



Pro-Poor
Livestock
Policy

Review of Household Poultry Production as a Tool in Poverty Reduction with Focus on Bangladesh and India

Frands Dolberg

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ABBREVIATIONS

Danida	Danish International Development Agency
DLS	Directorate of Livestock Services (Government of Bangladesh)
FAO	Food and Agricultural Organization
IFAD	International Fund for Agricultural Development
NGO	Non-government organisation
PLDP	Participatory Livestock Development Project
SLDP I	Smallholder Livestock Development Project I
WFP	World Food Programme

PREFACE

This is the sixth of a series of “Working Papers” prepared for the Pro-Poor Livestock Policy Initiative (PPLPI). The purpose of these papers is to explore issues related to livestock development in the context of poverty alleviation.

Livestock is vital to the economies of many developing countries. Animals are a source of food, more specifically protein for human diets, income, employment and possibly foreign exchange. For low income producers, livestock can serve as a store of wealth, provide draught power and organic fertiliser for crop production and a means of transport. Consumption of livestock and livestock products in developing countries, though starting from a low base, is growing rapidly.

The author of this paper draws on personal experience and an extensive literature review. The main focus of the paper is a review of what is known as the Bangladesh Model. Emphasising that this is not a static model, the author explains its evolution by Bangladesh’s largest NGO, BRAC, working with the government department responsible for livestock services. The main feature of the model is that the supply of inputs and services are turned into income earning opportunities for poor people. The focus is on poverty reduction, rather than on increasing the supply of eggs and poultry meat.

We hope this paper will provide useful information to its readers and any feedback is welcome by the author, PPLPI and the Livestock Information, Sector Analysis and Policy Branch (AGAL) of the Food and Agriculture Organization (FAO).

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Keywords

Pro-poor livestock policy, livelihoods, poultry, poverty alleviation.

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SUMMARY

Governments have agreed to halve the number of poor and hungry people in the world by 2015 as expressed in the Millennium Goals¹ and the search in all economic sectors is now on for ideas and experiences that can be translated into pro-poor strategies and policies. Work initiated in Bangladesh in the 1980s using very small poultry units of 5 - 10 adult birds have in recent years caught the attention of the development community. Here, a system is 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.

The aim of this paper is to review literature that relates to poverty reduction in general and which may provide indicators of process and progress when poultry, in particular, is used as a tool in poverty alleviation. The focus is on experiences from Bangladesh but survey and project work that has been undertaken in India is also examined.

It is concluded that the rationale for a pro-poor livestock policy that embraces smallholder poultry production is logical. It leads to much greater outreach to poor people than most livestock projects so far, which have tended to have a bias towards cattle. The evidence is that greater outreach leads to greater food security. People exchange high value poultry products for cereals or vegetables and marginal, but important, consumption increases are seen of food of animal origin such as milk, meat and fish. This leads to a triple benefit. Poor people take their first steps into the development mainstream, they become better nourished and the demand for animal products goes up.

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 is relevant. The work in Bangladesh is closely linked to the presence of NGOs and their capacity to reach out to poor people. 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 it is difficult to distinguish between the benefits from micro-credit and the benefits from poultry production in Bangladesh. In India, there are many NGOs that are much closer to people than the government extension services, but few of them have any poultry expertise of the type discussed in this paper. In spite of more years of experience in Bangladesh, sound knowledge of poultry production could be much better at NGO staff level.

It has not been possible to examine government policies in this paper, 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 so.

It is recommended that a survey is also undertaken in India and Nepal. In view of the mandate of the South Asia Hub of FAO's Pro-poor Policy Unit this could comprise:

(i) Government policy: in spite of a commercial poultry sector, which is strong in some of the Indian states, there are large sections of the rural population who are untouched by this. This is especially the case in the tribal areas and there is a need to identify, describe and analyse livestock strategies and policies in India at the state

¹ <http://www.un.org/millenniumgoals/>

and central level to (a) understand the policies and (b) develop proposals to exploit the potential of household poultry and other small animals in supporting and improving the livelihoods of very poor women and their families. This analysis cannot cover all states of India, but may be conducted in a comparative perspective and analyse pro-poor livestock policies in, for example, Kerala which has successfully reduced poverty, and compare those policies with less successful states that have a high incidence of poverty such as Uttar Pradesh, or large tribal population such as Orissa. It is important that the survey does not limit itself to the livestock departments, corporations or private companies, but is aware of the interdepartmental nature of the challenge. This is illustrated by the Women and Child Department's of Union Ministry of Human Resources, Government of India, which has recently announced support for a 'Backyard Poultry Project' for 10 000 women in Kerala².

(ii) Organisations with capacity to work with the poor. In India there is a large body of NGO and micro-finance experience of working with poor people on matters such as social mobilisation, awareness raising, gender and other social issues, group formation and micro-finance. Very few have experience of federating groups of very poor women, (or 'of forming federations of groups of very poor women) although it is understood that this has been done by the Dhan Foundation in South India. Similarly, few have experience of working with household poultry. There is a need to identify and analyse the experiences of such organisations to see what can be learned and what type of alliances in support of a pro-poor livestock policy can be established.

(iii) Approach and technologies. There is much field based learning behind the components of the Bangladesh Model. These skills and the knowledge to conduct these functions need to be in place for the smallholder approach to be implemented with success. There is a need to analyse which organisations can do what in India and Nepal, and the degree to which understanding, skills and knowledge exist in organisations responsible for policy, field level implementation or research and training.

In short the aim of the survey is to obtain an understanding of the policy, institutional and technology environment that is in place, or needs to be put in place, for poultry to play a role in poverty alleviation.

² http://www.poultrysolutions.com/pserv/DetailedNews?news_id=508 (September 8, 2003).

1. INTRODUCTION

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 (many millions of?) people. Often such birds are the only animals that poor people keep (table 3). 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.

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 will be presented.

2. PERCEPTIONS OF POVERTY AND GENERAL PRO-POOR POLICIES

The main purpose of pro-poor livestock policies is to make animal production contribute to the alleviation of human poverty to a greater degree than seen before and the aim of this paper is to present, briefly, established perceptions of poverty that include a gender perspective. There is a link, tacit or explicit, between general pro-poor policies, pro-poor livestock policies and the type of poultry interventions that are outlined in this paper and some characteristics of concepts are presented that influence the formulation of pro-poor policies. The aim is to present some social parameters on which we should see improvement to judge a policy to be pro-poor.

Subsequently the livelihoods framework will be described. The aim is to get closer to an identification of practical linkages between small household level poultry interventions and current development strategies.

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 Drèze, the Indian development experience in great depth in Drèze 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.

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 ³ 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

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>

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,⁴ 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% for women and men, respectively in Kerala, whereas the level at 35 and 62% for women and men in Bihar is much lower

³ The average number of children that a woman gives birth to in her lifetime, assuming that the prevailing rates remain unchanged.

⁴ Information from Population Reference Bureau: <http://www.prb.org>

and the gender difference much bigger. Practically all children (97%) in the age group from 6 to 14 years go to school in Kerala, whereas it is only 54% of the girls and 71% of the boys in Bihar. In Kerala 27% of the children are underweight while it is 54% in Bihar. Thus the salient difference between the two states is the much higher 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:

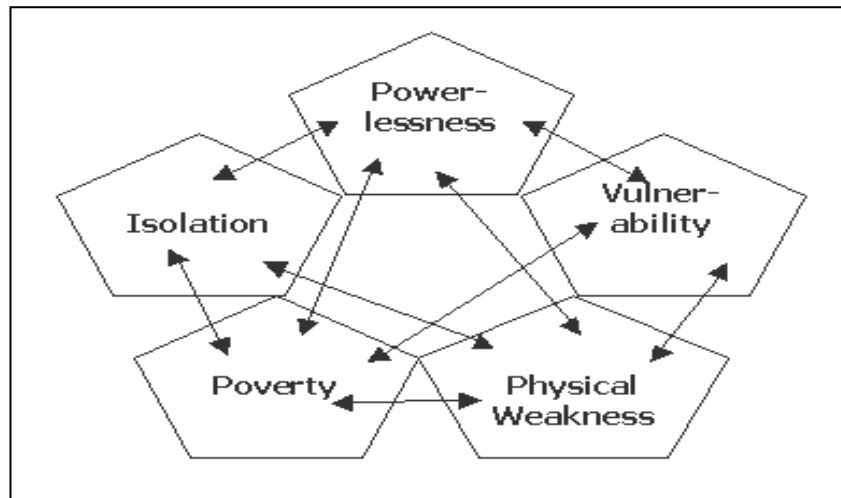
“The conclusion of many empirical studies of child development is that increased schooling of the mother is associated with larger improvements in child quality outcomes than is the increased schooling of the father. This has been studied with birth outcomes (e.g., birth weight), child survival, good 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. Nutrition aspects will be discussed below in section 3.3.

2.1 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.

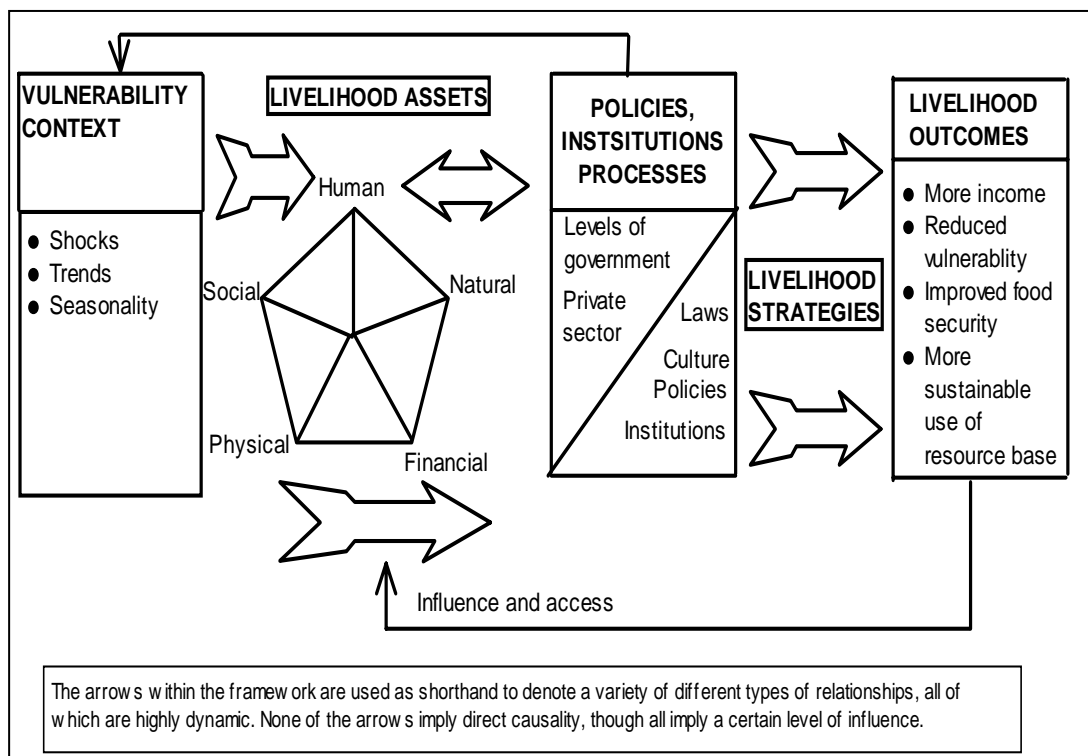
Figure 1: The deprivation trap.



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/guidance_sheets_rtf/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?

3. 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 the animals 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).

3.1 Village poultry as a tool for targeting

A 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% 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% 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.

3.2 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 (2002) and thereby begin a movement out of poverty. To document and examine this in greater detail a summary is provided in appendix 1 of some nutrition studies that have been undertaken in the livestock projects in Bangladesh. These projects, though labelled as livestock projects, have mainly been poultry projects supported by micro-credit. The assumption behind this analysis is that improved nutrition status can be interpreted as a proxy for added capabilities and improved livelihoods (see also Strauss and Thomas, 1998).

4. 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% 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.

Supporting the nutrition effect described in annex I, Seeberg (2003) reports that a large majority of the women questioned said that they now eat better. They were now able to eat three times a day and a more varied diet than before joining the project.

They listed investment in their children's education as an important achievement.

5. 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 important 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 (WFP) had entered into. Under this programme, poor families that could not provide for themselves were granted 31kg 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. An important point to bear in mind here, with reference to Ashley et al. (1999), is that designing livestock projects in collaboration with people who are so poor that they rely on WFP wheat for survival is sharply in contrast to the conventional way of formulating livestock projects. Much has been learnt from the experience.

5.1 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.net/b_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 cross-breeding 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.

5.1.1 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 systems, improved feeding methods and primary disease prevention. This was provided by the staff of the NGO and in collaboration with local staff of DLS.

5.2 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 co-ordinator, 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). There is more about research and training in section 6.4.

5.3 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 (PW). 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% 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.

5.4 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

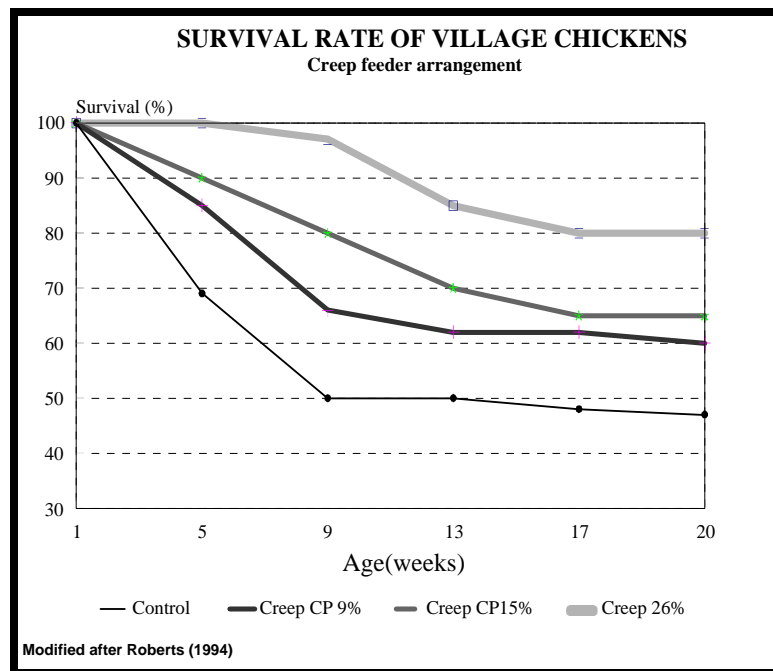
up new businesses. Later, following the realisation that the feed mixed by the trained feed sellers was not always of a sufficiently high standard, BRAC started to build its own capacity as a large scale producer of feed. By 1999, annual production from mills at Manikgonj and Nilphamari had reached 10,715 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 semi-scavenging conditions as it will clearly be uneconomic to provide supplements that the birds can scavenge. Some examples are discussed below to illustrate the point.

5.4.1 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



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% and 15% crude protein. However, with a supplement containing 26% 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.

5.4.2 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 %	207	200	159
Eggs/hen/year	154 ^a	157 ^a	103^b
Mortality %	12.3 ^a	43.9^b	19.8 ^a

Source: Rahman et al (1997)⁵. *Figures with same or no superscript in a row are not significantly different (P<0.05).*

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.

5.5 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 taka⁶ 10-12 per kg whereas a city consumer may

⁵ <http://www.cipav.org.co/lrrd/lrrd9/3bang931.htm>

⁶ Taka 58 to 1 US \$.

have to pay double that price. 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.

5.6 Supply of chicks

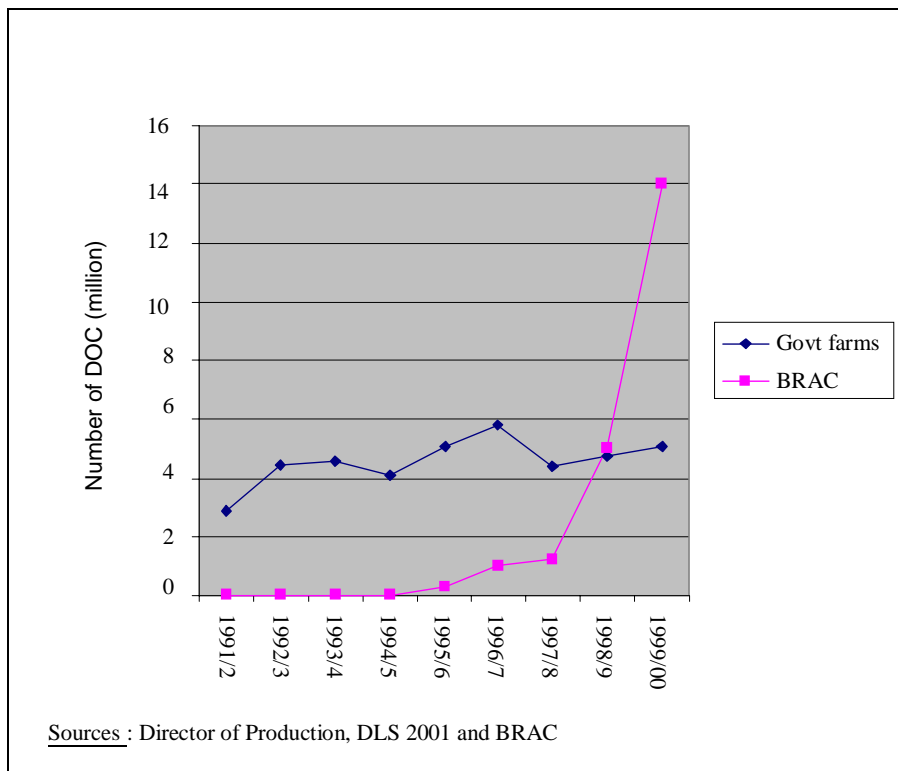
In the early 1990s BRAC made efforts to improve the supply of chicks. A new category of model rearers were created, who raise parent birds in complete confinement to produce fertile eggs for hatching. Other group members were trained and provided with additional credit to establish mini-hatcheries, that 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 culture 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



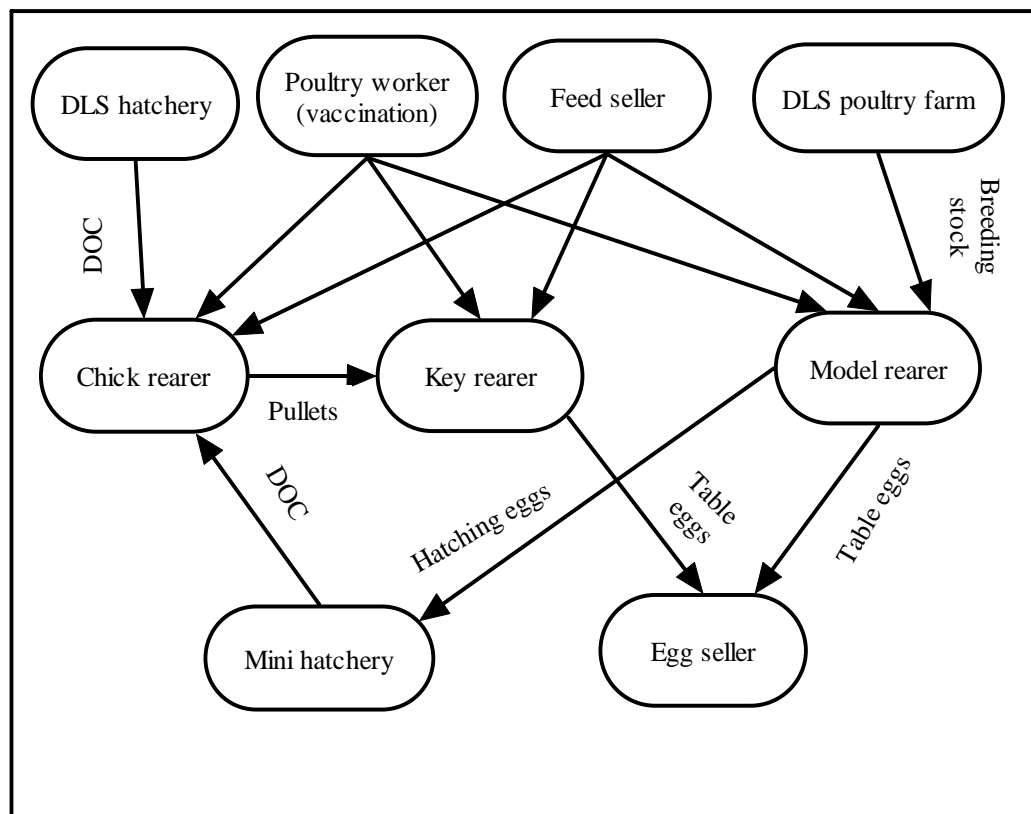
6. EVOLUTION IN THE DEVELOPMENT PROJECTS IN BANGLADESH

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.

6.1 SLDP I and PLDP

Figure 5 shows the components and linkages in the poultry model at the start of implementation of SLDP I 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.

Figure 5: The Bangladesh Poultry Model in SLDP I.



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.

6.2 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 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 subsidized 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.

6.3 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% from the veterinarians and the remaining 23% 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.

6.4 Research and training

Research and training are important forerunners for scaling up (section 5.4) and training, as well as project, programme and policy formulation should be based on sound knowledge. There has been a very 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% of the staff have a specialised livestock degree while 57% 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 agricultural 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 www.google.com 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 (www.poultry.kvl.dk), 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 projects⁷.

The student will receive taka 24,000 as stipend to be paid at the rate of taka 2,000 per month over the 12 month period of the research project. Taka 66,000 will be for research expenses, taka 6,000 will be honorarium for the supervisor and taka 4,000 honorarium for the co-supervisor. The amount allocated for research expenses may include training expenses if the student does field work in the project area. At the end of the research project they will provide SLDP II with a copy of the MSc thesis and account for all expenditures.

⁷ F. Dolberg (1991). Adding learning to a blueprint approach - or what a small amount of flexible money can do. <http://www.cipav.org.co/lrrd/lrrd3/1/dolberg.htm>

6.4.1 PLDP and SLDP II research organization

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.

7. 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.com⁸ 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.

7.1 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 practised 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)⁹ in the electronic conference organized 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.

⁸ <http://www.poultrysolutions.com/knowledge/about/product.htm>

⁹ <http://www.fao.org/ag/aga/agap/lpa/fampo1/freecom5.htm>

- 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% 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.

Prema Kumtakar (1999) and Vijay 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 - 20% of total cash income, the significance of that income was higher in landless families. Chicken mortality was particularly high in the first 40 days.

7.1.1 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 organization 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.

7.2 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 is 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 al. 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.

7.3 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 Pradesh¹⁰. 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 Foundation¹¹, which specializes 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 organizations 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.

7.3.1 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.

¹⁰ <http://www.denmarkindia.com/danida/agricul.htm>

¹¹ <http://www.dhan.org>

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 (See Recommendations).

7.4 Summary of Indian experience

Summarizing 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 poultry activities in Bangladesh*

Production	Supply	Service
Breeders	Parent stock	Village groups
Hatcheries	Feed	Training
Chicken rearers	Vaccine/medicine	Credit/saving
Smallholders	Marketing	Extension

7.4.1 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.

7.4.2 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.

7.4.3 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.

7.5 Conclusion - India

The conclusion is that in order to use poultry as a tool in poverty alleviation it will be important:

to identify organisations that have a combination of social and technical competence that can facilitate the process.

to decide what is required from research and technology and to what extent appropriate research and technology is already taking place in the country.

relating to Livestock Sector Policies at state and central government levels, to what degree do the policies constitute an enabling environment for applying the concept of smallholder poultry production as a tool in poverty alleviation?

There are practical examples to analyse. One example may be the recently announced¹² 'Backyard Poultry Project' that is to serve 10 000 women in Kerala. The project is supported by the Women and Child Department under the Government of India. Similarly, following a livestock sector review, the Government of Orissa has drafted a livestock sector policy (Government of Orissa, not dated) that states as one of its goals that the livestock sector should be used for social and economic development. In a review of the Danida supported Women and Youth Training and Extension Project in Karnataka (Danida, 2002), it was found that many women had not received, but wanted training in village poultry production (Danida, 2002, p. 12).

In such cases it is expected that the components pertaining to production, supply and services that constitute poultry activities in Bangladesh (table 5) can be used as an analytical framework for analyzing the strategies and policies of the State Governments, the Union Territories and the Central Government. In other words are the policies and strategies hindering or facilitating smallholder poultry production?

¹² <http://www.kerala.gov.in/news/30aug03.htm>

8. 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 significant, 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.

8.1 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.

8.2 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 programme 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 15 Bangladesh students at MSc level has been according to the sandwich model, where the degree is from Denmark, but the research has been conducted in Bangladesh.

9. RECOMMENDATIONS

This review may indicate that the poor women and their families for whom the smallholder poultry concept is relevant largely live in remote places that are outside the reach of most government agencies. This is not entirely true and an important assumption behind the recommendations below is that the governments at central as well as state level(s) can play important facilitating roles. Poverty reduction strategies, co-operation with donors, facilitation of financial, veterinary and production-oriented extension services whether conducted by private, NGO or government agencies, should have an impact on the rural poor. In view of the mandate of the South Asia Hub of FAO's Pro-poor Policy Unit it is recommended that a survey be undertaken in India and Nepal that could comprise:

9.1 Government policy

South Asia is home to 35% of the world's undernourished people and in spite of a commercial poultry sector in all South Asian countries, which is particularly strong in some of the Indian states, there are large sections of the rural populations who are untouched by this. This is especially so in the tribal areas and there is a need to identify, describe and analyse livestock strategies and policies in India at state and central level to (i) understand the policies and (ii) develop proposals as to how they can be improved upon to allow poultry in small units - and other small animals - to play a much stronger role in supporting and improving the livelihoods of very poor women and their families.

An analysis that covers all states in India would be a mammoth task but the severity of poverty varies from state to state in India. There may be important lessons to learn in a comparative analysis, which studies policies and strategies in states that have done comparatively well in poverty alleviation, such as Kerala, and states where a strong need for smallholder poultry interventions is seen, for example in those with a predominantly tribal population. This is the case in the newly created states Jharkhand and Chhattisgarh and in some of the North Eastern states such as Assam, Nagaland, and Mizoram. Another perspective would be to study how a smallholder approach can coexist with a strong commercial poultry sector in states such as Andhra Pradesh, Maharashtra or Tamil Nadu.

9.2 Organisations with capacity to work with the poor

There are many organisations in India, not the least NGOs, that have experience of working with poor people concerning social mobilisation, awareness raising, gender and other social issues, group formation and micro-finance. There are not so many that have experience in forming federations of groups of very poor women such as the Dhan Foundation in South India. And there are few who work with poultry as a tool for poverty alleviation. There is therefore a need to identify and analyse the experiences of such organisations as do exist.

9.3 Approach and technologies

The work that has led to the evolution of what is called the Bangladesh Model has identified a discrete number of components in production, supply and services that need to be in place and functioning (Table 5) for a smallholder approach to be implemented with success. This can be used to advantage as an analytical framework, when it comes to analysing which organisations can do what and the degree to which understanding, skills and knowledge exist in organisations responsible for policy, field level implementation, and research and training.

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A.1 Nutrition effect

Kiess et al., (2000) reported that about 50% of women of reproductive age in Bangladesh suffer from a chronic energy deficiency with a body mass index (BMI¹³) below 18.5 and that programmes to improve their nutritional status did not have a high priority. This is not only a problem for the women concerned, but society at large as it leads to the birth of many children with low birth weight (Alam et al., 1997) setting them off to a life marked by retarded growth, which in turn implies higher susceptibility to diseases, reduced school and work performances and, as adults, delivery of small children, who will tend to suffer the same problems (Onis et al., 2000). It is such a chain of events that has led Osmani and Sen (2003) to conclude that ill health can have foetal origin and that there are hidden penalties associated with gender inequality and poverty.

There have been four studies undertaken in the context of the Smallholder Livestock Development Projects (SLDP) and the Participatory Livestock Development Project in Bangladesh that include an examination of the effect on household nutrition and provide information about nutrition trends although three of them rely on a “before” and “after” comparison and suffer from not having a control group.

A.1.1 Studies in SLDP I

A summary of results from the first survey undertaken during SLDP I in Natore, Kushtia, Chuadanga and Rajshahi districts indicate a positive nutrition effect (Alam, 1997). This study covered 1000 households and was undertaken in October 1995 and the households had begun SLDP activities one to two years prior to the study. The study found the main nutrition effect to be indirect. Most of the eggs were sold and the income used to buy other food items like fish, rice, milk, beef and goat meat (Table A.1). However, improvement was also found in the consumption of eggs and chicken meat.

The increased consumption of different types of food of animal origin is important for young children and pregnant and lactating women in particular as these foods are rich sources of essential amino acids like lysine and methionine, which are found only in low levels in plant foods. The other point to make is that, as the table shows, increased income in the hands of poor people increases the demand for animal products like milk, mutton, beef, fish apart from poultry eggs and meat.

¹³ A body mass index is calculated by dividing a person weight in kg by the square of the height in meter, i.e. in this case the PLDP women’s average weight was 46.8 kg and they measured 1.51 meter in height: 46.8 divided by 1.51 x 1.51 = 20.5 (which may be at slight variance with the figure of 20.3 arrived at through calculation of the means of the individual BMIs).

Table A.1: Intake of food by households before and after inclusion in the SLDPI

	Eggs (No/week)	Chicken (No/yr)	Fish (times/ month)	Meat (times/ month)	Milk (Litre/ month)	Vegetables (times/ week)	Grain (kg/week)
Before	1.8	2.1	10.0	0.9	0.8	12.1	12.1
After	4.6	5.1	12.0	1.9	2.6	12.2	14.3

Source: Alam (1997).

A second study in the districts of Faridpur, Gopalganj, Madaripur, Jessore and Narail covering another 1000 households was undertaken two years later during June-July 1997 (Darudec and Danida, 1997) in households that had been included in the project in 1994 and 1995. It broadly confirmed the results of the first survey. In comparison to the first study the second study found an increase in consumption of vegetables and the study went deeper into who in a household got more or fewer eggs. It found that children have more eggs than adults and that, among children, the boys have more eggs than girls, and children above 5 years have more eggs than children below five. However, these trends varied with NGOs, indicating the importance of nutrition education. Households that were advised by the NGO Swanirwar had more eggs consumed by children below five. These data do suggest that more can be done to emphasize the benefits that young children of both sexes can derive from the regular consumption of eggs.

A.1.2 Nutrition studies in PLDP

First case study

Nielsen (2000) studied the impact of PLDP on food intake and nutritional status of women and girls. The study took place in Chapai Nawabganj district and included 35 PLDP women as well as a daughter of each of the women in the age range 5-12 years. 32 non-PLDP adopting women and their daughters (one for each woman) served as a control group. At the time of the study the women had been 10 months or more in the programme. The study took place during October-November 1999.

Nielsen (2000) found no significant difference in food intake between the two groups, although PLDP women and girls tended to eat more fish than the control group and this difference was close to statistical significance ($p = 0.08$ and 0.06 for women and girls, respectively). The study found that the PLDP women had a higher BMI at 20.3 than the non-PLDP women at 19.0 and this was statistically significant ($p < 0.46$), while it was close to significance for the girls ($p < 0.53$).

The study used a much smaller sample than the two studies undertaken during SLDP I. On the other hand "hard data" were collected as the women and the girls were weighed and measured as was their food on the basis of a previous 24-hour recall. A positive interpretation of the results is that participation in PLDP contributed to an increase in income, which enabled the participants to acquire more fish as in the SLDP I studies, which in turn improved their nutritional status. In terms of medium to long-term benefits it is highly relevant that a project intervention leads to higher body mass indexes in women and girls as that in turn will lead to the birth of heavier and healthier babies, which is an important pre-condition for overcoming the widespread malnutrition prevailing in countries like Bangladesh and for achieving a healthy population (Osmani and Sen, 2003).

Second case study

A second PLDP case study compares the nutrition and living standards in 19 families at the start of the project, two years later and three to four years later towards the end of the project (Nielsen, 2001 and Darudec, 2003). One significant result is that the families are now able to eat three meals rather than two or only one meal during the lean seasons and this result is seen during the first or second year.

Within the Project areas there are two lean seasons per year: February-March and again September-October. For more than half of the families, the number of meals per day was influenced by the lean and the good seasons in 1999 and at project start the families had less than three meals per day. After two years of project work in 2001, the lean seasons influenced the number of meals for only 1 of the 19 families. The 2001 study notes (Nielsen, 2001): "Several of the respondents emphasised that their children now eat eggs regularly in the morning. "

These nutrition results are in line with results obtained in studies on household level effect of micro-credit/-finance in Bangladesh (Hyder et al., 1999, Pitt et al. 2001 and Todd, 1996).

A.1.3 Limitations of the studies

It is a limitation of these studies, apart from the one reported by Nielsen (2000), that there is no control group to account for changes that are happening in the wider population at the same time. In other words, are these changes only due to the project interventions or could they be due to other changes in society? As an illustration, the ratio between rice prices and labour wages (the kg of rice that can be bought for a day's wage) from 1994/95 through 1999/2000 had ratios of 3.32, 3.33, 4.17, 3.95, 3.75 and 4.30 according to Mirza (2000), and Torlesse et al. (2003) found a strong association of household rice expenditure with child nutrition status as lower rice prices allowed the households to diversify the diet and buy more non-rice food. Yet, as noted earlier, consumption of food of animal origin is important for young children and pregnant and lactating women as this means consumption of food that is rich in essential amino acids and other important nutrients. The Helen Keller Foundation purposely promotes poultry production in its garden programmes in Bangladesh, Nepal and Cambodia as a tool to increase easily bio-available vitamin A¹⁴.

A second limitation of the studies is that they do not compare the extra benefits that may be derived from a micro-credit cum poultry project compared with a pure micro-credit project. The SLDP and PLDP studies show that they improve, apparently, the nutritional status of all household members including the children, but the question is, how much more than the pure micro-credit programmes?

¹⁴ http://hkiasiapacific.org/Resources/Downloads/bulletins_bangladesh.htm