

# Poultry for profit and pleasure

**FAO Diversification booklet 3**



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# **Poultry for profit and pleasure**

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# Preface

FAO Diversification booklets aim to raise awareness and provide information about opportunities at the farm and local community level to increase small-scale farmer income. Each booklet will focus on a specific farm or non-farm enterprise or technology that experience has shown can be integrated successfully into small farms or at a local community level. We explore the potential benefits associated with new activities and technologies, as well as appropriateness and viability in differing circumstances.

The main target audience for FAO Diversification booklets are people and organizations that provide advisory, business and technical support services to resource-poor small-scale farmers and local communities in low- and middle-income countries. We hope to provide enough information to help these support service providers consider new income-generating opportunities, and how they might enable small-scale farmers to take action. What are farmer requirements and constraints? What are critical “success factors”?

FAO Diversification booklets are also targeted to policy level people in government and non-governmental organizations. What actions might policymakers take to create enabling environments for small-scale farmers to diversify into new income-generating activities?

It is important to point out that the Diversification booklets are not intended to be technical “how to do it” guidelines. In order to provide farmer advisory and support activities relating to introduction of new income-generating activities, most organizations will find it necessary to seek more information or technical support. For these organizations, each booklet identifies complementary sources of information and technical support.

If you find this booklet of value we would like to hear from you. Tell your

colleagues and friends about it. If you have any suggestions where we can make changes for the better in our next edition, or topics for other booklets – this is equally important. By sharing your views and ideas with us we can eventually provide better services to you.

**Director, Agricultural Support Systems Division  
Food and Agriculture Organization of the United Nations  
Rome, Italy**

# Foreword

Rural poultry production is like the ultimate fashion garment: it can be a success by itself, or it can mix and match with almost anything. Raising poultry can be combined with most smallholder farming activities. A poultry programme designed to fit local conditions will result in some satisfied customers.

Rural poultry production contributes to sustainable food security in many developing countries, providing income to poor farmers, especially women. It makes good use of local resources, requires few inputs and makes important economic, religious, social and cultural contributions to household livelihoods.

Poultry have many advantages in mixed farming systems. They are small, reproduce easily, do not need large investments and can scavenge for food. They thrive on kitchen waste, broken grains, worms, snails, insects and vegetation; in Asia, ducks graze in rice fields. Geese and guinea fowl can serve as sentries; singing birds and fighting cocks can be used for rituals, social activities or betting.

The term “poultry” refers to domestic birds that produce eggs, meat, manure and feathers that can be

used or traded by their owners. Domestic chickens, turkeys, ducks, geese, guinea fowl, doves and pigeons, pheasants, quail and ostriches are raised throughout the world; the last three are usually raised on commercial farms. In rural areas it is not uncommon to see families raising several types of birds.

During the past decade, the world’s poultry population grew by 23 percent in developed countries and 76 percent in developing countries. This spectacular increase was largely the result of increased commercial production, notably in the Far East where growth averaged 90 percent. In poor countries, however, the conditions for a successful commercial poultry sector are rarely met. These include:

- an ability to purchase inputs such as improved breeds, quality day-old chicks, feed, vaccines, drugs and equipment;
- the availability of a skilled workforce;
- strict disease control;
- domestic markets that absorb poultry products at attractive prices.

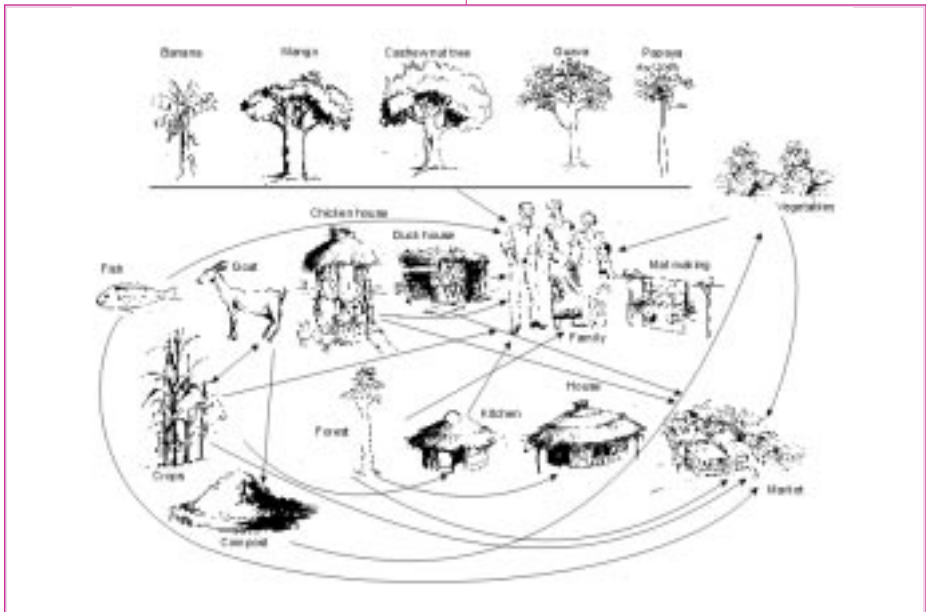
An area must be self-sufficient in cereal production or have access to hard currency from exports before



broiler or egg production can be established on a medium- or large-scale. In many countries, poultry production is based on traditional extensive low input/low output husbandry. It has been a component of small farms for centuries and will continue for the foreseeable future. Approximately 20 percent of the protein consumed in developing countries comes from poultry meat and eggs. Family poultry contributes 70 percent of poultry production in most low-income, food-deficit countries (LIFDCs).

This booklet aims to inform project designers, donors, development agencies and development workers of

the many ways in which rural poultry can help rural people to improve their livelihoods. Novel ideas are introduced, and tested programmes are reviewed. The support of FAO in the production of this booklet is gratefully acknowledged. The case study on the Bangladesh model was prepared by the Danish Network for Smallholder Poultry Development. The author would like to thank the Australian Centre for International Agricultural Research (ACIAR) for the resources and support provided during a period of six years for the work undertaken on village poultry production.



*FIGURE 1 Village poultry are the commonest livestock in rural areas. They fit neatly into the activities of family farms.(Artist: Razac Chame)*

# Abbreviations

<b>ACIAR</b>	Australian Centre for International Agricultural Research
<b>ARC</b>	Agricultural Research Council, South Africa
<b>INFPD</b>	International Network for Family Poultry Development
<b>LIFDCs</b>	Low-income food-deficit countries
<b>PSC</b>	Poultry supply centre
<b>ND</b>	Newcastle disease
<b>NGO</b>	Non-governmental organization





# History of domestic poultry production

Poultry have been domesticated for thousands of years. Archaeological evidence suggests that domesticated chickens existed in China 8 000 years ago and that they later spread to Western Europe, possibly by way of Russia. Domestication may have occurred separately in India or domesticated birds may have been introduced from Southeast Asia. Accounts of cock fighting in India from 3 000 years ago indicate that chickens have been part of the culture for a long time.

Domestic chickens appeared in Africa many centuries ago; they are now an established part of African life. The rooster frequently appears in the emblems of political parties. In the following extract, a cockerel plays a role in the creation story of the Yoruba, who were the rulers of the ancient state of Ife in what is now Nigeria:

“According to the Yoruba myth of creation, Ife was the original home of Man. Olorun, the supreme god of the Yoruba, let his son, Oduduwa, down from heaven on a chain carrying a five-toed cockerel, a palm-nut and a handful of earth. The earth was scattered by Oduduwa over the water. It was then scratched by the five-toed

cockerel and became dry land in which the palm nut germinated to become a palm tree. This palm tree had sixteen fronds which represented the sixteen rulers of Yorubaland”. (Crowder, 1977)

## ■ *Major types and breeds of poultry*

### **Domestic chickens**

The domestic chicken is descended from the Asian jungle fowl. Two types of domestic chicken have been developed in recent decades, one for eggs and one for meat. Breeds such as the New Hampshire and the Light Sussex were previously used for both purposes. Dual-purpose breeds are inefficient in competitive commercial markets, but they are ideal as household chickens; cocks are used for meat, hens for both eggs and meat.

Many local breeds are recognized. They are well adapted to their environments: they can avoid predators by flying, and the colour and pattern of their feathers provide camouflage. Hens’ strong instinct for brooding enable them to hatch their own eggs and mother the vulnerable chicks. They scavenge for food, so they

require little attention. Their meat has a strong flavour that is generally liked by consumers; it is well suited for boiling, a common way of cooking meat in developing countries. Their eggs often have a brown shell and a dark yellow yolk which consumers like.

### **Domestic turkeys**

The turkey was probably domesticated in Mexico. It was used as a domestic fowl by Native American communities in what is now the Southwestern United States. Turkey meat is high in protein and low in fat; it therefore has high nutritional value. Turkeys were introduced into Europe in the 1500s as a result of European colonization of Central America. They are now raised worldwide; over 50 percent of production is in developed countries. The main breeds are the Norfolk Black, Mammoth Bronze and the Broad-breasted Bronze. The lighter breeds do well in the dry tropics if they are allowed to range and there is adequate shade and feed.

### **Domestic ducks**

The mallard is generally regarded as the ancestor of domestic ducks except for the Muscovy from South America, which actually belongs to the goose family. Of the 500 million ducks kept worldwide, 430 million are in Asia. Commercially raised



*FIGURE 2 A black turkey raised in Uganda. (Photo: Baguma Francis)*

ducks such as the Aylesbury and Peking are primarily for meat; those such as the Khaki Campbell are for eggs. Local breeds of ducks are recognized in many countries. The Muscovy is an extremely good forager that does well under free-range conditions, because it does not need much water. The meat of the Muscovy contains less fat than other breeds.

### **Domestic geese**

Geese are raised primarily for meat, and they also produce excellent feathers. Domesticated geese are descended from the Wild Grey Goose of Europe and the Swan Goose of Asia. Domestic geese are much larger than

their wild ancestors and can no longer fly. Geese are exceptionally good grazers and will eat large quantities of grass and herbage, which makes them useful in developing countries where they can graze in the place of animals such as goats that damage crops. They are used in Egypt as scavengers around villages. They were also used to weed cotton before insecticides were introduced.

The main meat-producing breeds are the Toulouse, Oie des Landes, Embden, Roman, American Buff and Pilgrim, which descended from the European Greylag Goose. The Chinese breed probably descended from the Swan Goose; it is well adapted to hot climates and capable of laying 100 eggs per year.

### **Guinea fowl**

Guinea fowl originated in West Africa, but are now raised in many parts of the world although the numbers raised outside Africa are small. In France and Italy, they are raised commercially under intensive conditions for eggs and meat. Under village conditions, guinea fowl usually do not brood; their eggs are hatched under domestic chickens. There are three well-known varieties: the Pearl, the White and the Lavender.

### **Doves and pigeons**

In countries where doves and pigeons are raised, owners provide overnight housing and the birds scavenge for their own food. They are often raised in villages in conjunction with domestic chickens and ducks.



*FIGURE 3 Backyard geese. (Photo: FAO)*

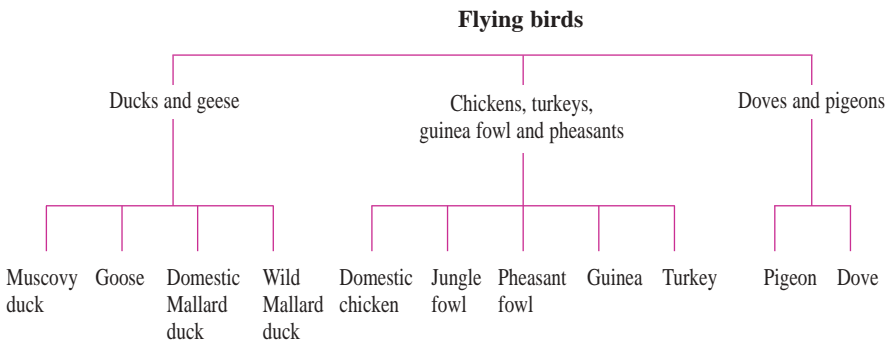
■ **Production systems, demography and geography**

Rural poultry flocks consist mainly of chickens in Africa, ducks in Asia and turkeys in Latin America. Household flocks range from 3 to 100 in Africa, 10 to 30 in South America and 50 to 2 000 in Asia. Flock size is related to the objectives of the enterprise; productivity is low compared to high-input systems. A scavenging hen lays only 30 to 50 eggs per year, or up to 90 under improved feeding and husbandry conditions; a hen raised commercially under optimal conditions will lay 280 eggs per year. A guide to matching interventions with local conditions is given in Box 7 on page 18.



*FIGURE 4 In Myanmar, smallholders often use hens to hatch duck eggs. (Photo: Peter Spradbrow)*

**FIGURE 5 A domestic fowl family tree**



*(Adapted from Smith, 1990)*

### **BOX 1 Defining the elements of poultry production**

- **Poultry:** domestic fowls such as, ducks, geese and, turkeys, etc., kept for use especially as a source of food.
- **Egg:** ovoid – spherical object produced by female bird that contains the germ of a new individual.
- **Poultry meat:** flesh of birds used for food.
- **Down:** first covering of young birds; soft under-plumage feathers of birds used to make cushions and for insulation linings.
- **Feather:** appendage growing from the skin of a bird, consisting of a quill, shaft and two vanes of barbs.
- **Manure:** droppings, faeces.

#### ■ *Social, cultural and religious importance of poultry production*

In many countries, social goodwill is created by offering guests a meal containing meat; more often than not the meat is poultry. Guests may be given a live bird to take home as a mark of respect. Poultry and poultry products can be sold to obtain items that enable families to participate fully in community activities. In the south of Bhutan, poultry play an important role in the worship of local deities. The deities require that animals be offered in pairs: a chicken, duck or pigeon can be paired with a large animal, or can be offered in the place of a goat or pig. A pig and a chicken, for example, or a goat and a pigeon are considered equal to two large animals. Farmers in this region believe

that the offerings will ensure that there will be no sickness in their households.

Chickens play an important role in the cultural life of rural Ghana, especially in the northern regions. John Miller Chernoff described the use of chickens in a ceremony when he was consecrated into the Yeve Cult of the Ewe tribe as an apprentice to master drummer Gideon Folie Alorwoyie:

“Basically the ceremony was to help me concentrate and learn better and faster. Gideon’s uncle, an important fetish priest, was in charge. First, that afternoon, Gideon and I bought two white chickens, male and female for balance and harmony, and a bottle of gin .... As the chicken stew was bubbling away, Gideon was busy



pouring more libations and telling me what the ritual would accomplish ... The priest announced that the chicken was ready. He laid the breasts on the ancestors' pile. Then he gave me a big bowl and said, 'Eat'. In the bowl were those parts of the chickens, which correspond to those parts of myself that were to be protected: the two heads, the feet, the wings, the tails, the gizzards and the hearts. I swallowed and ate." (Miller Chernoff, 1979)

■ ***Role of poultry on the farm and in the household***

Farmers may raise poultry for various reasons, from the need to create an income to the simple pleasure of watching the healthy birds. In general, rural poultry provide animal protein in the form of meat and eggs; they are available for sale or barter in societies where cash is not abundant. Village

poultry fulfil a range of functions that are difficult to value in terms of money; they provide pest control and manure, they are used in festivals, ceremonies, treating illnesses and for meeting social obligations.

■ ***Resources required for poultry production***

In most rural areas suitable for poultry production, farmers are already raising their own birds. Output of village poultry in terms of weight gain and number of eggs per hen per year is often low, but there is minimal input in terms of housing, disease control, management and supplementary feeding. Improving poultry production in a cost-effective manner requires the introduction of appropriate management skills, and husbandry inputs such as supplementary feed, disease control, shelter and development of effective marketing strategies.

# Contributions of poultry to sustainable rural livelihoods

## ■ *Income generation*

Poultry and poultry products can be sold or bartered to pay school or medical expenses or to buy oil, salt and other items. A study in the Southern Province of Zambia, hit by drought and the cattle disease theileriosis in recent years, found that households with chickens were able to survive drought and recover the following year better than households without chickens.

## ■ *Improved human nutrition*

Consumption of poultry meat and eggs increases once farming families are confident that they have sufficient birds and that the birds will not die in

great numbers. Eating poultry meat and eggs is especially important for children and expectant mothers. Poultry can make a significant contribution in areas where child malnutrition is common. Enhanced nutrition improves growth, mental development, school performance and labour productivity, and reduces the likelihood of illness.

Urban communities also gain from increased availability of village poultry. Larger numbers of birds normally lead to a decline in prices; lower prices mean that more urban consumers can afford to buy poultry, enabling producers to sell more birds and increase profits.

### BOX 2

“Chickens are the most accessible livestock species for people of lesser means, constituting a source of inexpensive protein ... Poultry operate as a ‘platinum credit card’ for poor families, which circulates rapidly and universally, with which the bases are cemented for their more active participation in a process of commodity-based development.”

His Excellency Mr João Carrilho, Vice-Minister for Agriculture & Rural Development of Mozambique opening speech of the SADC Planning Workshop on Newcastle Disease Control in Village Chickens, 6 March 2000. (*Alders and Spradbrow, 2001*)



*FIGURE 6 Children in Mozambique keep their own chickens and sell them to buy school books and other items. (Photo: Robyn Alders)*

### ■ *The first step on the livestock ladder*

Farmers on mixed farms often want to raise different kinds of livestock. For poor farmers, increasing the number of poultry they own increases their assets

and can greatly increase their ability to cope with unexpected crises. When Newcastle disease (ND) was controlled in village chickens in Mozambique, Senegal and Togo, farmers could sell some of their chickens to buy goats.

#### *BOX 3*

“The egg is one of the most balanced foods known, containing most essential amino acids, large amounts of calcium, phosphorus, magnesium, iron, zinc, vitamin A and vitamin B complex. It can be eaten alone or combined with other food using simple, easy to prepare recipes.” (*Branckaert, et al. 2000*)



FIGURE 7 A farmer in Senegal gathers eggs from her chicken house. (Photo: Robyn Alders)

### ■ *Empowerment of resource-poor farmers, especially women*

In many countries, poultry are regarded as women's business. A woman poultry farmer is more likely to have a say in the way her profits are used, because they are the product of her labour. In the south of Mozambique,

having chickens enables women farmers to buy their own goats; this is accepted by their husbands because it is a result of the women's labour. Some women are working to buy cattle, which is quite an achievement in a society where men are the traditional herders.

#### BOX 4

A Mozambican widow explained: "The chicken is my husband: it allowed me to buy these shoes, this piece of cloth and, this scarf."

■ *Positive environmental impact*

Rural poultry that scavenge for their feed can help to control pests such as cattle ticks. They produce manure that can be used to fertilize crops and vegetables. Extensive poultry production does not produce excessive amounts of waste or use commercial feed containing cereals grown in monoculture.

■ *Products free of antibiotic and hormone residues*

In many parts of Asia, village poultry command a higher price than commercial birds because they have not been treated with antibiotics or hormones.

■ *Animal health*

Animal-health programmes are more sustainable if they include prevention

and treatment of poultry diseases. It is easy for farmers to sell poultry to obtain small amounts of cash to pay for the services of an animal-health worker.

■ *Role in households affected by HIV/AIDS*

Poultry projects are underway in South Africa and Swaziland to assist families affected by HIV/AIDS. Households headed by children or elderly people raise poultry for sale and home consumption. Goats and cattle require herders to stay with them during the day, but this is impossible in households without working adults, because family members have to be time-efficient and cost-effective for the family to survive.

# Key components of rural poultry production

The components of rural poultry production are type of bird, feed, shelter, disease control, community collaboration and group formation. Examples of

how these components can be incorporated into poultry development programmes are given in case studies in this booklet.

## **BOX 5 Rural poultry production: components**

The components of poultry production include:

- type of bird;
- feed;
- shelter;
- disease control;
- community collaboration; and
- group formation.



# Cost effective ways to improved poultry production

Sustainable rural poultry programmes should build on what exists and match technological interventions with local situations. Cost/benefit analyses carried out before the spread of new technologies will help to identify interventions most likely to be adopted by farmers. Programme designers should be aware that poultry are susceptible to disease, theft and predators.

## ■ *Type of bird*

Raising the right kind of bird is crucial to the success of a rural poultry programme. The birds must be adapted to village conditions and not associated with local taboos. Local chickens often outperform their commercial cousins under village conditions because the indigenous birds can escape from predators, find their own feed and take care of their young.

## ■ *Feed*

The feed available for scavenging birds provides a range of nutrients and a balanced diet. Supplementary feeding can greatly improve the birds' performance, but care must be taken to ensure that the feed provided

is affordable and available locally. When supplementary feed is scarce, farmers should be encouraged to ensure that chicks up to the age of two months have access to additional feed; young chicks are the first to suffer from food shortage and their survival rate will fall. Creep feeders made from local materials dispense small quantities of feed without greatly increasing the amount given to household poultry.

## ■ *Shelter*

Poultry houses provide shelter from predators and bad weather and can improve poultry production. They ensure that birds can be easily handled if individual treatment or vaccination becomes necessary. Care must be taken to use designs and materials that do not promote infestations of internal and external parasites.

## ■ *Disease control*

Major poultry diseases must be prevented or controlled if rural poultry production is to become a reliable source of income. Newcastle disease (ND) can kill 100 percent of susceptible chickens. Commercial ND vaccines and good husbandry can prevent the disease in



areas where the vaccines can be kept cold; where cold storage is not available, thermo-stable ND vaccines should be used. Village chickens may be affected by fowl cholera and fowl pox, which can be prevented by a combination of vaccination and good husbandry.

Duck production can be severely hampered by outbreaks of diseases such as duck plague. Vaccines exist but are not always available in rural areas.

Internal and external parasite control will improve flock health. Commercial treatments for parasites are usually expensive, but local remedies that reduce or remove parasites can be used.

■ ***Community collaboration and group formation***

Activities that encourage community participation and group formation will promote the establishment of sustainable programmes.



*FIGURE 8 A creep feeder that will improve chick nutrition can be made from locally available materials. (Artist: Razac Chame)*

## Diversification of poultry production

The type of poultry raised often reflects traditional interests and cultural values. Traditions evolve slowly, however, so introducing new types of poultry calls for care and sensitivity. To diversify poultry production, it is best to start with a mar-

ket study to determine the products most likely to sell and a technical feasibility study to ensure that production is possible in the area. Expertise from other regions where similar production has been successful can be a great help.

### *BOX 6*

*The question ... is whether the proposed changes are feasible given the cultural reality, and not whether the cultural reality is correct or desirable.*

(Rushton and Ngongi, 1998).





## Intensification of poultry production

It may seem that having more poultry will make an enterprise more profitable, but this is not always the case. Care must be taken to ensure that inputs and expertise are available and affordable; otherwise attempts to intensify poultry production will not be sustainable. As the density of a poultry population increases, more

sophisticated disease-control measures are required. Improved breeds need good-quality housing and feed to produce well. Improved hens do not brood instinctively, so replacement stock must be brought in, which requires a reliable source of day-old chickens or older birds in the case of layers.



### BOX 7 Matching chicken programmes with local conditions

Criteria	Extensive rural production	Semi-intensive/ smallholder production	Intensive smallholder production
<b>Local conditions</b>			
Access to reliable electricity supply	No	Yes	Yes
Existence of cold chain	No	Yes	Yes
Feed source	Scavenging; occasional supplementation	Scavenging; supplementation necessary	Commercial balanced ration
Production/ farming system	Mixed, livestock and crops	Usually poultry only	Poultry only
Access to urban markets	No, or indirect	Yes	Yes
Poultry breeds	Local	Commercial or crossbred	Commercial
Flock size	1–50	50–200	> 200
Access to veterinary services and veterinary pharmaceuticals	Sometimes	Yes	Yes
Source of new chicks	Natural incubation	Commercial day-old chicks	Commercial day-old chicks
Poultry housing	Sometimes; usually made from local materials	Yes; conventional materials; houses of variable quality	Yes; conventional materials; good-quality houses
Time devoted each day to poultry	< 30 minutes	1 hour	> 1 hour
Other livestock raised	Usually	Sometimes	No
<b>Inputs required</b>			
Training	Basic: ND control, fowl cholera control (in parts of Asia), poultry husbandry and management.	Moderate: control of ND, Gumboro, fowl cholera and fowl pox; breed selection; supplementary feeding; appropriate housing; husbandry; financial management	Considerable: wide-ranging disease control; breed selection; use of balanced ration; good housing; husbandry; financial management.
Veterinary services and pharmaceuticals	Minimal	Essential	Essential
Programme timeframe	3–5 years	5–10 years	5–10 years
Estimate of project funds required per household to initiate programme	Minimal	Moderate	Considerable

# Utilization of poultry products

## ■ *Home consumption*

Poor farmers are often reluctant to eat poultry meat or eggs; they worry that the products may be needed to resolve some unforeseen problem. Once bird numbers stabilize as a result of technical interventions, families will eat more poultry meat and eggs.

It is important to work with health and education services to promote home consumption, especially where taboos exist concerning consumption of poultry products by certain family members. In parts of Africa, children and expectant mothers are traditionally forbidden to eat eggs. It is important to conserve eggs to hatch new chickens in situations of high mortality, when replacement birds are essential. If village chicken mortality is reduced, for example, by controlling ND, eating eggs becomes an option and a good use of resources.

## ■ *Marketing and sales*

Marketing networks exist in most areas and are sometimes based on ethnic groups. Men of the Frafra ethnic group from the Upper East Region of Ghana, for example, are the dominant force in the village poultry trade, even in Accra. Such

networks can be studied to determine their strengths and weakness before planning new market interventions.

Marketing poultry products will be easier if they are known to be in demand. In Bhutan in 1999, locally produced eggs cost twice as much as eggs imported from India. Local consumers still preferred local eggs, however, because of their brown shells and dark-yellow yolks. In Southern Mozambique, frizzle-feathered chickens are believed to have more power in traditional ceremonies, so they usually sell for twice the price of an ordinary chicken.

Demand will remain strong if the quality of products is uniformly acceptable. In areas without refrigeration, people prefer to buy live birds. Traders who buy poultry from farmers and take them to market will do better if the birds are vaccinated against diseases. The albumen quality of duck and hen eggs declines very rapidly when eggs are stored at ambient temperature, especially in hot climates. Losses can be reduced by oiling them with medical or technical oil on the day they are laid, which maintains albumen quality for several weeks at ambient temperature.

*BOX 8*

A local fowl expert has landed on the world's gastronomic stage with his nomination for the Slow Food Award 2001 Special Jury Prize. Noel Honeyborne of Fowls for Africa is the first South African finalist ...

At a taste-off at the Herbert Baker restaurant in Parktown, chef Alan Gerson prepared four different indigenous fowl and one ordinary chicken in a number of different ways, all with a strong local flavour: chicken chakalaka, chicken in kumquat sauce, chicken with Mpumalanga herbs and an inventive coq au pinotage.

The special Slow Food eat-in of Honeyborne's chickens at the Herbert Baker not only confirmed that local chicken is indeed very tasty, but showed that it makes sense in many, many ways. (Minnaar, 2001)

■ *Sharing market information*

Efficient marketing is an essential prerequisite for successful small-scale enterprises. Marketing techniques used for other commodities can be applied to rural poultry. Broadcasting market information by radio can help rural farmers to get fair prices for their poultry products.

■ *Entrepreneurial and management skills*

Fostering entrepreneurial and management skills are the final block in the foundation of sustainable poultry production and contributes to sustainable livelihoods in rural areas.



*FIGURE 9 Live chicken market in Asia. (FAO)*

## Examples/case studies

### ■ *Case study 1. Smallholder poultry: the Bangladesh model*

#### **Steps to success**

The activities of the Bangladesh model for smallholder poultry reach the poorest members of society, especially illiterate and destitute women with no land and no assets apart from their labour. The model is an example of effective development based on a combination of organizational, technical and socio-economic activities that include group formation, credit, technical training and poultry production. As the beneficiaries become members of village groups and receive technical help, microcredit and relevant training, their incomes and social status improve within a few years. The Bangladesh model is the result of a long process involving governmental and non-governmental organizations (NGOs).

#### **Smallholder poultry model – step by step**

Developing the model required a system of interdependent enterprises that provided training, savings and credit schemes, and support. The beneficiaries welcomed interventions that had

an immediate effect on their sociocultural, economic and natural environment. Poultry production met their criteria, because it provided increased income from selling eggs and chicken meat and increased influence in decision-making.

These steps were designed to create an enabling environment and make the interventions sustainable.

#### **Step 1: Group formation, credit and technical training**

Smallholders, mainly women, were selected on the basis of low economic and social status and interest in keeping poultry. Village groups of 30 to 40 people were formed. At their weekly meetings, the groups received one to three days of training on savings, microcredit systems and basic techniques of poultry management, including feeding, housing and disease control. The groups formed the core for future exchanges of experience and provided the social collateral needed to secure loans.

#### **Step 2: Vaccination campaign**

Village-based vaccinators, called poultry workers, received three days of initial training in vaccinating poultry and



managing and cleaning vacuum flasks, syringes and needles. To make the process sustainable, vaccines and equipment were sold to the poultry workers through small loans provided by local NGOs. Vaccinations, medicine and services were provided to smallholders, who paid in cash or in kind. The poultry workers provided house-to-house service for all birds, which was the secret of the success of the vaccination programme. An ND vaccination campaign reduced mortality from 41 percent to 19 percent in one year.

### **Step 3: Improved breeds**

Bangladesh has been working to improve poultry breeds for intensive production since the 1930s. After independence in 1972, the focus was on breeds suitable for village conditions. Mini poultry farms were set up to produce fertile eggs from improved breeds, boosting the laying capacity of village hens to 200 eggs per year.

### **Step 4: Supporting enterprises**

Establishing village enterprises provided the support needed to make the poultry activities sustainable. These included:

- chick-rearing units to rear chicks from birth to 8-12 weeks, to reduce mortality;
- feed-selling units in which cattle-feed sellers make poultry feed or feed ingredients available locally;

- mini hatcheries to hatch eggs and sell day-old chickens to smallholders or chick-rearing units;
- women egg collectors who collect eggs from smallholders and sell them in the markets, giving women smallholders a better price than traditional middlemen or even their own husbands.

## **Results**

The Bangladesh smallholder poultry projects improved beneficiaries' household conditions in many ways. These results show the benefits of the projects implemented since 1993:

- 99.9 percent of beneficiary households showed improved economic conditions;
- 93 percent of loans were repaid on time;
- 28 percent of beneficiaries moved above the poverty line within 18 months;
- 86 to 99 percent increase in school enrolment, especially for girls;
- women gained greater influence on family decision-making;
- household intake of animal protein was increased;
- 30 percent decrease in chicken mortality in one year.

By 2004, more than two million beneficiaries will be reached through projects implemented by national NGOs under the responsibility of the Government of Bangladesh.

### Reasons for success

Ninety-five percent of the beneficiaries of the Bangladesh smallholder poultry model are women. They are extremely poor and have access to less than 0.2 ha of land. They depend on the sale of their manual labour for income. The success of the programme can be traced to a series of decisions:

- choosing the right beneficiaries;
- making microcredit available;
- applying simple, low-risk technologies requiring little initial



FIGURE 10 A Bangladeshi farmer with her laying hen. (Photo: Jens Christian Riise)

training or investment that are socially and culturally acceptable with high turnover and quick returns;

- creating interdependence between beneficiaries and NGOs;
- ensuring the long-term commitment of NGOs and governmental institutions.

Long-term commitment is necessary to ensure that poverty alleviation and empowerment of women is on the long-term agenda of NGOs and government institutions (Danish Network for Smallholder Poultry Development, 2001).

### ■ *Improving village chicken production by controlling Newcastle disease*

ND is one of the major constraints to production of village chickens. Outbreaks of the disease regularly cause 50 to 100 percent mortality in countries where it is enzootic. ND outbreaks may occur less frequently in countries where it is not enzootic, but potential losses make vaccination mandatory.

Since 1984, ACIAR has supported collaborative research on control of ND in village chickens, reflecting the importance of ND in Southeast Asia and lack of vaccines. It built on earlier experience of disease control and research in Australia and Asian partner countries.

## Research phase

Investigations into the control of ND in Southeast Asia and Africa involved:

- laboratory testing of live thermo-stable NDV4-HR and I-2 ND vaccines;
- field testing vaccine administration routes such as eye-drops, drinking water, oral drenches and feeds such as cooked white rice and wheat;
- development of extension material;
- attention to cost-recovery and cost-saving issues.

## Results

The initial focus was development of an ND vaccine for use in difficult rural conditions where cold storage is often absent or unreliable. The NDV4-HR and I-2 ND vaccines performed well. In freeze-dried form, these vaccines retain their activity for two months at temperatures up to 28 °C. The I-2 wet vaccine – vaccine that has not been freeze-dried – remains active for two weeks when not refrigerated.

In Asia, NDV4-HR vaccine was initially mixed with wheat and feed pellets to vaccinate village birds that roosted in trees. This method provided 60 percent protection against ND in vaccinated flocks, but proved expensive because of the need to revaccinate birds at short intervals. In Africa, no suitable vaccine feed carrier has been identified. Maize, the common grain in most of Africa, contains a chemical

that deactivates live ND vaccines. Studies in Mozambique demonstrated that village chicken farmers prefer to administer eye drops because the method provides the best protection and is less expensive because it does not have to be given so often.

## Simple training

Training village chicken farmers to become community vaccinators is made easier because live thermo-stable vaccines are relatively easy to use. Once out of refrigeration, the vaccines can be transported wrapped in damp cloth in covered baskets. The dose is the same for birds of all ages. Overdosing with these vaccines is not dangerous to the birds, therefore if vaccinators are not confident that the first drop entered the eye, they can give a second drop.

## Availability of vaccines

NDV4-HR is a patented commercial vaccine that can be purchased when foreign exchange is available. For countries where foreign exchange is not readily available, ACIAR provides free non-patented I-2 master seed, which makes possible local production of ND vaccine suitable for village chickens. Attention must be given to social and economic aspects of the work, however, to make ND control sustainable. The basic objective is to improve food security and to alleviate

poverty in rural and peri-urban households. Sustainable food security is linked directly to sustainable livelihoods, so an ND control programme must fit into the local context.

### Beneficial outcomes

ND control programmes in countries such as Mozambique have increased numbers of chickens, household purchasing power, consumption of chicken products and women's decision-making power. Sustainable ND control programmes can only be achieved when all stakeholders are involved in the development of a national control strategy. Experience has shown that

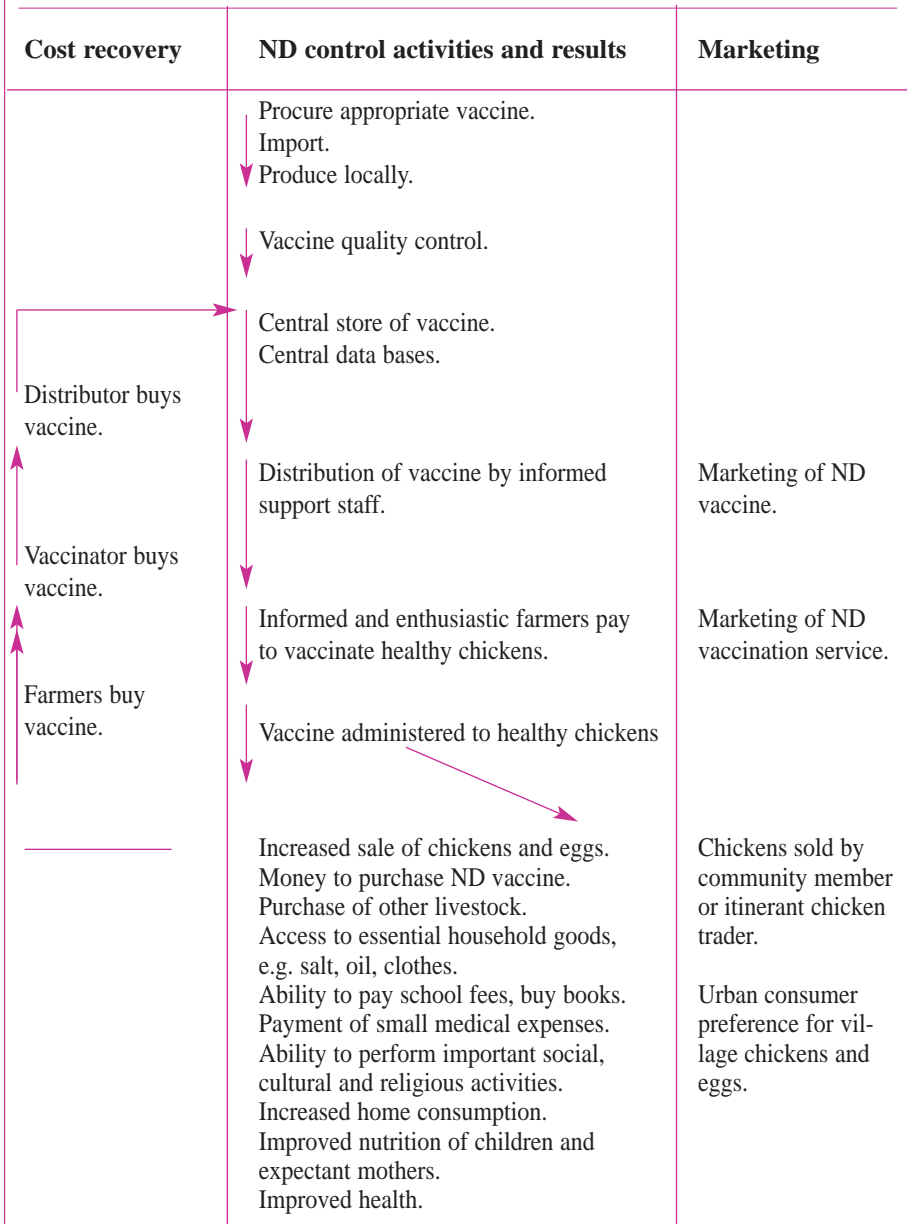
sustainable ND control has four essential components:

- appropriate vaccine and vaccine technology;
- extension efforts, including manuals, pamphlets, posters, flip charts, songs, plays and radio programmes, and approaches that target veterinary and extension staff, community vaccinators and farmers;
- simple evaluation and monitoring systems for technical and socio-economic indicators;
- economic sustainability based on commercialization of the vaccine and vaccination services and marketing of surplus chickens and eggs.



*FIGURE 11 Dona Marta Muholove calls her chickens by spreading maize on the ground. Dona Marta, a widow, is the head of a Mozambican family that lacks adults who could look after cattle. She started to vaccinate her chickens against ND a year ago and now has over 40 birds. (Photo: Robyn Alders)*

**FIGURE 12 Cost-recovery and marketing activities linked to the sustainable control of Newcastle disease in village chickens**



Source: Alders, et al. 2001

ND control technology made available free by ACIAR has been used in Bhutan, Cambodia, Ghana, Malaysia, Mozambique, Myanmar, Senegal, Tanzania and Viet Nam. This was supported by the Australian Agency for International Development (AusAID), FAO, the International Fund for Agricultural Development (IFAD) and the World Bank.

### ■ *Case study 2. South African Fowls for Africa® Programme*

Fowls for Africa® is a new initiative set up to bring poultry production within the reach of all farmers, and particularly those in resource-poor rural communities. It addresses the need for affordable animal protein by enabling people to produce eggs and meat for their own use and for sale. Under the auspices of the Animal Improvement Institute of the South African Agricultural Research Council (ARC), Fowls for Africa® achieves these aims by providing:

- training in poultry production;
- creation of poultry supply centres (PSCs) for feed and material requirements;
- primary poultry health care;
- poultry breeds adapted to the African environment;
- access to finance.

#### **Concept**

PSCs are franchises owned and managed

by members of the community that cooperate with the ARC. The ARC and its contractors supply PSC inventories at cost price. The inventories, sold at a profit by PSCs, include everything needed by poultry producers such as birds, feed, healthcare supplies and materials to build fowl runs.

ARC trains extension officers and prospective poultry producers on a cost-recovery basis. Those who complete the training receive certificates that secure accreditation with development banks or local government subsidiaries, which facilitate loan applications at financial institutions. ARC provides fowl first-aid kits at a nominal fee; these are designed for flocks of 50 to 1 000 and include disease identification and instruction brochures, vaccines and medication. They enable farmers without access to veterinary care to tend to the health of their flocks.

Six breeds have been identified that are adapted to survive under harsh low-input conditions, if shelter, feed, water and hygiene are provided. Fertile eggs and day-old and four-week-old chicks of these breeds are maintained by ARC and made available on contract to PSCs. The breeds are:

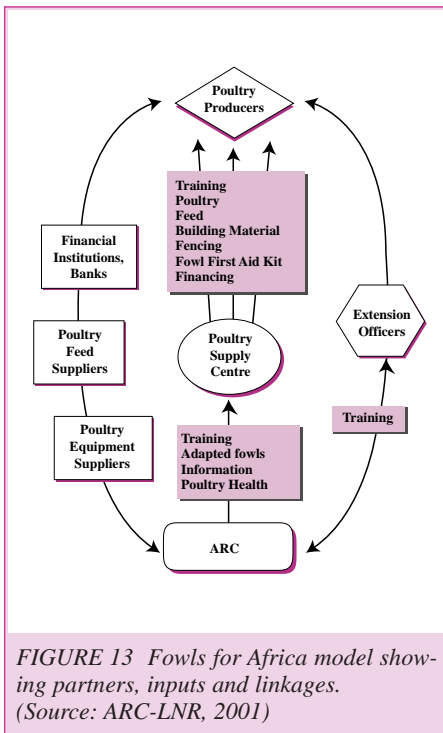
- Potchefstroom Koekoek – bred by crossing the Black Australorp and the White Leghorn; has good egg production
- Naked Neck – originated in Malaysia; a breed producing eggs

and meat; adapts well to hot climates;

- Venda – originated in the Venda area of Northern Province; has good egg production and a well-developed instinct for brooding;
- Ovambo – originated in northern Namibia and Ovamboland; good egg production; survives under harsh conditions;
- New Hampshire – dual-purpose breed of European origin; known for rapid development;
- Black Australorp – dual-purpose breed of European origin; can adapt to household production.

■ **Case study 3. Poultry production: a division of a small-scale agricultural programme in Pinalto, Guatemala**

Prudencia Ramos, a widow with six children, was able to improve her family’s diet, greatly increase her income and pass on what she had learned to her neighbours. She achieved these things through an integrated small-scale agriculture programme sponsored by the Ezra Taft Benson Agricultural and Food Institute in Pinalto, Guatemala. The programme, designed to support the food needs of a family of seven and provide cash income, provided improved planting technology for corn and black beans, establishment of a family garden and poultry production. The garden provided vegetables rich in vitamins and minerals, which had been largely missing from the family diet. Chicken production gave additional meat for the table and was a profit-making venture. When she entered the programme, Prudencia’s annual income was US\$350; her corn yielded 500 kg and her beans 50 kg per year. Prudencia was given credit to build a small poultry house and to buy ten-day-old broiler chicks. She reinvested the earnings from sales of her chickens and in time was able to increase her flock to 300 birds. At market time, she processed 25 birds daily and rode on a truck for an hour to the nearest city where she sold them. She organized





her neighbours into a production cooperative that eventually had 1 600 birds. After three years of participation in the programme, her annual income had increased by more than eight times, from US\$350 to US\$2 900, through the sale of chickens and increased productivity of her corn to 1 500 kg and beans to 200 kg per year. (Johnston, Flores and Guzman, 2001).

#### ■ *Case study 4. Duck production in Cambodia*

##### **Breeds**

Four breeds of ducks and crosses between them are common in Cambodia. They vary according to their ability to produce meat or eggs and in the size and number of eggs produced. The Angkam and Sompuwv breeds and crosses between them are the most common. It is often difficult to identify pure breeds in flocks that are mostly crossbreeds. The Angkam is slightly smaller than the Sompuwv and is a true dual-purpose producer; its 80 g eggs are smaller than those of the Sompuwv, which lays eggs of 100 to 120 g, but it produces more of them.

The Peking duck is a tall white duck specialized for meat production, and common in peri-urban areas near bodies of water, for example, north of Phnom Penh.

The Muscovy duck, or Kpar, actually belongs to the goose family. The

distinctive growth on its beak makes it easily identifiable. It is found in small numbers around the houses of farmers who do not specialize in duck raising. The Muscovy duck's natural behaviour and size allows it to incubate 10 to 15 eggs, compared with 5 to 8 eggs for local hens. These ducks are sometimes used by farmers to incubate the eggs of other ducks or chickens. Their use for meat is limited because farmers in some areas believe the meat is diseased although this belief appears to be decreasing.

##### **Production systems**

Commercial duck raising, using mostly Angkam, Sompuwv or crosses, is concentrated in the provinces of Takeo, Kompong Cham, Kampot and parts of Kompong Thom, in areas where there is access to water in the dry season. Incubators use artificial hatching units and sell between 200 and 400 day-old chicks at a time to raisers, usually in September, several months before the harvest.

In the first month, the ducklings are kept warm in the house, where they are fed on fish (for protein) mixed with broken rice. After the harvest, farmers take the ducks to the rice fields, where they feed on insects, snails and paddy that has fallen from the rice plants. The ducks roam freely, with no concern as to ownership of the fields. Little or no





*FIGURE 14 Duck herders in Asia move with their ducks as they feed; they can cover large distances. (Photo: Peter Spradbrow)*

supplement is given during this period.

There are markets for ducks from Cambodia in Viet Nam during the Chinese New Year in February. As the dry season approaches, the ducks scavenge in lakes for food such as snails, insects and water grasses; paddy is given as a supplement. By the Khmer New Year in

April, the ducks are five to six months old, and most raisers sell up to 90 percent of the males for meat. At that stage they weigh about 1.5 kg. Some females may be sold, but most are kept for egg production. Sales over this period assist the cash flow of the operation.

Females begin to lay eggs at about six months; daily egg sales finance

their feed. A farmer from Takeo noted: “The sale of 30 eggs finances the purchase of food for 100 ducks for a day.” The larger eggs of Sompuwv ducks are preferred for sale as boiled or uncooked eggs; the smaller Angkam eggs are commonly marketed as *brae*, which are salted black eggs. Many raisers have financial arrangements with the suppliers of the day-old ducks, which gives them some financial security.

### Marketing

Eggs sold to consumers can be embryonated or *bong dteer goan*, salted or *bong dteer brae*, fresh or boiled. The raisers sell fresh eggs to consumers or to processors. The simplest process is boiling. The incubators who produce day-old ducklings for sale also produce embryonated eggs, which are fertile eggs incubated for 18–21 days; the full incubation period is 28 days. Salted eggs are produced by putting them in a mixture of salt and the ash of rice husk for about a month. The salt is absorbed into the eggs and preserves them – a useful process for farmers. Fresh, boiled and embryonated eggs spoil within a day or two. Fresh eggs bring the lowest prices, followed by boiled and salted eggs; embryonated eggs have more than twice the value of fresh egg (Maclean, 1998).

### ■ Case study 5. Integrated rice-fish-fern-duck farming system in the Philippines

A 1995–1996 research project in the Philippines, integrating high-yield rice, genetically improved fish, aquatic ferns and ducks, generated increases in rice and duck production. It was conducted at the Freshwater Aquaculture Centre, Central Luzon State University with support from FAO and the Catholic University of Louvain, Belgium. It focused on production, economics and control of pests such as weeds and golden apple snails.

The project included high-yield IR64 rice, genetically improved Nile tilapia and the aquatic fern *Azolla*, which was cultured in lowland irrigated rice fields. Nine-month old Mallard ducks were integrated into the system at a density of 400 birds per hectare, comprising 367 ready-to-lay females and 33 males. *Azolla*, cultivated as a monocrop and incorporated as organic fertilizer before rice transplanting, provided half the nitrogen fertilizer requirement of the rice; the other half came from chemical fertilizer. It served as a weed suppressant and as feed for the tilapia and ducks. The ducks were allowed to forage in the rice fields during the fallow period before rice transplanting. A duck house made of cheap local materials was built over the fish pond refuge where the ducks were confined when they were not foraging.

The ducks' laying was over 60 percent, compared with a national average of 35 percent for ducks under traditional management systems. Herding the ducks economized on feed costs and was effective in controlling the herbivorous golden apple snails. The foraging of 400 Mallard ducks per hectare during the 30 to 48 days of fallow before rice transplanting kept the golden apple snails down

to densities that were not detrimental to the young rice plants.

The study demonstrated that when Nile tilapia, Azolla and Mallard ducks are integrated into the system, higher rice production can be achieved than with conventional monoculture rice production, rice-fish farming and rice-duck farming (Cagauan, Branckaert and Van Hove, 1998).

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International Network for Family Poultry Development  
<http://www.fao.org/ag/aga/agap/lpa/fampo1/fampo.htm>

Danish Network for Smallholder Poultry Development  
<http://www.poultry.kvl.dk>

Householder Poultry Enterprise – Asia  
<http://www.aphca.org>

## ■ *Other sources of information*

Fowls for Africa®  
<http://www.arc.agric.za/institutes/aii/main/divisions/animalbreedgen/resourcepoor/fowls/fowls.htm>

GRM International  
<http://www.grm.com.au>

Improvements in Rural Poultry in Developing Countries  
<http://www.vsap.uq.edu.au/ruralpoultry>

Poultry Resources for Small Farms  
[http://journeytoforever.org/farm\\_poultrylink.html](http://journeytoforever.org/farm_poultrylink.html)

VETAID  
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Vétérinaires sans Frontières  
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■ *Donor agencies supportive of rural poultry programmes*

Asian Development Bank (AsDB)

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<http://www.ausaid.gov.au>

Danish International Development Agency (DANIDA)

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Food and Agriculture Organization of the United Nations (FAO)

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International Fund for International Development (IFAD)

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**POULTRY ARE THE MOST BENIGN OF FARM STOCK; easy to manage, resilient and relatively productive under the most varied conditions. Anyone with a small patch of land can keep poultry for their eggs and meat, and for breeding. There are few greater pleasures than keeping a flock of hens and feeding them from the produce of the garden or surplus food from the house. The more commercially-minded producer will purchase proprietary foods, exploit local markets and make a reasonable income. Whatever the level of interest or scale, this booklet provides the information to encourage people to become more involved.**

