers of India's table and hatching eggs. Similarly, European Union, Japan, Indonesia, Republic of Korea and Thailand have been the most important markets for India's egg powder. Due to a downturn in sales to the EU and a decline in demand in Japan, egg powder exports declined sharply in 1998. Exports of egg powder from India are reported to have slid down further in 1999 and 2000, but has shown increasing trend in 2001 and 2002. During 2003 end, only three out of six egg-processing plants were operating and exporting.

It may be remembered that a few years ago, India was de-listed from the list of approved countries in EU for the import of egg powders into EU for non-submission of Residue Monitoring Plan (RMP). It has been the tactics of EU countries to introduce newer, stricter residue limits every time they feel they need to restrict imports from developing countries like India.

Therefore, the issue of residue limits and the Residue Monitoring Plan itself has been used as an SPS measure very strongly by developed countries like EU and USA. India also suffered since no domestic agency took the responsibility of preparing the Residue Monitoring Plan for animal products including egg powder and the matter was shifted from one public institution to other. If this had been laid down clearly in the documents itself that who will do and implement, this matter could have been sorted out easily. The issue of proper and good documentation comes out very strongly in this case. The second example of SPS measure which the developed countries are using is in the matter of granting equivalency to countries like India since we do not have proper documents. Where some document exists, there have been inordinate delays in inspection of plants and granting of equivalency. Third, invariably the test certificates issued by Indian laboratories are not accepted in EU (Box 1) and other developed countries as these labs are not accredited in developed countries. Though, the Indian labs follow the same testing methods and protocol for testing the samples. Therefore, the certification issue is also being used as an SPS measure by other countries.

The poultry product exporters from India have been witness to the dynamics of the food safety regulations in the developed country markets especially EU and US. The experience of the poultry industry with respect to SPS can be summarised in the following broad groups.

Documentation of Standards

An examination of the import regulations of different countries after 1995 make it evidently clear that every country has either tried to or is trying to tie their loose ends by combining various food regulation agencies under one authority of code for better cooperation, implementation and monitoring. Thus the efforts of developing countries to harmonise their own regulation with the international standards, namely, Codex, OIE and IPPC comes to a naught as it does not take them anywhere.

Practice-Perception Gap

The food safety issues are becoming increasingly complex every day. Box 1 story indicates only one such dimension. The cardinal principle of multilateral trade at the implementation stage, therefore, gets violated due to varying perceptions and interpretations. The Residue Monitoring Plan (RMP), Reference Labs, etc. are issues that require change in people's mind-set such that international complexities could be anticipated and perceived.

Barriers

The conditions being placed by EU like, RMP and frequent upgradation of their residue limits is actually creating a barrier for countries like India since we have to adhere to them and there is a possibility of being de-listed if the countries do not fall in line. It is ironical that within their own countries they have not *harmonised the standards* and different countries like Germany or Denmark still operate and practice with different residue limits for trade within their own countries. Despite that, they often insist on harmonisation of standards by developing countries.

Traceability

The whole issue of traceability, which has been flagged, by EU particularly, needs some serious consideration. It is ironical to note that countries, which are asking for higher standards, are facing the highest number of cases of food poisoning. During the

BOX 1: EXPORT OF "EGG POWDER" FROM A DEVELOPING COUNTRY TO DEVELOPED COUNTRIES: CASE OF EU ENTHUSIASM

The case study of Egg Powder export is illustrative of how the six implementation issues of WTO's SPS agreement have been addressed in the last one year when associated activities in respect of the Doha mandate attained pace. An Indian consignment of "Egg Powder" was rejected in the EU because the destination market included additional element known as MRPL or "minimum required performance limit" in May 2003. The Indian establishment did not know the rejection based on this additional criterion, MRPL. Obviously, here the questions of time frame and reasonable time interval between the announcement and the adoption/coming into force do arise. On investigation it was found that in March 2003 a decision for establishing MRPL of analytical methods was amended by Decision 2003/181/EC. Thus establishing criteria and procedures for the validation of analytical methods to ensure the quality and comparability of analytical results generated by official laboratories came into force immediately. Since the Revisions, Corrigendum, Addendum or Emergency follows the original notifications, all variants come into force immediately unless bilateral consultations are requested.

The establishment whose consignment was rejected had a valid equivalence issued by the EU. And yet there was a "Rapid Alert' issued in EC as a routine that went to all importing countries. However when the consignment was declared to be meeting the additional element of MRPL, the 'Rapid Alert' was neither withdrawn nor importing countries de-alerted. The loss of reputation and increases in costs both implicit and explicit in this whole episode is going to take a long time to recover.

Source: Mehta and George (2003).

year 1999, in EU alone, there were 1,66,000 cases of Salmonella poisoning and these cases are also increasing in US. It is happening despite the fact and claims by EU and US of being HACCP compliant and following the "farm to table" approach. This raises doubts about implementation of standards on domestic products in their own country as per the documentation.

Some countries are now insisting on *traceability in primary production*. For example, in case of poultry production the stipulation will require that farmers should keep records and monitor the environmentally harmful substances in or on eggs and avoid contamination from agricultural chemicals, fertilizers, hazard based feed lot, animal products, sewage treatment and even faecal material of other animals like cows, buffaloes, goats or any other domesticated or wild birds. The farmers should also keep records of water, feed, medicines, sprays and the sanitary methods being used at the primary production level.

It is not possible in India to monitor hundreds and thousands of small producers of eggs and chicken who practice mixed farming and keep multiple animal species of animals — cows, buffaloes, poultry and goats, etc. in small numbers on the farm. They cannot keep records of agricultural and veterinary drugs used. Moreover, traceability is a monitoring system and not a specific food and health safety issue. The production system of EU and US, is entirely different from Indian production and management system but this issue is being flagged and touted for vested interest by the developed countries.

Subsidy and Standards Escalation

Alongside the increasing incidence of producer's subsidies in EU and US the standards are escalating (Mehta and George, 2002). The changing MRL is the case in point. Increased subsidy and stringent standards by the industrialised countries contributes to grossly unfair world trade.

Marine Products

Marine products have long been an important component of Indian export lines. Marine exports registered a 6 percentage point increase in the share during 1998-99 to 2000-01 (Table 1), proving the capability of Indian exporters and producers to meet with the stringent food safety norms. In what follows, we examine

this segment under two major heads, namely, Seafood and Aquaculture.

Sea Food

The European Commission in August 1997 banned fishery products from India. This extreme measure was imposed due to three reasons, namely, serious deficiencies with regard to infrastructure and hygiene in fishery establishments; potentially high risk for public health with regard to the production and processing of fisheries products; and contamination by micro organisms.

The Government of India, faced with the EC ban, issued an Order that specified elaborate process standards to maintain the highest quality standards as per the health requirements of the importing countries especially the EC.

The European standards are higher than the CODEX standards. The Seafood Exporters Association of India (SEAI) claims to have spent US$ 25 million on up gradation of their facilities to meet the regulations. Appropriate training of the personnel involved in various stages of production and processing were also addressed. Many of the standards adopted in the government Order are either not relevant for the product quality or are too stringent given the Indian fishing conditions and the legitimate objective.

The EC approved plants are normally bigger plants with capacity of more than 10 tons per day. The sanitation protocol require that before entering the plant one has to take off shoes for rubber boots, put on a hair cover, facemask and a gown. These units have chilling room with -28 degree C temperature. These factories are spotless with excellent facilities. EC approved plants are as good as any plant in Europe and USA and even better at times. The floors are marble and spotless clean, the equipment stainless steel, very comfortable temperature, workers in uniform, enough space to work comfortably, provision for water for periodic cleaning of

BOX 2: THE INDIAN SEA FOOD INDUSTRY

Indian Seafood industry is some 45 years old. It started in 1953 with the first shipment of Shrimps to USA. Until 1960, Indian exports in the fisheries area consisted of mainly dried fish, dried shrimp, shark fins and similar products. Markets were largely confined to neighbouring countries like Sri Lanka, Burma, and Singapore. Around late 60s USA, France, Australia, Canada and Japan started emerging as important markets for frozen and canned items. Processing plants with modern machinery for freezing and canning sprang up mainly for exports. During 1980s the canned items have slowly disappeared and frozen items have become predominant.

The factories are located all along the coastal states. 95 per cent of the units are in small-scale sector. The industry employs over five million people directly and indirectly. These include a highly skilled and competitive work force. The women labour force is also quite predominant particularly in processes like peeling.

Marine Products (fish, shrimps, squid, lobsters, crabs etc.) constitute the largest single agricultural export. The exports of marine products stood at US$ 1213 million in 2001-02. The importance of marine exports to India is substantial. India's share of the total world market is 2.52 per cent. It represents important potential growth area for Indian economy and opportunity for foreign exchange. Though the industry contributes only 3.4 per cent to India's Foreign exchange earnings, it contributes to over 7 per cent of the Net Foreign Exchange Earnings.

Yet, Marine exports are at some risk, partly because of failure to adhere to or attain international standards. India's marine exports attract automatic detention in the United States. Automatic detention means the product must be sampled and tested before it gains entry into the country, which means delays, storage costs and may be faced with a substantial refusal rate at the border.

Source: Mehta, Saqib and George (2002)

hands and raw material. Every effort is made to re-ice the shrimp or to put them in the freezer in brine between steps in the processing. The workers are similarly attired, while the women who are

de-heading the shrimp do not generally wear gloves (because they are too easily punctured). There are chlorine baths permanently put near them for hand dipping. There are more than adequate facilities for workers to change, rest and washrooms.

In most of the plants, there is in-house peeling facility. Proper record keeping routine is maintained. A microbiological laboratory is also part of the facility. It is clean and well equipped. There is a microbiologist. There are regular checks of the incoming material as well as finished products. The microbiological tests are revalidated in external laboratories.

According to some industry experts, the most common occurrence is presence of '*coliform*' bacteria but they rarely found 'salmonella'. Since the first step is to wash the shrimps in cold brine, the contamination gets removed. There are many processing units like this in the country.

The second types of units are the ones who have applied for EC approval. These are the units (non-EU), which were exporting to EU before the ban came into effect but now are exporting to US, Japan and other places except EU. These units also have decent facilities. They did not have marble floors, polythene covers are provided as shoe covering rather than boots and head cover. The change rooms and laboratories are not luxurious but there are all provisions for hygiene. They also have laboratories. They have all the provisions required by HACCP manual but may be of a lesser standard than the EC norms. Basically their handicap is infrastructure. Probably they will not have the change room of the dimensions required by the EU. However it does not in any manner effect the hygiene part of the product.

The third kind is typically small companies with annual turnover of around Rs.2 crores. These are small structures. They do not have in-house peeling facilities and get peeling done from outside. They do have laboratories but few are functional. They are

inferior than EC approved units. They have plenty of water and cleaning facilities. The hygiene conditions apparently are not bad but scope for contamination is quite high. These companies are exporting to China, etc.

The exporters feel that the concept is good but its adoption in totality for a developing country is rather difficult. For example, even potable water, which is an absolute necessity, is in shortage in Cochin. But the EU standards require that even floors and ceilings should be washed by potable water. In situations where people do not get enough water for drinking, it is not easy to use 100,000 litres of water every day. The units, of course, often have their own treatment plants for potable water. They feel that EU norms are too strict and a few things are irrelevant for product safety. They have been asked to follow norms that even European plants do not follow. For example they have to undertake 62 tests to check water standards. For some of the tests, they don't even have equipment to test in India.

Following these norms substantially increases the cost of production. Earlier production was mainly in bulk form; the equipment required was plate freezers, refrigeration equipment for freezing, and building for processing hall and cold storage. But the EU requirement of infrastructure to meet standards involves heavy investment in equipment and building apart from the running cost. It is now necessary for each factory to have Potable Water System, Continuous Power (Standby Generators), Effluent Treatment Plants, Flake Ice Machines, Chill Rooms and Laboratories. It is estimated that such upgradation involves an expenditure of rupees 1 to 2 crore per unit as fixed cost. The banks are not willing to give loans. They want to see the performance for the last three years. Last few years were bad because of EU ban on exports from India. Even if they get loan the cost, at relatively high interest plus other running costs, is prohibitive (Kaushik, and Saqib 2001).

As far as running costs are concerned, the compliance cost increases tremendously. It has been estimated that for a medium sized plant, overhead cost goes up to as much as 5 times. The processing cost has gone up from Rs. 2 per Kg. to Rs.7 per Kg. The cost is more for existing units. According to MPEDA, about two-thirds of the units will ultimately upgrade themselves to the EC norms while the rest would perish. This may result in some unemployment and social tensions. Another problem is that coastal fishing has virtually reached its saturation point. Any further growth may not be sustainable.

In recent times process standards have become very important in the importing countries followed by the product standards. EU and US accord highest importance to process standards while Japan emphasises on the quality or product standards (Mehta *et. al.* 2004). It is found that in general importing countries are restrictive while importing from India. One interesting result is that Japan, which has been India's traditional and largest market has not been so restrictive while US and EU has been very strict about quality and Safety issues of Indian shrimps.

There could be two possible reasons for this behaviour. Firstly, since Japan buys fresh shrimp through their appointed agents and little or no processing is involved the danger of any contamination is far less than the processed shrimp imported by EU and US. Secondly, the frequent outbreaks of health related diseases in EU and a strong presence of domestic shrimp industry in the US forces their governments to be more vigilant while importing foodstuff.

The developing countries argue that kind of processes recommended by developed countries are at times not feasible to adopt and leave them non-competitive. Moreover these standards act as non-tariff barriers as well as protectionist measures. UK and Germany have a very stringent labelling requirement followed by packaging requirements. Japan is stricter about packaging than labelling. Border inspection is one of the major problems of Shrimp

exporters from India. Almost all countries are very strict about border inspections. Almost 60 per cent respondents have termed product standard requirement as "extremely restrictive". Interestingly we get an equally divided response on labelling requirements under "not at all restrictive" and "extremely restrictive" (Mehta, R. *et. al.* 2004).

EU and US lead as the discriminating countries followed by Japan. Border inspections are considered the biggest problem for shrimp exporters. Indian exporters feel that border inspections work, as NTBs and sometimes they are discriminatory. US market turned out to be major discriminators against Indian shrimp exporters. The discriminations are also prominent in EU while Japan and Australia are considered quite fair.

The cost of compliance is mainly related to HACCP standards, which are more prevalent in Shrimp industry. About 40 per cent respondents discern that the compliance cost is 5 per cent of sales revenue (Mehta, R. *et. al.* 2004). Another 45 per cent respondents say that this cost may be more than 10 per cent of sales revenue. This cost cannot be analysed in isolation and has to be read with other indicators like age, size, market share and international orientation of the company.

Mehta, R. *et al* (2004) study clearly points towards a declining profitability in Shrimp export business during 2001-02. The main reasons mentioned by the exporters are strict production standards. What it implies is that due to strict standards the compliance cost and subsequent increase in cost of production has led to decline in profitability. High raw material cost and lower international prices have also added to lower profitability.

In the final analysis it is heartening to note that the Shrimp exporters from India and other developing countries are fast learning the new market rule on FSS and often expressed amazement at the utility of these measures. This refrain, it needs to be pointed

out, is based on the antidumping investigations launched by US against six developing countries including India (Mehta, R. *et al* 2004).

Aquaculture

In view of the sustainability issues arising on shrimps harvested from the sea, there has been a gradual shift to aquaculture in India. This shift was assisted by MPEDA by providing technical assistance beginning in 1977-78. As a consequence, export of cultured shrimp in total export of shrimp has moved up to 42.9 per cent in quantity terms and 66.4 per cent in value terms by the year 1997-98. The total area under shrimp farming at the end of 1997-98 is estimated to be 141,591 hectare. Of this, more than 50,000 hectare is based on traditional shrimp farming practices in the states of Kerala, West Bengal and Karnataka. The rest is scientific farming with active assistance of MPEDA. The potential area for shrimp farming along the coast in India is estimated to be 1.2 million hectare, of which only about 10 per cent is currently being utilised. There is, therefore, significant scope for improving the production.

Environmental issues have emerged in aquaculture also, but these are emerging from domestic environmental concerns rather than international sustainability issues. The concerns arose in view of the reports of ecological and environmental effects of aquaculture in South East Asian countries. Experts, however, observe that the concerns are misplaced so far as India is concerned. According to them the apprehension that shrimp farming causes degradation of coastal zone is vague and baseless. In fact setting up of aqua farms in the coastal zone has helped in protecting the zone as most of these units have taken care to construct proper bunding with granite on the outer area facing the seacoast. In a way, these farms protect coastal zone against sea-erosion during monsoon. Aquaculture units are set up in fallow areas where land is inun-

dated with saline or brackish water and the units do not encroach upon the traditional fishing or farming zones.

Concerns were also raised about the acute shortage of drinking water in the coastal areas and the suspicions that aquaculture could have contributed to it. But as per the report submitted by the National Environment Engineering Institute (NEERI) "there is no seepage of drinking water wells because of shrimps farms, as the shrimp farms mostly remain in hard clay soil and the seepage is almost nil or at its minimum". A NEERI study also observes that salinity did not change after a distance of 25 metres. Deterioration of ground water quality was not observed around the pond sides. Even so, MPEDA propagates the setting up of a buffer zone concept as per the requirements of the site conditions. Unlike many other countries (Taiwan and Philippines for example) India does not use ground water for aquaculture. Aquaculture checks environmental pollution and degradation also as imported and costly seed is used resulting in economic use. Effluents from shrimp farms are biodegradable. However, intensive culture systems aimed at high levels of production per hectare could have pollutants in the form of heavy metals (mercury, cadmium), pesticides and petroleum products. Government of Orissa has banned aquaculture around the Chilka Lake because of this. The solution to this problem is to discourage intensive culture systems. MPEDA recommends a farming system that is sustainable in its technical assistance programmes.

In fact, aquaculture provides an environmental win-win situation in coastal Kerala where rice and shrimp crops can be rotated on the same land. This has been traditionally practiced in that area. Aquaculture cannot be done during monsoon and takes only three to four months. On the other hand, rice can be grown only during monsoon. It is a fact that aquaculture farmers have purchased land at premium from traditional agriculture farmers, and to that extent there is a shift from agriculture. This should be

checked, at least in the interior region, and can be done by the States concerned through Land Utilisation Act. The environmental issues for aquaculture are in fact of a different kind. For example, degradation of aquaculture land due to pesticide residues discharged from agriculture land is threatening aquaculture activity. Effluents from industrial belts along the coast may also contribute to the degradation. The fact that fish cannot survive in polluted water can be a boon for policy makers to ascertain which areas need corrective measures by looking at the aquaculture units in the area.

Shrimp farming has been getting attention of the international community for some time now. A majority of these concerns concentrate on the food safety dimensions' deleterious effect on the economy of the developing countries. For instance due to an EU ban on fishery import from Bangladesh during the period August-December 1997, on unhealthy and unhygienic practices in processing facilities, the estimated loss of revenue was US$ 14.6 million that was equivalent to 35 per cent of export earnings from that commodity in 1996.

Further, it was estimated that the total cost of upgrading facilities and equipment and training of staff and workers to achieve EC compliant SPS standards was US$ 18.0 million. The annual cost of maintaining the HACCP compliance was estimated to be US$ 2.4 million (Cato, and Lima das Santus, 1998).

In addition, it has been pointed out that while processing plants, being the large investors, could absorb the additional impost due on account of SPS measures, the small shrimp farms have found it extremely difficult to comply with the norm. As a result the industry is in crisis leading to low capacity utilisation at the plant and a very low yield at the shrimp farms (Haque, 2003).

Similarly, EU imposed importation ban on fresh fish and fish products from Kenya, Mozambique, Tanzania and Uganda on a spe-

cious ground that these countries had prevalent cholera infestation amongst the producing community. These countries experienced a considerable export loss. The WTO came out heavily on EU and declared this ban a violation of SPS measures (Henson, Brouder and Mitullah, 2000, and Wilson, 2002).

There are other instances of complete trade loss due to some food safety measures. For instance, the classic case is that of EU regulation requiring dairy products manufacturing units to source raw milk produced by cows kept on farms and milked mechanically (Wilson, 2002). Whereas clean and hygienic milk production is understandable but the trade distortion measures cited above clearly rule out import from many developing countries. An import ban by EU of cheese out of camel milk and made in Mauritania in clear violation of SPS agreement and has brought about untold hardship to small enterprises that innovated to develop the product at a considerable cost. India, for instance, had to struggle to get the labelling of "milk from black animals" neutralised at international fora.

In a related case of unreasonableness an Australian quarantine regulation requires that chicken meat imported from Thailand be heated at 70 degree Celsius for 143 minutes to avoid the possibility of carrying the pathogen of a certain disease. This has effectively closed the Australian market for Thai chicken exporter[1].

IMPACT ON SMALL HOLDER PRODUCERS

In the preceding sections, we have examined the 'meat and meat preparations' and 'fisheries' sectors positive contribution to export from India. It can be demonstrated that between the demand and supply side concerns, many supply side SPS elements, play debilitating roles and deny the sector a faster growth path option.

[1] It is said that the required heat treatment transforms chicken into paper! For details see Nidhiprabha, Chamchan and Cintakukhai (2003).

Though on the demand side, changes in socio-economic and technological factors result in changed consumption patterns and diversification of consumption basket. India has been undergoing significant changes in consumption patterns. There has been a continuous decline in per capita consumption of cereals since the beginning of the seventies. Various factors have been identified for this decline. Mechanisation of agriculture, improvement in rural transport facilities and easy accessibility of urban goods in rural areas are found to be important factors for decline in per capita consumption of cereals in rural areas (Rao 2001). This decline in cereal consumption is an indication of diversification of consumption basket, which takes place in two ways. As income increases, the proportion of income spent on food declines and the proportion spent on non-food and 'safe food' increases. This is the universally accepted Engel's law of demand. The application of this law results in diversification of expenditure from food to non-food items. Secondly, the food basket may also be diversified with a shift from cereals to non-cereal food. The welfare implications differ for each of these diversifications.

Notably, the supply side concerns can be narrowed down to scale of production and compliance with food safety regulations in order to access the high value markets in the developed north. In this context, the profit per unit of livestock product output is found to be relatively higher in smallholder than the large holder farms. There is scattered evidence at least in a few developing countries that support this inference.

Given the recent WTO reporting that between 1995, when SPS measures became effective, and end of 2002, number of new food quality related trade concerns rose each year has shown an increasing tendency (WTO, 2003). Within this trend, 40 per cent (highest among four categories) was relating to animal health and zoonses. And in the animal health related trade concerns, 42 per cent was on account of transmissible spongiform encephalopa-

thy (TSE). The foot and mouth disease related concerns account for 27 per cent.

Another significant fact crucial for small holder producers is that out of a cumulative total of 154 trade concerns during 1995-2002, only 28 solutions have been reported and there are 70 trade concerns that are at least a year old and for which no solution has been reported.

The moot question is how does one make the smallholder producer competitive, *ceteris paribus*. The cue is provided by the fact that production efficiency parameter in most cases favours smallholder producers. Since this group of producers spend more than half of their income on food, the 'employment ripple' strategy with some help of technology could be very beneficial (IFPRI, 2003). The catch is volume since the small holder on their own is not able to generate this 'critical mass' to compete in the market place in a globalised environment. This scale dilemma is in urgent need to be addressed.

We can broadly draw out a road map for this priority engagement. We need to recall the initial resource endowments in the country when the Operation Flood (OF) was initiated. The approach of OF was unique in the sense that among other things priority was given to remove the existing asymmetries in access to resources like, assets base, technical assistance, information and a host of other issues. The magnitude of asset asymmetry can be gauged from an examination of the Table 2 depicting the distribution of the livestock according to different major land holding categories. This is only part of the story. Many landless agricultural labourers also find rearing animals as a paying option meeting their livelihood requirements.

It is time that we take a re-look at these options for most of the small holder producers of livestock products. For instance, in the

TABLE 2: DISTRIBUTION OF LIVESTOCK ACCORDING TO SIZE OF THE HOLDING DURING 1991-92 (ALL INDIA)

(Million)

Category of Land holding	Cattle		Buffaloes		Sheep	Goats	Horses & Ponies	Mules	Donkeys & Assess	Pigs	Camels	Total
	Males	Females	Males	Females								
Marginal	38.2	36.6	8.7	24.4	13.8	36.2	0.42	0.1	0.18	2.8	0.16	161.56
Small	28.3	23.1	5.3	16.2	8.7	18.8	0.3	0.06	0.09	1.8	0.2	102.85
Semi-medium	24.2	20.7	5.1	15.6	7.1	14.2	0.21	0.02	0.08	1	0.27	88.48
Medium	17.4	15.1	3.8	12.2	5.6	9.3	0.1	0.01	0.03	0.5	0.4	64.44
Large	4.7	4.7	1.1	3.7	2.5	3.8	0.04	0.004	0.03	0.2	0.21	20.984
All Classes	**112.8**	**100.3**	**24**	**72**	**37.7**	**82.3**	**1.1**	**0.19**	**0.42**	**6.3**	**1.25**	**438.36**

Source: Department of Agriculture & Cooperation, Input Survey 1991-92, Ministry of Agriculture

case of poultry products some of these concerns are being attended to but the scale neutralisation process is woefully slow.

The tardy pace could be traced to certain externalities and policy impediments. There are overlapping areas and elements in both of these because the economic integration attempted through the multilateral trade agreements, in the final analysis, gets implemented with severe reverberation in the small holder producers in a local area. Besides, livestock is a state subject that has its own dynamics in policy analysis.

Without getting into these complexities certain areas like water quality, pollution norms, pathogen reduction / hazard analysis critical control points (PR / HACCP), good hygienic practices and good manufacturing practices do lend itself to local attention for adoption. Associated to these are the certification issues and as pointed out in the select product case studies cost effective option are already available in the country. The tendencies and temptations to take in international prescriptions without a serious discussion may prove damaging to the interests of the small holder producers. For instance, the stipulation of the country of origin labelling provisions in the 2002 farm Bill of US is geared towards the industrialised countries' for processors. It is estimated that the cost of record keeping on producer consequent to the labelling legislation would be US $ 1 billion if a voluntary labelling regime is practiced (VanSickle, et al 2003).

Harmonisation of standards may sound feasible for the plural set up dominated by the smallholder producers of livestock products. The other potent alternative purely applicable at the grassroots level is the mutual coexistence. It is 'here and now' that alternative pathways are participatively discovered instead of forced authoritative adoption.

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Editor's Report

It was pointed out in the preceding sections that growth enhancing interventions in the livestock sector are likely to have a larger impact on the pace of poverty reduction due to relatively egalitarian distribution of livestock assets vis-à-vis land. Further examination of the distribution of various livestock species shows that the distribution of small animals and backyard poultry birds is skewed in favour of the poor (see, for example, Figures 1A and 1B, for relationship between land and livestock holdings in very poor areas in South Asia—Noakhali district in Bangladesh and Orissa state of India). Therefore, small ruminants and household poultry offer a more natural entry point for reaching out to the poorest households. Household / backyard poultry has therefore caught the attention of development community and there are some very positive experiences within and outside Asia where household poultry has been leveraged to target extremely poor female headed households. Bangladesh model is perhaps the most well-known experience in this context. New pilots based on this model have been tested in a number of countries including Vietnam, Burkina Faso, Benin, Senegal, Eritrea, Malawi, Kenya, Tanzania, Zimbabwe and South Africa. Studies from various parts of the world have also shown that household poultry production has a much greater outreach to the poorest households and can therefore be an effective targeting tool.

THE BANGLADESH EXPERIENCE

The Bangladesh poultry model has evolved over a period of more than 30 years. Led by a very large NGO, BRAC, the Department of Livestock Services and Danida, the approach has been to identify target group households with less than half acre land, organise village groups, provide them training, credit and supply of inputs, and undertake necessary supervision and monitoring. The model consists of an integrated system of production, marketing, input supply and service support sub-systems. Each component

FIGURE 1A: DISTRIBUTION OF CATTLE, GOATS AND POULTRY ACROSS LAND CATEGORIES IN NOAKHALI DISTRICT OF BANGLADESH

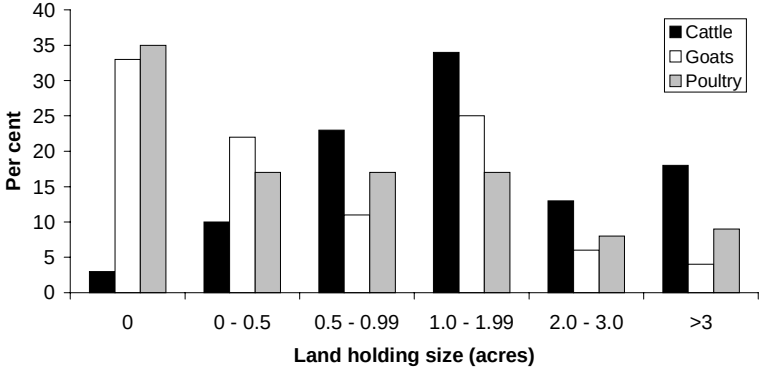
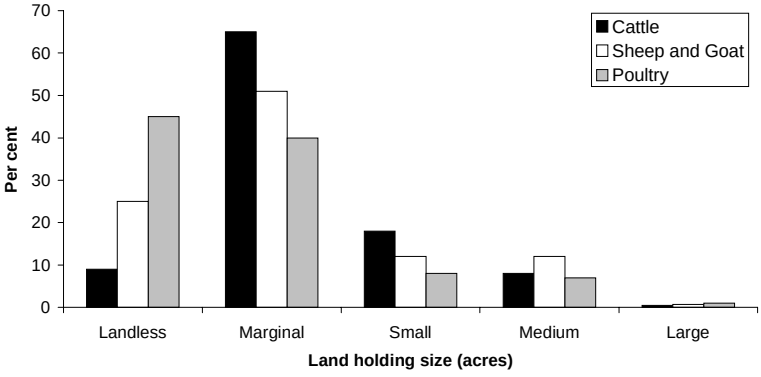


FIGURE 1B: DISTRIBUTION OF CATTLE, GOATS AND POULTRY ACROSS LAND CATEGORIES IN ORISSA STATE OF INDIA



of the system engages poor households and provides necessary organisation support. Most of the activities are done by women themselves. The key players in the system include—(i) A poultry extension worker who provides vaccination, some basic treatment, and advice on poultry management. (ii) Poultry rearers—the target group for the project, those who rear layers and broilers in their backyard, (iii) Chick rearing units—those who rear day-old chicks to six weeks, (iv) Feed seller — for providing supplementary feed, (v) Egg collector—who provides the link with market. The details of the model and functions of each component are given in the paper by Frands Dolberg.

Evaluation studies of household poultry projects in Bangladesh and other countries have demonstrated that the approach has a pro-poor bias and has a significant impact on the economic and nutritional status of the poor, specially women and girls.

CAN HOUSEHOLD POULTRY COMPETE WITH LARGE INTEGRATED UNITS?

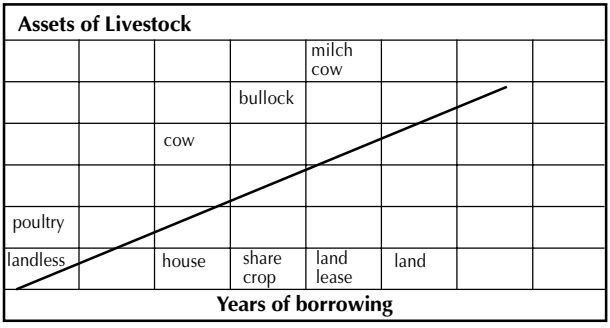
Rapid expansion of large integrated poultry production units with significant economies of scale has raised concerns about the sustainability of household poultry production models based on concentrated and semi-concentrated feeds. There are concerns that the household poultry model as promoted in Bangladesh may not withstand competition from large producers while traditional models based on scavenging feed may have a better chance due to near zero feed costs. But those who have closely observed the Bangladesh model express far more confidence in the sustainability and internal robustness of the model. They point out that commercial poultry farms may not necessarily be a constraint for backyard poultry since there is significant scope of market segmentation and product differentiation. However, systematic research to inform the market segmentation and product differentiation strategies is lacking. This deserves the work of organisations like FAO, ILRI and others so that some analysis of

these aspects becomes available to inform the policy making and project formulation processes.

HOW TO PROMOTE HOUSEHOLD POULTRY ENTERPRISE?

Although the debate on role of household poultry in the wake of rapid growth of large-scale commercial poultry production is still somewhat inconclusive, in a large number of remote and marginal areas, there may still be good scope for household poultry in helping the poorest households with initial asset accumulation. Indeed, it has been demonstrated that households with extremely low asset base invest in household poultry and then move up that ladder comprising goats, cattle and buffaloes. For example, Todd 1999 established the relationship between number of years of borrowing and the type of livestock assets the households invested in and found that the households in early phases of borrowing, specially the landless households with extremely poor asset base, invested in backyard poultry before moving on to other livestock enterprises (Figure 2). Thus, the households used poultry enterprise as an entry point to take the first step towards capital accumulation and poverty alleviation. The question remains however as to how does one promote these enterprises and what sort of policy and organisational support may be necessary to nurture them.

ILLUSTRATION OF SEQUENCE OF INVESTMENTS



Source: Todd, 1999

It was pointed out at the workshop that where backyard poultry already exists there is a need to systematically identify the constraints and facilitate provision of the required support services. This requires complete study of the entire production system, market chain, profitability and suitability of resources. It is also important to focus research on the aspects of market and institutional environment that are changing and how those changes are likely to affect the poor. Once some understanding is established in that respect, it will be necessary to initiate a dialogue with influential agencies to put in place necessary support mechanisms while ensuring that the process is interactive and inclusive. It is important that household poultry is seen as an integral item in the menu of livelihood options both by practitioners and policy makers.

In regions with no tradition of household poultry, it is perhaps better to start the activity in areas where there is already some awareness of this activity. Organisational support from organisations that have local credibility and are already engaged in livelihood support activities, will also be critical. Once again, additional efforts may be required to include backyard poultry as an additional option for livelihood support. What needs to be understood in this case however is that poultry may not be the only entry point for poverty alleviation. There are certainly other entry points available and it is important that a menu of entry points is prepared and the appropriate entry points identified, depending upon the area characteristics.

Role of the government and other stakeholders: There is poor awareness among the governments on the potential of household poultry in supporting poor peoples' livelihoods. That is one reason why generally there is poor government support towards promotion of this activity. It is therefore necessary to raise awareness about this option while ensuring that the government does not overwhelm and crowd out others. In this context it is also necessary to identify organisations that have already established some

trust and credibility with local communities and use these organisations as a catalyst for promoting the activity. At the same time, it is necessary to nurture powerful alliances including academia who can talk about these activities and can influence opinion of the government and political establishment. International agencies such as FAO, DFID, can aid in this process by providing credibility to activities such as those promoted by BRAC.

Need for a common platform: There is a need to organise a series of meetings and workshops to sensitise decision makers, politicians, bureaucrats, technocrats, policy makers and planners of propoor programmes. The sensitisation must be based on hard data. It is also necessary to involve people who write Poverty Reduction Strategy Papers, Human Development Reports, policy documents etc. Multilateral organisations such as FAO with a mandate to promote global exchange of information, collection, analysis, interpretation and dissemination of data and promotion of national and international action to undertake technological, social and economic research, can play a significant role in this context.

Capacity building: Organisation of support services and input supply is a critical element of any model that attempts to link smallholder with output markets. This requires support from people with strong organisational skills. Thus appropriate capacity building measures must become an integral part of the interventions that design and implement livelihood support options such as backyard poultry. Successful projects such as that by BRAC can be a resource for this training. Similarly government and NGOs can provide necessary technical training.

Linking with micro-credit: Microfinance organisations and self-help groups play a critical role in facilitating access to cash credit for financing expenditures on day-to-day operations of livelihood support enterprises. Establishment of strong linkages with micro-credit organisations must therefore be seen as an integral

component of all livelihood support interventions including household poultry. Besides facilitating access to credit, reliable micro-credit organisations and self-help groups can also help rationalise the interest rates.

Data and analytics: Finally, the database pertaining to poultry production is extremely weak and seriously hampers the analytical work necessary to support decision-making. There are significant discrepancies even in the basic production and price data issued by the government, private agencies, and the international organisations. It has been observed that generation of accurate data is critical for making informed policy decisions. The concerned agencies such as FAO, BRAC, NDDB, DFID and others should seriously deliberate on the possibility of creating a common information system for livestock products including poultry.

Emerging Structure of Poultry Production: Livelihood Implications for Poor Farmers in Asia

B.S. Sathe*

Poultry eggs and meat are important sources of high quality protein, minerals and vitamins. They have a special importance as supplementary nourishing food, particularly in the diets of growing children, sport-persons, pregnant women and nursing mothers. Poultry is an important part of allied agriculture. It provides supplementary income and employment to a large number of small and poor farmers in developing countries of Asia. It is also a rich source of organic manure for plants.

During the last fifty years significant scientific and technological advancement has taken place in all aspects of poultry production including breeding, nutrition, management, health cover and processing technology particularly in the developed countries. Overall growth in poultry sector in a number of developing countries has also been very significant. However, in these countries, the new technological benefits have mainly reached to large commercial poultry operations. Sustained efforts are, therefore, needed to ensure that they reach the small poor rural farmers. This paper presents the major issues involved, their possible solutions and suitable policies for poor poultry farmers in the developing countries of Asia. The paper begins with a brief overview of produc-

* B.S. Sathe is Poultry Consultant, Pune, India

tion, consumption and trade trends across major regions of the world and then moves on to the major characteristics, features of poultry sector and associated policy issues.

PRODUCTION, CONSUMPTION AND TRADE OF EGGS AND POULTRY MEAT

Data on production and per capita supply of eggs and chicken meat are presented in Tables 1 to 4. It can be seen from these tables that egg production and per capita supply of eggs has been much higher in developed countries than in the developing countries. But, the rate of growth is significantly higher among the developing countries of Asia particularly Indonesia, Laos, Pakistan, China and India. On the other hand, rate of growth in per capita egg supply has been high for Laos, Vietnam, Bangladesh and Pakistan. The trend for chicken meat is similar to the one observed in case of eggs. The only exception is Thailand amongst the developing countries where production was quite high. A comparison of cumulative growth rate for last five years amongst these countries shows that the rate of growth in meat production was generally higher in developing countries of Asia, particularly East Asia, than amongst the developed countries. Percentage growth in meat supply per capita presented in Table 4 shows that Vietnam, Indonesia and Malaysia did better compared to other countries of Asia.

The data on five major poultry egg and meat exporting and importing countries is presented in Tables 5 and 6 respectively. Amongst the selected developing countries, only China and Thailand appear in the list of major exporting countries. Rest of the developing countries have very little poultry exports/imports. This has relevance in view of the major changes which are likely to take place in future in view of the new WTO regime and China's entry into WTO. Under the new WTO regime, quantitative restrictions have to be progressively reduced, more market access has to be given, and tariffs and import duties have to be

reduced by member countries. Along with this, the requirements on international quality standards, packaging and processing and preservation standards will have to be followed for exports. The developing countries have the cost advantage at the production level. But processing infrastructure is poor. Huge capital investments will be required to meet international standards.

In Asia, China already has a large poultry production base. Also, cost of production in China is low and its economic growth rate is much higher amongst the developing countries of Asia. The entry of China into WTO, therefore, could be a major issue and China could be a major competitor for neighbouring Asian countries, particularly those of East Asia. WTO regime could also hamper India's poultry exports to middle east countries where already a stiff competition is being faced for poultry products imported from Europe. Another perceived serious threat to the survival and development of local poultry industry in the developing countries of Asia such as India, Sri Lanka and Pakistan is from dumping of excess poultry products from developed countries. For example, in USA, chicken breast meat (white meat) has a high local demand and consumption. In comparison, the leg meat (red meat) has poor off-take and sells at very cheap price. Large-scale of imports and dumping of such leg meat in an Asian market could completely upset the economics of local poultry meat production industry. These are some of the real challenges, which will have to be faced in near future by the Asian poultry industry under new WTO regime.

TRADITIONAL ASIAN POULTRY PRODUCTION SYSTEMS OF VERY POOR FARMERS

Major Characteristics

An important characteristic of traditional poultry production systems is that it makes significant contribution to family income of poor families. These systems have following major characteristics:

- The purpose is mainly production of eggs / poultry meat for home consumption and marginally for sale.
- It is a "low level input-low level output" system
- A large number of households in Asia are engaged in the system. For example, according to Huque (1996), almost 89 per cent of rural household in Bangladesh kept poultry. Out of 1,11,608 farms, about 89,702 (80.4 per cent) were under the system and had less than 50 birds each. The number of ducks mostly under this system, were 13.47 million. As per 1991 data, small farmers produced 96 per cent of eggs and 98 per cent of meat in the country. Sonaiya (1996) and Kitalyi (1996) have reported very large percentage of egg and poultry production by small rural farmers in several countries of Africa. Gupta (1997) reported that out of 176 million layers in India, 73 million were non descript birds (41.5 per cent) maintained by small rural farmers. Based on the data collected by development organisations like National Egg Coordination Committee (NECC) in India, Sathe (2000) has estimated that in India there were about 100,000 small farmers rearing poultry under extensive production system (both indigenous and hybrids) having small flock sizes.
- The system makes a significant contribution to national nutritional well being. It is estimated that about 50-70 per cent egg production in many Asian and African countries comes from this system (Huque 1996, Sonaiya 1996, Kitalyi 1996).
- An important feature of the traditional poultry production system is that, meat and eggs of country fowls fetch much higher prices. For example, in India the eggs and meat of local indigenous birds fetches 25-33 per cent more price as compared to those of exotic hybrid birds.

Major Features of the System

- Climatic influences are small as birds are highly adaptable to wide variations.

- Traditional, cultural influences and economic considerations lead to keeping poultry in small scale (5-10 birds / unit).
- Mostly non-descript local breeds are reared in free range system.
- Coloured birds are preferred as they have ability to camouflage in village / forest areas and survive the attack by predators.
- Efforts to improve the breeding stocks by upgrading / replacing the local male with exotic breeds or supplying chicks or poultry stock of exotic / hybrid varieties have met with limited success mainly because the hybrids require more inputs in terms of feed, health cover and labour.
- Housing is provided only for birds to roost at night or in some cases they roost on trees. Thus the housing costs are low.
- Surplus household labour (mostly women) and refuse / agri-byproducts and waste materials, insects etc. are the main inputs. The recurring costs are very low or negligible.
- Most of the eggs / birds are used for household consumption.
- Very little efforts are made to sell the eggs. Birds are sold as live birds (in numbers rather than weight) in nearby weekly markets. Marketing outlets are limited.
- Broodiness in hens is common. Eggs are obtained in small clutch sizes.
- Mostly, a ratio of one cock for ten hens is used for breeding purposes.
- Eggs are hatched by using broody hens. Incubator machines are not used.
- New Castle Disease is the most important disease causing heavy mortality in village poultry. ACIAR has funded research in which a thermostable New Castle disease vaccine has been produced. Mass vaccination with this vaccine has given good results. It is claimed that the vaccine can be given on food (orally), if necessary, which is a great boon to small flocks scattered in villages. In village flocks, chick mortality continues to

be high, mostly due to poor management and outbreak of diseases like Fowl pox and coccidiosis. Deaths due to attack by predators are also very common.

- The linkages of the system to crops are high as crop by-products are used for feeding the birds. They are also high with households as they provide eggs / meat for home consumption. The linkages are moderately strong with informal institutions (traders) for supply of chicks and feed and with formal institutions like governments and banks (financial incentives and credit supply and other input support to the system like birds, vaccination cover training etc.).

Economics of backyard poultry related to sustainability of the system, direct benefit to rural women, income to small family etc. have been studied in many African and Asian countries and have been the subject matter for the symposium on "Rural development with focus on employment, income and role of women" published in XX World Poultry Congress (1996), held in India. In the Bangladesh model financed by Grameen (rural) Bank, following cost: benefit ratios have been reported by Haque (1996).

Activity	Benefit Cost ratio	per cent poverty alleviation
Chick rearer	1.29:1	31.67
Key rearer	3.86:1	28.59
Model rearer	1.52:1	32.50
Mini hatchery	1.60:1	0.00
Feed seller	1.06:1	25.00

In another study conducted in the 18 adopted villages in north India where the crosses of exotic with indigenous breed were distributed and chicken reared as scavenging type backyard units, Johri (2002) has reported that average number of birds per farmer was 13 birds. The birds were reared for egg production for 44.5 weeks. Average cost of rearing was Rs 42.35 and average returns were Rs 127.47 per bird giving a benefit-cost ratio of 3.1.

Kitalyi (1996) in Africa and Miah (1996) in Bangladesh have reported several advantages of small poultry keeping for village women. Miah (1996) reported that through the formation of women self help groups in Bangladesh, (Proshika model), the costs and returns of small broiler and layer models were as under

Item	Broiler unit	Layer unit
Unit size	250 birds	100 layers
Rearing period	8 weeks /batch	One year production
Loan	25000	40000
Margin money	3000	4000
Capital investment	9050	10000
Operational expenses	14850	62300
Income	20000	79850
Gross profit	5150	17550
Net profit	4220	10650

Note: All costs are in Bangladesh Taka

In India, Parthsarthy (1996) studied units of 100 layers in central India and concluded that feed was the most important determinant of cost of poultry production. He reported a net profit of Rs 10 per 100 eggs. Several studies on small poultry units conducted by banks in India have indicated a profit of Rs 0.80 to Rs 1.00 per layer per month and Rs 1-2 per broiler depending upon the market demand and the efforts done by the farmers for finding a market resource for direct sale of their produce rather than depending upon the wholesale dealer to come and collect the produce.

Ramappa (2002) has indicated that in the tribal hilly rural people in southern India, where small units of hybrid meat type chicken were distributed, there was good income available from sale of hatching eggs (Rs 3 to 4 per egg - as against Rs 1.50 as table egg) to other neighbouring people, besides an income of Rs 120-130 per culled female and Rs 200 per male bird given as “stud males” for breeding purposes.

POULTRY PRODUCTION SYSTEMS: UNIT OF FARM SIZES

In the listed developing countries, the definition of small, medium and large poultry production and the farm sizes varies from one country to another.

In Bangladesh, Haque (1996) has reported four models for small poultry units i.e. small holder native scavenging chicken (4 to 20 birds), crossbred rural scavenging model (1 to 50 birds), small commercial rural farming (10 to 300 birds) and small commercial peri-urban / urban model for unemployed youth (50 to 5000 birds). For Self-Help-Groups (SHGs) of women in Bangladesh (Proshika), Miah (1996) has indicated a model of 250 broilers or 100 layers.

In India, three categories generally considered by financial institutions are as under:

1. Small or "Mini" Units

They consist of 5-10 birds maintained as a backyard unit in villages, forest or hilly areas in the free-range system of rearing. The birds mostly belong to non-descript breeds, are housed in temporary sheds or a coup only during night hours. They mainly survive on scavenging / eating agricultural / farm / forest by-products and waste-materials. In a few pockets, improved exotic upgraded birds of White Leg Hon / Rhode Island Red are supplied and vaccination cover for a few diseases like New Castle and Fowl Pox is periodically done with the help of the state governments. It is observed that mobility of government officials is extremely limited due to the budget constraints. Therefore, their main job is to produce and supply the vaccines while the farmer or local NGO does the vaccination.

2. Medium Units

The unit sizes are 100-1000 birds reared in semi-intensive / intensive system in sheds and are given concentrate feed mostly prepared by the farmers. Mostly commercial hybrid birds are maintained and all vaccination cover is provided. These units

mostly suffer from inadequate skills of management, poor financial support, inadequate backward-forward linkages, absence of proper bio-security measures and low volumes of output causing adverse pressures for marketing of the produce.

3. Large Commercial Units

These units are of large sizes (10000 and above). They are established mainly near the urban consumption centres and have adequate infrastructure facilities. The birds are reared in an intensive system. They are housed on floor / cages in well-built sheds, have adequate skilled staff, good management practices including feeding, health cover and marketing facilities.

POOR AND SMALL POULTRY FARMER AND POULTRY DEVELOPMENT-LIVELIHOOD IMPLICATIONS

In most developing countries of Asia, 60 to 80 per cent of poor small farmers live in rural areas-villages where livestock including poultry is maintained as a mixed farming system (crop and livestock or farm labour and livestock). Poultry is therefore a subsidiary source of income and employment. It also serves as an asset for liquid cash (ready income) to meet the emergency financial requirements. In the household, the women mostly manage poultry. Therefore, development of small poultry production for rural poor assumes a special significance and has a direct impact on the socio-economic development among the rural poor, particularly the women in the village. It therefore assumes a special importance for rural prosperity in developing countries.

The major problems of entrepreneurs and issues of small poultry production are as under:

- Lack of education in terms of overall literacy particularly for keeping records / maintaining accounts, bank procedures etc. and skills related to poultry farming.
- Lack of financial resources and security (collateral) to obtain bank credit.

- Poor infrastructure facilities like all weather roads, electricity, good potable water (much essential for health of poultry).
- Lack of backward linkages - poor quality chicks, sub-standard feed and poor veterinary health cover (resulting in to high incidence of diseases).
- Low productivity of village poultry due to poor quality breeds and low quality feeds.
- Small volumes of production making the farmer vulnerable to market pressures.
- Lack of forward linkages (processing, packaging, storage, marketing transport etc.).

ESSENTIAL BACKWARD AND FORWARD LINKAGES FOR SMALL POULTRY PRODUCTION

The essential backward linkages are development of skills, provision of quality poultry stocks, feed, health cover and adequate credit support. The forward linkages are support for marketing of produce (eggs / poultry meat).

The impact of improper backward-forward linkages on sustainability of small farmer production is very high. Considering the socio-economic advantage of small rural poultry keeping, it is imperative that the development and funding agencies give adequate attention for adopting suitable policy measures to provide these linkages.

Since it is often difficult for the government / banks to provide all these services at the door step of the farmers, there is a need to organise these farmers as groups (SHGs, associations, etc.) and take the help of local intermediaries (NGOs, Cooperatives, etc.) to provide training, input supplies and offer help in marketing of their produce.

LESSONS FROM SOME SUCCESSFUL EXPERIENCES OF SMALL POULTRY PRODUCTION SCHEMES

Designing Poultry Schemes: Selecting Small Farmers in a Compact Block

This includes designing schemes in a compact block of villages where the required inputs and services such as extension education, veterinary health cover and marketing infrastructure are available and can be provided efficiently and in a cost-effective manner. This requires suitable advance planning amongst all development / funding agencies. In India, NABARD has been advising banks for such an approach with good results. These actions have to be taken before the beneficiaries are selected and loans are sanctioned by banks.

Training Key Leaders, Village-youth, NGO or Woman Leader in the Village

It is often difficult for the government agencies to provide budget and staff for education of each individual farmer in the village. However, a leader in the village can be chosen and trained and he / she can act as a trainer for the remaining farmers. This experiment has been successfully adopted in the poultry schemes financed by Grameen Bank in Bangladesh, and in financing of women Self-help Groups and women groups under DWACRA project in India. The woman leader of the group is trained for management of brooding chicks, vaccination, record keeping and encouraging thrift saving amongst the members. The banks provide loans to the SHG instead of an individual borrower. The group stand as security and guarantee for the recovery of bank loan. If necessary, the group brings peer pressure on the individual borrower to recover the bank loan. The savings pooled by the group can be used as margin money to get fresh loan from the bank. In this procedure, the loan recovery by Grameen Bank Bangladesh has been very high and is now considered as a successful experiment for development of small rural poor in the developing countries.

Semi-scavenging Poultry Model in Bangladesh

This model has a package of following seven components:

1. **Poultry Workers:** About 20 landless poor (almost all women) are selected to form a group in the selected village. One woman from each group is selected and given training for 10 days. They mainly do vaccinations.
2. **Chick Rearers:** They are selected from the best 'workers' and given additional 9 day training—3 times in a year. They rear 250-300 chicks upto 8 weeks of age under intensive system. In low-cost housing system, chicks are sold to key rearers and model rearers. They rear 4-5 cycles in a year.
3. **Key Rearers:** They are trained on ideal methods of poultry rearing. They purchase 10-15 birds from chick rearers and keep them upto 80 weeks of age to produce eggs; thereafter the birds are culled.
4. **Model Rearers:** They are selected from experienced key rearers and given training. They produce hatching eggs for supply to mini hatcheries.
5. **Mini Hatcheries:** They use solar energy and rice husk heating method for incubation of eggs and production of chicks (about 1000 chicks per month). The chicks are sold to chick rearers.
6. **Egg Collectors:** One woman for each village is selected. She receives training on egg handling. She collects eggs from model rearer and sells them to mini hatcheries.
7. **Feed Sellers:** One woman is selected. She mixes and supplies feed to all members of the group.

All the workers are selected from women in the villages and given appropriate hands-down-training to develop local skills. Programme also includes demonstrations, group meetings, visits, mass communication programmes, publications, advisory services, field days, workshops and seminars which are essential part of the extension education. Besides, small credit varying from Taka 2000 to 6000 per beneficiary is provided. The loan repayment is

on weekly basis and loan is recovered in one year. The loan recovery is reportedly very satisfactory.

Some adaptive research has been done in Bangladesh to test the performance of various breed crosses in semi-scavenging model. The results showed that the choice of the breed was not so important from the point of view of average small holder. However, the results showed that it was necessary to have an excellent management and adopt good method of rearing with well balanced feed to get maximum returns from these units. For breeding units and hatcheries good sanitary and hygienic conditions were very important. In case of small-holder units, provision of supplemental concentrate feed and high survival rate (better vaccination cover) was found to be more crucial.

It was also seen that 10 hens in semi-scavenging method gave the same income as one day labour-wages for a village woman suggesting that the woman can stay at home and take care of the family and still earn her income through poultry. This is of great economic and social significance. The results also show that the "gender role" for village poultry is important and it is the women in villages which should be given priority in training programmes.

Composite Farming Schemes Having Poultry as One Component

In several South Asian countries, these systems have been developed. For example, duck and fish farming in small ponds, duck or poultry unit on the fish pond and coconut or banana trees on the bunds of the pond, pig-poultry-fish farming, poultry / fish / rice / vegetables farming etc.

In Kerala, India a unique system is followed by duck farmers in which batches of ducks belonging to 4-5 farmers (each of 50-100 birds are sent out on grazing after the harvest of the main cereal crop (paddy) and the flocks move over long distances from one paddy field to another, feeding on the harvest waste, insects, snails

etc. and in turn providing manure to the owner of paddy field. All along the way, a supporting system of entrepreneurs has developed who provide valuable service of one-day old ducklings, concentrate feed, transport service, egg marketing service etc. A small intervention by the government agency is needed to provide vaccination cover (mainly for duck cholera and duck plague).

It is interesting to note that this system also helps the dairy cattle farmer. For example, in Maharashtra, India, it was found that duck grazing on paddy fields significantly helped to reduce the population of snails which acted as intermediate host and checked the diseases like Liver fluke infections in cattle.

Establishing "Mother Units" and Satellite "Small Layer Units" in a Compact Area

Normally, farmers interested in egg production purchase one-day-old female chicks. However, these chicks need very careful handling and most precise management skills during their growing period before they start producing eggs at the age of 5 months failing which farmers suffer from very heavy losses from mortality or poor growth leading to low production of eggs. In order to avoid this problem a new scheme has been developed in Maharashtra, India in which there is a central "mother unit" established by the hatchery, cooperative society or a private large commercial farmer. This unit purchases one-day-old chicks and rears them under proper management. They are sold to "satellite individual small farmer units" in batches of 100 to 500 grown-up pullets of 12-16 weeks of age in a 15-20 kilometre radius area .The mother unit also supplies feed and veterinary health cover and collects eggs and culled birds from the satellite small farmer unit and markets them for him. In this procedure the small farmer is relieved of his problem of rearing delicate one day old chicks and get ready to lay pullets and all input and output linkages. As the volume of produce increases, the farmer also commands a better market price and share in his profit.

Contract Growing by Small Farmers

This concept has been adopted successfully in many developing countries including India. This has been particularly successful in broiler farming where units are small and all birds are taken out of farm and disposed off in one lot. In India the hatchery establishments or commercial feed manufacturing companies have established this concept. The company supplies the one-day old chick, feed and management guidance to small farmers who owns the shed and equipment or hires it on lease basis. Banks provide loans against the security / collateral provided by the company. At the end of the growing period, the main company purchases the birds from the small farmer on the basis of a formula incorporating body weight, feed conversion efficiency and liveability of birds. In this manner the small farmer does not have to worry to find out the market for the small volume of his produce. In India, the present system can only called partial integration where the large commercial hatcheries or the feed millers take up contract growing by farmers. They supply chicks and feed and buy back the birds but the system is not integrated with meat processing and it mainly depends upon the wholesale buyers of live birds. As of now, very few hatcheries and feed millers have come forward to invest money in large scale meat processing operations.

Small Farmers Uniting Together and Deciding the Price of Eggs

A new and successful development in egg marketing has been adopted by Indian poultry farmers coming together as a farmers' Association "National Egg Coordination Committee" (NECC) which has established zonal offices in major egg producing pockets of India. They get information on daily basis on the prevailing supply and demand position of eggs from each zone, decide how many eggs should be transported from one market to another and decide and publish wholesale egg price for each zonal market.

This has provided adequate and effective check on holding of eggs and the wholesale price declared by the private wholesale egg traders and thereby giving better margins in egg prices to the poultry farmers. NECC also provides some market support to farmers to keep their eggs in cold storage for some time or arranges to lift their eggs for exports, whenever they perceive a glut in egg market and possibilities of a slump in egg prices. Now efforts on similar lines are being made in case of broilers in few states of India.

WORK RELATED TO DEVELOPMENT OF SUITABLE BREEDING STOCKS AND FEEDING OF BIRDS FOR SMALL FARMER DEVELOPMENT

In Africa some work on development of suitable genotype has been done under the African Network for Rural Poultry Development (ANRPD) as reported by Sonaiya (1995). Work done in Bangladesh for developing suitable breed using 8 different breed crosses (using local breed -Sonali-) has been reported by Jensen (1996). The average egg production ranged between 92 to 110 eggs / hen / year in a scavenging system of rearing of birds.

Considerable work on this aspect for producing meat (broiler) type hybrids and egg type hybrids suitable for village free range or semi-intensive systems of rearing has been done in India by the agricultural Universities of Karnataka, Kerala, Tamilnadu and Madhya Pradesh and by Central Government research institutes at Hyderabad and Izatnagar. Some promising breed crosses are as given below. It is necessary to develop networking amongst these institutions and prepare a plan of action for nation-wide programme to breed and distribute the best productive stocks for village poultry development programmes.

BREEDING STOCKS SUITABLE FOR SMALL VILLAGE POULTRY PRODUCTION

Name	Production	Institute	Place
Meat/Dual purpose (egg/meat)			
Giriraja	1.3 kg	Agriculture University	Karnataka
Vanraja	1.6 kg	Central Government	Hyderabad
Nandnum	1.3 kg	Veterinary University	Chennai
Kroiler	1.4 kg	Kegg Farms	New Delhi
M-Bro	1.7 kg	Agriculture University	Mumbai
CARI-Nirbheek*	1.7 kg/166 eggs	CARI(ICAR)	Izatnagar
UPCARI*	1.3 kg/182 eggs	CARI(ICAR)	Izatnagar
HITCARI*	1.3 kg/174 eggs		
Egg type			
Gram Lakshmi	180 -200 eggs	Agriculture University	Kerala
CARI Shyama*	1.3 kg/178 eggs	CARI	Izatnagar

* Breed crosses of exotic with Indigenous breeds Rest are breed crosses amongst exotic breeds.
Note: Body weight in 8 weeks. Egg production/hen/year.

Source: Khan (2002), Singh (2002), Johri (2002) and Jalaluddin (2002)

WORK RELATED TO SUITABLE FEED RESOURCES FOR RURAL POULTRY

A large amount of research work has been done in developed as well as developing countries on the composition and nutritional value of agricultural by-products and waste materials commonly available in rural conditions for feeding poultry. (Reddy and Quadratullah, 1996). They include materials suitable primarily as energy-carbohydrate sources (cereal by-products) or as protein sources (vegetable or animal protein by-products).

However, what is lacking is suitable guidance and extension education of small rural people. It is necessary that this responsibility is jointly taken by the government agencies and teaching/research institutes. The best way to transfer this knowledge will be to identify the local voluntary organisations, train them and use them for extension education of the farmers in the village. A networking amongst various states of India and amongst various countries of Asia is urgently necessary so that the knowledge

gathered can be fruitfully utilised by all developing countries of Asia to achieve the goal of sustainable development of rural small poultry production.

EXPERIENCE OF INTERNATIONAL AND NATIONAL DEVELOPMENT AND FUNDING INSTITUTIONS

International funding agencies like World Bank, Asian Development Bank etc. have independently financed very few poultry projects. Most of these agencies are now providing credit for large integrated agricultural or rural development projects, of which poultry is a very small component. Funding for individual activity such as poultry, dairy etc. has been now replaced by financing for the development of entire rural sector.

International Fund for Agricultural Development (IFAD) has financed more than 420 agricultural / rural development projects in about 100 countries in Asia, Africa, Latin America and the Carribean. Nabeta (1996) reported on poultry component of 12 IFAD projects funded in Bangladesh, Cameroon, China, Egypt, Indonesia, Lesotho, Malawi, Nepal, Pakistan and Sri Lanka. The main findings were high feed prices and chick mortality, low production performance and marketing difficulties. Role of women was strong in all projects. Credit repayment was better in semi-scavenging model than in semi-intensive system. Projects having sufficient demand for selling eggs locally were more successful than the projects, which depended on outside long-distance markets. Nabeta (1996) also reported that in some African countries like Cameroon and Lesotho, eggs / poultry meat imported in large volumes at cheaper rates from the neighbouring countries like South Africa had an adverse effect on local markets. He has also reported that in some places in China, poultry kept by large industrial enterprises threatened small broiler units. The experience of most of the developed countries is that small units have been integrated into large-scale operations.

One of the important issues for developing countries in the emerging environment, therefore, is what are the required measures and safeguards for small poultry sub-systems so that they withstand the competition with domestic large-scale commercial sector. The following measures are suggested:

- Experience in India shows that most of the large commercial units have come up in the urban/peri-urban areas and their major markets are large metropolitan and industrial townships. They have not made any dent in the rural markets where there is a good demand but less supply. There is an urgent need that government and other financial agencies look to this big rural demand and take suitable measures to help small units for catering to such markets.
- The other possibility is to follow the efforts such as those of NECC whose membership includes small, medium and large farmers brought under one umbrella of marketing of poultry produce.
- The present policy support by the government to provide capital incentives and technical assistance to small poultry units will have to continue.
- Low productivity of village birds has to be addressed through government efforts to produce the desirable type of hybrid birds with high productivity and disease resistance and supply them to the entrepreneurs.
- A network study on small farmer poultry production in Africa funded by FAO has indicated that small interventions like improvement in quality of feed and vaccination and health cover of birds (particularly New Castle disease) are useful to improve sustainability of small poultry units.
- The cost of rearing has to be reduced by documenting suitable cheaper and locally available feed materials The idea of supplemental concentrate feed for scavenging village poultry can reduce the recurring costs without adversely affecting the income.

- Efforts have to be taken to encourage smallholder to find methods to reduce the cost on housing the birds.
- Suitable policy support by government and financial institutions is necessary for introducing small-scale units for poultry processing. Research and Development efforts from the teaching and research institutions and the adoption of such technologies in the field are imperative if the smallholder production has to survive the competition from large-scale commercial industry.

ASSISTANCE BY BANKS FOR SMALL POULTRY UNITS

Experience of Grameen Bank in Bangladesh in financing small scale scavenging poultry units has been explained earlier in this paper and is encouraging.

In India, commercial and cooperative banks have been providing credit both for large, medium and small-scale poultry units. NABARD — an apex banking institution in Agricultural sector in India — provides refinance to the above banks for poultry sector. The figures for last 5 years are as under:

NABARD REFINANCE FOR POULTRY DEVELOPMENT IN RUPEES MILLION

Particulars	1997-8	1998-9	1999-00	2000-01	2001-02
Schematic*	1053.0	1175.9	1108.0	707.4	697.3
IRDP#	29.7	41.5	24.8	53.4	33.5
Total	1082.7	1217.4	1132.8	760.8	730.8

Note: * - Schematic= mostly medium & large units
- IRDP= small farmer units of 100 birds
US$ 1.0= Rs 47.36 (as on 26-2-2003)

Above data on 'NABARD refinances for poultry development' indicates that the quantum of refinance in last 2 years is showing a downward trend. The possible reasons are as under:

- Commercial banks are utilising their own resources (funds) and are not resorting to taking refinance from NABARD.

- Banks have been directed to reduce their NPA (non-performing assets) portfolio. Many banks at field level are more concerned about reconsolidating their weak accounts rather than going for fresh loans in agriculture / livestock.

A recent poultry sector study conducted by the author for NABARD in 2001 indicated the following:

- The uptake of NABARD refinance for small farmer IRDP units was only about 4.6 per cent of the total amount of refinance.
- The general trend by commercial banks was to go in a case-by-case manner and be more vigilant in selection of entrepreneurs and ensure proper marketing tie-up arrangements so that their NPA account was kept low. As a result of this movement, the target-oriented approach in the past in IRDP schemes has been reduced.
- One of the major problems of egg marketing is the seasonal fluctuation in egg demands and prices in India. The prices go down in summer due to a myth and belief that eggs having a heating effect on the body and should not be eaten in hot climatic temperature. Egg prices again drop due to large scale fasting adopted by Hindus and Muslims in religious months of "Shravana" and "Ramzan" (Ramdan) respectively. When the new pullets start production in July-August, a large number of small sized eggs (pee-wee eggs) become available for sale in the market. This reduces the rates for normal size eggs of hybrid pullets (In India, as yet, there is no system of marketing eggs by grades according to the egg weight). All these aspects have an adverse effect in seasonal fluctuation in egg rates as will be seen from the NECC data given in Table 7.
- NABARD study has shown that banks were providing credit mostly for setting up farms for commercial egg or broiler production. As mentioned earlier the share of credit to small units was very small. Most of these projects were being funded out of State / Central Government budgets for scheduled castes /

tribes, backward class people below poverty line. For example, in Maharashtra state, the Government was implementing a scheme for distribution of a back-yard unit of 10 hens + 1 male (White leg horn X Rhode Island Red birds produced and reared at the government farm upto 8 weeks) worth Rs 400 per beneficiary as a one-time incentive. Thereafter, the beneficiary has to bear all expenses including housing, equipment and recurring costs. During 2001-02, 1317 units were distributed with a budget provision of Rs 0.527 million. A critical evaluation of the scheme is needed to know the actual impact of the scheme.

- NABARD study has also indicated that there was a need to diversify lending by banks to other important activities of poultry sectors such as processing, packaging, preservation and marketing, preparation of value added products. The banks say that they are interested but are not finding right type of entrepreneurs. The major companies who have invested for hatcheries or feed mills have gone into contract growing by farmers, but barring a few, are not very keen at present to invest in processing activities. It appears that with liberalised trade and economy, perhaps MNCs may join hands with above-mentioned domestic companies and take up these activities.
- The cost of one-day-old chicks, concentrate feed and veterinary medicines and vaccines was rising and the margins of profits were becoming narrower. Improvement in productivity and reduction of cost through more efficient management was key to the profits in future.
- In broilers, the trend of contract growing and vertical integration was evident.
- Maintenance of proper bio-security measures on poultry farms and a strict vigilance by the government veterinary authorities was needed to ensure proper health status of the birds. Since mobility of veterinary officials is limited due to budget

constraints, it would be desirable to involve local NGOs in extension education services to the small farmers.

- The studies have shown that small farmer units could be successful if proper arrangements for backward and forward linkages and timely inputs were provided to the small farmers. These farmers had little access to marketing and were largely dependant on wholesale dealers. Farmers' organisations like NECC can play a significant role in providing help in marketing. There is also a need to develop rural marketing for eggs and poultry products.

CONCLUSIONS AND RECOMMENDATIONS

The following conclusions are drawn and recommendations made keeping in view the findings of IFAD and other agencies like Grameen Bank in Bangladesh, NECC and banks in India on small farmer poultry units in developing countries:-

- Identify suitable options of production systems for poor farmers- semi-scavenging system versus semi-intensive models.
- Help improve productivity per bird of village poultry by selection of suitable breeding stocks. Reasonably good egg / meat production (dual purpose) and disease resistance should be given priority. A networking amongst the concerned research and development institutions in Asia is needed.
- Develop village based feed supplementation strategies taking into account locally available cheap farm / industrial by-products — waste materials suitable for poultry feeding.
- Training and technical follow up is essential and should be provided to small farmers (particularly women).
- Feed costs and mortality are two major factors. They should be focused in education programmes and should be closely monitored on on-going basis by project authorities.
- The model for beneficiary should not require very high initial investments (housing, equipment etc.). Only manageable number of birds reared per cycle should be considered.

- Production models that are economically viable and which depend on local market be given priority. Nearness of the project area to a steady local market is essential.

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TABLE 1: EGG PRODUCTION IN WORLD, DEVELOPED AND DEVELOPING COUNTRIES

('000 tonnes)

Country	1998	1999	2000	2001	2002	Cumulative Growth rate (%)*
World	51906.6	53962.7	55518.4	56995.4	57803.6	10.90
Developed Countries						
France	1023.0	1054.0	1039.0	1034.0	1010.0	-1.19
Germany	854.0	882.0	900.0	890.0	886.6	3.04
Netherlands	645.0	647.0	668.0	658.0	653.0	1.31
USA	4731.0	4912.0	4998.3	5082.5	5128.0	8.18
Developing Countries						
China	20590.8	21740.1	22825.6	23760.0	24191.5	16.48
Asia Developing	27621.2	29020.7	30381.2	31310.6	31954.5	14.88
Bangladesh	156.1	157.5	159.0	159.0	159.0	1.05
Cambodia	14.6	14.9	14.9	14.9	14.9	2.04
India	1658.0	1732.5	1783.0	1905.7	2010.0	19.78
Indonesia	529.5	640.4	762.2	766.0	780.0	42.16
Iran	498.0	570.0	579.0	580.7	580.0	13.58
Laos	7.8	8.7	10.2	10.2	10.2	29.12
Malaysia	403.9	411.9	426.9	433.9	433.9	7.18
Nepal	23.1	24.1	23.3	25.7	26.1	10.27
Pakistan	276.5	330.6	338.6	347.0	352.7	26.08
Philippines	594.0	508.0	514.0	514.0	563.0	3.77
Sri Lanka	49.7	50.9	52.4	53.7	53.7	7.82
Thailand	815.5	776.4	807.2	822.7	822.7	1.07
Vietnam	164.5	179.0	193.0	168.0	168.0	3.35

* Cumulative growth rate is sum of annual growth rates for 5 years with 1996 as base year.
Egg production in metric tonnes
Comparison made on weight basis (Average Egg weight 55 gm)
One kg = 18.18 eggs

Source: www.fao.org

TABLE 2: PER CAPITA SUPPLY OF EGGS IN THE WORLD, DEVELOPED AND DEVELOPING COUNTRIES

(Number/year)

Country	1996	1997	1998	1999	2000	CGR %
World	7.8	7.7	7.8	8.0	8.1	3.7
Developed Countries						
France	16.0	15.7	15.7	16.0	16.0	0.0
Germany	12.5	12.6	12.6	12.2	12.2	-1..1
Netherlands	15.2	16.1	18.2	15.1	19.7	32.4
USA	13.5	13.6	13.9	14.5	14.6	8.0
Developing Countries						
China	14.7	14.1	14.8	15.5	16.1	9.45
Asia Developing	7.3	7.1	7.3	7.6	7.8	1.01
Bangladesh	0.9	1.1	1.1	1.1	1.0	13.11
Cambodia	1.0	1.1	1.1	1.1	1.0	1.91
India	1.4	1.4	1.5	1.5	1.5	7.14
Indonesia	3.1	3.0	2.0	2.5	2.7	3.88
Iran, Islamic Rep of	6.9	6.0	6.1	6.9	6.3	-8.92
Laos	1.0	1.1	1.3	1.4	1.7	56.99
Malaysia	14.2	13.9	14.5	13.7	14.4	1.80
Nepal	0.9	0.9	1.0	1.0	0.9	1.11
Pakistan	1.8	1.8	1.7	2.0	2.0	12.09
Philippines	6.7	7.5	7.6	6.3	6.2	-5.43
Sri Lanka	2.3	2.3	2.3	2.4	2.4	4.34
Thailand	10.6	11.0	10.2	9.7	9.9	-5.21
Vietnam	1.9	1.9	2.0	2.2	2.3	19.80

Source: www.fao.org
CGR = Cumulative growth rate is sum of annual growth rates for 5 years with 1996 as base year.

TABLE 3: POULTRY MEAT PRODUCTION IN WORLD, DEVELOPED AND DEVELOPING COUNTRIES

('000 tonnes)

Country	1998	1999	2000	2001	2002	Cumulative Growth rate (%)*
World	62294.0	65341.9	68405.1	70376.0	72237.9	15.11
Developed Countries						
France	2292.6	2188.1	2223.2	2203.3	2117.1	1.38
Germany	735.1	748.0	801.0	862.0	895.0	20.31
Netherlands	761.0	768.0	789.0	756.0	756.0	1.15
USA	15177.9	16039.0	16415.6	16809.6	17349.6	13.63
Developing Countries						
China	11349.1	11948.1	12869.7	13196.0	13519.4	17.18
Asia Developing	18610.5	19603.7	21109.2	21716.1	22335.4	18.75
Bangladesh	109.7	111.5	111.7	111.7	111.7	1.82
Cambodia	24.1	24.9	25.0	25.2	25.2	4.73
India	540.0	558.9	575.1	595.3	595.3	9.71
Indonesia	620.5	620.1	817.7	820.6	871.0	40.96
Iran	716.4	744.8	822.7	812.1	859.7	18.98
Laos	11.2	10.8	12.8	13.2	14.3	26.13
Malaysia	788.6	809.6	820.6	830.6	835.6	5.84
Nepal	11.6	12.4	12.9	13.5	14.1	19.54
Pakistan	288.6	314.6	326.6	337.6	359.6	22.71
Philippines	511.2	517.1	555.1	610.1	624.0	20.68
Sri Lanka	59.0	56.9	63.2	82.1	82.1	37.42
Thailand	1189.1	1189.6	1220.1	1366.5	1450.5	21.12
Vietnam	299.4	325.5	360.1	371.6	383.8	25.81

Cumulative growth rate is sum of annual growth rates for 5 years with 19996 as base year.

Source: www.fao.org

TABLE 4: PER CAPITA POULTRY MEAT SUPPLY IN WORLD, DEVELOPED AND DEVELOPING COUNTRIES

(kg/year)

Country	1996	1997	1998	1999	2000	CGR %
World	9.5	10.0	10.2	10.6	10.9	14.01
Developed countries						
France	25.6	26.3	26.6	25.3	26.2	2.55
Germany	13.6	13.2	13.9	12.7	13.1	-3.08
Netherlands	21.4	18.8	19.3	15.0	13.4	-42.43
USA	44.6	45.0	45.4	47.9	47.6	4.88
Developing Countries						
China	7.4	8.5	9.1	10.0	10.5	36.81
Asia Developing	5.0	5.5	5.6	6.0	6.2	17.29
Bangladesh	0.9	1.0	0.8	0.8	0.8	-8.90
Cambodia	1.9	1.9	1.9	2.0	1.9	0.26
India	0.5	0.5	0.6	0.6	0.6	20.00
Indonesia	4.7	4.4	3.0	3.0	3.5	-21.54
Iran	10.4	10.9	11.0	10.9	11.9	5.81
Laos	2.2	2.2	2.2	2.1	2.4	9.75
Malaysia	32.0	35.2	35.7	36.5	36.7	14.21
Nepal	0.5	0.5	0.5	0.6	0.6	20.00
Pakistan	2.8	3.0	2.2	2.3	2.3	-14.37
Philippines	6.8	7.3	7.1	7.4	7.6	11.64
Sri Lanka	3.1	3.2	3.2	3.1	3.4	9.78
Thailand	14.3	13.9	14.5	13.9	13.5	-5.50
Vietnam	2.7	3.8	3.9	4.2	4.6	67.99

CGR = Cumulative growth rate which is sum of annual growth rate for 5 years with 1996 as the base year.

Source : www.fao.org

TABLE 5: MAJOR EGG AND POULTRY MEAT EXPORTING COUNTRIES IN THE WORLD

Eggs (in million eggs)		Poultry meat (in '000 tonnes)	
Country	**Quantity**	**Country**	**Quantity**
USA	2640	USA	2389
Netherlands	1905	Brazil	692
Japan	1730	France	418
Hong Kong (Island)	1513	China	340
China (mainland)	1000	Thailand	282

Source: USDA Farm Advisory Service Data of 2000

TABLE 6: MAJOR EGG AND POULTRY MEAT IMPORTING COUNTRIES IN THE WORLD

Eggs (in million eggs)		Poultry meat (in '000 tonnes)	
Country	**Quantity**	**Country**	**Quantity**
Japan	1730	China (Mainland)	820
Hong Kong (Island)	1513	Russia	610
Canada	730	Japan	507
Mexico	263	Saudi Arabia	271
France	212	Hong Kong (Island)	269

Source: USDA Farm Advisory Service. Data of year 2000

TABLE 7: AVERAGE MONTHLY WHOLESALE EGG PRICES IN HYDERABAD FOR YEARS 1996-2002

(Rupees per 100 eggs)

Month	1996	1997	1998	1999	2000	2001	2002
January	93.87	124.55	129.23	109.48	134.81	133.29	122.39
February	85.21	129.39	99.93	90.43	95.34	110.14	122.29
March	93.97	118.97	89.19	92.23	127.23	95.77	103.13
April	76.30	93.67	87.53	82.70	88.03	94.37	92.90
May	90.58	101.06	90.10	102.97	115.29	105.48	96.55
June	110.27	120.70	111.37	110.07	119.33	129.13	113.77
July	119.00	119.58	106.81	113.42	121.94	109.52	108.87
August	109.29	102.42	97.61	106.35	109.13	109.16	95.94
September	94.90	110.97	98.60	109.67	120.13	106.27	102.87
October	98.90	117.84	106.90	110.52	117.45	113.45	102.55
November	118.90	126.07	130.23	117.53	126.22	115.60	120.97
December	124.48	138.55	116.10	125.77	132.00	125.10	120.97
Average	101.31	116.98	105.30	105.93	111.33	112.27	108.56

Note: Wholesale price declared by NECC

Review of Household Poultry Production as a Tool in Poverty Reduction With Focus on Bangladesh and India

Frands Dolberg*

Governments have agreed to halve the number of poor and hungry people in the world by 2015 and this needs formulation of gender sensitive and pro-poor policies across sectors. It is consistent with this aim to examine livestock development initiatives that have shown potential as poverty reduction tools. Poultry is of interest in this context because the small, scavenging poultry production system is the most widespread animal production system and represents a technology known to people. Often such birds are the only animals that poor people keep. It is of great relevance in the context of this present paper that poultry kept in very small units of 5 - 10 adult birds have, in recent years, caught the attention of the development community due to some positive experiences with reaching poor women in Bangladesh. A system is now in place which involves people in production, supply and services. It is described as the Bangladesh Model although the components of the model undergo continuous change. The work in Bangladesh began with support from the World Food Programme to poor women and their families and it was demonstrated that poultry production in very small units can alleviate poverty.

* Frands Dolberg is Associate Professor, Department of Political Science, University of Aarhus, Denmark.

The aim of the paper is to review literature that relates to poverty reduction in general and poultry production in particular with a focus on the experiences in Bangladesh. Subsequently, survey and project work is examined that has been undertaken in India and, finally, the conclusions are presented.

PERCEPTIONS OF POVERTY AND GENERAL PRO-POOR POLICIES

Amartya Sen defines poverty as deprivation of basic capabilities (Sen, 2001, p.20) drawing examples from premature mortality, undernourishment (especially of children), persistent morbidity and widespread illiteracy, and describes, together with Jean Dreze, the Indian development experience in great depth in Dreze and Sen (2002). A comparison of the two Indian states Kerala and Bihar illustrates well the point on deprivation (Table 1). Average data for India are included in the table as well.

The disparities between Kerala and Bihar are striking. A woman born in Kerala can expect to live 17.5 years longer than a woman born in Bihar, whereas the difference in the case of men is only 10 years. In their first year of life, 14 babies out of 1000 will die in Kerala whereas the number is 62 in Bihar. The total fertility rate in Kerala is, at 1.8, below the statistical figure of 2.1 that are the number of children born to a woman who, demographers estimate, need to be born for a population to replace itself. In Bihar the figure is 4.4. In Kerala there are 1058 women per 1000 men, while the number in Bihar is 926, which is a difference of 132 women per 1000 men in the two states. The literacy rates are 88 and 94 per cent for women and men, respectively in Kerala, whereas the level at 35 and 62 per cent for women and men in Bihar is much lower and the gender difference much bigger. Practically all children (97 per cent) in the age group from 6 to 14 years go to school in Kerala, whereas it is only 54 per cent of the girls and 71 per cent of the boys in Bihar. In Kerala 27 per cent of the children are underweight while it is 54 per cent in Bihar. Thus the salient difference between the two states is the much higher

TABLE 1: BASIC POVERTY INDICATORS IN THE STATES OF KERALA AND BIHAR

State	Expectancy of life at birth 1993-97 (years)		Infant mortality rate 2000*)	Total fertility rate* 1996 – 98	Female–male ratio 2001	Literacy rate (age 7+) 2001		Proportion of children Aged 6-14 Attending school 1998 – 9 (%)		Percentage of children underweight (-2 Standard deviations) 1998-99*)
	Female	Male				Female	Male	Female	Male	
Kerala	75.9	70.4	14	1.8	1058	88	94	97	97	27
Bihar	58.4	60.4	62	4.4	926	35	62	54	71	54
India	61.8	60.4	68	3.3	933	54	76	74	83	47

* The average number of children that a woman gives birth to in her lifetime, assuming that the prevailing rates remain unchanged.

Sources: Drèze and Sen (2002), p. 84 and *) UNDP, New Delhi: http://www.undp.org.in/programme/undpini/factsheet/bihar.pdf and http://www.undp.org.in/programme/undpini/factsheet/kerala.pdf

education level, longer life-expectancy and much lower fertility rate that exist in Kerala compared to Bihar, and the rest of India. The much more favourable female to male ratio in Kerala illustrates the much more favourable conditions that women enjoy in Kerala compared to Bihar.

Ravallion and Datt (2002) attempted to answer the question why economic growth had been more pro-poor in some Indian states than others and found literacy to be an "overwhelming" factor, the relation being that pro-poor economic growth had been better where the rate of literacy was high.

The observations above relate to pro-poor smallholder poultry production because money in the hands of women tends to bring significant educational and nutritional benefits to their children. (Darudec, 2003, Hyder et al., 1999, Pitt et al. 2001 and Todd, 1996).

A development path that leads to support to education has obvious benefits. Schultz (2001, p. 212) observed on the basis of an international review that:

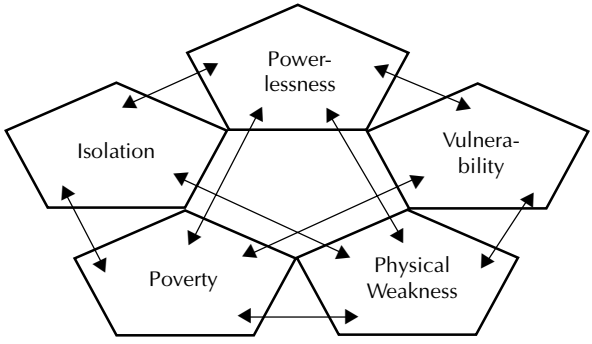
> *"The conclusion of many empirical studies of child development is that increased schooling of the mother is associated with larger improvements in child quality outcomes than is the increased schooling 'of the father. This has been studied with birth outcomes (e.g., birth weight), child survival, good nutrition, earlier entry into school, increased school enrolment adjusted for age, and more years of schooling completed on reaching adulthood."*

These examples point to the fact that policies that empower women will lead to faster reductions in poverty and as small household poultry production is typically in the hands of women, the link in theory is established between a pro-poor livestock policy and household poultry production. The next question to answer is how this is to be done in practice.

The livelihoods context

Smallholder poultry production - because the units are small - will not generate a huge income. However it represents a known skill to most poor women and can help them into a positive spiral of events that may move people out of poverty (Jensen and Dolberg, 2003). The background is that poverty has several dimensions and there is a strong relationship between poverty, vulnerability and assets (Sen, 1981). Chambers (1983) made a comparable observation and summarised it in his deprivation trap (figure 1), which shows how powerlessness, vulnerability, physical weakness, poverty and isolation interact and can reinforce one another, leading to what he termed integrated rural poverty.

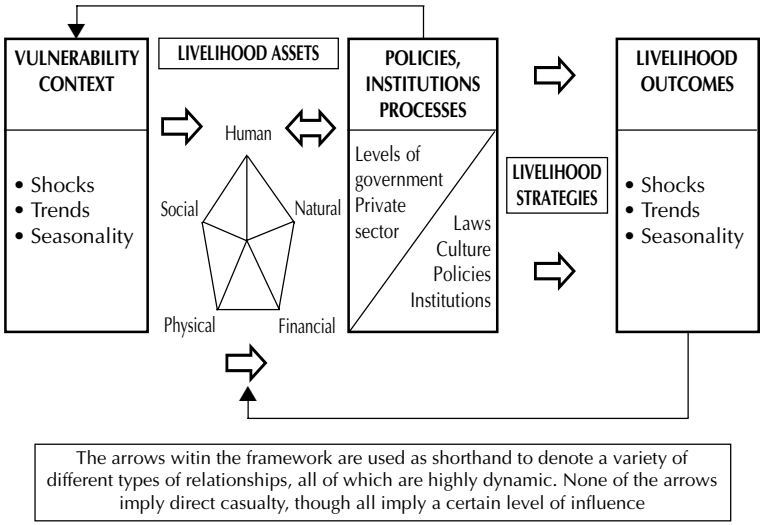
FIGURE 1: THE DEPRIVATION TRAP



Source: Chambers (1983).

The same concepts lie behind the Livelihoods framework, which is now much in vogue. The framework usefully adds links between the context at micro level and the political and institutional context at macro level and points to outcomes (figure 2), which include reduced vulnerability, greater food security, more sustainable use of the natural resource base and increased income.

FIGURE 2: SUSTAINABLE LIVELIHOODS FRAMEWORK



Source: http: / /www.livelihoods.org/info/guidancesheets rtfs/Sect2. rtf

The five types of human, social, natural, physical and financial capital that the livelihood framework uses and their criteria are set out in table 2.

TABLE 2: TYPES OF LIVELIHOODS CAPITAL AND CRITERIA

Capital	Criteria
Natural	Food security situation, land, homestead, livestock
Physical	Living (house or no house). Quality of house and clothes.
Financial	Access to funds
Human	Confidence, motivation, education, nutritional status
Social	Social network – memberships

Source: Adapted from IFAD workshop on Sustainable Livelihoods, Italy, 2002.

Set against the background of these concepts and criteria, one important challenge stands out; how to identify entry points. Where and how do we start? In other words, when our aim is poverty alleviation, what does a pro-poor livestock strategy look like?

HOW POULTRY CAN HELP PEOPLE TO TAKE THEIR FIRST STEPS OUT OF POVERTY

The rationale for a pro-poor livestock policy to embrace smallholder poultry production is logical as it leads to much greater outreach to the poorest. Cattle have been at the centre of attention in livestock development projects for a long time. In a review of more than 800 livestock projects, Ashley et al. (1999) noted that, indeed, most livestock projects had been cattle projects. They concluded that it is disappointing to see the paucity of evidence that demonstrates any long-term sustainable impact on the poor as a result of livestock projects. They add that, "Donors may need to rethink their approach to the sector and develop a new paradigm for poverty reduction through livestock" (Ashley et al, 1999, p.35).

Such a new paradigm may be emerging from the experience of smallholder poultry projects where the most comprehensive work and documentation is from Bangladesh, although there is now experience from other countries as well including India (Jensen and Dolberg, 2003).

Village poultry as a tool for targeting

The first step is to identify the poor, and village poultry keeping is a useful means to identify them (table 3). In table 3 the left column shows different size categories of land holdings in acres. The subsequent columns present information for total number and relative distribution of livestock by size of landholding. Not less than 80 per cent of the bullocks were recorded for holdings with more than one acre, which is not surprising as the bullocks are used to cultivate the land. Bullocks were not kept by the landless. Instead, there is a tendency for smaller animals to be kept by persons with smaller land holdings or no land at all. Table 3 demonstrates that more than 50 per cent of the total number of goats and chickens were kept by households with less than 0.5 acre of land.

TABLE 3. RELATIONSHIP BETWEEN SIZE OF HOLDING AND TYPE OF LIVESTOCK IN NOAKHALI DISTRICT, BANGLADESH

Land Acres	Bullocks		Cows		Young cattle		Goats		Poultry	
	No	%	No	%	No	%	No	%	No	%
0	0	0	10	6	15	17	64	33	433	35
0–0.5	4	3	28	17	11	12	40	21	200	16
0.5–0.99	25	17	43	26	12	13	22	11	201	16
1.0–1.99	57	40	49	30	25	27	47	25	195	16
2.0–3.0	25	17	16	9	17	19	12	6	95	8
>3	33	23	20	12	11	12	7	4	109	9
Total	**144**	**100**	**166**	**100**	**91**	**100**	**192**	**100**	**1233**	**100**

Source: de Lasson and Dolberg (1985).

In these very poor households poultry can be used as a targeting tool much like the housing index is used in the micro-credit work (Gibbons et al., 1999). Women can be brought out of their isolation and thereby increase their social-capital by participating in a poultry programme - a point that has frequently been made by women in evaluation and impact studies (Darudec, 2003). The women stress that the benefit is not only the money they earn, but that they get basic skills in running an enterprise and opportunities to meet other women through regular group sessions for training or credit collection. This break in their isolation and the opportunity to learn new skills enhances their self-confidence and encourages them to take on other tasks (Jensen and Dolberg, 2003 and Policy and Planning Support Unit, 2003). In terms of the livelihoods framework they have earned important human and social capital and may begin to move out of the deprivation trap.

Village poultry as an entry point to poverty reduction

A series of livestock projects undertaken by the Government of Bangladesh, with support from bi- and multilateral development agencies such as WFP, Danida, IFAD, ADB and the World Bank, have demonstrated that an approach developed in Bangladesh, which uses improvement of village poultry as the technological intervention, can be targeted to reach poor women. It can help

poor households to increase their food security, reduce their vulnerability and start a process that will move them out of poverty (Darudec, 2003 and Policy and Planning Support Unit, 2003) and it reaches out to many more poor people than cattle projects have ever done. In short, it is possible to design livestock projects that help poor people obtain basic capabilities as emphasised by Sen (2001) and thereby begin a movement out of poverty.

ONWARDS FROM THE ENTRY POINT

Investments in small poultry units are clearly entry points according to the impact studies conducted in Bangladesh (Darudec, 2003). Seeberg (2003) interviewed 69 women about their use of income and subsequent micro-credit loans after they had used their first round of loans to invest in poultry in the PLDP project. According to her findings:

50 per cent of the households invested in other livestock other than poultry. The preference was to invest in a female calf of local breed, which was considered by the women to be a very significant achievement. There were also investments in goats, but a calf that could later become a milk producing cow was considered to be much better.

About a third of the women invested in their husband's business. This could range from petty trading on the street to a rickshaw that the husband would operate or lease, or the purchase of land for cultivation.

Investments also went into dowries and marriage ceremonies, purchase of homestead land and repairs to houses, children's education, and family health due to enhanced access to food.

EVOLUTION OF THE 'MODEL' IN BANGLADESH

The potential contributions to poor women's and their families' livelihoods by small poultry units as illustrated above are quoted by Bangladesh's largest NGO, BRAC (Saleque, 2000), as impor-

tant reasons for BRAC's development in cooperation with the Directorate of Livestock Services (DLS) of what is now known as the Bangladesh Poultry Model. However, it would be wrong to associate it with a word that gives connotations of something static because the Model evolves all the time. DLS refers (Fattah, 2000) to the challenge it faced in having to support the Vulnerable Group Feeding Programme (VGF) that the Government of Bangladesh and the World Food Programme had entered into. Under this programme, poor families that could not provide for themselves were granted 31 kg wheat per month for two years. The challenge was to find a sustainable source of income for these families that could continue to provide them food and income after the supply of WFP wheat ran out. Often these households were headed by women.

Early evolution

A very common feature of the system of production, supply and services of what is now called the Bangladesh Model is that the requirements for services and inputs have been turned into income opportunities for people. The existence of a well-established micro-credit system for financing, and NGOs for outreach, have been instrumental in its widespread application. The components the Model requires have been learnt through implementation and trying to turn problems into opportunities. According to BRAC (http: / / www.brac.netib glance.htm) till June 2003 this programme had created work for 1.7 million women within that organisation alone. In recent years cage and broiler rearing has begun but the focus has been on small, semi-scavenging, egg laying units. This is because egg production, like milk production, can provide daily income and is therefore particularly appropriate for poor, cash constrained households. The primary production unit is small and may consist of no more than 3 5 hens with some chicks. Exotic birds have been used in combination with local birds that have the advantage that they brood.

In 1978 BRAC and DLS started a poultry project in Manikganj upazila, which is located immediately to the west of Dhaka. As a first step, 400 women were offered training in improved household chicken rearing techniques. At the same time, a cock exchange programme using exotic males was initiated in an attempt to encourage crossbreeding with local hens and improve the genetic stock. A small poultry farm was set up at BRAC's Training and Resource Centre (TARC) from which the cocks were supplied. A poultry specialist was appointed, and a target set of establishing 10-20 BRAC members as chicken rearers, each of whom would have at least one exotic male and ten local hens.

Cock exchange does not work, Chick rearing does

Although some progress was made, it became apparent after a time that this approach was flawed. The introduction of a single improved male bird into a rearing operation was found, by itself, to be insufficient to achieve significant improvements in the local gene pool, and mortality rates remained high. From 1981 a new approach began with Chick Rearers. Accomplished rearers were encouraged to establish specialist units where 250 - 300 chicks would be confined and raised to the age of eight weeks before being sold on to ordinary rearers shortly before the birds were ready to start producing eggs. The rationale is strong as it is common in village systems to have very high mortality in the first 6 - 8 weeks, caused not only by diseases but by poor nutrition and management as well. Mortality rates on the entire flock will therefore be substantially reduced by ensuring high survival in the first 6 - 8 weeks of the life of the bird. This was realised long ago (Matthewman, 1977). The problem was to find viable technical interventions that could be applied on a large scale through efficient institutional arrangements.

Loans were made available to purchase the chicks and to construct and equip the rearing units. Financial support was accompanied by training in improved rearing techniques, housing sys-

tems, improved feeding methods and primary disease prevention. This was provided by the staff of the NGO and in collaboration with local staff of DLS.

Scaling up: Research and training should come first

After five years of development in Manikganj, BRAC felt ready to start replicating the basic model in 32 upazilas. BRAC established a new cadre of livestock officers; each of whom first received three weeks basic training before being set to work in their own area offices. In most instances a single individual was expected to take the major responsibility for all aspects of livestock, which included cattle and goat rearing in addition to poultry. Some support was provided by their overall area coordinator, who also had a number of sectoral programmes to oversee. Research and training were seen as important precursors for scaling up: "BRAC's top managers feel that continued expansion is possible provided the organisation strives to conduct research and training, and to expand logistics support at the same rate or faster than the growth of the programme" (Saleque, 2000).

The poultry worker

As the programme spread, a series of further changes began to be introduced. Whilst the new systems had contributed to substantial reductions in mortality, unacceptable numbers of birds were still dying. Further progress required that all chicks should be vaccinated, but the existing government veterinary services lacked the resources to provide this service on an independent basis. Another collaborative initiative was therefore set up with the DLS. Starting with a pilot programme in Manikganj, Village Organisations in each village were asked to nominate one woman, selected on the basis of motivation, reputation and acceptability within the community, to be sent on a course to become a Poultry Worker Training lasted five days. It focused on the most common diseases but dealt with other aspects of poultry management as well.

On completion of the course, the government supplied each trainee with a free starter pack of syringes and vaccines. These were produced by local firms, and could be purchased from the government, on the open market, or at cost plus 5 per cent from local BRAC offices if other sources were not accessible. The PWs would then be paid by rearers to give vaccinations and provide medicines as required.

Feed sellers and distributors

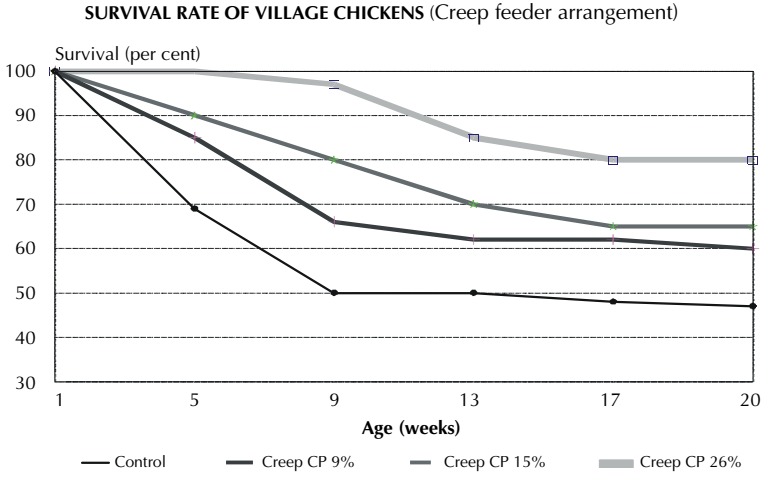
Another problem that had to be overcome was the quality of feed. Whereas local birds had partially foraged and partially relied upon household scraps, exotic chicks required better feed, and not all ingredients were available on the market. This led to training of another group as feed mixers and sellers, teaching them how to locate and purchase ingredients and to mix them in proper proportions. Once again loans were provided under the credit programme to enable Village Organisation members to set up new businesses. Later, following the realisation that the feed mixed by the trained feed sellers was not always of a sufficiently high standard, BRAC started to build its own capacity as a large scale producer of feed. By 1999, annual production from mills at Manikgonj and Nilphamari had reached 10,715 million tons, and a new one opened at Gazipur in 2000 with an annual capacity of 42,000 million tons. With these new facilities coming on stream, the former feed mixers have converted to the role of distributors. As part of the Gazipur complex, an analysis programme has been established with the capacity to identify the presence of harmful aflatoxins and to conduct assessments of feed quality.

A critical question to ask here is what types of supplements are required under semiscavenging conditions as it will clearly be uneconomic to provide supplements that the birds can scavenge. Some examples are discussed below to illustrate the point.

Supplementation is important, but insufficiently explored

The importance of the correct supplementation strategy for growth, immune status and survival of young chicks is illustrated in figure 3.

FIGURE 3: SUPPLEMENTS INFLUENCE SURVIVAL



Modified after Roberts (1994)

The figure is based on research conducted in Sri Lanka and used because it is the only piece of work that can be found in the literature on the subject. What is shown in figure 3 is that without supplementation there is a very high mortality in the chicks' first 9 weeks of age. This relatively high mortality is maintained even with supplements containing 9 per cent and 15 per cent crude protein. However, with a supplement containing 26 per cent crude protein, mortality is drastically reduced, which is plausible because it is known that sufficient protein in the diet is required to build up a young chick's immune system. However, this issue has been neglected and there is a need for much more work to identify nutritionally good supplements that it makes economic sense for smallholders to use.

The scavenging feed base is important for production

Research in Bangladesh has found *location* or, more likely, the amount of feed that the birds can scavenge in a location to be important for egg production and thereby the profitability of the enterprise. Results of the first trial are summarised in Table 4., which was a study that compared the same breed combinations in different locations.

TABLE 4. EFFECT OF LOCATION ON EGG PRODUCTION

Parameters	Location and cropping pattern		
	Jessore: Grain/fibre	Manikgonj: grain dominant	Rajshahi: Sugarcane/grain
Agro-ecological zone	Medium to high land	Low Ganges river flood plain	High Ganges flood plain
Seasonal floods	No	Yes	No
Cropping intensity per cent	207	200	159
Eggs/hen/year	154[a]	157[a]	**103**[b]
Mortality per cent	12.3[a]	**43.9**[b]	19.8[a]

Source: Rahman et al (1997). *Figures with same or* no *superscript* in a row *are not significantly* different (P<O.O5).
Figures in bold show statistical significance

The results showed no difference in egg production between Jessore and Manikgonj, whereas there is a big and statistically significant difference between these two locations on the one hand and Rajshahi on the other. Soil and cropping patterns, and therefore the amount of feed available for scavenging, probably explain the difference in egg production between locations. Rajshahi, with low egg production, had a farming system dominated by sugarcane and grain and a cropping intensity of 159 at the time of the study. Manikgonj had a grain dominant cropping pattern and in Jessore it was a grain and fibre cropping pattern, which may have resulted in more residue from the grain production available for scavenging. Other factors that may help explain the differences are the characteristics of the agro-ecological zones. The trials in Rajshahi were located on high Ganges flood plains where

drier soils have fewer organisms for the birds to pick from the ground. Manikgonj, on the other hand, is located in low Ganges plains and is prone to flooding, which may have caused heavier mortality. A more recent study (Ali, 2002) has confirmed a strong influence of location on egg yield.

The implication of these experiments is that there may be considerable economic and production gains to be obtained from a better understanding of what it is in a location that results in higher production.

Egg marketing

In a final extension to the evolving Model which took place in the late 1980s, other, usually male, Village Organisation members were provided with loans and some basic instruction enabling them to set up business as egg traders. In the case of milk, especially where there are no specific marketing arrangements, there are often significant price differences between milk sold in a village and milk sold in towns and cities. Milk in the village may fetch taka 10-12 per kg whereas a city consumer may have to pay double that price[1]. However, in the case of eggs produced in the villages, large price differences are rarely seen. One explanation may be that because eggs keep longer than milk, local traders can travel - by foot, cycle, rickshaw or bus - to reach market outlets before the quality deteriorates. However, analysis is required to see whether in fact this is the case. In general, marketing has not been reported as a major problem so far. This could be due to the high population density in Bangladesh and the short distances to markets. However, as long as exotic breeds are used, a supply from outside the village needs to be organised. It is interesting that according to the available documentation (section 7) the same seems to apply in India.

[1] Taka 58 to 1 US $.

Supply of chicks

In the early 1990s BRAC made efforts to improve the supply of chicks. A new category of model rearers were created, who raise parent birds in complete confinement to produce fertile eggs for hatching. Other group members were trained and provided with additional credit to establish mini-hatcheries, that would take the eggs from the model rearers, oversee hatching and then feed new birds back into the system through the chick rearing units. This sub-system has enjoyed limited success and is no longer encouraged. The reason is that it used the very labour intensive Chinese Rice Husk Hatchery method, which requires eggs to be turned at 6 hour intervals, even during the night. This proved to be too demanding for women, who had families to look after as well. However, in duck production the technology continues to be used, but typically in larger units that rely on hired labour.

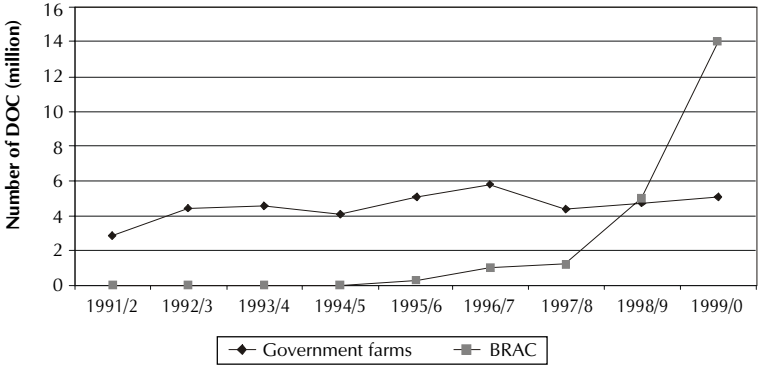
The DLS farms have not been able to supply the volume of chicks required. Funding for the IFAD / Danida sponsored Smallholder Livestock Development Project I (SLDPI) included US $2.93 million to improve, expand and operate DLS poultry farms, but limitations in management capabilities meant these farms did not perform as planned.

To help overcome this problem, and to meet rapidly expanding demand, BRAC has sought to increase its own production capacity, and now operates five poultry farms and hatcheries around the country. By the end of 2000, these were supplying about 850,000 day-old chicks per month, with numbers expected to exceed 1.1 million.

BRAC day-old chick production now far exceeds that of government farms (see Figure 4). In a closely related development, a disease diagnosis laboratory has been established with the capacity to perform germ culture to detect specific diseases, rapid serum plate agglutination tests to identify antibodies, and cul-

ture sensitivity tests to assist in the selection of appropriate treatment, together with post mortem facilities.

FIGURE 4: ANNUAL PRODUCTION OF DAY-OLD CHICKS IN DLS AND BRAC FARMS



Sources: Director of Production, DLS 2001 and BRAC

EVOLUTION IN THE DEVELOPMENT PROJECTS IN BANGLADESH

What is called the Bangladesh Model has been used in three major development projects with the DLS as government lead agent, using NGOs to implement in the field: the Smallholder Livestock Development Project (SLDP I) sponsored by IFAD and Danida, the Participatory Livestock Development Project (PLDP) sponsored by the Asian Development Bank and Danida and the Smallholder Livestock Development Project in Five Southern Districts (SLDP II) sponsored by Danida. Other projects such as the World Bank sponsored Bangladesh Integrated Nutrition Project have used the Model, but with no aim to modify it.

SLDP I and PLDP

Figure 5 shows the components and linkages in the poultry model at the start of implementation of SLDP 1 in 1993. In each location, implementation of the model was administered through an NGO

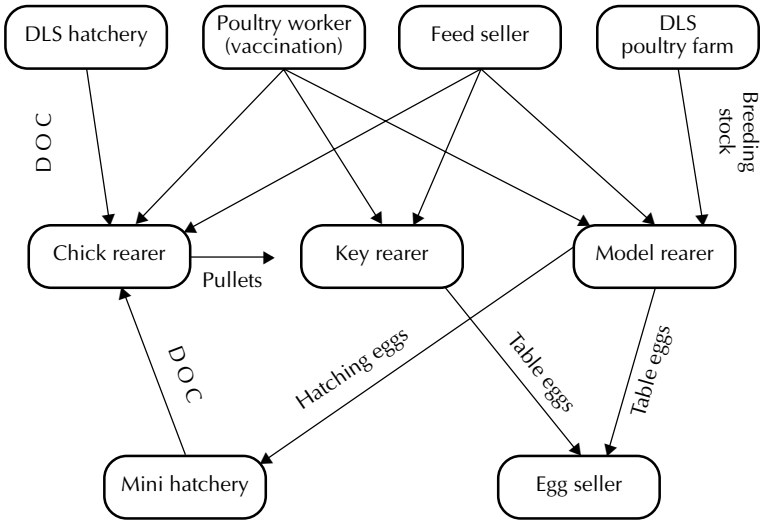
Area Office (AO), with responsibility for approximately 4,000 (SLDP I) to 6,000 (PLDP) women participants. It was the responsibility of the AO to identify the women to be included in the programme, organise them into groups, to train them technically as well as in awareness rising, and to maintain regular contact with the groups. The AO was also responsible for the micro-credit.

An important finding in PLDP is that realistically an Area Office can serve only 2000 beneficiaries (Wollesen, personal communication), not 4000 or 6000 as planned in earlier projects.

What does the implementation experience say about government support?

A pertinent question to ask in 2003 is what type of government support is required on the basis of the experiences of these projects? The answer to the question relies much on material collected through the author's exposure to the situation in Bangladesh during three visits to Bangladesh in 2001 and 2002 in the

FIGURE 5: THE BANGLADESH POULTRY MODEL IN SLOP I



context of preparing a new Micro Finance and Technical Support Project (MFTSP) to be sponsored by IFAD, while implementation in Bangladesh will be with the apex funding agency for micro-finance in Bangladesh, PKSF. The plan is to build capacity within small and medium size NGOs to provide livestock technical support to both existing and new groups of clients.

Several cases were registered where inputs such as vaccines and veterinary drugs were obtained from private dealers, who obtained their supplies through imports. Accompanying these trends has been a policy shift taking place from 1993 onwards, to a system of cost recovery, covering virtually all aspects of operations apart from training.

Duck production seems well placed in the private sector, not least because the local duck compares well with any of the imported breeds. This does not mean that there has been found no supply of such inputs from DLS. The point is that these critical supplies are not dependent on DLS as sole supplier any more.

The one critical item of supply is that of breeding material for egg laying chickens. It has been difficult to make the government farms charge market rates for day-old chicks. They continued to sell at subsidised prices of taka 8 - 10 per day-old chick in comparison to the price of taka 22 - 25 in the private sector, thereby providing unfair competition to NGOs and private companies. The justification given is that a hybrid combination between Rhode Island Red and Fayoumi called Sonali has been found the most appropriate bird for the smallholder system (Rahman *et al.*, 1997). However, there are other factors that may be more important. The effect of location has been discussed (Table 4.) and in several situations it may be more appropriate to begin with whatever local breeds exist. Supplementing with the right ingredients (Figure 3) and at the right time in the life of the bird is equally, if not more important.

Poultry workers need support from professional veterinarians

Timely vaccination and preventative veterinary work is important for the sustainability of poultry enterprises at household level. The 2002 survey by Darudec (2003) contains an interesting section on the cooperation between those who ensure the vaccinations and the preventative veterinary work, i.e. the Poultry Workers and those who should support them with training and technical advice: the DLS field staff and the NGOs.

Distance is an important factor in deciding from where the Poultry Workers obtain their technical backstopping and buy their vaccines and medicines. Sixty-five percent of Poultry Workers get their technical advice only from the NGOs, 12 per cent from the veterinarians and the remaining 23 per cent from both the NGOs and the veterinarians, but all recommend closer contact to professional veterinarians. This may be an important lesson to carry into future programmes in Bangladesh or other countries.

The Poultry Workers, who are all women, also want training in treating other animals such as goats, sheep and cattle.

Research and training

Research and training are important forerunners for scaling up and training, as well as project, programme and policy formulation. There has been a rapid expansion in recent years of the work on the smallholder poultry concept in Bangladesh and the result is that there is a shortage of well trained livestock staff at all levels. A survey of eight NGOs that employ staff that work on livestock revealed that only 5 per cent of the staff have a specialised livestock degree while 57 per cent have degrees at bachelor or master level in a subject other than livestock. The rest have Higher or Secondary School Certificate or some diploma.

Rural semi-scavenging poultry production for poor women and their families has never been a priority for the international agri-

cultural research system nor for national agricultural research systems. A discussion of priorities in the Indian system has been provided by Gupta et al., (1990). Dolberg (1997) reported on a literature search through the library of the Royal Veterinary and Agricultural University in Copenhagen, using international databases. Key words used were such as: village, scavenging, poultry, India, Bangladesh and Sri Lanka. The search brought no records from India, but some from Bangladesh. In 2003, a search on the Internet using the google search engine putting these words into the search box: "'Bangladesh Model" poultry' yielded 138 hits, when this paper was prepared, indicating some documentation has taken place.

However, the description above provides the background for the emphasis on research in the projects in Bangladesh. Fifteen Bangladesh students have been trained or are presently undergoing training at MSc level according to the sandwich model, where the degree is from Denmark, but the research conducted in Bangladesh with strong components of on-farm research. This work has been facilitated by the Danish Smallholder Poultry Network which is located at the Royal Veterinary and Agricultural University in Copenhagen (Riise, 2002).

Danida has been the donor providing the technical assistance on SLDP I, PLDP and the sole donor behind SLDP II and there is therefore a strong coordination between the research activities of PLDP and SLDP II. The main innovation in SLDP II in comparison to SLDP I and PLDP is that students now have their education in Bangladesh. SLDP II has an allocation of 50 local scholarships (10 per year) to graduate students from Bangladesh Agricultural University and other relevant institutions in Bangladesh such as the Government Veterinary College in Chittagong, The students will conduct research on selected topics and prepare their MSc theses on data gathered in the project area. No foreign travel is implied. This follows earlier positive experience with student

involvement in Bangladesh in rural development projects (Dolberg, 1991).

PLDP and SLDP II research organisation

In PLDP and SLDP II a *Participatory Livestock Research Committee* to approve research grants has been formed. If plans are carried through, there will be at the end of SLDP II 65 professionals trained at MSc level. Fifteen will have graduated from the Danish Agricultural University and 50 from institutions in Bangladesh. The holders of these degrees will form an important pool of knowledge for future training on smallholder livestock production in Bangladesh.

EXPERIENCES IN INDIA

India has one of the world's largest commercial poultry sectors, but a big urban-rural divide in the level of consumption of poultry products. According to PoultrySolutions.com average urban annual per capita consumption of eggs and meat are 100 eggs and 1.2 kg poultry meat against an average rural consumption of 15 eggs and 0.15 kg meat. Much of the urban demand as well as export sales are met by production in large commercial farms in Andhra Pradesh, Maharashtra, Tamil Nadu, Haryana, Punjab and Delhi, indicating considerable geographical space for other types of production.

Target group

The question is often asked whether a concept that uses very small poultry units as a tool in poverty alleviation has any place in a country like India, which has a large, commercial poultry sector?

The answer is that yes, apparently, the concept has a place. The starting point is that the World Food Summit in 1996 estimated the number of undernourished people to be between 830 - 840 million in the world and South Asia alone accounted for one-third of these people. In India, FAO estimated the number to be 207

million (World Food Programme, 2001, p.5). These figures show that there is a strong need to identify technologies and policies that can alleviate, if not eradicate poverty in India and this should provide space for an approach that uses poultry as a tool in poverty alleviation.

The poultry concept that is discussed in this paper builds on the low input and low output scavenging system, which a large majority of rural households have practiced for centuries. The challenge is to improve that system in a manner that is cost-effective for the involved households. One place where this is being explored is in the Basanti area of the Sunderbans of West Bengal, which is located at a distance of three hours' drive by car from Kolkata. Proximity to a mega city offers market opportunity but it might be expected that the demand from such a large market would be met by the commercial sector.

The Danish NGO "India Group Funen" has obtained funds from Danida to run an experiment, inspired by the poultry experience from Bangladesh. The project involves 1200 women and their families in the Sunderbans. It is premature to draw strong conclusions, but the farmers report a premium price for birds of local breeds and an interest in breeds like Rhode Island Red and Black Australorp for egg production. Farmers in the area who are into broiler production report occasional losses. One limitation of this project is that the project pays for the work of the village level workers and charges only for the cost of the vaccines (Pedersen, 2003).

A particular place for a smallholder poultry production strategy may be in the *tribal* belts of India. Rangnekar and Rangnekar (1999) in the electronic conference organised by FAO's International Family Poultry Network (INFPD) in 1999 contributed a paper based on a survey of the tribal belt of western India along the interstate boundaries of the states of Rajasthan, Madhya Pradesh and Gujarat.

Some of their salient findings were:

- Poultry production was the women's domain.
- Marketing: There were well established weekly markets but no large and modern ones.
- Duck keeping is not common, except in high rainfall areas.
- More than 90 per cent of the households in the 35 surveyed villages kept village poultry, mainly native and coloured birds. The typical number was 6 - 8 adults.
- Newcastle disease was the major disease encountered but even where chickens were vaccinated, management and predation problems led to losses.

Kumtakar (1999) and Kumtakar (1999) reported comparable findings from their surveys of households of the Bharias and Gond tribes of Madhya Pradesh, but added that while the income from traditional poultry production was between 11 and 20 per cent of total cash income, the significance of that income was higher in landless families. Chicken mortality was particularly high in the first 40 days.

Development priorities

Consultations with the families participating in the survey showed that the highest priority was given to an effective disease control which, however, was predicted to suffer from these constraints:

- Transport facilities difficult to obtain.
- Difficulties in maintaining a proper cold chain.
- Lack of organisation of the farmers (for regular vaccine production).
- Lack of awareness of and confidence in the vaccine.

Following the survey, the Indian Development Research Foundation BAIF took up pilot work in ten of the surveyed villages, but reports on this work were not available at the time that the present review was written.

Some experiences in Danida supported projects

Two livestock projects sponsored by Danida were or are located in tribal areas; both are named Integrated Livestock Development Projects. One is located in Bastar, Chhattisgarh and the other in Koraput, Orissa. The Tamil Nadu Livestock Development Project is a third livestock project sponsored by Danida.

It is a common feature of the three projects that they have attempted to address the issues of:

1. Bias towards large animals. The projects have worked on village poultry and small ruminants.
2. Provision of services. The projects have trained private farmer extension workers, who could vaccinate against common poultry disease like Newcastle disease, undertake veterinary first aid such as dressing of wounds and parasite treatment and they could promote technologies related to feeding of the animals.
3. Institutions. Village committees and self-help groups have been established to act as a platform for the farmers to articulate their needs.

A common lesson learned from these projects is that, as in Bangladesh, it is possible to create a pool of private extension workers who, among other things, undertake poultry vaccination work, although issues remain with regard to supply of vaccine and medicine. However, introduction of user payment has frequently led to a fall in the number of vaccinations and the village committees have not necessarily been very interested in livestock activities (Pradhan et at. 2003, p. 29).

Sale of animals, meat and eggs via the local market was not reported to be a problem in any of the projects.

The institutional question remains

The question that remains after it has been proven both in Bangladesh and India that poor people, not the least the women, can

involve themselves in poultry and other small livestock production both as producers and service providers, is how to create an institutional framework that can carry the responsibilities for the various services in a sustainable manner? An answer to the question may come from experiences with livestock and crop extension work in India.

Danida has sponsored a series of women extension projects in Tamil Nadu, Karnataka, Orissa and Madhya Pradesh. While these projects have shown that women farmers are as competent as male farmers, they have not found solutions with regard to their institutional home.

Options need to be examined. Ahuja et al. (2000) in their analysis of the livestock health and breeding services in India found that the services were highly valued by the farmers who were prepared to pay for the services. However, it was cattle and buffalo milk production that was in focus in the analysis and not smallholder poultry production in remote areas. Most current discussions in India on the general extension service is, as in most countries, biased towards crops with scant, if any, mention of a production system like smallholder poultry production (Sulaiman, 2003 and Sulaiman and Holt, 2002). The Sulaiman and Holt (2002) report does contain some relevant sections of which one is on private sector extension in India (p.10), and it lists some NGOs like Bharatiya Agro-Industries Foundation (BAIF) and Action for Food Production (AFPRO) that work with the poor in marginal areas on livestock-related subjects in several states. From an institutional perspective, one NGO to mention is the Dhan Foundation, which specialises in forming federations of groups of poor women in Tamil Nadu, Andhra Pradesh and Karnataka and scaling down technologies to suit the purposes of poor people. This is an experience that deserves closer examination. Dhan has not worked on smallholder poultry production, but has plans to do so (personal communication).

The potential role of NGOs is reinforced by the study on consultations with the poor in India that the World Bank published in 1999 (World Bank, 1999) as a forerunner to the World Development Report 2000-2001. This study in its institutional analysis did not list well-known agricultural and livestock organisations such as agricultural extension, the milk cooperatives or the government livestock services to be close to the poor people. It found that people ranked high the local NGOs that addressed their needs, but with little mention of issues relating to animals.

Universities and research institutions

Agricultural universities and research institutions in India have paid very little attention to poultry production technology that will suit very poor households although some have tried to breed a bird that they assume will suit village conditions (Rangnekar and Rangnekar, 1999). However, the assumptions have been generated in the laboratory with no proper participatory field testing. Early experience in Bangladesh showed that cock exchange did not work (Saleque, 2000).

In 2000, the Kerala Agricultural University, the Society for Sustainable Agriculture and the Swiss Agency for Development Cooperation organised a conference on "Smallholder Livestock Production Systems in Developing Countries" with about 350 participants of whom only 15 were from outside India.

After the conference the representative of the Danish Smallholder Poultry Network reported (Pedersen, 2000):

> *"…the conference had been too dominated by a large number of research reports by Indian animal scientists and veterinarian researchers, PhD and MSc students. Most of these reports had a very narrow scope and were lacking linkage to the development perspectives, which was officially presented as part of the overall conference concept. This was to some extent compensated for during the plenary closing session, where an attempt was made*

by the organisers to summarise at a more general level and draw lines to development perspectives.

Interesting presentations were made by a few Indian NGOs who were using poultry as part of their activity programmes. Some of them were referring to Hans Askov Jensen's presentation of the Bangladesh model at the World Poultry Conference in *Delhi* in 1996."

It has not been possible to identify any of these NGOs for the present paper, but they could be contacted to document what ensued subsequently if further surveys are to be undertaken.

Summary of Indian experience

Summarising this brief review of Indian experience, it is useful to keep in mind the various components that constitute poultry activities in Bangladesh within what is called the Bangladesh Model. They can serve as an analytical framework for factors to look for in production, supply and services (Table 5).

TABLE 5. COMPONENTS THAT CONSTITUTE THE POULTRY ACTIVITIES IN BANGLADESH

Production	Supply	Service
Breeders	Parent stock	Village groups
Hatcheries	Feed	Training
Chicken rearers	Vaccine/medicine	Credit/saving
Smallholders	Marketing	Extension

Production

In India there are plenty of poor people who keep a small number of poultry birds in a traditional village system, especially in the tribal belts and among the very poor. Provided a conducive supply and service environment can be created, some could no doubt be trained as chicken rearers as in Bangladesh. Running small hatcheries is an option that would need to be tested. India has many modern hatcheries as well as breeding farms where a supply of day-old chicks or other breeding material can be obtained if it is found advisable to work with breeds other than the local.

Supply

As breed is not a first constraint, and because there are many good reasons to begin with the local bird, the question of parent stock is not the most important. There are many poultry feed mills in India and feed can be obtained from such mills although distance and transport cost may be factors to account for. Vaccines and medicines are available in the private market for commercial poultry farms and experience of training women or men vaccinators demonstrates that this is a real option. The challenge will be to create a line of supply that is within the end user's reach physically and financially.

Marketing

By which is meant the sale of eggs and live birds - has not been reported to be a problem in the Danida sponsored Integrated Livestock Projects from Tamil Nadu, Orissa and Chhattisgarh, and Rangnekar and Rangnekar (1999) did not find marketing a problem in their survey of poultry production in the tribal belt of Western India.

Services

India has a large NGO community with experience of organising poor people of tribal and other socially disadvantaged backgrounds in groups, and there are several NGOs that have experience with micro-finance. However, there are few NGOs which also have staff skilled to undertake training in smallholder poultry production and extension.

CONCLUSION

The rationale for a pro-poor livestock policy that embraces smallholder poultry production is logical because it reaches, more successfully than cattle-based projects, the people that pro-poor development is meant to benefit. The evidence is that this leads to greater food security because people exchange high value poultry, eggs and meat for cereals or other vegetables. Small, but sig-

nificant, increases in the consumption of food of animal origin, such as milk, meat and fish, are also seen in the poultry producing section of the population. The result is a triple benefit. Poor people take their first steps into the development mainstream, they become better nourished and the demand for animal products is greater than before.

The Bangladesh experience teaches us that it is possible to build on the scavenging system and to organise interventions that reach out to many poor women and their families. However, what exactly these interventions should be and how they should be organised will have to be decided in each specific situation. Reductions in mortality through vaccinations conducted by trained women, and improved management that protects the lives of young chicks for the first 6 - 8 weeks, would come high on the list. If the model is to be sustainable, an increase in production will require a market for the sale of eggs, live birds or meat so that producers are able to pay for the inputs. In subsistence situations with no market sales, it is next to impossible to envisage a programme that could work without government subsidy.

Static connotations associated with the words "poultry model" should be avoided. The smallholder concept is better understood as an approach - a way of doing things - that makes livestock production contribute to poverty alleviation and gender equity to a greater degree than seen before.

The objective of the smallholder concept to poultry production discussed in this paper is to contribute to poverty alleviation and not, primarily, to stimulate an increase in production of eggs and poultry meat. It is a tool to help poor women and their families to take the first steps out of poverty. Important evaluation criteria are therefore whether the women and their families have enhanced their capabilities and now are better able to cope with threats that are common to poor families such as human diseases, hidden

hunger or a depletion of their assets, and whether they have stronger social networks, can feed their children better and keep them in school. Smallholder poultry is only one of the instruments that can be used to reverse a negative poverty spiral. It is important that this is clearly understood by stakeholders at the outset in order to identify the various interventions and their sequence, and to formulate the right policy. In livelihoods terms it is a tool that can be used as an entry point to help poor women and their families increase their human, social, physical, financial and natural capital. However, once they have experienced some positive initial steps with the poultry they may well prefer to start other enterprises and, ideally, policies and strategies should be in place that will facilitate such a progression.

The work in Bangladesh is closely linked to the presence of NGOs and their capacity to reach out to poor people. The primary target group discussed in this paper is poor women and so far no independent producer organisations of poor women poultry producers have emerged. Micro-credit has been an important component in the interventions that the NGOs undertake and impact studies have not clearly distinguished between the benefits from micro-credit and the benefits from poultry production.

Strengths

The impact studies note that income from the sale of eggs, apart from being used to diversify the diet, are used to educate children and, where this is possible, to begin a process of asset accumulation. The lesson is that the contribution was not so much from the increased domestic consumption of poultry meat and eggs by the producing household, but rather from the income generated by the sale of poultry products. Micro-finance loans and income - apart from improving nutrition - have been used to improve the housing and homestead of the family. Fencing has improved and investment made in wells and latrines. Inside the homes, more wooden beds, quilts, mosquito nets, grain storage

containers, tables and chairs are seen. There are investments in other livestock such as ducks, goats and dairy cattle, and some have expanded their poultry activities. Many have helped their husbands to get work by helping them to buy a rickshaw, open a business or hire some agricultural land.

Much can be done by the private and NGO sectors. Government need not be involved in the production and supply of inputs, provided a policy exists that allows a supply chain of private dealers, producer organisations and NGOs to function. Marketing of products, i.e. eggs and live birds have not been reported to be a problem in Bangladesh or in the cases reported from India.

Weaknesses

Government extension programmes are not close to the poor. Animal husbandry and agricultural departments' extension programmes are hardly known or used by most poor people for whom the poultry work outlined in this paper are relevant. There are many NGOs that are much closer to people, but few of them have any poultry expertise of the type discussed. It has not been possible to examine government policies, but this needs to be done. In Bangladesh the subsidy regime that DLS continues to apply to its own production of day-old chicks does not encourage the private sector or the NGOs to enter into production of day-old chicks for the smallholder sector although the NGO BRAC has done it.

There has been a very rapid expansion in recent years of the work on the smallholder poultry concept in Bangladesh and the NGOs are short of staff that are well trained in the biological and technical aspects of the type of poultry work that is required.

There is no model in Bangladesh for training of NGO extension staff in livestock matters, although a consensus is developing that training with a strong element of learning by doing is the most appropriate. Chittagong Government Veterinary College now pursues a strategy of work-based learning in its graduate pro-

gramme and it has plans to develop an MSc in rural poultry production. This is an evolution of the collaboration facilitated by the Danish Smallholder Poultry Network where training of Bangladesh students at MSc level has been according to the sandwich model. Such training opportunities need to be strengthened further.

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The Way Forward

An important message that emerged from the workshop was that it is the agricultural growth that reduces poverty in the developing countries and the future growth in this sector is likely to come from high value commodities—livestock and horticultural products. It is this growth that has the potential of supporting and improving many more livelihoods than any other commodity focused intervention. So the livestock is not only important for supporting the livelihoods of the poor, it is also a very powerful engine of economic growth that has the potential of contributing to a rapid reduction in poverty and enhancing the livelihoods of a large number of poor across Asia.

Another important message pertained to the role of farmer organisations. Due to the perishable nature of livestock products and small marketable surplus with individual farmers, the role of farmer organisations is likely to be far more critical in the case of livestock products than perhaps cereals. The need to organise farmers is therefore central in the approach to exploit the potential of the livestock sector for poverty alleviation. This also requires appropriate technology development and research and a re-examination of how the research money is spent and how extension is carried out. Finally, the role of physical infrastructure in accessing new markets is far more critical for these commodities than for cereals and other field crops.

Thus, in a sense, a significant shift is required in the poverty alleviation strategy using smallholder livestock as an engine of economic growth. This, in turn, also means that a decisive shift must occur in the policy-making processes whereby 'technology oriented commodity focused' policy interventions give way to 'people centred livelihood focused' interventions. This requires broadbasing the consultative process leading to policy design and implementation.

There is perhaps some understanding about perishability, high growth in demand for livestock products, and the need for vertical coordination and diversification at very high levels of policy making in the governments in the region, but there appears to be some skepticism about the ability of smallholder and poor households to respond to the complexities of emerging market environment. Future agenda in the livestock-policy-poverty interface therefore must focus on creating awareness and sensitivity at very high levels of national and international decision making about the role smallholders and the poor can play in this process and the contribution this sector can make towards meeting the poverty alleviation goals. This needs to be done through collecting evidence and success stories from across the globe and sharing with people at highest levels of policy-making not just in agriculture and livestock related forums but perhaps more important in non-agricultural platforms such as planning commissions, ministries of finance, and economic advisory councils.

Broadbasing the consultative process and bringing organisations and individuals with livelihood focus in the policy design and implementation process would mean a significant shift in the current way of doing things. This will perhaps also require moving the decision-making somewhat away from traditional technical people in various line departments to those who are concerned with improving livelihoods of the poor. Managing this change will be a real challenge and would require creating a com-

munity as broad as possible of stakeholders, including the government to drive this agenda. It is critical that the governments are sensitised about the role smallholders can play and that the governments are sympathetic to these goals. In absence of this sensitisation and sympathy, large players, including multinationals, will continue to influence the policies to support their kind of production.

Nurturing this process of creating the community and facilitation of dialogue will require a coalition of national and regional organisations who are willing to make long-term commitment to this vision. The organisations must also have sufficient clout, credibility, track record of making things happen in difficult circumstances and a livelihood focus. There is perhaps no alternative to putting together such a coalition giving it the time to evolve and establish credibility among key stakeholders. All countries in the region have examples to demonstrate the powerful role of small producers in generating poverty alleviating growth. It would be necessary to identify the organisations that are involved in these success stories, learn from them and share the examples of how to reach out to the poor producers.

Finally, it must be understood that there is a very long gestation period in intellectual change. It is therefore absolutely critical that the organisations and individuals representing the next generation become an active partner in this coalition.

Annexure 1: Poster Papers

Dairy Cooperatives in Bangladesh: A Brief Synopsis

Gobinda Chandra Saha*

OBJECTIVES OF MILK VITA

- Raising subsidiary income of poor, landless and marginal farmers living in relatively remote areas through milk purchase at reasonable price
- Ensuring regular supply of safe, hygienic and nutritious milk and milk products to city dwellers at a fair price.

SERVICES TO THE FARMERS BY MILK VITA

- Round the clock free animal health services
- Free vaccination against common epidemic diseases
- Free artificial insemination services with frozen semen
- Fodder extension services
- Arrangement of balanced cattle feed on cost basis
- Arrangement of *Bathan* (Pasture land) for members of cooperative
- Training farmers on better animal husbandry practices
- National and International study tours for cooperative farmers
- Imparting knowledge and information through audio-visuals
- Arrangement of interest free loan for cattle purchase.

MICRO-CREDIT FACILITIES OF MILK VITA

- The organisation started experimentation in micro-credit. Loans are sanctioned on easy terms to poor farmers for purchasing of cattle. Since 1994, Milk Vita has provided loans amounting to about 15.00 million taka.

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* Gobinda Chandra Saha is General Manager, Milk Vita, Bangladesh

MILK VITA PRODUCTS

- Pasteurized Liquid Milk
- Flavoured Milk
- Butter
- Full Cream Milk Powder
- Skimmed Milk Powder
- Ice-Creams
- Ghee
- Sweet Curd
- Cream
- Lollies
- Rasa malai (sweet meat) etc.

FUTURE PLANS OF MILK VITA

- Expansion of plant handling capacity
- Establishment of chilling plants, UHT plants & cattle feed plants, condensed milk plant
- Expansion of the chocolate crunch making plant into a complete chocolate plant
- Acquisition of *bathan* land from government for use as grazing land
- Replication of the project in other areas, especially in the divisional head quarters of Chittagong, Khulna and Rajshahi.

CONSTRAINTS

- Lack of an appropriate dairy policy to address product standardisation, taxation, infrastructure development, price, import rationalisation and product safety measures
- Competition from imported milk powder and milk products along with threats from the local competitors
- Non-congenial taxation policies and higher custom duties for imported items
- Absence of the Dairy Development Board in Bangladesh and lack of autonomy in functioning
- Acquisition of bathan land for farmers' cattle grazing
- Channeling the government's poverty alleviation programmes through the infrastructure of Milk Vita in all the milk-shed areas of the country
- Shortage of quality cattle feed at a reasonable price

- Lack of support from the government, national and international donor agencies to undertake a massive dairy development programme for the country, similar to Operation Flood I, II and III in India, and
- Absence of adequate training facilities and support to adopt new technologies.

TABLE 1 : NO. OF CATTLEHEADS IN BANGLADESH. (MILLION)

Livestocks	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	Yearly Increment per cent
Cow	23.32	23.40	23.48	23.56	23.64	23.72	0.34
Buffalo	0.81	0.82	0.83	0.84	0.85	0.86	1.23
Goat	33.33	33.50	33.67	33./84	34.01	34.19	0.51
Lamb	1.08	1.11	1.14	1.17	1.21	1.24	2.78

TABLE 2 : MILK PRODUCTION IN THE COUNTRY (MILLION TONNES)

Product	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	Yearly Increment per cent
Milk	1.57	1.59	1.62	1.65	1.68	1.71	1.76	1.89

Source: Directorate of Livestock Services, Bangladesh.

TABLE 3: POWDER MILK IMPORT IN THE COUNTRY

Years	Tonnes	Million US$	1 US$ = Taka
1996-97	14,000	53	42.70
1997-98	13,000	45	45.46
1998-99	15,000	56	48.06
1999-2000	16,000	60	50.31
2000-2001	19,000	62	53.96
2001-2002 **	20,000	67	57.25

**Approximate. Source : Bangladesh Bank.

TABLE 4 : IMPORTED VS DOMESTIC MILK USE IN THE COUNTRY

Product	Domestic Production (Million Tonnes)	Imported milk converted Equivalent (Million Tonnes)	Total Milk Use (Million Tonnes)	Total Deficit against import
Liquid Milk	1.75	0.16	1.91	9.14%

Source: Cooperative Directorate, 2002.

TABLE 5 : MILK VITA PROFIT/LOSS ACCOUNT

Years	Profit (Tk. Million)	Yearly Turn-over From sale (Tk. Million)
1995-96	29.80	470.23
1996-97	41.59	470.46
1997-98	47.74	690.71
1998-99	40.20	785.66
1999-00	35.48	850.47
2000-01	61.40	1019.25
2001-02*	67.58	1368.20

* Unaudited

Meat Production and Marketing in Nepal from a Smallholder Livestock Farmer's Perspective

Durga Datt Joshi, Bimal Kumar Chhetri, Minu Sharma and Mahendra Maharjan*

INTRODUCTION

- Nepal is a small and one of the least developed countries in the world.
- Per capita GNP: US$ 240
- Population below poverty line: 42 per cent
- Livestock sector is an important component of Nepalese economy in terms of income, employment and equity.
- Livestock sector contributes one-third of agriculture GDP and 4 per cent of the total export of the nation.

TABLE 1: PER FAMILY LIVESTOCK POPULATION AND THEIR DISTRIBUTION

Area	Cattle*	Buffalo	Goat/Sheep	Pig	Poultry	Duck
Mountain	3.4	1.0	3.7	0.2	4.0	0.04
Hill	2.7	1.4	2.5	0.2	4.0	0.04
Terai	2.6	0.9	1.6	0.2	3.3	0.2
Nepal	2.7	1.1	2.2	0.2	4.5	0.1

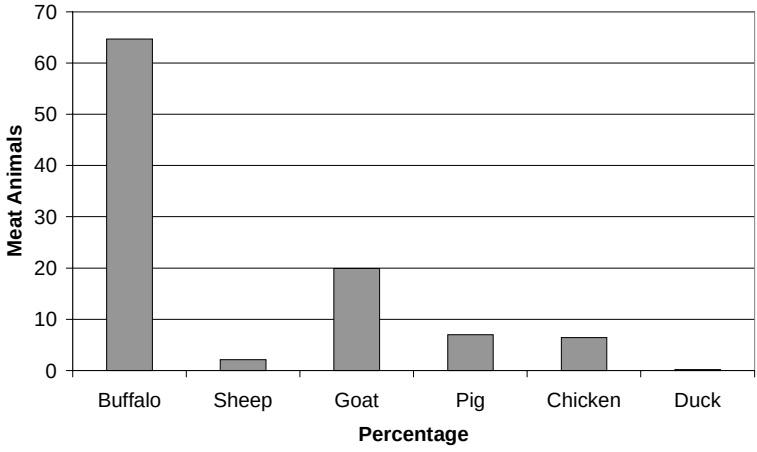
* Including Yak & Chauri (Source: Estimated on the basis of Holdings report Agriculture Census 1991

ANIMAL SLAUGHTERING PRACTICES

- No modern slaughterhouse except one at Hetuada, constructed about 20 years ago.
- Animal slaughtering occurs at street sides, riversides, open pasturelands or courtyard.

* Durga Datt Joshi is Director, National Zoonoses and Food Hygiene Research Centre, Kathmandu, Nepal

MEAT PRODUCTION IN NEPAL



MEAT PRODUCTION AND TRADE PATTERN

- Annual meat production is 181,867 million tonnes.
- Present demand of meat is 189,700 million tonnes.
- Deficit in meat supply is about 8000 million tonnes.
- 90 per cent of the demand for meat in Kathmandu Valley is met by imports from India.

MARKET STRUCTURE, FACILITIES AND MARKETING SYSTEM

- Market places are not organised.
- Price information and weighing scale are not available.
- In urban areas marketing is organised by small retail butchers, no inspection is conducted.
- In rural areas, there are about 754 registered Hat Bazaars.

INVOLVEMENT OF SMALLHOLDER MEAT PRODUCING FARMERS

- Farmers' keep livestock species like buffalo, cow, goat and free ranging chicken.
- Most of the indigenous breeds of Nepal are genetically unproductive and suffer from inadequate policies on commercialisation of livestock industry.

- Poultry industry accounts for 6 per cent of the total meat production.

GOVERNMENT INVESTMENT IN LIVESTOCK SECTOR

- Nepal Agriculture Perspective Plan initiated in 1997-98 with 20 years horizon.
- The livestock master plan being implemented since 1991-92.
- The 10th plan has set target growth rate of 10, 6.6 and 13.7 per cent for meat, milk and egg production from current growth rate of 3.94, 2.72 and 5.04 per cent respectively.

EXISTING MARKETING SITUATION OF LIVESTOCK

- Domestic market for live animals is strongly influenced by trade with India and Tibet.
- Poor market infrastructure
- The logistic chain includes
  - Indian sellers supply to Nepalese buyers
  - Live animals transported by truck to Kathmandu
  - Sold to butchers in Kathmandu.
  - Animals kept in pens near slaughtering places
  - Animals are slaughtered
  - Retailers or butchers transport meat to their shops
  - Meat is sold to the consumers

RAW HIDE AND SKIN

- Collection of skin is inefficient and unregulated.
- There are about 50 agencies involved in collecting goatskin to supply to tanneries, located at Terai region.
- About 40-50 per cent of hides collected are processed to finished leather and consumed locally to manufacture shoes.
- Over 90 per cent of exports are to European countries by individual tanners.

ANIMAL SLAUGHTER HOUSE AND MEAT INSPECTION ACT AND FOOD ACT (1998)

- Animals are to be killed only at slaughter house or as prescribed by the chief district officer.
- No slaughtering is permissible elsewhere except for religious sacrifices or research purpose.

CONSTRAINTS

- Low productivity, scarcity of inputs & breeding bulls.
- Lack of adequate animal health care.
- Lack of adequate marketing system and channels for perishable animal products.
- Ineffective extension services by the government.

CONCLUSION AND RECOMMENDATIONS

- There is an urgent need to study the existing market situations.
- Establishment of modern slaughterhouses, commercialise production of livestock goods to reduce cost of production, involving smallholders.
- Provision of effective & efficient input delivery and extension services.
- Regulate unrestricted entry of poultry breeding stock and day old chicks.
- Establish efficient marketing channels to reduce transaction cost and improve efficiency in marketing.
- Establish a separate marketing section under department of livestock services.

Market Opportunity for Milk in Indonesia

Ismeth Inounu, Tjeppy D. Soedjana and Atien Priyanti*

THE ROLE OF LIVESTOCK SUB SECTOR IN AGRICULTURAL DEVELOPMENT

Livestock sub sector in Indonesia has had significant role in agricultural development. The sub-sector accounts for more than 10 per cent of agricultural and 2-3 per cent of the national GDP. During the period of 25 years, the contribution of livestock sub sector to agricultural GDP has increased significantly, from approximately 6% in 1969 to almost 11% in 2001 (Statistical Book, 2002).

At the farm household level, the role of livestock farming is an important contributor of good quality food, cash income, savings. Besides, livestock is a symbol of social status and performs religion ceremonial functions. Livestock farming has become an important component for the agricultural sector, and contributes significantly to family income (Rachman, 1999; Abdurachman, *et al.*, 1993; Haryanto *et al.*, 1999). Although the contribution of livestock farming to household welfare is clearly recognised, improvements in livestock sub sector are still needed through the application of technology innovations. The relatively inefficient animal production systems require continued innovation to make larger contributions to household income and to improve national nutrition level.

The livestock sub sector is currently providing almost all meat and eggs, and part of the milk for domestic consumption. The Government of Indonesia is keenly aware of the importance of the livestock sub sector as a renewable supplier of animal protein for human consumption. Rapid economic progress in Indonesia during the last twenty years has resulted in rising consumer's

* Ismeth Inounu is Scientist, Indonesian Center for Animal Research and Development, Jl. Raya Pajajaran Kav. E-59, Bogor 16151, Indonesia

income, which in turn has led to the subsequent changes in consumption patterns that place increasing demands on the livestock sector. During 2001, per capita consumption of meat, egg and milk increased by 22.8 per cent, 23.4 per cent and 24.3 per cent, respectively compared to the year 2000 (Statistical Book, 2002). Three is also some evidence that this has resulted in improvement of the society nutrition with animal protein consumption reaching 6 g / capita / day (LIPI, 1998). In addition to that, due to the changes in the demographic composition of the population and high urbanisation, the livestock sub sector in the twenty years is expected to grow very fast. Predictions are that it will produce almost half of the total output in agricultural development (Delgado, 1999). Continued growth of livestock sub sector in fact, absorbs Indonesia's increasing labour force and will promote a stable transition to an industrialised economy.

The average milk consumption in Indonesia is about 4l / cap / year. Approximately 40 per cent of this demand is met by national sources. Rest of the demand is met by imported milk from Australia and New Zealand. The Government of Indonesia had placed various regulations for the dairy industry, such as import ratio, import tariff, import licensing and restrictions, to promote dairy sector. However, with the latest Presidential Instruction (Inpres No.4 / 1998) in response to the 50 items commitment with IMF, all the regulations have been lifted out. This situation has posed new challenges and it is important to elaborate further the operational steps towards livestock technology development to meet the new challenges. Improving location-specific farming systems involves not only technological problems, but also includes appropriate management systems. The objective of this paper is to provide some information on the market opportunities for milk in Indonesia.

DEVELOPMENT OF DAIRY FARMING IN INDONESIA

Dairy farming in Indonesia is characterised by its small scale and household nature, where most of dairy farms use traditional management practices. The population of dairy cattle in Indonesia is about 354,000 heads owned by 86,100 farmers (Statistical Book, 2001). As a consequence productivity levels are still very low—8-10 l / head / day. The productivity is marginally better in Pangalengan (West Java), Boyolali (Central Java) and Pujon (East Java) where it varies from 10-15 l / head / day (Priyanti *et al*., 2001). In the year 2002, the milk production reached 528.5 thousand tonnes. Domestic fresh milk production grew significantly during the period of 1980 – 2001, at an average of 8.22 per cent per annum (Table 1). This was due mainly to the protection and support offe-red to the milk industry through implementation of several government policies. During this period, the population of dairy cattle had increased from 103,000 head in 1980 to 354,000 in the year of 2000, an annual growth rate of 5.6 per cent. During the same period, the dairy cooperatives grew at over 14 per cent per annum. A dramatic increase in the population of dairy cattle was due mainly to a special credit program for imported dairy cows and due to a Presidential Support Program which distributed dairy cattle to small-scale farmers.

TABLE 1: THE DEVELOPMENT OF DAIRY INDUSTRY IN INDONESIA.

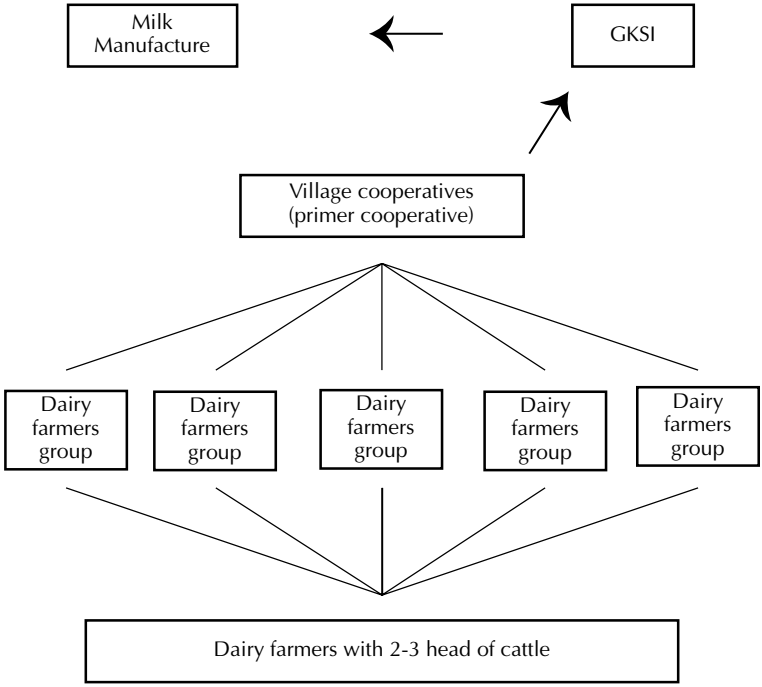
Description	1980	1985	1990	1995	2000
Fresh milk production (000 tons)	78.4	191.9	345.6	433.4	495.6
Number of dairy cattle (000 head)	103	208	294	341	354
Number of dairy farmers	12807	59524	74000	86100	n.a.
Number of dairy cooperatives	50	173	190	207	210

Sources: GKSI and statistical book various issues

The marketing and distribution of fresh milk in Indonesia is similar across regions and is essentially dominated by two groups, i.e. milk cooperatives and their association (GKSI) and milk manufacturers (IPS). Dairy farmers are obliged to sell their fresh milk

to the village dairy cooperatives where all dairy cooperatives become a member of GKSI. The organisation involved in the dairy farming in Indonesia is shown detailed in Figure 1. The price levels and quality standards negotiated by the GKSI and IPS bind the farm gate price, in which approximately 90 per cent of domestic fresh milk is absorbed by IPS as input for processed milk and less than 10 per cent consumed directly as pasteurised fresh milk. Therefore, the share of private distributors in the marketing of fresh milk is very small.

FIGURE 1: ORGANISATION OF DAIRY FARMING IN INDONESIA



TRENDS OF MILK TRADE IN INDONESIA

Data on export and import of milk products during 1980 to 2000 are given in Table 2. Within two decades the volume of milk imports has almost doubled to meet the demand. The combination of rapid income growth and increased population along with the high elasticity of demand for dairy products has led to rapid growth for milk demand in Indonesia. Empirical study have indicated that demand elasticity for milk production was 1.54 (Soedjana, et al., 1997) while that in the supply side was 2.12 (IPB, 1999).

Significant changes have taken place in the dairy industry starting 1998 as a consequence of having IMF letter of intent signed. Major regulations in the dairy industry involved were (a) import rationing policy, (b) import tariffs, (c) import licensing and state trading, as well as (d) restrictions on investing in milk processing. Import rationing policy is the most complex of the policy instruments that affected to the dairy industry. The government controlled the extent of milk imports on the basis of the quantity of domestic milk purchased by milk manufacturers. The latest domestic purchase-to-import ratio was 1:2, meaning that imports of two equivalent units of dairy raw materials were allowed for one unit of domestic fresh milk absorbed by the manufacturer. To import dairy raw materials, the manufacturing firms need to show "absorption" letter or *bukti serap (Busep)* that indicated the volume of domestic milk it has absorbed. Recent study has shown that import rationing policy resulted in net economic losses to society of Rp.26.3 milyar with the domestic producers gaining benefit for Rp.18.9 milyar. The consumers, on the other hand, have lost nearly Rp.45 milyar (Priyanti *et al*, 2002). This finding also indicates that import rationing policy was effective in increasing domestic milk supply due to the guarantee market with the price protection of milk. With the lifting of the import rationing policy, the dairy industry is faced with a free market trade. However with the depreciation of rupiah in 1997, the milk manufacturer

TABLE 2: TREND OF EXPORT AND IMPORT MILK PRODUCTS: 1980-1990

Products	Export					Import				
	1980	1985	1990	1995	2000	1980	1985	1990	1995	2000
Volume (ton)										
Milk	n.a.	n.a.	15318.5	4978.3	31482.4	73019.2		35868.1	66070.5	117268.2
Butter	n.a.	n.a.	23.0	311.5	29171.3	1309.2		4077.3	38533.8	41391.6
Cheese	n.a.	n.a.	72.2	17.7	21.7	1053.0		2656.5	7911.0	6062.2
Value (000 US$)										
Milk	n.a.	n.a.	16075.7	6900.3	55080.3	77364.9		55964.0	144026.5	189273.3
Butter	n.a.	n.a.	156.9	60.4	19430	1321.6		8577.0	65531.0	53466.9
Cheese	n.a.	n.a.	53.8	113.2	57.6	1188.7		6625.2	11999.7	11504.0

n.a. : not available information

Source: Statistical book, various issues

has still managed to absorb the domestic milk producer because the price of domestic milk was still lower than the world milk price (Rp.1750 / litre vs Rp.2480 / litre) (GKSI, 2003).

ALTERNATIVE DEVELOPMENT OF DAIRY SECTOR

Indonesia is focusing on integrated crop livestock systems with the basic principle that livestock will utilise residues of crop plants and the land areas will receive manure produced by livestock as organic fertilizer. This simple relationship between crop and livestock systems is expected to successfully maintain land productivity in terms of physical and economical aspects. When smallholder crop livestock systems are supported by market infrastructure, dairy can become a major component, especially as systems intensify in the face of human population pressure (de Leeuw, et al., 1999). Under the Crop-Animal Systems Research Network (collaborative project between Central Research Institute for Animal Sciences - CRIAS and the International Livestock Research Institute – ILRI), farmers in Cilawu, Garut, West Java were found to utilise 23 per cent of the available rice straw as feed, 39 per cent used as mulch and 30 per cent being burned (Djajanegara, *et al.*, 2001). In contrast, all corn Stover produced is fed to animals. The success of the integration systems of food crop and livestock management under study is foreseen and expected to be implemented in a wider area to achieve food security, reduced poverty and protection of the environment from further degradation. Creation of sustainable agriculture through maintaining land productivity, improved production efficiency, and enhanced farmer income will ultimately serve the national food security goal.

FINAL REMARKS

Production of fresh milk in Indonesia has not increased markedly over the past ten years, and the current level of production is insufficient to satisfy the fast growing demand for milk and milk products. Around 90% of Indonesian fresh milk production

comes from dairy cooperatives and the milk processors handle the processing and distribution. Less than 10% of the milk is sold directly to the consumer.

The opportunity of dairy business is open for smallholder farmers as well as commercial farmers. The opportunity is not only in marketing of fresh milk or milk products, but also for organic fertilizer (manure), meat from culled cow, female calf for breeding purposes and feeder cattle from male calf. The dairy farming systems could developed by the schemes implemented through high, medium or low external input systems approach. The systems will relate to the farmers or the enterprises who process and market the products.

Cooperatives seem the best alternative for the smallholder or commercial farmers in the dairy business in Indonesia. The empowerment of the primary cooperative and its members are very important to reach the goals. Farmers should also consider marketing their products directly to the consumer in order to get better price for their milk.

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The Philippine Dairy Industry: Situation, Competitiveness and Outlook

Salvacion M. Bulatao*

BACKGROUND

- Philippines is a huge market for milk and milk products with a small dairy farming community that has been growing vigorously in the last two years.
- The dairy market generates sales amounting to US$1.1 billion annually.
- Australia, New Zealand and the USA supply 80 per cent of milk imports.
- In 2002, Philippines imported some 215 million kg of milk and milk products at a cost of Php 17.3 billion (US$346 million).
- Milk powder comprises 71 per cent of the imports.
- Around 8,000 dairy farming families in 223 villages are engaged in milk production. They pour milk to over 100 dairy cooperatives accounting for 23 per cent of national liquid milk supply – 11 million kg of milk from some 8,900 milk animals.
- The local dairy herd is composed primarily of cattle and buffaloes. Herd buildup has been dependent on importations of tropical crosses from Australia and New Zealand.
- The Philippine Carabao Center is active in upgrading local buffaloes through its gene pool and extension work. The Dairy Training and Research Institute assists the National Dairy Authority in upgrading of local cattle.
- In the last two years, dairy goat farms have started producing for commercial use.
- Handling and processing capacity has received more attention with the expansion of market. New suppliers of equipment have offered alternatives to processors.

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* Salvacion M. Bulatao is Administrator, National Dairy Authority, Philippines

- The National Dairy Authority (NDA) is also actively upgrading dairy engineering capacity.

DOMESTIC MARKET

- There is a growing consumer preference for liquid milk. UHT milk imports have trebled since 1995, while milk powder imports have remained constant over the same period.
- There is also a surge in demand for milk from local milk producers from the leading coffee shops in Metro Manila.
- This growing market provides the economic incentive to dairy farmers to observe quality assurance procedures.

COMPUTING FOR COMPETITIVENESS

- Local raw milk is sold from Php12 - 15 per litre, or from US$0.24 - 0.30 per litre, assuring each dairy farmer a margin of at least 40 per cent.
- A dairy farmer owning 5 animals can generate a daily cash flow of Php450 (US$9) and from sale of 30 litres of raw milk can realise a net income of Php180 (US$3.6).
- Every million peso (US$20,000) invested in dairy cattle produces the following benefits over the eight-year productive life of the animals:
- 430,950 litres of wholesome, affordable milk
- 44 head of milch animals added to the dairy herd of the country
- 41 new jobs created in the same or new farms receiving the new dairy animals
- Php17.2 million (US$344,000) in foreign exchange savings
- Php6.60 million (US$132,000) in revenues from sales of milk and male calves.
- 10,774 children fed in milk feeding programs.

TABLE 1: PRODUCTION COST PER LITRE OF MILK

COUNTRY	COST RANGE (US$/LITRE)
Japan	0.61 - 0.70
Netherlands	0.31 - 0.35
Canada	0.31 - 0.35
France	0.31 - 0.35
Germany	0.31 - 0.35
Israel	0.31 - 0.35
Unites States	0.26 - 0.30
Thailand	0.26 - 0.30
India	0.21 - 0.25
Russian Fed.	0.16 - 0.20
Philippines	0.12 - 0.21
Uruguay	0.10 - 0.15
Australia	0.10 - 0.15
New Zealand	0.10 - 0.15

Source: FAO Dairy Information Network 2001

THE DAIRY ROAD MAP

- Local producers are geared to increase their market share of liquid milk from 20 per cent to 40 per cent.
- The aim is to double national milk output from 11 million litres to 24 million litres by 2004.
- Appropriate financing packages are in place for requirement in herd build-up.
- We are looking at the tariff proposals from the sector and would like to ensure that producers enjoy fair play without unduly affecting mass consumers.
- Support for dairy enterprise enhancement is directed not only to the farms but also to the diversification of sources of milk handling, testing facilities, supplies and for upgrading of dairy engineering capacity.
- Support for local dairy from various sectors of society, particularly local government units (LGUs) and civil society has increased.
- A Milk Trust is in the process of institutionalisation as more local and national agencies opt to address the problem of mal-

nutrition through community and school milk feeding programs that procure the milk from local producers.

- The dairy road map's targeted growth for the medium term is aimed at the following results:
  - 18,260 full-time jobs
  - Php572 million (US$11.4 million) in milk sales
  - Php891 million (US$17.8 million) in livestock assets
  - Php450 million (US$9 million) in foreign exchange savings
- International cooperation in terms of shared approaches to pursue dairy development is the new ground that we seek to explore.
- We recognise the leadership of the emerging dairy nations and look to forging ties with them in support of milk as a basic component of national self-reliance and self-respect rather than a commodity that spawns dependence and unfair trade relations.

Annexure 2: Participants

1. **Gobinda Chandra Saha**
   General Manager
   Bangladesh Milk Producers' Cooperative Union Ltd. (Milk Vita)
   Dugdha Bhaban
   139–140, Tejgaon Industrial Area
   Dhaka 1208, BANGLADESH
   Tel: +880 2 8826888
   Fax: +880 2 8826880
   Email: milkvita@bangla.net

2. **Md. A. Saleque**
   Programme Coordinator
   Programme Support Enterprise
   BRAC
   BRAC Centre, 75 Mohakhali C.A.
   Dhaka 1212, BANGLADESH
   Tel: +880 2 8824180-7, 9881265
   Fax: +880 2 883542, 883614
   Email: saleque.ma@brac.net

3. **Yang Hongjie**
   Deputy Division Chief
   Division of Domestic Animal Genetic Resources Administration
   National Animal Husbandry and Veterinary Service
   Ministry of Agriculture
   Maizidian Street 20#, Chaoyang District
   100026 Beijing, P. R. OF CHINA
   Tel: +86 10 64194610
   Fax: +86 10 64194611
   Email: yanghj67@yahoo.com

4. **R.C.A Jain**
   Secretary (Agriculture and Cooperation)
   Department of Agriculture and Cooperation
   Ministry of Agriculture
   Krishi Bhavan
   New Delhi 110 001, INDIA
   Tel: +91 11 23382651, 2338844
   Fax: +91 11 23386004
   Email: rcajain@krishi.delhi.nic.in

5. **M.P.G. Kurup**
   Livestock Consultant
   16/2A, Borsad Road
   Jitodia 388 345, INDIA
   Tel: +91 2692 236610, 235549
   Email: mpgkurup@yahoo.com

6. **Vijay Paul Sharma**
Professor, Centre for Management in Agriculture
India Institute of Management (IIM)
Vastrapur, Ahmedabad 380 015, INDIA
Tel: +91 79 26324819
Fax: +91 79 26306896
Email: vijays@iimahd.ernet.in

7. **Shashi Sareen**
Director
Export Inspection Council of India (EICI)
Ministry of Commerce
Government of India
11th Floor, Pragati Tower
26, Rajendra Place
New Delhi 110 008, INDIA
Tel: +91 11 23365540
Fax: +91 11 23748024
Email: eic@eicindia.org

8. **Balwant Shankar Sathe**
Poultry Consultant
C-19, Mantri Avenue I
Near NCL Pashan
Pune 411008, INDIA
Telefax: +91 20 5898173
Email: bssathe@pn2.vsnl.net.in

9. **N.V. Ramana**
Senior Vice President
Basix India
501-502, Nirmal Towers
Dwarkapuri, Pinjagutta
Hyderabad 500 082, INDIA
Tel: +91 40 55618846
Fax: +91 40 55633491
Email: nvramana@basixindia.com

10. **Ismeth Inounu**
Scientist
Indonesian Centre for Animal Science Research and Development
J1. Raya Pajajaran, Kav. E-59,
Bogor 16151, West Java, INDONESIA
Tel: +62 251 328384, 322138
Fax: +62 251 328382, 380588
Email: crian-1@indo.net.id

11. **Durga Datt Joshi**
Director
National Zoonoses and Food Hygiene Research Centre
Tahachal, GPO Box 1885
Kathmandu, NEPAL
Tel: +977 1 270667
Fax: +977 1 272694
Email: ddjoshi@healthnet.org.np

12. **Dala Ram Pradhan**
Deputy Director General
Department of Livestock Services
Harihar Bhavan
Lalitpur, NEPAL
Tel: +977 1 5521610, 5522056
Fax: +977 1 5542915
Email: dalaram@wlink.com.np

13. **Leticia Ramos-Shahani (Ms.)**
Presidential Adviser on Culture, Republic of the Philippines
Chairman, Board of Trustees
Dairy Development Foundation of Philippines Inc. (DDFPI)
22 Solar Street, Bel Air 3
Makati City, PHILIPPINES
Fax: +63 2 897 03 53
Email: lrshahani@manila.mcco.ph

14. **Salvacion M. Bulatao (Ms.)**
Administrator
National Dairy Authority, Department of Agriculture
NDA Building, BAI Compound
Vsyas Avenue, 1100 Dilman
Quezon City, PHILIPPINES
Tel: +63 2 9260733-36, 9296755
Fax: +63 2 9268847
Email: nda01smb@mozcom.com, sbulatao@mozcom.com

15. **Le Duc Ngoan**
Dean, Faculty of Animal Sciences
Hue University of Agriculture & Forestry
102 Phung Hung Street
Hue City, VIETNAM
Tel: +84 54 525439, 522535
Fax: +84 54 524923, 530000
Email: fas@dng.vnn.vn

16. **John W. Mellor**
Vice President
International Development Group
Abt Associates Inc.
4800 Montgomery Lane
Suite 600, Betnesda, MD, USA
Tel: +1 202 3478802
Fax: +1 202 3478806
Email: John_mellor@abtassoc.com

17. **A.K. Joseph**
Project Coordinator
Capitalization of Livestock Project Experiences India
34, Sarvodaya Enclave
New Delhi 110 017, INDIA
Tel: +91 11 26868536
Fax: +91 11 2656773
Email: icindia.calpi@spectranet.com

18. **Peter Bazeley**
Senior Livestock Adviser
Policy Division
Department for International Development
Level 4 East, Ext. 0931
1, Palace Street, London
SW1E 5HE, UNITED KINGDOM
Tel: +44 20 70230931
Fax: +44 20 70230299
Email: P-Bazeley@dfid.gov.uk

19. **Torsten Hemme**
FAL- Federal Agricultural Research Centre
Bundesallee 50
38116 Braunschweig, GERMANY
Tel: +49 531 5965117
Fax: +49 531 5965199
Email: torsten.hemme@fal.de

20. **Christopher Delgado**
Director
ILRI-IFPRI Joint Programme on Livestock Market Opportunities
International Food Policy Research Institute (IFPRI)
2033 K Street, NW
Washington DC 20006-1002, USA
Tel: +1 202 8625600
Fax: +1 202 4674439
Email: C.Delgado@cgiar.org

21. **William Thorpe**
Representative in Asia
International Livestock Research Institute
C/o ICRISAT Delhi Office
CG Centres' Block (1st floor),
National Agric Sci Centre (NASC) Complex
Dev Prakash Shastri Marg, (Todapur Road)
Near Pusa Institute, New Delhi 110 012, INDIA
Tel: +91 11 25849522, 25841553, 25849554
Fax: +91 11 25841294
Email: w.thorpe@cgiar.org

22. **Lucy Maarse**
Head
Natural Resource Management Sphere
Swiss Agency for Development and Cooperation
C/o Embassy of Switzerland
P.O. Box 392, Chandragupta Marg
Chanakyapuri, New Delhi 110021, INDIA
Tel: +91 11 26877819, 26877820
Fax: +91 11 26873631
Email: Lucy.Maarse@sdc.net

23. **Thomas R. Carter**
Cooperative Coordinator
DCHA/PVC
US Agency for International Development
Ronald Reagan Building, Room 7.6.70
1300 Pennsylvania Avenue, NW
Washington DC 20523, USA
Tel: +1 202 7125226
Fax: +1 775 2551911
Email: trc22742@hotmail.com, thcarter@usaid.gov

24. **Frands Dolberg**
Associate Professor, Department of Political Science
University of Aarhus
DK-8000 Aarhus C, DENMARK
Telfax: +45 8615 2704
Email: frands@mail1.stofanet.dk

25. **David K. Leonard**
Dean of International and Area Studies
Professor of African Politics & Development Administration
University of California at Berkeley
360 Stephens Hall, Berkeley, CA 94720-2300, USA
Tel: +1 510 6421140
Fax: +1 510 6429466
Email: leonard@socrates.Berkeley.EDU

26. **Samuel Jutzi**
Director
Animal Production and Health Division (AGAD)
Food and Agriculture Organization of the UN
FAO Headquarters, Room C-546
Via delle Terme di Caracalla
Rome 00100, ITALY
Tel: +39 06 57053371
Fax: +39 06 57055749, 57053152
Email: Samuel.Jutzi@fao.org

27. **Henning Steinfeld**
Chief – Livestock Information and Policy Branch
Animal Production and Health Division
Food and Agriculture Organization of the UN
FAO Headquarters, Room C-542
Vialle delle Terme di Caracalla, 00100 Rome, ITALY
Tel: +39 06 57054751
Fax: +39 06 5705749, 57053152
Email: henning.steinfeld@fao.org

28. **Daniel Gustafson**
FAO Representative in India and Bhutan
Food and Agriculture Organization of the UN
55 Max Muellar Marg, Ex- Lodi Estate
Post Box No. 3088, New Delhi 110003, INDIA
Tel: +91 11 24693060, 24628877
Fax: +91 11 24620115
Email: Daniel.Gustafson@fao.org

29. **Joachim Otte**
Project Coordinator
Pro Poor Livestock Policy Facility
Food and Agriculture Organization of the UN
FAO Headquarters, Room C-510
Vialle delle Terme di Caracalla,
00100 Rome, ITALY
Tel: +39 06 57053634
Fax: +39 06 57055749, 57053152
Email: joachim.otte@fao.org

30. **Hans-Gerhard Wagner**
Senior Regional Animal Production Officer
Food and Agriculture Organization of the UN
FAO Regional Office for Asia and the Pacific
Maliwan Masion, 39 Phra Atit Road
Bangkok 10200, THAILAND
Tel: +66 2 6974326
Fax: +66 2 6974445
Email: hans.wagner@fao.org

31. **Vinod Ahuja**
(Coordinator, South Asia Pro-Poor Livestock Policy Facility of FAO)
Associate Professor
Indian Institute of Management
Vastrapur, Ahmedabad 380 015, INDIA
Tel: +91 79 26324858
Fax: +91 79 26306896
E-mail: ahuja@iimahd.ernet.in

32. **Amrita Patel** (Ms.)
Chairman
National Dairy Development Board
Anand 388 001, INDIA
Tel: +91 2692 260145
Fax: +91 2692 260156
Email: amrita@nddb.coop

33. **Deepak Tikku**
Managing Director
National Dairy Development Board
Anand 388 001, INDIA
Tel: +91 2692 260806
Fax: +91 2692 260156
Email: tikkur@nddb.coop

34. **D.V. Ranganekar**
Consultant
National Dairy Development Board
Anand 388 001, INDIA
Tel: +91 2692 226237
Fax: +91 2692 260157
Email: dvr@nddb.coop

35. **C.L. Dadhich**
Sr. General Manager
Rural Economics and Policy Research Group
National Dairy Development Board
Anand 388 001, INDIA
Tel: +91 2692 226221
Fax: +91 2692 260157
Email: dadhich@nddb.coop

36. **P.V.K. Panicker**
General Manager-Productivity Enhancement
National Dairy Development Board
Anand 388 001, INDIA
Tel: +91 2692 260184, 226241
Fax: +91 2692 260157
Email: pvkp@nddb.coop

37. **A. Wayangankar**
Manager
Cooperative Services
National Dairy Development Board
Anand 388 001, INDIA
Tel: +91 2692 260808, 226131
Fax: +91 2692 260157
Email: arunw@nddb.coop

38. **T.N. Datta**
Senior Executive
National Information Network
National Dairy Development Board
Anand 388 001, INDIA
Tel: +91 2692 226222
Fax: +91 2692 260157
Email: tndutta@nddb.coop

39. **A. Rajasekaran**
Executive-Quality and Plant Management
National Dairy Development Board
Anand 388 001, INDIA
Tel: +91 2692 226115
Fax: +91 2692 260157
Email: araj@nddb.coop