

Small-Scale Poultry Farming and Poverty Reduction in South Asia

From Good Practices to Good Policies in Bangladesh, Bhutan and India



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Executive summary

The South Asia Pro Poor Livestock Policy Programme (SA PPLPP) has identified and documented a variety of Good Practices along the poultry supply chain in Bangladesh, Bhutan and India, from input supply to husbandry practices, from animal health service delivery to marketing of live birds and eggs. A Good Practice is defined as a mix of technology and/or institutional set-ups that has remarkable and sustainable impact on the livelihoods of smallholders. This paper reviews and draws lessons out of 11 Good Practices in small-scale poultry farming, documented by SA PPLPP, in collaboration with a variety of public and private actors, including national and state governments, NGOs and private companies. The ultimate objective is to identify gaps and opportunities to improve the current policies and the institutional framework in South Asia, which affect the livelihoods of small poultry farmers.

A large majority of rural households in South Asia keep poultry birds. In Bangladesh, about 80 to 90 per cent of rural households are estimated to keep flocks of 3 to 10 birds (Jensen and Dolberg, 2003; Dolberg, 2009). In Bhutan, a majority of rural households keep some poultry birds; and village chicken constitute approximately 86 per cent of the national poultry stock; there are only a few commercial layer farms around major urban centres (Royal Government of Bhutan, 2004, quoted in Narapati, 2007; Royal Government of Bhutan, 2006). In India, agricultural households keep about 85 per cent of the poultry stock, which are rather equally distributed among the population (Government of India, 2006a). A typical small-scale poultry farmer keeps an average flock of 1 to 9 birds, which contributes to household livelihoods in multiple ways: the sale of eggs is a regular source of income; birds are occasionally sold to make some cash to cover above-average or unexpected expenditure such as school fees or doctor's fees and medicines; the consumption of eggs and poultry meat is a valuable source of nourishment for family members; poultry litter is excellent manure and contributes to enhanced crop/fish productivity in mixed production systems; birds contribute to social and human capital and are often taken care of by women, thereby favouring an equitable allocation of resources within the household.

It is difficult to quantify the overall contribution of poultry to household livelihoods. (i) There exists a variety of production systems at the village level—including a free-range system, semi-scavenging poultry production systems, semi-intensive multiple batch broiler systems, and semi-intensive all-in all-out broiler systems. (ii) Farmers keep birds of different breeds, with different productive performance in terms of the number of eggs laid, growth rate and live weight. (iii) At any moment in time, farmers have a flock that may include day-old chicks (DOC), pullets or grown hens and a few cocks, whose overall contribution, including both monetary and non-monetary benefits, to household livelihoods is hard to measure. However, an analysis of the unique data assembled through the documented Good Practices show that small but tailored interventions in backyard production systems provide handsome returns (up to over 200 per cent per year) both in terms of monetary income and availability of animal food. These results are due to a combination of interventions that ensure: (i) a regular supply of birds, which can be supported through a small-holder-based supply chain; (ii) access to reliable veterinary supplies and animal health services, which can be efficiently provided by community based animal health workers, when appropriately selected and trained, and supported by animal health assistants/veterinarians; (iii) access to adequate feed resources, with commercially oriented, small-scale farmers willing to pay for balanced feed rations for their birds; (iv) availability of basic infrastructure, primarily, housing for birds; (v) access to reliable markets for live birds, poultry meat or eggs, which is particularly relevant for market-oriented, small-scale poultry producers.

A review of the basic elements characterizing Good Practices vis-à-vis the prevailing policy framework in South Asia concludes as follows:

- Good Practices highlight that, in backyard poultry production systems, returns to investment are higher in nondescript and indigenous poultry as compared to exotic

birds because the former are more resistant to local diseases and because of the high cost of feed for exotic birds, which are poor scavengers. Note, however, that it makes little sense for farmers to keep more than a few nondescript/indigenous birds when the scavenging base is limited because the cost of feed is higher than the expected returns, in terms of chicks, live birds, eggs and poultry meat. Some private companies in South Asia have developed dual-purpose birds, which have many of the desirable characteristics of nondescript birds but are more productive, and sell them to farmers, even in remote rural areas, making a profit. In spite of this evidence, governments in Bangladesh, Bhutan and India show a preference to distribute, under a variety of programmes and schemes, exotic birds to small farmers, often free of charge. These policies make sense when medium- to large-scale broiler or layer farms are to be established, which are characterized by high volumes and low-profit margin per bird, and when farmers have regular access to DOC, animal health services and to a reliable market for live birds and poultry products, which is rarely the case in rural areas. If the objective is to reduce poverty and increase food security, distribution of local breeds or improved birds may be a more effective strategy.

- Good Practices highlight that animal health services and veterinary supplies can be delivered at farmers' doorsteps on a sustainable basis, typically through the services of trained animal health workers. In Bangladesh, the government has been collaborating with a variety of NGOs to train a number of 'poultry vaccinators' to provide animal health services to farmers in rural areas but the focus is mainly on areas where the so-called Bangladesh poultry model—an integrated package of support aimed at establishing small-holder-based, self-sustainable poultry supply chains—has been implemented, so far only in some areas of the country. In Bhutan and in India—with the exception of a few states such as West Bengal—animal health services are provided by government veterinarians and animal health assistants free of charge but inefficiencies loom large and only a minority of farmers, typically those living close to towns, are able to access those services. In addition, veterinarians and animal health assistants tend to focus on large ruminants, providing, for example, artificial insemination and vaccinations to dairy cattle, and disregard poultry birds. Some institutional changes in the way animal health services are provided, including a focus on public-private partnership (animal health workers) and on market functioning (farmers are willing to pay for good services) may improve the coverage and quality of services although political economy issues are likely to make such reforms particularly challenging (for example, veterinarians may oppose the institutionalization of animal health workers).
- Good Practices suggest that small changes in husbandry practices such as adding crushed snail shells to poultry feed or building small wooden shelters for birds have little, if any, cost for farmers, and generate positive returns in terms of reduced bird mortality, increased eggs laid and live weight of adult birds. In Bhutan and India, whereas policy makers consider feed quality and availability a major issue for poultry farmers, current programmes and schemes tend to prioritize feed for large ruminants over monogastrics. However, both governments recognize the importance of making use of locally available material to improve feed quantity and quality, and Bhutan has already been experimenting with some new types of fodder (for ruminants). In Bangladesh, so-called feed sellers, trained and supported by the government and NGOs, travel the countryside to sell appropriate feed rations to poultry farmers although they mainly serve farmers who participate in the Bangladesh poultry model. In general, the current system of livestock extension in South Asia, which is government-driven in Bangladesh, Bhutan and India, only reaches a minority of farmers and the extension staff is rarely trained to provide advice on small-scale poultry farming practices. Governments are attempting to enhance the quality and quantity of extension services, which is critical to also support backyard and small-scale poultry farming but the focus on poultry is still very limited.

- Good Practices suggest that marketing of birds and eggs is rarely an issue for backyard poultry farmers whereas access to a reliable market becomes critical for small-scale, market-oriented poultry producers. The governments of Bangladesh, Bhutan and India are investing both in infrastructure and marketing information systems for agriculture and, in Bhutan, on the establishment of small-size egg production and marketing cooperatives. However, information on prices for eggs and poultry meat is not a priority in the current marketing systems, and only when marketing policies are complemented by productivity-enhancing interventions are there chances of effectively supporting the development of small-scale, market-oriented poultry farmers. In the medium- to long-term, governments should continue investing in market-related public goods, that is, information and infrastructure, and should also endeavour to better integrate poultry into their marketing policies and programmes; for selected areas, integrated interventions could be considered, in order to support the establishment of small-scale, market-oriented poultry farming.

Overall, Good Practices provide evidence that backyard and small-scale, market-oriented poultry farming contribute to farmer livelihoods significantly, in terms of food, cash and as a buffer stock, and that often minor changes in technical and institutional dimensions generate handsome returns for farmers. However, the current policy framework in South Asia, whilst not anti-poor, does not help farmers make profitable use of their few poultry birds: there is a focus on exotic poultry breeds, which do not thrive well in rural areas; inadequate animal health and extension services, which either do not reach the poor or tend to focus on ruminants and advanced technologies; and marketing strategies that are often disconnected with production and productivity issues limit the contribution of poultry to household livelihoods.

Changes in the current policy and institutional setting such as an increased focus on nondescript birds and the inclusion of poultry in the current system of animal health services will definitely enhance the contribution of poultry to farmer livelihoods, thereby reducing poverty and increasing food security. However, political economy issues and institutional rigidities may thwart any attempt to revamp the current policy framework. For instance, policy makers may be unwilling to invest public resources in backyard poultry farming because despite positive returns to investments, benefits to smallholders are difficult to measure; veterinarians may oppose the institutionalization of community animal health workers on the assumption that this would make it unprofitable for them to work in rural areas; governments in South Asia have made major investments in producing and distributing exotic and/or improved DOC/pullets to rural dwellers; changing the current organizational structure may be costly and demanding. Moreover, livestock extension agents have traditionally focused on large ruminants, and changes in their work cultures are not achieved overnight.

Good Practices documented by SA PPLPP provide evidence that targeted investments in small-scale poultry farming can be both good economics and good policy. These may contribute to refurbishing the current policy and institutional framework in Bangladesh, Bhutan and India so as to enhance the contribution of poultry farming to the livelihoods of a large share of rural households.

1. Introduction

SA PPLPP is a joint initiative of the National Dairy Development Board, India (NDDB) and the Food and Agriculture Organization of the United Nations (FAO), in partnership with the Bangladesh Rural Advancement Committee (BRAC), the Department of Livestock Services (DLS) of the Royal Government of Bhutan and BAIF Development Research Foundation, India. The Programme's aim is *'to ensure that the interests of poor livestock keepers are reflected in national as well as international policies and programs affecting their livelihoods'* (www.sapplpp.org).

SA PPLPP builds on the evidence that, in South Asia, a region in which a large share of the poor are livestock dependent and the demand for animal source food is fast-growing, the potential contribution of livestock to poverty reduction and food security has remained largely untapped to date; and on the assumption that policies and programmes that are evidence-based and inclusive are the most likely to nurture the growth of the livestock sector, which is both fast and equitable (Ali, 2007; Otte et al., 2009). In cooperation with a variety of local actors, including NGOs, state and national governments, universities, and some private companies, SA PPLPP has been identifying and documenting field experiences that have a remarkable and sustainable impact on farmers' livelihoods—called Good Practices—in three major livestock-related domains, namely small-scale poultry farming; goat and sheep production systems; and the inter-linkages and dependence of livestock production systems on common lands. The objective is to infer lessons and recommendations from field experiences, to help policy makers take informed decisions and elaborate livestock-related policies and institutional changes that effectively benefit livestock-dependent poor.

The present document draws key lessons out of the Good Practices documented in small-scale poultry farming and endeavours to identify gaps/recommend changes in poultry-related policies and programmes in Bangladesh, Bhutan and India. In a few cases, specific policy reforms in the poultry sector are advocated for whereas, in a majority of instances, changes in the broader livestock sector policy and institutional framework are recommended, poultry being a sub-component of livestock.

The next section reviews the broad linkages between poultry sector development and poverty reduction in South Asia. Section three and four briefly introduce the Good Practices documented by SA PPLPP and highlight the positive returns to investment in small-scale poultry farming. Section five draws some lessons out of the identified Good Practices. Section six reviews the identified lessons against the prevailing poultry-related policy framework in Bangladesh, Bhutan and India, and proposes some changes in the current policy and institutional scenario, which are anticipated to benefit small-holder poultry rearers. Section seven summarizes the main findings and draws some conclusions.

2. Poultry and poverty reduction in South Asia: The macro picture

2.1 Agriculture, livestock and poverty reduction

In the last two decades, South Asian economies have been growing at an average rate of over 6 per cent per year, with gains in real per capita income ranging from 2.5 to 5 per cent per annum. Structural transformations have been occurring in the economies of Bangladesh, Bhutan and India, with the industry and service sectors now contributing the most to gross domestic production (GDP) and agriculture accounting for about 20 per cent of the GDP. Changes have also been occurring within the agricultural sector, with fruits, vegetables, fish, meat and dairy products gaining some importance. These shifts are accounted for by policy interventions and technological advancements on the supply side and by a burgeoning demand for high-value agricultural products by increasingly affluent consumers. The livestock sector, the focus of SA PPLPP's work, today accounts for about 15 per cent of the agricultural GDP in Bangladesh and Bhutan, and for about 32 per cent in India. (FAO, 2010a; World Bank, 2010)

Table 1: Economic and Social Indicators—Bangladesh, Bhutan and India

	Bangladesh		Bhutan		India	
	1987	2007	1987	2007	1987	2007
Population (in millions)	108.1	157.8	0.51	0.67	798.7	1,123.3
Urban (%)	18	27	14	33	25	29
Rural (%)	82	73	86	67	75	71
GDP (in US\$ billions)	23.8	67.7	0.26	1.1	276.0	1,124.7
Industry (%)	20.8	28.5	25.7	42.9	26.3	29.4
Services (%)	46.8	52.6	36.6	36.3	44.3	52.8
Agriculture (%)	32.4	18.6	37.7	20.9	29.4	17.8
<i>Livestock in agriculture (%)</i>	<i>11.8</i>	<i>14.4</i>	<i>24.7</i>	<i>16.3</i>	<i>28.4</i>	<i>31.9</i>
GDP per capita (US\$)	220	429	510	1,641	346	1,001

Sources: FAO, 2010a; World Bank, 2010.

Agriculture remains a critical component of South Asian economies: it accounts for about 20 per cent of GDP; it supplies food to a growing urban population; its growth is a pre-condition for reducing poverty levels because poverty incidence and poverty density are the highest in rural areas and the largest majority of poor households depend on agriculture for their livelihoods, either directly or indirectly (FAO, 2009; World Bank, 2008).

South Asian governments appreciate the overall importance of investing in agriculture to reduce poverty. The 2005 National Strategy for Accelerated Poverty Reduction of Bangladesh reads: *'accelerating growth and bringing a pro-poor orientation in the growth process would be achieved through emphasizing four priority areas: (i) accelerated growth in rural areas and development of agriculture and non-farm economic activities'* (Government of Bangladesh, 2005, p. xii) The Bhutanese Tenth Five Year Plan (2008–13) urges that: *'the overall macro-strategy of the Tenth Plan for poverty reduction will include promoting economic opportunities through broad-based growth and boosting critical sector such as agriculture and rural industries and enterprises that are important for the poor'* (Royal Government of Bhutan, 2009a, pp. 23–24). The Eleventh Five Year Plan (2007–12) 'Inclusive Growth' of the Government of India contends that: *'for growth to be at all inclusive, the agricultural strategy must focus on the 85 per cent of farmers who are small and marginal, increasingly female, and who find it difficult to access inputs, credit, and extension or to market their output'* (Government of India, 2008, p. 8).

Table 2: Urban and Rural Poverty in Bangladesh, Bhutan and India

	Bangladesh	Bhutan	India
	Survey Year: 2000	Survey Year: 2006	Survey Year: 2004–05
Total (%)	49.8	23.2	27.5
Urban (%)	36.6	1.7	25.7
Rural (%)	53.0	30.9	27.5
Urban (mio)	12.2	0.04	82.4
Rural (mio)	82.4	0.14	220.3

Source: World Bank, 2010

The capacity of agriculture to contribute to poverty reduction does not only depend on the overall rate of growth, but also on the ability of poor households to participate in that growth, that is, on the quality or inclusiveness of the growth process. Keeping this perspective, investing in small-scale farming is an effective strategy to sustain an inclusive growth of the agricultural sector because small farmers and the landless represent a large share of rural households in South Asia. In Bangladesh, according to the latest census on agriculture, there are almost 12 million farms, of which about 80 per cent are smaller than 1 ha and less than 3 per cent are larger than 3 ha (BBS, Bangladesh Bureau of Statistics, 1996). In Bhutan, the average farm size is 1.4 ha; in particular, about 14 and 56 per cent of farms are smaller than 0.4 ha and in the 0.4–3 ha size, respectively (Togbay, 2005). In India, small (1 ha–2 ha) and marginal (0.002–1 ha) farms account for 82 per cent of all holdings, and only 6 per cent of all farms are larger than 6 ha (Government of India, 2006b).

A variety of policies and programmes can be designed and implemented to support the growth of smallholder agriculture, including on-farm, off-farm and non-farm interventions. Given past and projected trends in the demand for animal protein in South Asia - according to Rosegrant et al. (2001), the demand for meat will increase from 7.3 to 15.8 million tonnes between 1997 and 2020; that for eggs from 2.1 to 4.5 million tonnes; and that for milk from 97 to 198 million tonnes—targeted investments in the livestock sector appear promising to nurture a pro-poor, market-oriented and sustainable growth of agriculture. As of today, governments in South Asia have successfully invested resources for an inclusive development of the dairy sector—the Operation Flood in India is recognized worldwide as an exemplary programme able to sustain a smallholder-based growth of the dairy sector (Cunningham, 2009)—but have largely neglected other sub-sectors of livestock, whose growth could also contribute to accelerated poverty reduction.

2.2 Small-scale poultry farming and poverty reduction

There is evidence that investments in small-scale poultry farming generate handsome returns and contribute to poverty reduction and increased food security in regions where a large share of the population keeps some poultry birds (Jensen and Dolberg, 2003; Mack et al., 2005; Pica-Ciamarra and Otte, 2010). This is the case for South Asia. In Bangladesh, about 80 to 90 per cent of rural households are estimated to keep flocks of 3 to 10 birds; there are a total 120 thousand commercial broiler and layer farms, of which most are of small size (only about 4 per cent of the broiler farms rear more than 3,000 birds) (Jensen and Dolberg, 2003; Dolberg, 2009). In Bhutan, a majority of rural households keep some poultry birds, and village chickens constitute approximately 86 per cent of the national poultry stock; there are only a few commercial layer farms around major urban centres (Royal Government of Bhutan, 2004, quoted in Narapati, 2007; Royal Government of Bhutan, 2006). In India, about 85 per cent of the poultry stock is kept by relatively small farms (Government of India, 2006a). Statistically, a landless/marginal/small-scale Indian poultry keeping household keeps an average flock size of 8 to 9 birds; at the same time, there are some large commercial producers, who contract a number of relatively well-off poultry farmers to rear DOC and directly run capital-intensive and labour-saving hatcheries, feed mills, slaughter and processing plants (Government of India, 2006a; Mehta and Nambiar, 2007).

Table 3: Poultry and Rural Households in Bangladesh, Bhutan and India

Country	Total Poultry Population (1,000)	Local Birds/Total Flock (%)	Rural Households Keeping Birds (%)	Output from 'Small' Farms (%)	Average Flock Size (no.)
Bangladesh	2,42,700	90	80–90	80	3–10
Bhutan	230	74	63	n.a.	2–2.5
India	6,56,000	54	n.a.	43	1–9

Sources: Government of India, 2006a; Jensen and Dolberg, 2004; Dolberg, 2009; Royal Government of Bhutan, 2004 and 2006.

Governments in South Asia recognize that increasing the productivity of small-scale poultry farms can contribute to alleviating poverty and reducing malnutrition on a broad scale.

In Bangladesh, the 2007 National Livestock Development Policy recognizes that: *'the livestock sub-sector that includes poultry offers important employment and livelihood opportunities particularly for the rural poor, including the functionally landless, many of whom regard livestock as a main livelihood option'* (p. 1) [...] *'poultry keeping emerges as promising to offer substantial growth potentials with a positive impact on nutrition, employment and poverty alleviation'* (p. 4). The first two priorities of the *'Policy framework for poultry development'* include: *'(1) Successful pro-poor models would be replicated for semi-scavenging poultry development; (2) formation of poultry smallholder groups, community based organizations, and producers associations would be facilitated'* (p. 9).

The Tenth Five Year Plan (2008–13) of the Royal Government Bhutan notices that: *'There is [...] considerable potential for expanding livestock production beyond subsistence levels in view of the sizeable demand within the domestic market, particularly in peri-urban areas and certain districts. In view of this potential for enhancing both income generation capacity and the nutritional and dietary status of the population, the programme will continue to focus on creating an enabling environment to boost livestock production'* (p. 45). It stipulates that: *'a generic pro-poor livestock development framework will be formulated accordingly and implemented to address poverty alleviation. This will target the poorest of the poor and concentrate on improving livelihoods of marginal communities in remote areas'* (p. 46); [...] *'providing access to market for livestock products and the formation of farmers groups will be employed as major strategies to boost livestock production in rural areas'* (Royal Government of Bhutan, 2009a, p. 46). The Plan allocates resources for supporting egg production by small-scale farmers and farmer groups in 16 out of the 20 *dzongkhags* (districts) in the country.

The 2008 India National Livestock Policy (Final Draft) recognizes that: *'the potential of developing and building rural poultry production has not been fully tapped. It is important to note that rural low-input poultry production system contributes substantially to nutritional requirement of rural populace and supplements their income'* (p. 18). [...] *'since livestock production depends heavily on small holdings, priority shall be accorded to study the problems of small farms and develop packages of practices to maximize animal productivity per unit of land'* (p. 17). It also aims to: *'encourage livestock production and development through small holders with low input system to enhance supplementary income to rural farmers; to encourage establishment and growth of independent, self-sustainable and financially viable private production units; and to enhance participation of women in livestock development'* (p. 14).

The broad policy framework in South Asia seems, therefore, conducive to smallholder based poultry development. However, broad-scale poultry sector policies and programmes, which effectively support the development of small-scale poultry farming, largely remain to be designed and implemented.

3. Good Practices in small-scale poultry farming

SA PPLPP has identified and documented 11 Good Practices in small-scale poultry production systems. Table 4 provides a snapshot of the documented Good Practices in backyard and small-scale market oriented poultry production systems.

Table 4: Good Practices in Small-scale Poultry Production Systems in South Asia

Good Practice: SA PPLPP Code and Title	Interventions
SAGP05: A government-led Integrated Approach for Delivery of Services to Smallholder Poultry Farmers (Chhattisgarh, India)	 <p>The Bastar Integrated Livestock Development Project (initially supported by DANIDA and, later, the Government of Chhattisgarh) has promoted the establishment of a network of village facilitators, who deliver animal health services at smallholders' farm gates on a cost-recovery basis. Self-Help Groups (SHGs) have been established to facilitate the dissemination of knowledge and access to micro-credit for small-scale investments in poultry.</p>
INGP04: Enhancing Livelihoods of Tribals through Niche Market Opportunities (Madhya Pradesh, India)	<p>The state government and BAIF Development and Research Foundation have supported the introduction of the Kadaknath indigenous breed, the only black meat chicken breed available, in new areas in India. The livelihood of farmers has improved because the Kadaknath fetches a higher market price than traditional breeds, and the bio-diversity has been preserved.</p> 
SAGP03: Making Modern Poultry Markets Work for the Poor (Madhya Pradesh and Jharkhand, India)	 <p>PRADAN (an NGO) has supported the establishment of small-scale poultry cooperatives. Beneficiary women are trained to rear broilers in sheds built on their homesteads; the cooperatives provide them a variety of services, including animal health services and marketing support. Each member rears up to 300 birds in a batch; seven to eight batches can be reared and sold each year; net income per batch was over Rs 1,900 (~ US\$ 43 in 2008).</p>
SAGP10: Replicas of Native Chicken in Rural Poultry Production (Maharashtra and other states, India)	<p>Yashwant Agritech Pvt. Ltd. has developed two synthetic replica birds of indigenous chicken, one for meat and one for eggs. These birds, which are more productive than indigenous breeds, are sold with a profit, both to small-scale poultry farms (50 to 2,000 birds) and to backyard poultry keepers (10 to 15 birds), thus providing a supplementary source of income to female farmers.</p> 
SAGP25: Unpacking the 'Poor Productivity' Myth (Andhra Pradesh, India)	 <p>Anthra (an NGO) supported 1,800 women in East Godavari, Andhra Pradesh, to facilitate in-situ conservation of indigenous poultry breeds; the programme led to a remarkable reduction in poultry mortality, tripled financial benefits from poultry rearing and encouraged diversification of agricultural activities.</p>

SAGP11: Backyard Poultry Farming through SHGs in West Bengal
(West Bengal, India)

The Government of West Bengal has started the distribution of poultry birds to poor rural households through SHGs. A one-day training is given to all beneficiaries before chicks/ducklings are distributed; two women members in each SHG are given a seven-day training in brooding, to ensure self-sustainability of the programme. Beneficiaries of the programme benefit in terms of both monetary income and availability of animal proteins.



SAGP01: Linking Business with Pro-Poor Development
(West Bengal and Other States, India)

Keggfarms Pvt. Ltd. has developed the Kuroiler, a dual-purpose, multi-coloured, hardy, village bird, capable of producing over 150 eggs a year and achieving a marketable body weight in 8 weeks in open range conditions. Through an innovative smallholder-based supply chain, the company is able to sell, for a profit, the Kuroiler to the poorest segments of the rural population.



BDGP01: Mitigating Diseases and Saving Valuable Assets
(Bangladesh)



Following a 20-year Government-NGO collaboration, livestock health services in Bangladesh, which used to be highly centralized, are currently provided by about 19,900 poultry vaccinators, who provide vaccination services, extension services and disease surveillance in the

remotest areas of the country. Vaccinators are self-employed and charge market rates from poultry farmers for their services.

BDGP02: Sustainable Livelihoods for the Rural Poor through Small-scale Poultry Rearing
(Bangladesh)

BRAC (an NGO) has supported the establishment of a smallholder-based poultry model including breeders, mini-hatcheries, chick rearers (rearing 200–300 DOC), key rearers (rearing 5 pullets), poultry vaccinators, feed sellers and egg collectors. The model is self-sustainable because each agent derives benefits from its poultry-related activity, in terms of increased income, consumption of animal food and empowerment of women.



BDGP03: Combating Bird Flu through Bio-security Measures at Farm and Community levels
(Bangladesh)



In Bangladesh, simple bio-security measures, designed through a public-private partnership and fully agreed upon by local communities have proved effective in containing outbreaks of the highly pathogenic avian influenza (HPAI) in some parts of the country.

BDGP04: Lighting up Lives—Biogas from Poultry Litter as a Sustainable Energy Source
(Bangladesh)

The Bangladesh Association for Social Advancement (BASA) has designed small-scale biogas plants that produce manure and gas from poultry litter (thereby reducing environmental pollution). The relatively small investment costs, which are recovered within an average time span of three years, and the immediate monetary benefits to farmers, in terms of reduced expenditure for purchasing fertilizers and fuels, have been favouring the up-scaling of poultry litter-based bio-gas plants throughout the country.



4. Poultry, income and food security: Evidence from Good Practices

4.1 Measurement issues

Good Practices show that chicken birds contribute to household livelihoods in multiple ways. The sale of eggs is a regular source of income; birds are occasionally sold to make some cash to cover above-average or unexpected expenditure such as school fees for children or doctor's fees and medicines; the consumption of eggs and poultry meat is a valuable source of nourishment for family members because animal foods are energy-dense and good sources of protein and micronutrients; poultry litter is an excellent manure and contributes to enhanced crop/fish productivity in mixed production systems; birds contribute to social and human capital, playing a role in social events (for example, marriages, religious festivals, cockfights) and are, most likely, taken care of by women, thereby favouring an equitable allocation of resources within the household.

To give some numbers, in Bangladesh, and in the states of Orissa, Uttar Pradesh and West Bengal in India, backyard poultry systems contribute between US\$ 30 to US\$ 65 to annual household income, vis-à-vis rural poverty lines ranging between US\$ 8 and US\$ 10 per month (Government of India, 2007; Islam and Jabbar, 2005; Subrahmanyam and Murthy, 2006; Rao and Reddy, 2002; Zeller and Johannsen, 2006). In remote rural areas, where livestock food items are not regularly available in markets, family produced meat and eggs contribute about 20–30 per cent to the total supply of animal proteins, taking second place to dairy products (Sonaiya and Swan, 2004). Among animal products, which are by and large substitutable in human diet, the input-output ratio for poultry is most favourable: the Government of India reports that when appropriate feed is given to animals, chicken (both meat and egg) gives more protein than swine, cow milk, beef and mutton (Government of India, 2005). Poultry litter can compete economically with commercially available fertilizers: in Bangladesh, with an investment of about US\$ 300 to construct a bio-gas plant to digest poultry litter and produce energy, rural households could earn an income of about US\$ 15 per month (SA PPLPP, 2009a).

Despite all evidence, it is difficult to measure the overall contribution of poultry to household livelihoods for a number of reasons:

- There exists a variety of poultry production systems at the village level, depending on flock size and input-output relationships, which contribute differently to income and food security. (i) The free-range system of poultry production, whereby one to a dozen local birds or so scavenge all day long and are kept in bamboo baskets or in the house at night, is most common in rural and tribal areas and requires minimal, if any, use of land, labour and capital. This system is self-sustainable inasmuch as eggs are hatched by broody hens. (ii) In semi-scavenging production systems, birds (often improved) scavenge all day long but are also regularly fed with some compound feed, thereby recording higher productivity than purely scavenging birds in terms of numbers of eggs laid and growth rate. (iii) In semi-intensive multiple-batch broiler systems, batches or a few dozen improved DOC or pullets are bought at irregular intervals and reared to appropriate market weight before being sold. Investments in a poultry house, feeders, waterers as well as vaccines and compound feed are necessary in this system. (iv) In semi-intensive, all-in all-out broiler systems, batches of a few hundred DOC are bought at regular intervals and raised on farm premises, which are cleaned and disinfected to receive each new batch of broilers. Inputs in the form of proper shelters, feeders and waterers, commercial feed and vaccines are critical for such a business to thrive.
- Poultry flocks include birds of different breeds, with different productive performance, in terms of the number of eggs laid, growth rate and live weight. (i) In free range production systems, nondescript native breeds are usually reared. These birds possess genes that are well adapted to local conditions, that is, well resistant to diseases and stress conditions, but their production performance is low (for example, they lay about 40–60 brown eggs per year). (ii) Indigenous pure breeds such as the Kadaknath, the

Aseel and the Naked Neck are also raised in backyard production systems and are relatively well resistant to diseases. These breeds, which are reasonably productive, are raised both because they fetch a higher market price than local birds (the meat is of better texture, the eggs are tastier) and for socio-cultural reasons (for example, in cockfights). (iii) Improved breeds of birds such as the Sonali, the Giriraja and the Kuroiler are often found in semi-scavenging systems. These breeds have been developed by private companies or public research institutes; they have many of the desirable characteristics of local birds (for example, multi-coloured plumage, long legs to escape predators and they lay tan coloured eggs) but are more productive, both in terms of number of eggs laid, growth rate and live weight. (iv) Exotic birds, raised by industrial commercial farms and integrators, are hybrid broiler or layer strains evolved out of three- or four-way crosses by breeding companies, often in industrialized countries, and are highly productive.

- At any moment in time, farmers have a flock that may include DOC, pullets or grown hens and a few cocks, whose overall contribution to household livelihoods is hard to measure. The mortality rate in birds as well as egg spoilage is variable, and birds are not marketed at any definite age (that is, they may be sold for meat from 6 months to over two years of age) and, even though farmers prefer selling birds when they fetch the maximum price (namely, during festival seasons), birds are also sold to meet unexpected expenditure, such as medical fees. The contribution of eggs and meat consumption to household nutrition depends on the ability of family members to employ appropriate processing/cooking techniques as well as on their overall health status (for instance, uncooked poultry meat may be the culprit of diarrhoea, which in turn reduces the efficiency of the body to absorb nutrients). The cost of birds and other inputs are difficult to measure: barter exchange, the value of supplemental feed (for example, broken rice) given to birds—which may also have nutritional value for family members, the existence of alternative employment opportunities, the availability of local material to build shelters, etc., all influence the investment and running costs of poultry enterprises. Finally, the social value of birds such as their contribution to women's empowerment and to family social prestige is hard to quantify. In sum, the value of a bird depends on both exogenous and household-specific characteristics, and is often state-contingent.

4.2 The economics of backyard and small-scale poultry farming

Using data extracted and elaborated from the Good Practices documented by SA PPLPP, the tables below provide comparable data on the economics of different poultry enterprises. Tables 5 and 6 present the economics of one hen, either a local or an improved bird, in scavenging and semi-scavenging systems before and after a 'Good Practice' is implemented. Table 7 displays the economics of small-scale layer (10 birds) and broiler (10 birds) farms as well as the economics of one commercial broiler farm (400 birds). Data were not available for investment and labour costs, which though are negligible in scavenging and semi-scavenging poultry farms.

Several evidences emerge from the tables.

- Returns on a one-year investment in one single hen in scavenging and semi-scavenging systems are handsome, averaging about 285 per cent and providing an average annual net income of about US\$ 40 in India, that is, about 34 per cent of the national rural poverty threshold. These include eggs laid and consumed/sold, chicks hatched and birds consumed and sold.
- In backyard production systems, investments in nondescript and indigenous birds, such as the Aseel and the Kadaknath, provide higher returns than investments in exotic ones, because of the high cost of feed for exotic birds (which are not good scavengers) and the lower market price of exotic meat and eggs (which are not preferred by rural consumers).

- A before/after comparison shows that 'Good Practices' in backyard production systems have increased the contribution of poultry birds to household income and food security. For example, following the implementation of the Good Practice in Bastar district of Chhattisgarh, the net income per hen/yr has increased from US\$ 22.5 to US\$ 51; in Barwani district of Madhya Pradesh, the average number of eggs laid per hen has increased from 50 to 84. However, Good Practices are not associated with definite improvements in returns to investments because increased bird weight, reduced spoilage of eggs and lower mortality of birds are often due to increased use (and cost) of inputs, primarily feed and medicines.
- The larger the flock size, the smaller the return on investments and the profit per bird, most likely because of the growing feed and animal health costs, which are minimal, if any, in backyard poultry farming system. In effect, commercial and semi-commercial poultry enterprises are characterized by high-volumes and low-profit margins per bird. The implication is that backyard and small-scale poultry farms are viable enterprises only as far as the scavenging base is sufficient to feed the birds.
- Keeping a few exotic birds makes little economic sense because it is more profitable to raise a few nondescript or indigenous birds that can thrive almost on their own. At the same time, when the scavenging base is limited, it is sounder to keep just one or a few local birds rather than a flock of say ten local hens because the cost of additional feed will be higher than the returns from the hens.
- Small-scale broiler and layer farms represent good investment opportunities, with average returns definitely above 100 per cent. However, initial costs of DOC or pullets, feed and vaccines may be unaffordable for the majority of farmers, and some financial assistance is needed.

Table 5: Hen Economics in Traditional Scavenging and Semi-scavenging Systems in South Asia*

Year Country Breed	2007 India/West Bengal/ Murshidabad <i>Desi</i> /Nondescript			2007 India/West Bengal/ Jalpaiguri <i>Desi</i> /Nondescript			2007 India/Madhya Pradesh/ Barwani <i>Desi</i> /Nondescript			1998 India/Andhra Pradesh/East Godavari Indigenous/Aseel			2000 India/Chhattisgarh/ Bastar <i>Desi</i> /Nondescript		
	No.	Unit Value (Rs)	Total Value (Rs)	No.	Unit Value (Rs)	Total Value (Rs)	No.	Unit Value (Rs)	Total Value (Rs)	No.	Unit Value (Rs)	Total Value (Rs)	No.	Unit Value (Rs)	Total Value (Rs)
Revenues	Eggs laid	46		53			50			36			35		
	Eggs spoiled	6		6			15			12			10		
	Eggs sold/consumed	25	2.5	62.5	34	2.5	85	15	3	45	-		3	3	9
	Chicks hatched	15		13			20			24			22		
	Dead birds	4		3			5			7			16		
	Cocks sold/consumed	5.5	60	330	5	61	305	7.5	150	1,125	8.5	200	3	200	600
	Hens sold	5.5	60	330	5	61	305	7.5	120	900	8.5	100	3	200	600
	Gross Income		722.50			695			2,070			2,550			1,209
Costs	Hen	1	60	60	1	61	61	-	-	1	150	150	1	200	200
	Feed per bird	12	2.2	26.4	11	7.7	84.7	16	30	480	18	41	738		
	Health care per bird	12	5.9	70.8	11	5.2	57.2								
	Total Cost		157.2			202.9			480			888			200
Benefits	Net Income		570.3			492.1			1,590			1,662			1,009
	(2008 prices)		(612)			(528)			(1,706)			(2,570)			(1,452)
	Return on investment (%)		374.7			242.5			331.3			187.2			504.5
	Net income/Rural poverty line (%)		10.9			9.4			30.3			31.6			19.2
	Eggs available/ Recommended intake (%)		34.7			47.2			25.0			0.0			5.0

* 1 Rs = 0.023 US\$ (2008)

Table 6: Hen Economics in 'Good Practice' Scavenging and Semi-scavenging Systems in South Asia*

Year	2008			2008			2008			2008			
Country	India/Madhya Pradesh/ Barwani			India/Andhra Pradesh/East Godavari			India/Chhattisgarh/ Bastar			India/West Bengal/Howrah			
Breed	Indigenous/Kadaknath			Indigenous/Aseel			Desi/Nondescript			RIR/Exotic			
	No.	Unit Value (Rs)	Total Value (Rs)	No.	Unit Value (Rs)	Total Value (Rs)	No.	Unit Value (Rs)	Total Value (Rs)	No.	Unit Value (Rs)	Total Value (Rs)	
Revenues	Eggs laid	84		45			35			159			
	Eggs spoiled	25		6			2			29			
	Eggs sold/consumed	20	4.5	90			8	3	24	109	4	436	
	Chicks hatched	39			39		25			21			
	Dead birds	6			7		12			6			
	Cocks sold/consumed	16.5	250	4,125	16.5	250	4,125	6.5	200	1,300	7.5	150	1,125
	Hens sold	16.5	150	2,475	16.5	140	2,310	6.5	200	1,300	7.5	150	1,125
Gross Income			6,690			6,435			2,624			2,686	
Costs	Hen	1	200	200	1	200	200	1	200	200	Free provision by state government		
	Feed per bird	34	120	4,080	34	60	2,040	14	10	140	16	132	2,112
	Health care per bird	34	5	170	Free provision by animal health department						Free provision by animal health department		
Total Cost			4,450			2,240			340			2,112	
Benefits	Net Income		2,240			4,195			2,284			574	
	(2008 prices)		(2,240)			(4,195)			(2,284)			(574)	
	Return on investment (%)		50.3			187.3			671.8			27.2	
	Net income/Rural poverty line (%)		42.6			79.8			43.5			10.9	
	Eggs available/ Recommended intake (%)		50.0			0.0			13.3			242.2	

* 1 Rs = 0.023 US\$ (2008)

Table 7: Economics of 'Good Practice' Small-scale Poultry Farms in South Asia*

		Multiple batches		Layer farms - 1.5 year			Broiler farm
Year		2008	2007	2008	2007	2008	2008
Country		India/Satpuda	India/ Kuroiler (West Bengal all)	India/Maharashtra	India/Kuroiler	Bangladesh/ all over	India / Pradan
Bird		Satpuda <i>Desi</i>	Kuroiler	Satpuda	Kuroiler	Sonali	Exotic
No. batches per year		4	3	1	1	1	6
No birds per batch		10	10	10	10	10	400
Mortality rate of birds (%)		20	20	25	25	10	5
Currency		INR	INR	INR	INR	BDT	INR
Costs	Day old chicks	—	—				2,400
	Brooded chicks (3-4 week old)	250	222	250	222		—
	Pullets (2-4 month old)	—	—			1,000	—
	Feed		257	540	771	6,000	7,400
	Vaccines	provided for free	44.5	provided for free	134	10	500
	Other variable costs	n.a.	n.a.	n.a.	n.a.	10	2,175
	Total costs	250	524	790	1,127	7,020	12,475
Revenues	Sale of eggs		—	1,440	2,496	12,775	—
	Sale of pullets	360	1,105	400	—	—	—
	Sale of broilers / hens	400		315	n.a.	1,080	14,400
	Gross income	760	1,105	2,155	2,496	13,855	14,400
Benefits	Net income per batch (2008 prices)	510 (510)	582 (624)	2,155 (2155)	2,496 (2678)	13,855 (13855)	1,925 (1925)
	Net income per year (2008 prices)	2,040 (2,040)	1,745 (1,872)	1,365 (1,365)	1,369 (1,469)	6,835 (6,835)	11,550 (11,550)
	Return on investment (%)	204.0	111.1	172.8	121.5	97.4	15.4
	Net income / rural poverty line (%)	38.8	33.2	26.0	26.0	71.9	219.8
	Eggs available / recommended intake (%)	n.a.	n.a.	800.0	1386.7	7097.2	n.a.

* 1 Rs = 0.023 US\$ (2008); 1 BDT = 0.014 US\$ (2008)

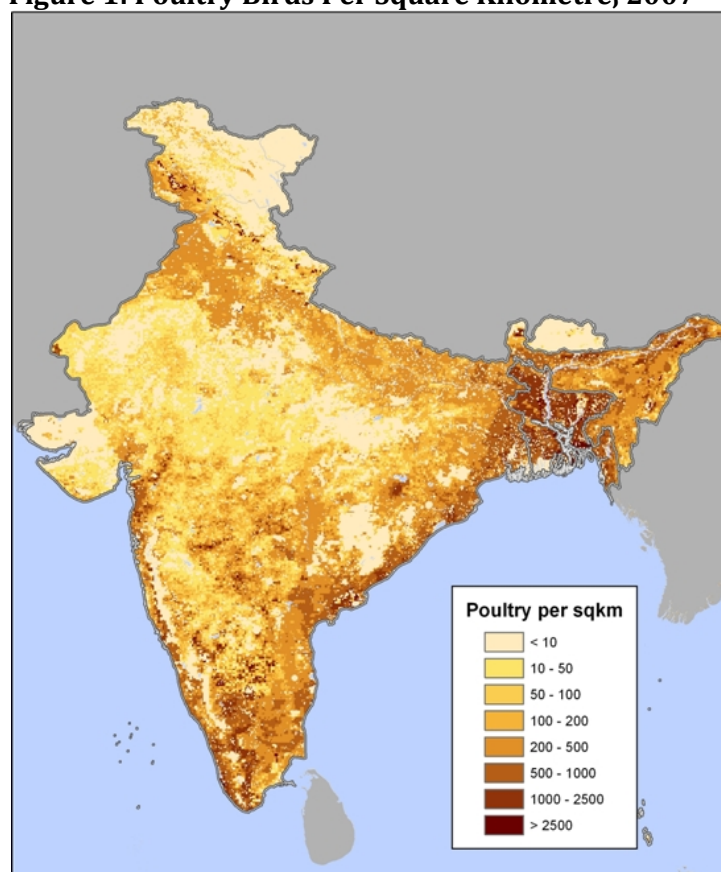
5. Distinguishing elements in poultry Good Practices

A review of the technologies and institutions underpinning the various Good Practices vis-à-vis traditional poultry rearing may help in identifying their key distinguishing features and characteristics, which decision-makers should take into account when designing policies and institutional reforms aimed at supporting backyard and small-scale poultry farms. Five critical components of poultry farming are compared in traditional and 'Good Practice' systems, including (i) sourcing of birds, (ii) access to veterinary supplies and animal health services, (iii) access to feed, (iv) availability of basic infrastructure, primarily housing for birds (v) and access to reliable markets for live birds, poultry meat or eggs.

5.1 Sourcing of birds

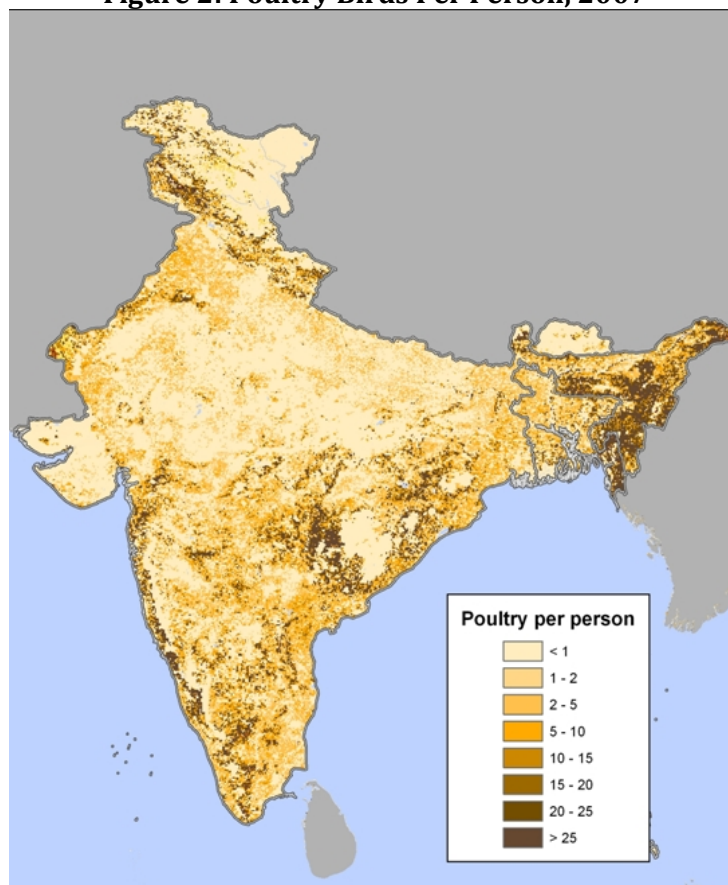
In rural areas, poultry birds are sourced locally, either through self-reproduction or from available markets for chicks, pullets and grown hens and cocks. Figures 1 and 2 below, which map the distribution of poultry birds in Bangladesh, Bhutan and India per sq km and per person, show that there are plenty of poultry birds in the region (1.45, 0.05 and 0.5 poultry bird per person in Bangladesh, Bhutan and India, and 1,589, 6.19 and 179 birds per sq km, respectively). However, there is rarely a functional market for DOC or pullets, which would allow farmers to establish profitable small-scale poultry enterprises.

Figure 1: Poultry Birds Per Square Kilometre, 2007



Source: FAO (2007)

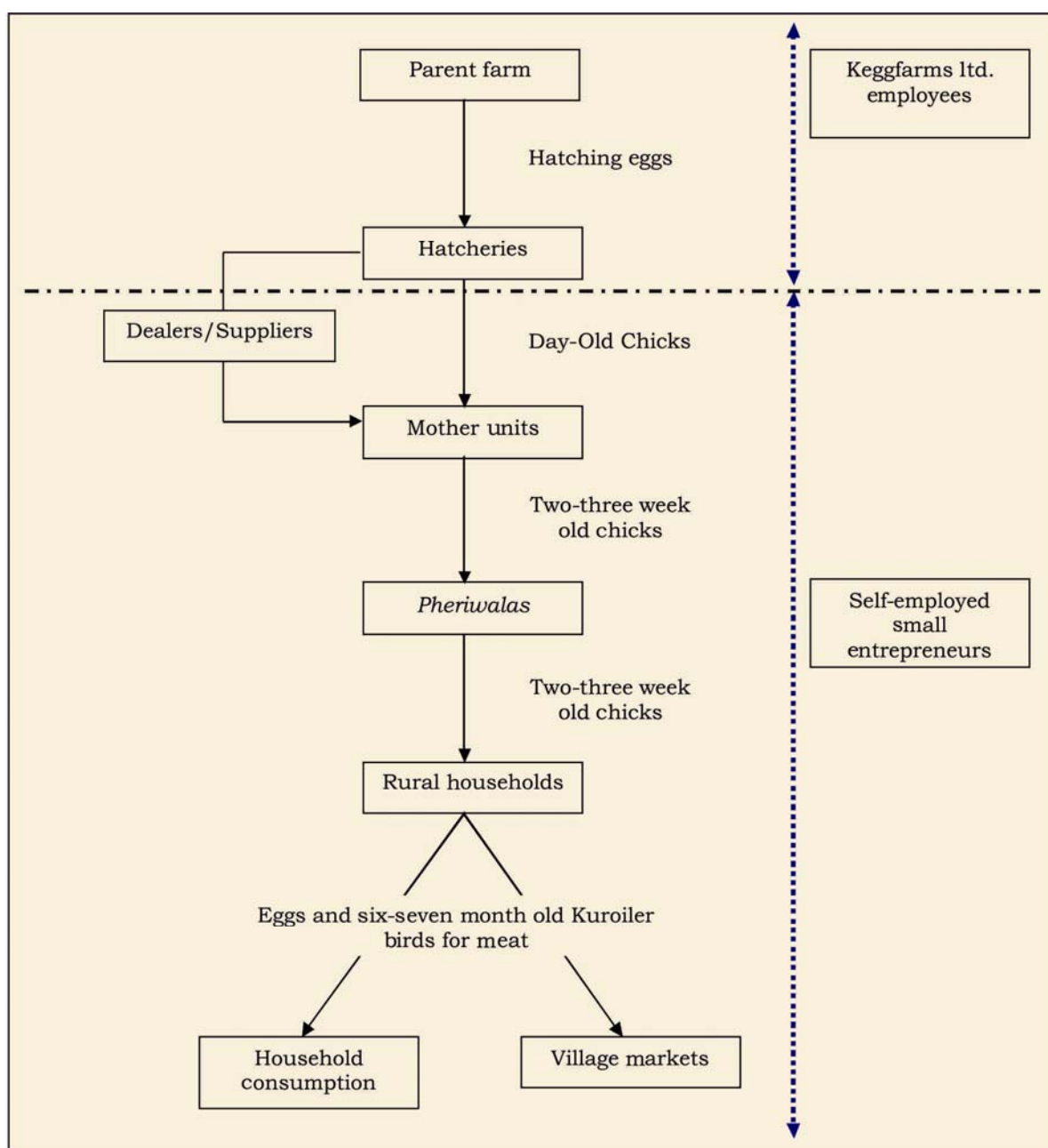
Figure 2: Poultry Birds Per Person, 2007



Source: FAO (2007)

- Good Practices show that functional smallholder-based supply chains can be established to supply improved chicks/pullets to small rural households even in remote areas, when a public/private/NGO-owned hatchery sells DOC to 'mother units', which raise the birds for about three weeks; mother units sell the grown birds to small vendors, who travel to rural areas to sell the birds to households. There are three critical elements in such a supply chain: (i) the existence of small-scale 'mother units' spread throughout rural areas, that is, brooding centres where DOC are kept for about 20 days under good heat and light conditions, and appropriately fed. This is critical because only after three weeks the brooded chicks, by which time these weigh around 250 gm, are able to live and thrive in the open range, scavenging rearing systems. (ii) The existence of hatchery farms willing to serve rural households rather than commercial broiler or layer farmers, which requires setting up a non-traditional business model based on a high-volume, low-margin approach. In the business community, there is growing recognition that the less-well-off represent a market with good profit opportunities and many private firms are now targeting the 'bottom of the pyramid'. (iii) All actors in the chain must have their own private incentives to play their role well, that is, hatcheries, mother units and vendors should make a profit out of their activities, which is ultimately possible because farmers are willing to pay a market price for the birds. The figure below is a schematic representation of the smallholder-based supply chain for the Kuroiler, a dual-purpose improved bird produced by Keggfarms, a Haryana-based private hatchery farm.

Figure 3: A smallholder-based poultry bird supply chain



Source: SA PPLPP, 2009c

5.2 Access to animal health and veterinary supplies

Veterinary supplies and animal health services are rarely adequate in rural areas and although village poultry are considered resistant to diseases, high mortality in birds is common and widespread. In Bangladesh, various poultry diseases are estimated to kill at least 30 per cent of all birds every year (Giasuddin et al., 2002; Saleque, 2007); Mandal et al. (2006) report that poultry diseases are considered the most binding constraints for poultry farmers in Uttar Pradesh, India; Good Practices show that before any intervention is carried out, mortality rate in birds due to diseases range between a minimum of 35 to a maximum of 75 per cent. The most common diseases in poultry are Newcastle Disease, Infectious Bursal Disease, Marek's Disease, Fowl Pox, Leucosis, Infectious Bronchitis, Fowl Cholera and Coccidiosis and, over the last few years, the Highly Pathogenic Avian Influenza. Poultry are also affected by numerous parasites, which make the birds dull and emaciated, reduce their

productivity and may even kill them. Young chicks up to 2 months old are particularly affected because once they become weak they cannot compete with grown chickens for scavenging and are also liable to get killed by predators (SA PPLPP, 2009b). A DFID (UK Department for International Development) Livestock Production Programme found that 90 per cent of village poultry were infected with intestinal parasites in Rajasthan and Tamil Nadu (Conroy, 2004).

- Good Practices provide evidence that animal health services and veterinary supplies can be delivered at the doorsteps of small farmers on a sustainable basis. Usually, rural villagers, often semi-literate women, are trained to provide vaccinations, de-worming and first aid to poultry, small ruminants and large ruminants, and are given access (for free or for a fee) to basic equipment and vaccines/drugs. These animal health workers (AHWs) charge a small fee for their service. The fee is affordable for farmers because AHWs live locally (reduced transaction costs) and have less income expectations than fully trained veterinarians or animal health assistants. The income derived from the provision of small animal health services, however, cannot be a primary source of livelihoods for AHWs, who need to also rely on other sources of income. Table 9 shows mortality rates in poultry due to diseases before and after the institutionalization of AHWs, as per three Good Practices.

Table 8: The Impact of AHWs on Poultry Mortality Due to Diseases

	Mortality rate in poultry	
	<i>Before</i>	<i>After</i>
Bangladesh	35–40	15
Andhra Pradesh, India	41	10
Chhattisgarh, India	75	20

- The capacity of AHWs to deliver health services depends on some critical factors: (i) appropriate selection and continuous training, both in class and in the field; (ii) AHWs cannot be the only actors providing animal health services, but need to be constantly backed by animal health assistants/veterinarians from the public, the private sector or NGOs; (iii) markets for veterinary supplies (that is, medicines, de-wormers, vaccines) malfunction in rural areas; therefore, the regular provision of inputs/equipment by the public sector or by NGOs to AHWs appears crucial for their sustainability; the use of low-cost ethno-veterinary medicine, based on traditional knowledge systems, may reduce this need; and (iv) awareness campaigns regarding vaccination against major poultry diseases are critical for motivating farmers to pay for the services of AHWs.

5.3 Feeding and housing birds

In backyard production systems, birds forage seeds, grains, kitchen waste, worms and insects in the open area around the farmstead and they source water from drains and ditches. There are thus limited, if any, feed cost for farmers as long as the scavenging base is adequate. The quality and quantity of feed available to birds is however variable, not only constraining their productivity but also generating uncertainty about the flow of eggs/income from chickens. Some poultry farmers, therefore, supplement the scavenging base with a fistful of locally available/home-grown grains (broken rice, millets, etc.) or purchase some feed, but there are occasions where nutritional deficiencies in birds are unavoidable such as during drought or flooding.

Farmers rarely provide separate housing for birds, which are left out to roost on trees or kept indoors with the family, with negative bio-security implications for both the birds and family members. In addition, predation of chicks by rodents, snakes, cats, jackals, mongoose

and eagles is a major issue for poultry farmers. Huque (1989) claims that in Bangladesh during the brooding period, between 18 and 32 per cent of all chicks are lost to predation; Biswas et al. (2006) find that losses due to predation are not significantly different than losses due to animal diseases; Conroy et al. (2005) report that bird mortality due to predation ranges between 19 and 24 per cent in Udaipur district of Rajasthan, and between 11 to 33 per cent in Tiruchirapalli district of Tamil Nadu; according to Jalaludeen (2009), almost half the mortality of native chicken population in Kerala, including chicks, growers and layers, is due to predation.

- Good Practices indicate that small simple changes in feeding practices can significantly contribute to increased bird productivity, in terms of both number of eggs laid, bird live weight and growth rate. For instance, adding crushed snail shells, which are available in fish ponds, to poultry feed (as a source of calcium) or rearing termites in earthen pots (as a source of protein), and changes in cropping pattern, which result in the availability of crop residues, all increase the quantity and quality of feed for poultry birds and, hence, their productivity. Using plastic, bamboo or terracotta containers to keep some water for the birds reduces the worm-load in poultry flocks; and the addition of some turmeric powder to water has been shown to be a powerful immune-modulator.
- Good Practices indicate that shelters for birds can be easily built at low cost, using locally available material such as bamboo, paddy straw, rice husk and mud paste, thereby reducing predation and allowing compliance with some basic bio-security measures (for example, birds are kept away from the house).

Box 1. Portable, Low-cost Poultry Sheds

BRAC has developed a prototype of a special wooden shelter for housing layers. The dimension of the shelter varies according to the number of birds to be housed; shelters are built from locally available material, usually wood or bamboo, and their cost is relatively modest, even for poor households. As an example, a shelter measuring 90 x 70 cm and with a height of 60 cm, which can accommodate 8–10 birds, would cost about US\$ 4.3. A peculiar characteristic of the BRAC shelter is that it is portable and can be easily moved from one place to another, to protect birds from sun, cold and predators; it can also be easily cleaned outdoors. The returns to investments in the shelter are noteworthy.

Source: SA PPLPP (2009d)



- Critical factors to nurture small though effective changes in husbandry practices include: (i) a deep understanding of local livelihoods, that is, government staff working at the grassroots or NGOs acting locally have some comparative advantages at supporting these changes, which are location-specific and build on local resource endowment; (ii) some research is often needed, including trial and experimentation or revival of traditional, often abandoned practices, to identify appropriate changes in husbandry practices that can be effectively adopted by local farmers; (iii) incentives should be given to farmers to change their husbandry practices (for example, demonstration trial) because the returns in terms of increased productivity/household benefits are not immediate and, at the very beginning, farmers tend to perceive only the cost component (mainly in terms of household time) of changed husbandry practices.

5.4 Marketing

Marketing is not an issue for backyard poultry producers. Nondescript and indigenous birds have ready markets available locally, and both live birds and eggs receive higher prices than exotic eggs and broilers, as documented by a variety of Good Practices (Table 9). Access to a reliable market is instead crucial for commercially oriented, small-scale farmers because only a constant flow of cash can ensure profitability of 'all-in all-out' poultry units.

Table 9: Prices of Poultry Meat in India (Rs/kg)

Breed	Exotic	Improved	Nondescript	Pure indigenous
Price (Rs/kg)	40-50	60-80	100-120	120-140

- Good Practices show that small-scale commercial poultry units can be established successfully when farmers have access to a reliable market. However: (i) comprehensive systems of input supply and marketing support are necessary, often established through cooperative mechanisms; (ii) appropriate targeting and training of selected farmers is key because the extreme poor are most likely unable to properly run a commercially oriented farm; (iii) financial support is necessary because rarely (if ever) do farmers have enough savings to make the investments that are needed to build housing and buy appropriate equipments (for example, feeders, waterers); (vi) it can take years to find the appropriate institutional setting that allows farmers to cooperate efficiently and set up profitable small-scale poultry production units; (v) the public sector has a potential role to play in helping farmers explore different business and cooperative models, which are developed through experimentation and trials and errors.

Box 2. Successful Small-scale Broiler Farming

PRADAN has developed, tested and implemented a smallholder-based, market-oriented broiler farming model in the Madhya Pradesh, India. Women's SHGs are trained in poultry production/economics/management and supported to establish and manage a broiler cooperative. Each member of the cooperative invests about US\$ 1,380, obtained through bank loans and government subsidies, to build sheds, buy poultry feeders/water dispensers and other equipment necessary to raise 300 to 500 birds per production cycle (four to five weeks); the cooperative takes responsibility for the



provision of quality chicks, feed, animal health services as well as for marketing broilers; it sells about 75 to 80 per cent of all broilers in small rural markets, at a price that is 20-25 per cent lower than the retail price in major urban markets throughout India; each member of the cooperative earns between US\$ 207 to US\$ 345 per year. It took almost ten years for PRADAN to identify ways to overcome location-specific constraints, build a culture of business ethics, train farmers to set up and manage appropriate systems of input supply and marketing, that is, to transform small, rural poultry keepers into successful market-oriented entrepreneurs.

Source: SAPPLPP (2009e)

6. Lessons for poultry sector policies in Bangladesh, Bhutan and India

The major findings emerging from the Good Practices are reviewed against the prevailing policy and institutional framework in Bangladesh, Bhutan and India, with the objective to identify if and where there are gaps and opportunities to support policy and institutional changes that may enhance the contribution of poultry to the livelihoods of the livestock dependent poor.

6.1 Sourcing of birds

Birds are a private good because the benefits of raising chickens accrue fully to the raiser: economic theory would, therefore, suggest that farmers should purchase birds at market price. However, the government may decide to distribute birds free of cost or provide rural households with a grant/loan to buy a bird, on the assumption that because birds self-reproduce there will be sustainable and long-term benefits for farmers.

Local birds are self-reproducing and readily available in most rural markets in South Asia; there are however no public or private hatcheries that sell local birds; because of their low productive efficiency, in terms of both laid eggs and feed conversion ratio, there are no economic incentives to establish broiler or layer farms with hundreds of nondescript birds. Indigenous birds (for example, the Kadaknath in India) are usually available from government-owned hatcheries and, on occasion, are also sold by small poultry rearers. Improved and exotic birds, which are typically poor brooders, are supplied by private and public hatcheries, with Good Practices showing that private companies can make a profit through selling improved birds to farmers, even in remote areas.

6.1.1. Bangladesh

In Bangladesh, farmers can source birds from private, government and NGO-owned parent farms. In particular, five major hatcheries, namely, Aftab Poultry Ltd., CP Bangladesh, Kazi Farms, Nourish Poultry and Paragon Poultry, satisfy about 80 per cent of the market for exotic chicks (the most popular are Hybro PN and Cobb500 for broiler and Bovana Nera and Shaver 579 for layers). They sell broiler chicks at Tk 55–60 (US\$ 0.75–0.85) and layer chicks at Tk 70–75 (US\$ 0.98–1.8) to about 1,20,000 medium- to small-scale farmers (Dolberg, 2009; Rahman, 2009). In semi-scavenging poultry production systems, the Sonali—a cross-bred offspring of a Fayoumi female and Rhode Island Red male—is distributed through the so-called ‘Bangladesh Poultry Model’ implemented by the government and some NGOs with support from a variety of donors, including DANIDA, IFAD and ADB. Sonali DOC are produced either by government or NGO-owned hatcheries: the government runs 23 poultry farms whereas BRAC, the largest NGO in the country, has established six large-scale hatcheries. Between 2002 and March 2007, according to the DLS of the Government of Bangladesh, about 144 million Sonali birds have been distributed to the so-called key rearers, that is, smallholders, who invest in 5–10 two-month-old Sonali birds and rear them as layers while, at the same time, keeping a small flock of local hens for brooding purposes (Biswas et al., 2006).

Nondescript birds constitute about 80 per cent of the total poultry population in Bangladesh; having undergone long periods of natural selection, they are a reservoir of excellent genetic diversity. These birds are easily available in rural areas although in some areas culling in response to recent outbreaks of avian influenza has put their existence under threat. In some districts, pure indigenous birds are common, such as the Aseel and the Naked Neck, which, according to some studies, are particularly efficient at producing meat and eggs in hot, humid climatic conditions (Islam and Nishibori, 2009). No significant attempts have been made to improve and conserve these valued genetic resources (Bhuiyan et al., 2005).

The lessons learnt from Good Practices suggest the following considerations:

- Improved DOC (mainly Sonali birds) are supplied only by government and NGO hatcheries, to support the development of the so-called 'Bangladesh poultry model'. The government supplies the improved breed in an integrated package, which includes motivation, group organization, training on poultry management, vaccination, small credit and regular supervision and advice. The distribution of improved breeds is supply-driven because the government and the NGOs involved decide on the implementation schedule and coverage, which largely depends on the availability of funds. For instance, Islam and Jabbar (2005) report that between 1992 and 2003, about 8,73,000 poor women benefited from the poultry-model vis-à-vis over 75 million smallholder poultry keepers in the country; they also note that a supply-driven model is destined to failure because if a large proportion of poor families take up poultry and expand the size of the enterprise under semi-scavenging conditions, the aggregate increased production gluts local markets, making poultry farming less and less profitable.
- Government and NGO-run hatcheries supply only one type of cross-bred bird in the rural areas of Bangladesh, that is, Sonali, and no private company has so far explored the possibility of developing village-hardy birds and distributing them to rural households through a smallholder-based supply chain. The latter could lead to demand-driven allocation of birds, thereby favouring long-term sustainability of small-scale poultry farming. The government, therefore, may wish to explore the option of providing incentives to private parent farms, to develop and sell improved birds in rural areas.
- Although conservation/promotion of indigenous birds is mentioned in the 2007 Bangladesh Livestock Development Policy—'*Conservation and utilization programmes of potential indigenous breeds for poor smallholders in the pertinent locality will be developed*' (Government of Bangladesh, 2007, p. 15), no programme has so far been implemented. Yet, Good Practices show that in backyard production systems, indigenous birds often contribute more to household livelihoods than improved and exotic birds.

6.1.2. Bhutan

In Bhutan, farmers can easily source indigenous and nondescript birds in rural areas whereas there are two government breeding farms that produce exotic White Leghorns and Rhode Island Reds. However, only some small-scale commercial farmers in peri-urban areas have incentives to purchase exotic birds; usually they prefer the Rhode Island Red because of its colour, but because the local supply of DOC is limited and their import is severely constrained by outbreaks of poultry diseases in neighbouring countries, Bhutan is currently a net importer of eggs. As for backyard poultry farmers, in the 1970s and the 1980s, the government's attempts to distribute 1 or 2 exotic birds per household had little success; and when 200 to 250 birds were received by farmers, production was initially good but scarcity of feed and the unwillingness of farmers to cull birds at the end of their productive life (on account of religious sensitivities) prevented many households from setting up profitable poultry enterprises (Alders, 2001; Nidup et al., 2005).

Since mid-2009, the Government of Bhutan has been attempting to mainstream small-scale poultry farming through farmers' groups/cooperatives, with the objective to contain increases in egg prices associated with the ban on imports of poultry products from neighbouring countries due to outbreaks of highly pathogenic avian influenza. In particular, the Livestock Department has started selling exotic layer pullets (8 weeks old) to farmers—about 10 pullets per farmer—upon conditions that farmers form and financially contribute to groups/cooperatives, which are anticipated to achieve those economies of scale necessary to transport and sell eggs for a profit in major rural towns. The programme has a large subsidy component and birds are delivered for free at farmers' doorsteps; pullets are sold to farmers at a subsidized rate; credit is provided by the Bhutan Development Finance Corporation at an

interest rate of 12 per cent, which is below market rates; and animal health services and training are provided free of charge. Preliminary evidence suggests that group members have recorded an increase in their income although the irregular supply of pullets by the government hatchery may jeopardize the long-term sustainability of the programme.

The following issues as to the sourcing of poultry birds deserve attention by policy makers in Bhutan:

- Throughout the country, farmers willing to set up market-oriented layer farms are constrained by limited availability of DOC/pullets; so much so, DOC are often imported, even from New Zealand. Increasing imports of DOC as well as increasing the capacity of producing DOC in the country, both through public or private investments, are options to be considered and assessed by the government.
- The Government of Bhutan should continue exploring the possibility of establishing small-scale backyard poultry groups/cooperatives, which allow small farmers to make a decent profit even from the sale of a few eggs (broilers, in some cases), and to satisfy the increasing demand for animal source food in urban areas. However, the government should consider (i) whether it could be more effective to distribute indigenous or nondescript birds to rural households, which are less input-intensive than exotic birds and whose eggs are highly preferred by consumers and fetch a premium price on the market; (ii) only a limited number of farmers have so far benefited from the current pilots, and no overarching policy has been designed because of budget constraints. Given that the current pilots contain a huge subsidy component, which is difficult to justify from a budget and economic perspective, given the handsome private returns to poultry farming, the government may wish to consider selling birds at market prices to farmers.

6.1.3. India

In India, there are both private and public-sector hatcheries supplying birds throughout the country. As per the centrally sponsored scheme 'Poultry Development', the central government financially sustains state hatcheries and sponsors schemes for state governments to distribute exotic birds to rural households, with the objective of improving their intake of protein through increased consumption of eggs and poultry meat. For instance, 11 state poultry farms in Uttar Pradesh and 3 in Bihar have received financial assistance from the central government, to produce and sell exotic birds at subsidized rates to poor rural households (<http://cpdonrched.gov.in/function3.htm>). Exotic birds are also supplied by large private hatcheries but only to the large commercial layer and broiler farms, which serve urban areas and have been expanding rapidly in South India, where climatic conditions are mild, and at a slower pace in the western and eastern states (Mehta and Nambiar, 2007). For example, the Tamil Nadu-based Suguna Poultry Farm produces about 395 million broiler DOC per annum, and 90 per cent of the eggs currently consumed in India are laid by the BV-300 layer, which is supplied by the Maharashtra-based Venkateshwara Hatcheries Ltd.

A few private hatcheries have developed their own improved poultry birds and sell them to rural households for a profit. These birds, which thrive well in village conditions and are more productive than local nondescript birds, are distributed to rural households through market-based supply chains in which all stakeholders, including mother units, chicken vendors and farmers, have their own profit motives to participate in the business.

Nondescript poultry birds are widely available in rural areas whereas indigenous breeds can be either found in the market or, in some circumstances, are supplied by government hatcheries. For instance, the Animal Husbandry Department of Madhya Pradesh has established a breeding farm and hatchery in Jhabua district, to conserve and propagate the

Kadaknath, a native breed of poultry, which is a poor brooder but whose dark coloured meat fetches a price premium in local markets.

The following are some issues that Indian policy makers may consider as to the availability of birds for smallholder farmers in rural areas:

- Good Practices indicate that, in a typical rural village, a small flock of nondescript, indigenous or improved birds perform better than a comparable flock of exotic birds, because of lower mortality rate of birds, lower cost of feed (if any) and higher market prices for eggs and live birds. It is only when relatively large commercial-oriented systems are established, such as the PRADAN model shows (see Box 2), that it makes sense to provide exotic birds to rural households. Put in another way, the distribution of a few exotic birds to rural households is an effective way to enhance the short-term consumption of meat/eggs but it does not help smallholders establish self-sustainable backyard poultry enterprises. Under this perspective, it is difficult to fully appreciate the rationale of the current centrally sponsored scheme 'Poultry Development'.
- Good Practices suggest that smallholders are willing to pay for birds at market price because they realize the positive returns of poultry farming for their livelihoods. The Government of India should, therefore, reconsider what is the economic rationale underpinning the current distribution of birds at a subsidized market rate.
- The Government of India may consider giving some incentives (for example, tax rebates/training) to private companies for developing improved breeds suitable for village conditions, and/or to provide incentives to other small actors to establish supply chains able to deliver, on a sustainable basis, improved DOC/pullets to small farmers. In effect, one of the constraints to the distribution of exotic birds from state poultry farms is that, in most cases, farmers have themselves to collect birds at the state hatcheries or at decentralized animal health posts, which involves costs in terms of time and bird mortality during transport.
- Given the significant contribution of indigenous breeds to the livelihoods of rural households, the Government of India should consider whether, from a poverty reduction and food security perspective, it could make more sense for state poultry farms to conserve and distribute indigenous breeds such as Kadaknath, Aseel or Naked Neck to rural households rather than producing and distributing exotic birds.

6.2 Animal health services and veterinary supplies

Good Practices show that even limited access to animal health services can significantly increase the contribution of poultry birds to household livelihoods, through reduced bird mortality and morbidity, and increased productivity in terms of number of eggs laid and bird live weight. They also show that farmers, once aware of the potential contribution of poultry to their livelihoods, are willing to pay both for animal health services and veterinary supplies because the costs are more than offset by increased returns and improved livelihoods.

6.2.1. Bangladesh

In Bangladesh, responsibilities for the delivery of animal health services and veterinary supplies are shared between the public sector, namely, the DLS, and the NGOs. The country is subdivided into 64 districts and 460 sub-districts; in each sub-district, there is a government veterinarian and three veterinary assistants, who (are expected to) provide animal preventive and curative services, as well as drugs, within a 10 km radius from the major town. In total, there is about one government veterinarian/veterinary assistant for every 1,88,000 birds, and he also has to take care of other livestock. Below the sub-districts, animal health services and drugs are provided by poultry and livestock extension workers, who are supported in their activities by the sub-district officer and local NGOs. In particular, the latter organize special training in vaccination, first aid and basic livestock husbandry to volunteer farmers—called vaccinators—who are selected in consultation with the local sub-district

committee chairman and members. The courses, which are offered free of charge, are both theoretical and practical and, on completion, the vaccinators are supplied (at cost) with vacuum flasks and other necessary equipment, and given vaccines free of charge. The vaccinators charge a market fee for their services and when they return the empty vials to the NGOs/sub-district livestock office, they receive new doses of vaccines.

The Bangladesh model of delivery of animal health services/drugs to smallholders builds on a public-NGO partnership that is quite innovative; it is viable because there are about 18,000 NGOs working in Bangladesh, of which about half are involved in some livestock programme (Shamsuddoha, 2009). As of today, about 20,000 poultry workers have been trained, a number which appears sufficient to vaccinate the country's poultry flock (about 33 birds/day per poultry vaccinator), particularly given the high poultry density in the country. However, this partnership is apparently not delivering as anticipated: thermo-stable vaccines are not always available; vaccinators often handle vaccines improperly; Biswas et al. (2006) report that in the southern part of Bangladesh, about 48 per cent of the semi-scavenging chickens of key rearers remained un-vaccinated; according to the Bangladesh Livestock Research Institute, Newcastle disease appears every year in the form of an epidemic and claims about 60 per cent of the total mortality in poultry.

The Government of Bangladesh recognizes that animal health services are inadequate in rural areas. The 2008 Livestock Development Policy reads: *'Inadequate veterinary services are one of the major obstacles for livestock development in Bangladesh. The ratio of Veterinary Surgeons to farm animals and birds was estimated at 1:1.7 million and only 15–20 per cent of farm animals receive routine vaccination. Private sector investment in the animal health sector remains low and is expanding gradually. The quality and quantity of vaccines produced and delivered by the DLS are inadequate. The use of subsidies in vaccine production in present form is a possible deterrent to private investors. There is no independent authority to check the quality of domestically produced or imported vaccines. Vaccination is done in a haphazard manner without any strategic plan for controlling the targeted diseases. [...] The disease surveillance system is almost non-existent'. [...] '1) soft loans would be provided to accelerate the development of private veterinary services; 2) community-based veterinary service would be developed through special projects; 3) mobile veterinary services will be provided by DLS '* (Government of Bangladesh, 2007, pp. 10–11).

There are three major considerations that can be made on the current animal health policy and institutional framework in Bangladesh:

- The intention of the government to improve quality and coverage of animal health services through support for community-based animal health workers is promising. However, the focus on projects to establish community-based veterinary services is surprising: projects are limited in time and resources whereas an efficient system of community animal health workers should be an integral part of DLS and would necessarily require regular (and sufficient) budgetary allocations.
- The provision of soft loans to nurture the market for private veterinary services is also noteworthy. However, unless the roles of the DLS, of NGOs and of the private sector are detailed in some programmatic document, few private veterinarians will be eager to operate in rural areas. Whereas the empirical evidence, including in Bangladesh, shows that NGOs are particularly efficient at reaching the poor, the very existence of NGOs may provide some disincentives to veterinarians to enter the private animal health market because the former do not always run business-oriented companies, are governed by *ad hoc* rules and regulations and their provision of services in rural areas may have some level of hidden subsidies and grants.
- The Livestock Development Policy openly recognizes that subsidies to vaccine production may provide disincentives for private sector investments, but only indicates

that *'An autonomous Quality Control Agency would be established to ensure quality of veterinary drugs, vaccines, feeds, feed ingredients and breeding tools and materials'* (Government of Bangladesh, 2007 , p. 12). How the current demand-gap in the vaccine market will be filled in the coming years is not clear.

6.2.2. Bhutan

In Bhutan, livestock services, including all preventive and veterinary services as well as animal drugs, are provided free by the DLS in the Ministry of Agriculture. In each of the 20 *dzongkhags* of the country, there is one District Veterinary Hospital managed by a District Veterinary Officer. However, because there is presently a dearth of veterinarians, some of these hospitals are being manned by para-veterinarians. In the major town of each *gewog* (sub-district) in a *dzongkhag*, there is one Livestock Extension Centre (LEC), which supervises the work of so-called village AHWs. The latter are nominated by village committees and trained by the Department of Livestock, through its mobile units, to vaccinate livestock and handle minor animal diseases. AHWs charge a fee for their services but provide vaccines and drugs for free to farmers. Vaccines are produced by the government and some imported from India and Australia.

The current institutional structure for the delivery of animal health services relies on a public-private partnership, which attempts to reach even the most remote areas through the establishment of village AHWs. However, as the Tenth-Five-Year-Plan 2008–13 notices: *'Diseases such as Zoonoses, Foot and Mouth, Rabies, Avian Influenza, etc. will continue to be a major threat to livestock health and development. Basic standard materials and equipments to carry out livestock extension health and laboratory activities continue to be inadequate in the Gewog centres. There is also a need to strengthen both clinical and epidemiological animal health services and infrastructure'* (Royal Government of Bhutan, 2009b, pp. 40–41). A *'Livestock Health & Laboratory Services Programme'* has been formulated, which comprises nine activities/projects including *'provision of livestock health services in rural areas'* and *'training of community animal health workers'* (Royal Government of Bhutan, 2009b). The programme is linked to productivity indicators which, in turn, are linked to increased household income from livestock and reduction of poverty level.

- The Government of Bhutan recognizes that animal diseases are a significant constraint in the development of the livestock sector and plans to invest more resources for disease prevention and control. However, the allocated budget for implementing the *'Livestock Health and Laboratory Services Programme'* will only fund the expansion of activities of the National Centre for Animal Health in Serbethang, the National Clinical Hospital in Thimpu and four Regional Livestock Development Centres, with envisaged undersupply of livestock services in the other districts of the country.
- The *'Livestock Health and Laboratory Services Programme'* ultimately represents an expansion of current activities, with no planned changes in the current institutional framework for the delivery of animal health services. Given the low population density in rural areas and limited returns to public investments in terms of poverty reduction through livestock development, the government may wish to explore other alternatives to deliver services and animal drugs to farmers. Cost-recovery mechanisms, joint human-animal health service delivery and the use of ethno-veterinary medicines are options, which could be piloted to evaluate whether they could improve the quality and coverage of animal health services in rural areas (FAO, 2010b).

6.2.3 India

The institutional structure for the delivery of animal health services, although a state matter, is largely similar across all Indian states. The underlying principle is that animal health services and veterinary drugs should be provided free to all farmers, including poultry keepers. In practice, farmers get free services when they are able to take their livestock

either to the Central Veterinary Hospital or to one of the District Veterinary Hospitals. Minor livestock services (for example, AI and vaccination) and veterinary supplies (for example, vaccines and drugs) are provided by the Block (sub-district) Livestock Development Officer and by two/three Block Livestock Development Assistants (para-veterinarians). When the blocks are large, the Block Livestock Development Officer also manages a veterinary dispensary. However in many, if not most, cases, farmers have no or inadequate access to animal health services and veterinary supplies, both because the State Departments of Animal Husbandry are understaffed and with small budgets, and because of few output-related incentives for staff, including rewards and penalties.

Poultry vaccines and drugs are produced both by the public and private sector and, at present, there is a demand-supply gap in poultry vaccines, with 40 per cent of vaccines being imported; the production and sale of pharmaceuticals is entirely in the hands of the private sector.

The massive involvement of the government in the supply of health services and poultry biologicals—almost 32,000 veterinarians are estimated to work for national and local governments in India in 2004, according to the World Organization for Animal Health (OIE)—creates barriers to the development of a private market for veterinary services/animal health; limited training in veterinary practice management and lack of efficient diagnostic laboratories provide further disincentives to private veterinary practices. In 2004, there were only about 2,100 private veterinarians, most of them serving large commercial farmers and poultry integrators and only retired government veterinarians appear willing to serve rural areas.

The 2005 draft National Poultry Policy notes that: *'Health coverage to the birds in the rural areas need a deep health service delivery system not adequate presently, to counter the high mortality rates particularly in birds of young age'*; it suggests that: *'doorstep delivery of health services to the rural poultry farmers shall be brought about through the trained link workers who are decentralized and self-sustaining. Cold chain and thermo-stable vaccines are other requirement, which shall be considered along with continuous supply of biologicals drugs. Ethno-veterinary medicines shall be encouraged in this sector, and the knowledge will be widely disseminated after validation and documentation'* (Government of India, 2005, p. 12). The policy also recommends that: *'the poultry science departments of the veterinary colleges shall be strengthened and inclusion of rural poultry farming during graduation will help the veterinarians understand its importance once they are in the field'* (Government of India, 2005, p. 15).

Whereas the National Poultry Policy (draft) appears to have identified major constraints in small-scale poultry farming and proposes sound solutions, the practice on the ground is different.

- The *'Livestock Health'* schemes, which are currently sponsored by the central government and implemented by the states, only marginally reflect the priorities identified in the National Poultry Policy. The *'National Project on Rinderpest Eradication'* and the *'Foot & Mouth Disease Control Programme'* target cattle and cattle farmers; the *'Animal Quarantine and Certification Services'* aims to *'prevent entry of any disease from outside into the country through import of livestock and livestock products'*; the *'Professional Efficiency Development'* scheme plans *'to regulate veterinary practice and to maintain register of veterinary practitioners'* (www.dhad.nic.in). Only the *'Assistance to States for Control of Animal Disease'* scheme is somewhat consistent with the (Draft) National Poultry Policy: first, it aims to assist state governments in strengthening existing Veterinary Biological Production Units and Disease Diagnostic Laboratories; second, it provides in-service training to veterinarians and para-veterinarians. Note,

however, that the scheme refers to in-service training, that is, in principle, it does not support training of newly recruited para-veterinarians or animal health workers, which is necessary to expand the coverage of the current system of animal health services.

- In general, livestock health schemes tend to prioritize large ruminants vis-à-vis monogastrics. If public veterinarians and animal health assistants were also trained and mandated to support backyard poultry production systems, some benefits could be expected for smallholder poultry farmers at marginal or no cost for the public budget.
- The Ministry of Agriculture and the National Bank for Agriculture and Rural Development (NABARD) have been implementing the Agri-Clinic and Agri-Business Scheme, which aims to '*supplement the efforts of the government extension system*' and '*make available supplementary sources of inputs supply and services to needy farmers*' (www.agriclinics.net). The scheme aims to train agricultural graduates and provide them with loans at favourable interest rates to set up agri-clinics and agri-business centres in rural areas, thereby stimulating the supply-side of a market for animal health services and goods. In particular, agri-clinics are expected to provide services and advice to farmers and livestock keepers; agri-business centres are intended to offer inputs and farm equipment, both for sale and on rent. A number of 'project models' can be implemented, including private veterinary clinics; private veterinary clinics with a retail outlet for feed and medicine; and private veterinary clinics with small, private artificial insemination centres. However, since private veterinarians rarely, if ever, serve smallholder poultry farmers, the government could consider whether to develop a similar scheme to train village AHWs in handling minor livestock diseases, including poultry diseases.

6.3 Feeding birds

For backyard poultry producers rearing a small flock of poultry birds, the scavenging base and household waste are typically sufficient to feed the birds, though the quality of feed may be an issue. When the flock size increases or when backyard producers keep some exotic birds, lack of affordably priced feed becomes an issue because feed—usually corn and soybean meal—contribute up to 70 per cent of all production costs in broiler and layer farming; its quality and timely availability are, therefore, critical for market-oriented poultry farmers to make a profit.

6.3.1. Bangladesh

Limited land availability and high poultry density makes access to supplementary feed difficult in Bangladesh, both in backyard and market-oriented poultry farms. In the former, the scavenging base is often insufficient to keep a flock of a few birds, and the quantity and quality of feed are highly variable. In some areas, so-called feed sellers sell appropriate feed rations to poultry rearers. Initially, feed sellers received a three-day training by the government or some NGO on mixing locally available feed ingredients with purchased nutrients (for example, vitamins and fishmeal) so as to prepare balanced feed rations for different types of birds. However, since most of them were unable to prepare feed of good quality for poultry keepers by themselves, the government and concerned NGOs decided to provide the sellers directly with concentrated feed (BRAC started to build its own feed mills), de facto transforming them into feed distributors.

For commercial layer and broiler farms, feed is expensive because there is not enough production of feed in the country and the existing feed mills—about 50, such as Kazi Farm Ltd. and Nourish Feed Ltd.—have to import feed ingredients. In general, only farmers who have entered a contract-growing scheme with some large commercial integrators have an adequate and timely supply of good quality feed for their birds.

The Government of Bangladesh recognizes that reduced availability of feed is a key limiting factor in increasing the contribution of poultry to household livelihoods and for the

development of the poultry commercial sector. *'The acute shortage of feeds and fodder is one of the single most important obstacles to livestock development in Bangladesh. The main constraints for feeds and feed management include: (i) shortage of feeds and fodder; (ii) scarcity of land for fodder production; (iii) seasonal fluctuations of feeds and fodder; (iv) low quality feed; (v) high feed prices; and (vi) poor husbandry practices'* (Government of Bangladesh, 2007, p. 13). The 2007 Livestock Development Policy provides that: *'1) Feed and fodder development strategy would be developed for community-based fodder cultivation along roads and highways, rivers and embankments, in Khas lands, and in combinations with crops; 2) necessary support would be provided to the private sector for utilization and promotion of crop residues, agro-industrial by-products and unconventional feed resources as animal feed; 3) an Animal Feed Act would be approved and implemented to ensure feed quality; 4) a private sector support system would be developed for strengthening manufacturing and marketing of feed and feed additives'* (Government of Bangladesh, 2007, p. 14). In 2010, the Fish and Poultry Feed Act has created a licensing system for all feed manufacturers and suppliers and requires labels on all feed and feed ingredients, including manufacture date, expiration date and ingredients; the Act was passed to put an end to the sale of sub-standard and adulterated animal feed.

A review of the current policy thrusts vis-à-vis the lessons learnt out of Good Practices suggests that:

- The Government of Bangladesh could consider whether to re-start training feed sellers to mix purchased feed with locally available materials. In a country where the feed constraint is binding also for backyard poultry producers, the capacity of using locally available feed ingredients is critical: resources are used, which would otherwise remain unutilized, the food-feed trade-off would be relaxed, imports of feed ingredients would reduce. For this to occur, however, local authorities should be responsible to identify locally available materials such as snails, crushed shells of snails and termites, which farmers could use as feed supplements for scavenging birds, with no need to mix them with purchased feed.
- It would make sense for the government to have feed sellers not only targeting participants in the 'Bangladesh Poultry Model', which are a small fraction of all poultry keepers, but also farmers keeping nondescript and indigenous birds.
- Both Good Practices and experience from Bangladesh (for example, Kazi Farm) indicate that small farmers are willing to pay market prices for good-quality feed. A fundamental issue, therefore, is whether feed sellers should be provided with feed at a subsidized rate or whether it would be more efficient to establish a competitive market for feed. Note that, under this perspective, the current policy thrust is in apparent contradiction with the role the DLS is expected to play, according to the 2005 National Strategy for Accelerated Poverty Reduction, namely, *'to mainstream analysis and prevention of contagious animal diseases that can pass on to humans and the rule of service provision for individual livestock rearers (that is, animal vaccination, treatment, first-hand diagnosis and technical advice) should be gradually phased out to private sector and NGOs when they are fully developed'* (Government of Bangladesh, 2005, p. 94), that is, the DLS is expected to play no direct role in feed production and distribution.

6.3.2. Bhutan

Whereas there is plenty of scavenging feed available for poultry in backyard production systems, the lack of good and reliable commercial feed is a major factor preventing the development of the poultry sector in Bhutan. The only feed mill in the country, Karma Feed Group Mill, is unable to satisfy the national demand for poultry feed: feed price is high; the feed produced is not of the best quality (the major private broiler farms in the country such as Wangchutaba broiler farm in Thimpu district and Gurung broiler farm in Gelephu district

prefer importing feed from India); the packaging size of feed is too big to accommodate the needs of small-scale poultry keepers, which further reduces the incentives for farmers to purchase balanced feed rations.

The Government of Bhutan, both at the central and the *dzongkhag* levels, is aware that availability and quality of feed are constraining factors in the development of the poultry sector. The Tenth Plan Five Year Plan 2008–13 provides a framework for a forthcoming '*Feed and Fodder Development Programme*', which will aim at improving pasture management and promoting the establishment of micro-feed mills to be operated by farmer groups. The Department of Livestock has been running a number of programmes and pilots on feed and fodder development throughout the country such as on optimal use of tree fodders (willows and ficus), on feed and fodder conservation technologies (for example, silage-making and proper storage of hay); on optimal management of pasture lands (for example, appropriate quantity of seeds and weeding).

The current policy framework regarding poultry feed in Bhutan is open to two major recommendations:

- Whenever the feed constraint is addressed by policy makers in Bhutan, the focus is largely on large ruminants (cattle and yaks) and, for poultry, on commercial and semi-commercial layer and broiler farms. The issue of feed availability and quality for backyard poultry producers does not find place in the current policy framework. The government of Bhutan should consider including backyard poultry producers as a target group for some of its feed policies/programmes, also because the National Policy for Food Self-Sufficiency encourages small farmers to take up backyard poultry farming.
- Many of the feed and fodder programmes that are being implemented in Bhutan aim at identifying and disseminating technologies that are simple and use locally available materials, that is, they can be easily adopted by a majority of farmers, including the relatively poor ones. The focus is however on ruminants. Expanding the current programmes to also cover poultry feed could lead to positive outcomes, in terms of reduced vulnerability and increased food security for poultry keeping households.

6.3.3. India

In commercial poultry production systems, corn (for energy) and soybean (for protein) constitute the major feed ingredients, and feed constitutes approximately 70 per cent of the cost of production (farmers also use substitutes for corn, such as broken rice, millet and wheat). Compound feed is also used by small-scale commercial producers, which have to coordinate to achieve the bargaining power necessary to purchase feed at competitive prices. However, since the cultivation of corn is limited in India, there is shortage of poultry feed and the competitiveness of market-oriented poultry farmers is severely affected by the high feed cost.

In backyard production systems, birds are fed with broken grains, insects, kitchen waste, green vegetables, leaves and other edible items which, but for when natural calamities occur, are usually sufficient to feed a flock of one to ten birds. However, this feeding system is haphazard (for example, there is no separate feeding for chicks and adults), and little, if any, attention is paid to feed quality. According to Kumtakar and Kumtakar (1999), for example, current feeding practices are a major contributor to bird under-nutrition and malnutrition, which favour diseases and early death.

The Government of India is aware of the feed constraint for poultry farmers, and the Eleventh Five Year Plan 2007–12 reads: '*feed and fodder are a perennial problem for exotic breeds and efforts made during the Tenth Plan to improve feed and fodder resources for livestock were not very successful.*' [...] '*the schemes and programmes relating to feed, fodder*

and pasture development in the country are quite limited' (Government of India, 2008, p. 11) and largely focus on small dairy farms because milk production has been at the centre of India's livestock policy for decades. Interventions targeting the commercial poultry sector are limited and largely *ad hoc* such as the distribution of 800,000 tons of corn at subsidized prices to poultry farmers in 2006; the authorization of tax-free corn imports in 2007 in response to feed shortage; the establishment of standards for feed for poultry as recommended by the 2005 (Draft) National Poultry Policy.

With regard to backyard small-scale production systems, the 2005 National Poultry Policy (draft) notes that *'the need for this sector is for non-conventional and locally available feed resources, which may be used by the farmers. Research on the nutritive value of these ingredients and extension of this knowledge will be intensified through documentation of regional availability, quantity to be used in rations, limiting factors, if any, etc. The low cost feed formulations using locally available raw material shall be standardized so as to have wide acceptability and accessibility by the small-scale farmers'* (Government of India, 2005, pp. 11–12).

The current policy framework, affecting access to poultry feed for farmers, is open to one major recommendation:

- Good Practices show that local resources are generally available to feed nondescript or improved birds and, in effect, the (Draft) National Poultry Policy recommends that more research be done on local feed ingredients. Research should be adaptive, that is, carried out on-farm, decentralized and even sub-contracted to local NGOs and organizations because there is (often) no need of revolutionary findings, to identify appropriate local sources of feed for birds and, in many circumstances, the use of traditional practices and knowledge is a viable, readily available solution. However, the current focus on research for local feed is not fully consistent with the overall policy of distributing exotic birds to poor farmers, which need to be fed with compound feed, rarely available at affordable prices in rural areas, nor are changes proposed in the tasks of livestock extension agents, who would be responsible to assist farmers in using available material as feed for their birds.

6.4 Livestock extension

Good Practices show that appropriate extension messages, which lead to small changes in husbandry practices, can enhance the contribution of poultry to household livelihoods. Efficient husbandry practices in small-scale farming are typically context-specific, based on local resource endowment and knowledge and, on occasion, build on traditional practices.

6.4.1. Bangladesh

Agricultural extension is provided by a variety of agencies/institutions in Bangladesh such as the Department of Agricultural Extension, the Rural Development Board, the Agricultural Development Corporation, the Bangladesh Agricultural University and the DLS for animal husbandry (Government of Bangladesh, 1996). In particular, in the formal extension system four types of extension workers are involved in disseminating technical knowledge and raising awareness among farmers: (i) livestock officers at the district and *upazilla* levels, who work for the DLS; (ii) teachers, students, researchers and project officers at the Bangladesh Agricultural University; (iii) Youth Training Centres established by the government to provide technical know-how to educated farmers by theoretical and practical training; (iv) NGOs, such as BRAC, PROSHIKA, CARE-Bangladesh, Helen Keller International, Rangpur-Dinajpur Rural Services (RDRS), Friends in Village Development Bangladesh (FIVDB), Gono Unnayan Prochestrta and others (Government of Bangladesh, 1996; Islam et al. 2010).

Extension services have long been provided independently and with little coordination by the various actors and the traditional training-and-visit system has dominated. By the end of the 1980s, it was clear that the system was not working because of its inherently top-down approach and limited appreciation of the complexity of the farming system. In 1996, the New Agricultural Extension Policy was thus adopted, which emphasizes the importance of promoting partnerships among all extension providers, including the government and NGOs (Government of Bangladesh, 1996; Uddin, 2008). Implementation of the policy is limited to date, and government staff still disseminates technical know-how to poor farmers through short visits (1 to 3 days on average); in parallel, NGOs provide extension services through short training and seminars although they also provide farmers with some loans and the initial stock of birds to start poultry farming (Islam et al., 2010).

Overall, owing to a shortage of technical officers at the field level, extension services in Bangladesh are '*inadequate, ineffective and infrequent*' (Islam et al., 2010). Parveen (2008) reports that in three villages in Bangladesh only 44 per cent of female-headed households had access to livestock extension services (a typical problem is that most extension agents are men, with whom women may have difficulties in dealing). Hasan and Islam (2010) find that in the districts of Dinajpur, Rajshahi and Jamalpur, about 49 per cent of the farmers had no linkage or contact with the extension agents and about 21 per cent had weekly contact with them.

The current system of extension needs improvement and the Bangladesh 2007 Livestock Policy recommends that: '*(1) Private sector, NGOs, and CBOs would be encouraged to provide private goods livestock services, viz. veterinary services, vaccination etc.; (2) DLS would be reformed to enhance its role as a provider of public goods services viz. regulatory measures, quality assurance and control, monitoring function, food safety function, disease surveillance, etc.; (3) Livestock extension services frontline would be extended ... to make it available close to villages; (4) Resource allocations to DLS would be increased to make it effective in delivery of public goods services; (5) ... (10) Extension-research-NGO linkage would be strengthened for field testing and dissemination of livestock technologies*' (Government of Bangladesh, 2007, pp. 34–35). The 2008 National Poultry Development Policy reads: '*For further development and sustainable of domestic/commercial system of poultry farming the present extension activities will be more strengthened. The arrangements will be made to transform the field level people of animal resources division to more efficient manpower. For the sake of smooth management at the field level poultry health care and extension services at Union level and Sub-district level field workers and supervisors will be recruited.*' In particular, '*for the development of family/commercial system of poultry farm management some package programme at field level extension areas will be taken. ... Aiming for the transformation of the development of efficiency and technology at the farmers' level model demonstration farms will be established*' (Government of Bangladesh, 2008, pp. 6–7).

A review of the current system of extension and policy priorities against the lessons learnt from Good Practices leads to the following recommendations:

- Good Practices show that use of local resources and small changes in husbandry practices can have positive impact on poultry productivity and, hence, on farmer livelihoods. The current system of extension in Bangladesh tends to largely focus on technical issues, for example, vaccination and feeding, and simple husbandry messages, such as adding crushed snail shells to poultry feed or using bamboo containers to keep some water for the birds that reduce the worm-load in poultry flocks, are rarely passed on to farmers.
- Unless there are significant improvements in the current system of agricultural extension, which reaches only a minority of farmers to date, there could be limited benefits in new messages and training delivered to poultry rearers. The Government of Bangladesh plans to improve the quality and coverage of agricultural extension but

budget constraints are likely to thwart all good intentions. However, given that Good Practices show that small farmers are willing to pay for the services they get such as for vaccination, the promotion of private extension workers may be an option to increase the coverage and quality of extension services in the countryside such as suggested by Islam et al. (2010).

6.4.2. Bhutan

During the 5th Five Year Plan (1981–87), the *dzongkhags* took over the management of agricultural extension, with the first appointments of the Dzongkhag Agriculture Officers (DAO), animal husbandry officers from the *dzongkhags*, and extension agents in the *gewogs*. The objective was to have at least three extension agents in each *gewog*, one for forestry, one for livestock, and one for crop agriculture (Tshering et al., 2007).

Initially, the main emphasis of extension programmes was to import technologies such as new varieties of seeds and technologies and adapt them to Bhutan. However, as the provision of inputs on its own soon proved insufficient to sustain the growth of agriculture, the 6th (1987–91) and 7th (1992–97) Five Year Plans established that extension should also concentrate on information and on participatory approaches to address local-level problems. The so-called ‘Renewable Natural Resources’ (RNR) approach, based on an integrated management (and extension) of crop agriculture, forestry and animal husbandry, was adopted and the College of Natural Resources (CNR) established ‘to provide higher education and generate competent extension professionals’ (www.cnr.edu.bt), which also includes a Faculty of Animal Husbandry. The 2006 draft National Extension Policy stipulates that services provided by extension agents include ‘*advisory, technical support, communication, capacity building and input supply*’ (Tshering et al., 2007).

On paper, the current system of agricultural extension services should provide adequate support to poultry farmers but reality on the ground is different and improvements are possible.

- Tshering et al. (2007) note that agricultural extension in Bhutan is not effective because of inadequate resources and equipment, limited technical skills of many extension agents, a weak monitoring and evaluating system, an excessive top-down approach, etc. Unless these issues are addressed at the level of the Ministry of Agriculture such as through provision of basic to extension centres or the design of demand-based extension services (Tshering et al., 2007), there will be few chances to support backyard poultry farming and enhance its contribution to farmer livelihoods.
- Extension agents in Bhutan are expected to be trained at the College of Natural Resources (CNR). The objective of the Diploma in Animal Husbandry is to ‘*train a versatile mid-level staff to mainly cater to the needs of the farming community through a holistic and farmer oriented training in animal production and animal healthcare*’ (www.cnr.edu.bt) but the curriculum appears biased towards technical issues such as animal nutrition, feed and fodder production and clinical veterinary medicine, and there are few modules focusing on extension and on the household economy. Technically competent, future extension agents will have difficulties in fully appreciating the economy of rural households and in recommending small, basic changes in husbandry practices to small poultry farmers. Some adjustments in the curriculum of the two-year Diploma in Animal Husbandry could be critical, in the medium- to long-term, to better support backyard poultry farmers in the country.

6.4.3. India

The State Departments of Agriculture are the main source of information for farmers and livestock keepers in India but their policies and programmes are strongly influenced by the policies and schemes supported by the Ministry of Agriculture at the centre. The Ministry

comprises three departments, namely, the Department of Agriculture and Cooperation, the Department of Agricultural Research and Education and the Department of Animal Husbandry, Dairying and Fisheries. There is an Extension Division in the Department of Agriculture and Cooperation: it aims to promote *'agricultural development by providing the extension functionaries and the farmers with information, training and other extension support on a continuous basis on improved production technologies. The Extension Division of the Department of Agriculture and Cooperation lays down the policy guidelines on extension matters and specific programmes'* (<http://agricoop.nic.in>).

In 2000, the Ministry of Agriculture drafted a Policy Framework for Agricultural Extension (PFAE), which includes five major guiding elements: (i) reform of public sector extension; (ii) support to the private sector to effectively complement, supplement and, wherever possible, substitute public extension; (iii) development and dissemination of information technology for extension; (iv) mainstreaming of gender issues in extension practices; (v) capacity building (www.agricoop.nic.in). The centrally sponsored scheme *'Support to State Extension Programmes for Extension Reforms'* is a major scheme to operationalise agricultural extension reforms across the country, through the provision of financial support to those states that undertake extension reforms within the broad purview of the Policy Framework for Agriculture Extension (PFAE).

Whereas efforts are ongoing to improve the institutional framework for extension services, in most, if not all, cases, extension services in the livestock sector are provided by veterinarians and veterinary auxiliaries working in veterinary hospitals and village dispensaries. These are not expected to provide extension messages beyond the animal health and the feed domains and their focus is largely on dairy animals—the most common messages relate to crossbreeding through artificial insemination, balanced feeding and growing green fodder crops—with little attention to monogastrics, including poultry (Matthewman and Ashley, 1996; Matthewman et al., 1997).

The current system of agricultural/livestock extension appears inadequate to support small-scale poultry farmers. In particular:

- The central government may look for ways to better integrate livestock into the states agricultural extension systems, which currently prioritize crops over livestock and, within livestock, ruminants over monogastrics. Attempts have been made to train agronomists in basic animal health and feeding but the results have been disappointing. More formal and coherent ways to integrate livestock into the Extension Division of the Ministry of Agriculture could be considered and experimented with.
- The State Departments of Animal Husbandry and Dairying are best placed to deliver livestock information to farmers. However, extension agents in these departments are able to reach only a limited number of farmers and, in most cases, tend to focus on dairy production, disregarding poultry. Training extension agents to provide advice on small-scale poultry farming and facilitating private sector investments in extension may facilitate some changes in poultry husbandry practices, which are essential to improve poultry productivity.

6.5 Livestock marketing

Marketing of poultry birds or eggs is not an issue for backyard poultry farmers whereas continuous access to a reliable market is a necessary condition for small-scale market-oriented broiler and layer farms to thrive. All benefits from marketing accrue to the various actors along the value chain, and the government is not expected to sustain marketing activities. However, poor communication and transport infrastructure, lack of or limited information, unequal bargaining power among contracting parties, imperfect contract monitoring and enforcement, limited access to finance and other inputs reduce the capacity

of smallholders to access output markets and, hence, to make profitable use of their poultry birds. Good Practices show that integrated interventions, which support both poultry production and marketing, are effective ways to assist small farmers in setting up sustainable small-scale broiler and layer farms and competitively participate in markets.

6.5.1. Bangladesh

The Department of Agricultural Marketing (DAM) of the Government of Bangladesh, established in 1983, aims to provide 'improved marketing services to ensure fair returns to the growers for their produce and adequate supply to the consumers at reasonable prices. The main mandates of DAM are: to collect market information at farmer level, wholesale and retail prices, market arrivals, movement and stock of farm products and to disseminate price information through radio, press and news bulletins for information of farmers, traders and consumers; to monitor the prices, identify reasons for price fluctuations and suggest corrective measures; to organize movement of farm products, especially perishable items, from glut to deficit areas/consuming centres in cooperation with trade and transportation agencies; to organize movement and sale of the produce of the farmers of new/concentrated producing areas; [...] to construct wholesale markets with adequate facilities in important distribution/consuming centres and to introduce improved market practice' (www.moa.gov.bd).

The provision of price information as well as the construction of market facilities are necessary but not sufficient conditions for supporting small-scale poultry broiler and layer farms because, as shown by Good Practices, small farmers should also produce on a competitive basis to benefit from market participation and, therefore, they need support and assistance in production too. In effect, the National Livestock Development Policy stipulates that: 'Smallholder production and marketing of ducks and minor poultry species (e.g. Quail, Goose, Pigeon, Guinea fowl) in selected areas would be promoted' (Government of Bangladesh, 2007, p. 10); the 'Marketing Arrangements' section of the 2008 National Poultry Development Policy reads: 'For marketing facilities the farmers will be encouraged and supported to form co-operative societies; poultry products processing will be encouraged and supported; Animal Resources Department through web site will provide information on market prices, demand and supply related information. To extend such information service a Poultry Marketing Support Services branch of Animal Resources Department will be established' (Government of Bangladesh, 2008, p. 5). The policy also aims to eliminate the influence of middlemen in poultry marketing, which is particularly relevant for eggs, whose marketing is under control of the so-called Artdars, who extend credit to the poultry farmers, who, in turn, are obliged to sell through them for loan repayment (Government of Bangladesh, 2007).

A review of the current policy framework vis-à-vis the lessons learnt out of Good Practices suggests that:

- The Government of Bangladesh marketing policy builds on two major pillars, including information and market infrastructure, with only paper connections with production and productivity-related policies. If the envisaged Poultry Marketing Support Services Branch of the Animal Resource Department would plan investments to facilitate marketing by smallholders such as training in basic hygiene practices, negotiation, packaging and setting up cooperatives, the development of small market-oriented poultry farms could be better sustained.

6.5.2. Bhutan

In 2010, the Government of Bhutan endorsed the Agriculture Marketing Master Plan. 'The policy objective of marketing vision is to improve standard of living and quality of life of the Bhutanese farmer and the promotion of sustainable livestock production and marketing.

Achieving food self sufficiency, food security & food safety by setting up of Efficient and Vibrant Agriculture Marketing Service for Agriculture and Allied Products including the Development of both domestic and export market were some of the paramount objectives of the plan' (www.moa.gov.bt).

The Master Plan outlines provisions and guidelines to increase crop and livestock productivity, to develop processing capacity at the village level, and to support associations of farmers to facilitate marketing, with training on cooperative management and negotiation (the 2010 Cooperatives Rules and Regulations of Bhutan allow farmers to legally register Farmers Groups and Cooperatives). In 2009, for example, the Livestock Department supported a poultry farmer group—Kuenphen Ugyen Tshogpa—in the Kawang block of Thimphu District, through supplying 43 pullets (8 weeks old) to seven farmers who agreed to establish an egg production and marketing cooperative (www.sapplpp.org).

The current agricultural marketing policy framework in Bhutan seems supportive of small-scale poultry farmers, however:

- The Government of Bhutan should ensure that adequate resources continue to be invested to support farmers in setting up production and marketing cooperatives able to supply surplus poultry products in major towns of the country. Given the limited population of and demand for poultry products in Bhutan, however, it is anticipated that not many of such groups can be established, that is, a demand-driven approach to production and marketing training should be possibly devised and implemented.

6.5.3. India

The Government of India has been playing an important role in developing the Agricultural Marketing System in the country. The Directorate of Marketing and Inspection in the Department of Agriculture and Cooperation is responsible for providing advice to state governments in regulating, developing and managing agricultural produce markets; for promoting the standardization and grading of agricultural and allied produce under the Agricultural Produce (Grading & Marking) Act (1937); for conducting market research, surveys and planning; for training government personnel in agricultural marketing; for supporting agricultural marketing information networks; and for supporting the construction of rural godowns (warehouses) and other agricultural marketing infrastructure.

The Directorate of Marketing has so far supported state governments in drafting so-called Agriculture Produce Acts to regulate agricultural markets, in terms of rules concerning handling and storage of food, marketing practices, etc.; it has promoted the dissemination of agricultural price information, for example, through the establishment of the Agricultural Marketing Information System Network (AGMARKNET) being implemented since the Ninth Five Year Plan; has established minimum quality standards, for example, the so-called AGMARK standards; has sponsored the construction of warehouses in rural areas, for example, the Grameen Bhandaran Yojana Scheme; has provided training on marketing at various levels in the national and state governments through the National Institute of Agricultural Marketing (NIAM) in Jaipur.

The current policy framework does not fully support marketing of livestock products, including poultry, as also noted by the Eleventh Fifth Year Plan (2007–12): *'With large quantities of animal products now being produced, research on process technologies, value addition, packaging, storage, transportation, and marketing should receive high priority'* (Government of India, 2008, p. 12). *'The markets lack even basic infrastructure at many places. When the Agriculture Produce Marketing Committees were first initiated there was significant gain in market infrastructure development. However, this infrastructure is now out of date, especially given the needs of a diversified agriculture. At present only one-fourth of the markets*

have common drying yards, trader modules, shop, godown [warehouse], and platform in front of shop exist in only 63 per cent of the markets. Cold storage units are needed in the markets where perishable commodities are brought for sale. However they exist only in 9 per cent of the markets at present and grading facilities exist in less than one third of the markets' (Government of India, 2008, p. 22). 'Some of the important issues relating to agricultural marketing which would be addressed during the Eleventh Plan include marketing system improvement and conducive policy environment; strengthening of marketing infrastructure and investment needs; improving market information system with the use of Information and Communication Technology (ICT); human resource development for agricultural marketing; and promotion of exports/external trade. We should move to a regime of professionally managed wholesale markets' (Government of India, 2008, p. 23). And the 'Backyard Poultry: An Approach Paper' of the Government of India recommends that: 'The required minimum infrastructure, inputs, feed, health service dissemination etc. as backward linkage and marketing of egg, meat, poultry products as forward linkage have to be provided by a resource agency or link agency. Preferably, these units should concentrate on inputs and services including procurement, rather than production itself. The failure of most of the poultry corporations/federations has been generally attributed to their giving more attention towards production and less towards marketing' (Government of India, 2005, p. 8).

A review of the current policy thrusts and institutional system of agricultural marketing vis-à-vis the lessons learnt out of Good Practices lead to one major recommendation:

- The Government of India appreciates that current livestock markets, including those for poultry products, malfunction and plans to make significant investments for improving the marketing environment, both in terms of rules and regulations and infrastructure. However, if small-scale, market-oriented broiler and layer farms are to be promoted, particularly in rural areas, some sort of integrated support should be provided to farmers, who have to cooperate and collaborate so as to achieve those economies of scale necessary to be competitive in poultry markets. Providing such type of support to all poultry keepers would make little economic sense. The government may elaborate some detailed small-scale poultry sector policies/programmes to identify and target some areas/categories of poultry producers that have the capacity to and are provided effective opportunities to expand their production/productivity, and then profitably participate in the growing market for live birds, poultry meat and eggs.

7. Summary and conclusions

Small-scale poultry farming contributes to the livelihoods of the largest share of rural households in Bangladesh, Bhutan and India. A majority of households keep a small flock of birds, in the range of 1 to 10, which generate food and cash, and act as a buffer stock when shocks occur; rarely, if ever, is poultry a major source of livelihoods for rural households, even though returns to investments in small-scale poultry farming are noteworthy. The potential contribution of poultry to household livelihoods, even though small, remains largely unexploited because of pervasive animal diseases, poor husbandry practices and inadequate policies and supporting institutions. Governments in South Asia pledge to better support small-scale poultry farmers so as to increase the contribution of poultry to their livelihoods, such as stated in the 2007 National Livestock Development Policy of Bangladesh, the Tenth Five-Year Plan (2008–13) of the Royal Government of Bhutan and the 2008 National Livestock Policy (final draft), India. However, how these broad policy visions and thrusts will be articulated in practice is still uncertain, and detailed programmes and strategies remain to be designed and implemented.

This paper reviewed and drew lessons out of 11 Good Practices in small-scale poultry farming documented by SA PPLPP. The lessons were then reviewed against the prevailing policy framework in Bangladesh, Bhutan and India, to identify gaps and provide policy and institutional recommendations to better support small-scale poultry farmers.

- Good Practices highlight that, in backyard poultry production systems, returns to investments are higher in nondescript and indigenous poultry as compared to exotic birds because the former are more resistant to local diseases and because of the high cost of feed for exotic birds, which are poor scavengers. Note, however, that it makes little sense for farmers to keep more than a few nondescript/indigenous birds when the scavenging base is limited because the cost of feed is higher than the expected returns, in terms of chicks, live birds, eggs and poultry meat. Some private companies in South Asia have developed dual-purpose birds, which have many of the desirable characteristics of nondescript birds but are more productive, and sell them to farmers, even in remote rural areas, making a profit. In spite of this evidence, governments in Bangladesh, Bhutan and India show a preference to distribute, under a variety of programmes and schemes, exotic birds to small farmers, often free of charge. These policies make sense when medium- to large-scale broiler or layer farms are to be established, which are characterized by high-volumes and low-profit margin per bird, and when farmers have regular access to DOC, animal health services and to a reliable market for live birds and poultry products, which is rarely the case in rural areas. If the objective is to reduce poverty and increase food security, distribution of local breeds or improved birds may be a more effective strategy.
- Good Practices highlight that animal health services and veterinary supplies can be delivered at farmers doorsteps on a sustainable basis, typically through the services of trained animal health workers. In addition, many of the diseases affecting poultry can be treated making use of locally available herbs and other material. In Bangladesh, the government has been cooperating with a variety of NGOs to train a number of ‘poultry vaccinators’, to provide animal health services to farmers in rural areas but the focus is mainly on areas where the so-called Bangladesh poultry model—an integrated package of support aimed at establishing smallholder-based, self-sustainable poultry supply chains—has been implemented, so far, only in some areas of the country. In Bhutan and in India, with the exception of a few states such as West Bengal, animal health services are provided by government veterinarians and animal health assistants free of charge, but inefficiencies loom large and only a minority of farmers, typically those living close to towns, are able to access those services. In addition, veterinarians and animal health

assistants tend to focus on large ruminants, providing, for example, artificial insemination and vaccinations to dairy cattle, and disregard poultry birds. Some institutional changes in the way animal health services are provided, including a focus on public-private partnership (animal health workers) and on market functioning (farmers are willing to pay for good services) may improve the coverage and quality of services, though political economy issues are likely to make such reforms particularly challenging (for example, veterinarians may oppose the institutionalization of animal health workers).

- Good Practices suggest that small changes in husbandry practices such as adding crushed snail shells to poultry feed or building small wooden shelters for birds have little, if any, cost for farmers and generate positive returns in terms of reduced bird mortality, increased eggs laid and live weight of adult birds. In Bhutan and India, whereas policy makers consider feed quality and availability a major issue for poultry farmers, the current programmes and schemes tend to prioritize feed for large ruminants over monogastrics. However, both governments recognize the importance of making use of locally available material to improve feed quantity and quality, and Bhutan has already been experimenting with some new types of fodder (for ruminants). In Bangladesh, so-called feed sellers, trained and supported by the government and NGOs, travel the countryside to sell appropriate feed rations to poultry farmers, though they mainly serve farmers, who participate in the Bangladesh poultry model. In general, the current system of livestock extension in South Asia, which is government-driven in Bangladesh, Bhutan and India, only reaches a minority of farmers, and extension staff is rarely trained to provide advice on small-scale poultry farming practices. Governments are attempting to enhance the quality and quantity of extension services, which is critical to also support backyard and small-scale poultry farming but the focus on poultry is still very limited.
- Good Practices suggest that marketing of birds and eggs is rarely an issue for backyard poultry farmers whereas access to a reliable market becomes critical for small-scale, market-oriented poultry producers. Governments of Bangladesh, Bhutan and India are investing both in infrastructure and marketing information systems for agriculture and, in Bhutan, on the establishment of small-size egg production and marketing cooperatives. However, information on prices for eggs and poultry meat is not a priority in the current marketing systems and only when marketing policies are complemented by productivity-enhancing interventions, are there chances to effectively support the development of small-scale, market-oriented poultry farmers. In the medium- to long-term, governments should continue investing in market-related public goods, that is, information and infrastructure, but should also endeavour to better integrate poultry into their marketing policies and programmes; for selected areas, integrated interventions could be considered in order to support the establishment of small-scale, market oriented poultry farming.

Overall, Good Practices provide evidence that backyard and small-scale, market-oriented poultry farming significantly contribute to farmer livelihoods, in terms of food and cash, and as a buffer stock, and that appropriate, often minor changes in technical and institutional dimensions generate handsome returns for farmers. However, the current policy framework in South Asia, whilst not anti-poor, does not help farmers make a profitable use of their few poultry birds: there is a focus on exotic poultry breeds, which do not thrive well in rural areas; inadequate animal health and extension services, which either do not reach the poor or tend to focus on ruminants and advanced technologies; and marketing strategies that are often disconnected with production and productivity issues, limit the contribution of poultry to household livelihoods.

Changes in the current policy and institutional setting such as an increased focus on nondescript birds and the inclusion of poultry in the current system of animal health services will definitely enhance the contribution of poultry to farmer livelihoods, thereby reducing poverty and increasing food security. However, political economy issues and institutional rigidities may thwart any attempt to revamp the current policy framework. For instance, policy makers may be unwilling to invest public resources in backyard poultry farming because despite positive returns to investments, benefits to smallholders are difficult to measure; veterinarians may oppose the institutionalization of community AHWs on the assumption that they would make it unprofitable for them to work in rural areas; governments in South Asia have made major investments in producing and distributing exotic and/or improved DOC/pullets to rural dwellers, and changing the current organizational structure may be costly and demanding; livestock extension agents have traditionally focused on large ruminants and changes in their work cultures are not achieved overnight.

Good Practices documented by SA PPLPP provide evidence that targeted investments in small-scale poultry farming can be both good economics and good policy. They may contribute to refurbishing the current policy and institutional framework in Bangladesh, Bhutan and India so as to enhance the contribution of poultry farming to the livelihoods of a large share of rural households.

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