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village chicken production:

A MANUAL FOR FIELD WORKERS AND TRAINERS



Improving village chicken production:

A MANUAL FOR FIELD WORKERS AND TRAINERS

Christine Ahlers, Robyn Alders, Brigitte Bagnol, Ana Bela Cambaza, Mohamed Harun, Richard Mgomezulu, Halifa Msami, Bob Pym, Peter Wegener, Ed Wethli and Mary Young



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Foreword

Poultry have contributed to human health and wellbeing for millennia. For rural communities, poultry continue to be an integral part of farming systems and household economies. For cities and towns, where an increasing proportion of people now live, large- and small-scale commercial poultry industries play a critical role in providing safe, good-quality products for urban consumers. In many countries, commercial and household poultry are located within the same communities, and improvement programs designed to increase the capacity of producers and introduce new technologies and practices can have widespread impact.

Australia has supported the implementation of effective village chicken production programs in Asia, Africa and Latin America, including several research projects funded by the Australian Centre for International Agricultural Research (ACIAR). This investment in research and development, always in collaboration with producers, traders and other stakeholders, has been shown to increase poultry numbers, household purchasing power, home consumption of chicken products (resulting in improved nutrition for families) and the decision-making power of women. Village chicken improvement programs have the potential to contribute to each of the Millennium Development Goals and to do so for the most vulnerable families in developing countries.

This is the fourth manual on improvements to village chicken production supported by ACIAR.¹ These manuals aim to fill gaps in the training literature, which has dealt mostly with intensive commercial production or backyard production in developed countries. This manual is focused on developing countries and describes husbandry practices and biosecurity measures for village chickens that can be implemented using locally available resources. These measures will lead to both increased productivity and improved protection from disease in village chicken systems.

The manual is comprehensive, covering many aspects of production and health. It draws on the research results of a number of ACIAR-funded projects that provided a sustainable base to the control of Newcastle disease (ND) in village chickens using thermotolerant vaccine. Newcastle disease remains a major constraint to poultry production worldwide and these projects recognised that benefits to farmers can be further increased when other health and production issues are tackled in addition to vaccination.

Much of the content of the manual has been developed to this final stage during a project funded by the Australian Agency for International Development (AusAID) from 2002 to 2005, to implement the Southern Africa Newcastle Disease Control Project (SANDCP) in Malawi, Mozambique and

¹ Controlling Newcastle disease in village chickens: field (Alders and Spreadbrow 2001), training (Alders et al. 2002) and laboratory (Young at al. 2002) manuals (ACIAR Monographs 82, 86 and 87, respectively)

Tanzania. SANDCP followed on from 7 years of ACIAR-funded research on ND control conducted by the Mozambican National Institute for Veterinary Research and the University of Queensland.

It is pleasing to note that the success of SANDCP, including the use of the training material in this manual, has gone well beyond the control of ND in these three countries and has laid a foundation for responding effectively to the worldwide epidemic of highly pathogenic avian influenza and in developing livelihood strategies for communities affected by high levels of HIV/AIDS.

ACIAR will continue to support research that contributes to food security, food safety and ecologically sustainable livestock production, and to recognise that building capacity in poultry health and production is of special significance to developing countries.

Leter Core

Peter Core Chief Executive Officer ACIAR

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About the authors

Author	Description	Contact details
Christine Ahlers	A poultry veterinarian with experience in both commercial and family poultry, working for the Food	 FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand
	and Agriculture Organization of the United Nations in its Regional Office for Asia and the Pacific	2. Soomskamp 12, 27324 Eystrup, Germany
		Email: c-ahlers@gmx.de
Robyn Alders	A village poultry specialist with the International Rural Poultry Centre of the KYEEMA Foundation and the Cummings School of Veterinary Medicine, Tufts University, USA	 KYEEMA Foundation, GPO Box 3023, Brisbane, Queensland 4001, Australia.
		 International Program, DEPH, Cummings School of Veterinary Medicine, Tufts University, 200 Westboro Road, North Grafton MA 01536, USA
		Email: robyn.alders@gmail.com
Brigitte Bagnol	Social anthropologist with the University of the Witwatersrand, Johannesburg, South Africa and	Postnet suite 118 Private Box X1, Melrose Arch, 2076 Johannesburg, South Africa
	the International Rural Poultry Centre of the KYEEMA Foundation	Email: bagnolbrigitte@gmail.com
Ana Bela Cambaza	A veterinarian working for the	CP 1406, Maputo, Mozambique
	Directorate who has been involved with the control of Newcastle disease in village chickens since 2004.	Email: controlodn@yahoo.com.br
Mohamed Harun	Veterinary physiologist specialising in the biology of incubation and temperature regulation in neonates	Veterinary Faculty, University of Eduardo Mondlane, PO Box 257, Maputo, Mozambique
	of avian species	Email: kabil.harun@tvcabo.co.mz
Richard Mgomezulu	Animal production specialist with 18 years' experience in livestock production including poultry.	Department of Animal Health and Livestock Development, PO Box 2096, Lilongwe, Malawi
	He has been actively involved in control of Newcastle disease in village chickens using a thermotolerant I-2 ND vaccine since 2003.	Email: richardag_mgomezulu@ yahoo.co.uk
Halifa Msami	Principal veterinary research officer, Tanzania national coordinator for	Central Veterinary Laboratory, PO Box 9254, Dar Es Salaam, Tanzania
	Newcastle disease control; poultry pathologist with several years experience working on village chicken development	Email: hmmsami@gmail.com

Author	Description	Contact details
Bob Pym	A poultry geneticist by training with interest and involvement in small-scale family poultry production in the developing countries of South-East Asia and Southern Africa	School of Veterinary Science, University of Queensland, St Lucia, Queensland 4072, Australia Email: r.pym@uq.edu.au
Peter Wegener	A community development and extension specialist who has also helped design training materials and programs for the control of Newcastle disease in village chickens	School of Natural and Rural Systems Management, University of Queensland, St Lucia Campus, Queensland 4072, Australia Email: p.wegener@uq.edu.au
Ed Wethli	A poultry specialist with many years' experience of small-scale chicken development in rural and peri-urban areas	PO Box 171, Ifafa Beach 4185, KwaZulu-Natal, South Africa Email: edwethli@absamail.co.za
Mary Young	A veterinary pathologist with several years' experience in control of Newcastle disease in village poultry using thermotolerant I-2 Newcastle disease vaccine	KYEEMA Foundation, GPO Box 3023, Brisbane, Queensland 4001, Australia Email: mary_p_young@yahoo.com

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Abbreviations

ACIAR	Australian Centre for International Agricultural Research
AIDS	acquired immune deficiency syndrome
CRD	chronic respiratory disease
°C	degrees Celsius
FAO	Food and Agriculture Organization of the United Nations
FGD	focus group discussion
g	grams
HIV	human immunodeficiency virus
HPAI	highly pathogenic avian influenza
IB	infectious bronchitis
IBD	infectious bursal disease, also known as Gumboro disease
kg	kilogram
L	litre
m	metre
m²	square metre
mL	millilitre
ND	Newcastle disease
NGO	non-government organisation
PRA	participatory rural appraisal
OIE	World Organisation for Animal Health (Organisation Internationale des Epizooties)
PPE	personal protective equipment
SFRB	scavenging feed resource base

Glossary

Antibody	A protein produced by specialised B cells after stimulation by an antigen. Antibodies bind with antigens on foreign organisms to help inactivate them. Each antibody can bind to only one specific antigen.
Biosecurity	Any practice or system that prevents the spread of infectious agents from infected to susceptible animals, or prevents the introduction of infected animals into a herd, region, or country in which the infection has not yet occurred. More specifically, biosecurity combines 'bioexclusion', i.e. measures for preventing a pathogen from being introduced into a herd/flock, and 'biocontainment', stopping the spread of a pathogen among animal groups within a farm or of being released from the farm.
Broody	If a hen (= female chicken) is broody, she is ready to lay eggs and sit on them.
Cloaca	The internal cavity into which the intestinal, urinary and genital canals empty in birds. In females it also serves as the depository for sperm. The cloaca has an opening (vent) for expelling its contents from the body.
Cockerel	A young male chicken.
Droppings	The excrement (i.e. manure) produced by animals and birds.
Embryo	An animal that is developing, either in its mother's womb or in an egg, or a plant that is developing in a seed.
Endemic	An endemic disease or condition is one that is regularly found and very common among a particular group or in a particular area.
Fomites	Inanimate objects such as boots, clothing, equipment, instruments, vaccination needles, vehicles, crates or packaging that can transmit an infectious agent to a new host mechanically. Fomites become contaminated but not infected.
Forage	Food grown for livestock consumption.
Gleanings	Cereal remnants in the field after harvesting.
Genotype	The particular type and arrangement of genes in an organism.
I-2 vaccine	Thermotolerant, live, avirulent Newcastle disease vaccine.

Lipid	A substance such as a fat, oil or wax that dissolves in alcohol but not in water and is an important part of living cells.
Mechanical transmission	The transfer of an infection from one animal to a new host where the transmitter is not infected, in that tissues are not invaded and the agent does not multiply. Fomites are often involved in mechanical transmission.
Mutation	A sudden change from the parent type in one or more heritable characteristics, caused by a change in a gene or a chromosome.
Organic	Organic produce, such as plants and animals grown for food, is produce grown without the use of insecticides and other synthetic chemicals.
Pathognomonic	A pathognomonic sign is a specific sign whose presence means, beyond any doubt, that a particular disease is present.
Pullet	A young, female domestic fowl, especially a chicken, from the time she begins to lay until first moult.
Rales	A clicking, rattling, or crackling noise heard during inhalation.
Reassortment	The fragmentation and reassembly of the genetic material of two similar viruses that are infecting the same cell.
Rooster	An adult male chicken.
Snick	A high-pitched sound associated with sneezing in poultry.
Thermolabile	A thermolabile agent loses activity (especially infectivity) at elevated temperatures.
Thermotolerant	A thermotolerant agent retains activity (especially infectivity) at elevated temperatures.
Tropism	A preference for a particular location or direction. The site preferred by a virus (e.g. ND virus) for replication within the body.
Vent	The external opening of the cloaca, through which eggs and droppings pass.
Vertical transmission	Passage of a disease-causing agent (a pathogen) vertically from mother directly to her offspring during pregnancy or lactation. In the case of poultry, the transmission is from the hen to her chick via the egg.
Virulence	Refers to the degree of pathogenicity of a microbe or, in other words, the relative ability of a microbe to cause disease.



PART 1 Village chickens and village chicken farmers

The improvement of village chicken production can have a profound effect on the wellbeing of rural families. The effective, low-cost interventions described in this manual can directly contribute to poverty alleviation, household food security, income generation, HIV/AIDS mitigation and wildlife conservation. Working with male and female farmers to improve the production of their village chickens also provides opportunities to enhance their understanding of nutrition, stock management, and the origins and development of diseases.

- Farmers' knowledge of poultry and human nutrition can be increased in parallel. Since women are often the family members responsible for both the care of poultry and the preparation of the family's meals, this approach can bring big benefits.
- Once the production of village chickens improves, farmers take a greater interest in managing their stocks of birds by monitoring the availability of local feed resources and assessing options for the off-take of birds by sale or other means.
- Ensuring that farmers understand disease processes is an essential step as it is very difficult to improve biosecurity practices if they do not believe that diseases are caused by infectious agents.

Before promoting improved management and disease control in an area or village, it is important to understand the existing environment in which village chickens are produced. Part 1 of this manual therefore provides, in three chapters, background material on the role of village chickens and where they fit into the rural production system. It also describes how to involve the community in any activities relating to village chicken production. It should be read and understood before deciding on implementing any of the interventions described in Parts 2 and 3.

A number of terms that may be unfamiliar are defined in the glossary at the beginning of the manual.

1 Introduction

1.1 Village chickens defined

Village chickens are the most common type of livestock in many rural areas. Even very poor households with few labour resources will normally keep some chickens. 'Village' chickens are also known as rural, indigenous, scavenging, traditional or family chickens, and have various names in local languages.

There are several definitions of village, rural or family poultry. The main differences between them relate to the degree to which aspects of more intensive and commercial chicken production systems are included. For the purposes of this manual, *family poultry* is used as a more general category that also includes production systems more commonly found in urban areas, where a family raises chickens in an enclosure with a greater level of purchased inputs. The term *village poultry*, on the other hand, refers to the extensive production systems most commonly found in rural areas, and usually involves indigenous chicken genotypes. The information provided in this manual is directed toward improvements to village poultry systems and aims to maintain the basic advantages of this system, which are low inputs and, consequently, low risk. Although the emphasis is on village chickens, many of the recommendations in this manual can be applied to other poultry species, such as ducks, turkeys and guinea fowl.

Village poultry:

- comprise local genetic stock (sometimes, but rarely, interbred with improved stock)
- are raised extensively in relatively small numbers (between 1–50 at any time, although more commonly 5–15 birds)
- are not usually confined and obtain most of their diet from scavenging for food and water around the home (including household wastes) and village
- require minimal investment in inputs, with most if not all of the inputs generated around the home
- engage labour inputs that are not salaried but are drawn from the family, with women and children commonly most responsible for their care
- production is geared essentially toward home consumption and savings (a living bank) for small expenses such as school fees and medicines.

Animal protein consumed in rural areas frequently comes from village chicken meat and eggs. Chickens can also be sold or bartered to meet family needs

such as medicines, clothes and school fees. In this way, they act as a ready source of cash for emergencies and small purchases. Village chickens provide manure and play a role in pest control. They are also important for special festivals or to meet social obligations, and they are essential for many traditional ceremonies and methods of treating illnesses. They are generally owned and managed by women and children, and are often an essential part of households headed by women.

Chicken meat and eggs

Chicken meat and eggs provide a readily available, high-quality source of proteins, vitamins and micronutrients. Eggs are an excellent source of iron, zinc and vitamin A, all of which are essential to health, growth and wellbeing. Chickens and eggs contribute to a nutritious, balanced diet, which is especially important for children, nursing mothers and people who are ill.

Village chickens play a very important role in poor rural communities in that they can convert feed available around a house or village (the 'scavenging feed resource base', SFRB—see Section 2.4) into highly nutritious, well-appreciated products.

Although the output of traditional village chickens in terms of weight gain and number of eggs per hen per year is low, it is obtained with minimal labour and other inputs. This factor of low input and, consequently, low risk is one of the major advantages of village chicken production. It is important to remember that it is undesirable for any initial improvements to village chicken production to significantly raise the labour costs or financial risks involved in the activity.

Simple changes in management of village chickens can significantly improve production and the living conditions of many rural families in terms of enhanced nutrition and income generation through the sale of surplus chickens or eggs. Improved village chicken production is therefore a low-cost and important aspect of rural development.

1.2 About this manual

This manual follows on from 'Controlling Newcastle disease in village chickens: a training manual' (Alders et al. 2002). That manual and associated handbooks (see the Bibliography for a list of titles) were designed to help extension workers and community vaccinators to understand how Newcastle disease (ND) can be controlled in rural areas.

In many places, ND is considered the most significant constraint to village chicken production. Poultry farmers' familiarity with the high mortality caused

by ND has delayed the detection of highly pathogenic avian influenza (HPAI) in many countries and complicated HPAI control measures. The effective control of ND will facilitate the early detection of incursions of HPAI by reducing mortality in flocks and improving relations between farmers and animal health authorities. However, once ND is controlled, there are other diseases that will naturally assume greater importance and which traditionally have received less attention in research and extension programs. While none of these diseases is likely to be individually as significant as ND, collectively they are very important and can markedly reduce the potential benefits from ND control.

As ND control improves, producers are motivated to take the next steps in improving their chicken production. They talk about increasing flock size, controlling other diseases, reducing mortalities from predators, minimising theft, improving feeding and organising better marketing systems. Once a successful ND control program is under way, extension agencies can prepare for the increase in the demand for information by organising training and information for extension officers. Until recently, however, most of the information relating to chicken production was directed toward intensive or semi-intensive systems.

This manual aims to provide, for extension workers and livestock officers, basic information on the production of traditional village chickens and how productivity can be improved by introducing appropriate, low-cost approaches. The manual describes the initial steps that can be taken to improve village chicken production. More costly techniques, such as keeping birds permanently in chicken houses and supplying only commercial feed, are not covered in this manual, although information about these techniques can be obtained from documents posted on websites listed in the 'Sources of further information' section in Appendix 6. These other techniques could be tested by farmers after they are comfortable implementing the suggestions described in this manual and they have a good understanding of the extra costs and labour that would be required for more intensive chicken production.

Although this manual includes information on ND, the more comprehensive ND training manual mentioned earlier should be referred to for controlling this disease in areas where it is endemic. Once ND is under control, or in areas where ND is not endemic, farmers will be have a greater incentive to implement the measures suggested in this manual.

1.3 How to use this manual

The manual is in three parts.

- Part 1 gives general information about village chicken production and how to work with chicken producers.
- Part 2 describes management and husbandry practices that will improve chicken production.

• Part 3 deals with various poultry diseases and their control, with special emphasis on ND.

The manual is designed as a practical reference tool for extension workers, livestock officers and field veterinarians. Each chapter details improvements that could be applied by village chicken producers. The key extension messages of each chapter are summarised at its start.

The appendixes provide more detailed information that will assist people working with village chicken producers. While the main part of the manual deals with practical information that would be of direct use to village chicken producers, the appendixes are aimed at providing additional technical information.

- Appendix 1 gives suggestions on how to use this manual as part of a training course.
- Appendix 2 describes participatory exercises that could be used with village communities to identify problems.
- Appendixes 3, 4 and 5 provide information on sample collection and serology.
- Appendix 6 provides sources of other information and further reading.

The order in which information in the manual could be used could vary as follows, according to the principal problem to be addressed in a particular area:

PRINCIPAL PROBLEM			
Newcastle disease (ND)	Part 1 \longrightarrow	Part 3 (plus ND training manual)	\longrightarrow Part 2
Other diseases	Part 1 \longrightarrow	Part 3	\longrightarrow Part 2
Management	Part 1 \longrightarrow	Part 2	\longrightarrow Part 3
Supplementary feeding	Part 1 \longrightarrow	Part 2	\longrightarrow Part 3

1.4 Promoting improved village chicken production using minimal external inputs

Why should extension and development agencies promote improved village chicken production and why should they promote improvements that require minimal extra inputs?

Village chicken production has traditionally been underrated in importance as a vehicle for rural development. This has partly been due to the constraints that ND imposed on the development of this enterprise, but also because women's activities and priorities in rural development in general, and livestock production specifically, have rarely been adequately addressed. Control of ND in endemic areas opens up further opportunities for improvement that were not previously feasible or considered worth undertaking. There are many improvements offering substantial benefits that can be achieved by farmers from within their own resources without cash expenditure or external assistance apart from appropriate extension advice. Examples would include measures for reducing chick mortality, predation and theft; management of other diseases; and improving flock management.

The benefits of village chicken raising are increasingly being recognised.

- Most rural families, including very poor households, keep some chickens or other poultry species. Chickens are often essential elements of female-headed and HIV/AIDS-affected households. Improvements in chicken production would therefore have a significant effect on most rural families, but especially the poorest and most marginalised people in rural communities.
- Significant returns can be achieved from village chickens without the need for expensive housing, complex technology and funding for the purchase of inputs not available locally.
- Chicken meat and eggs are a source of high-quality nutrients (e.g. proteins and micronutrients) that are often otherwise unavailable to resource-poor families.
- Village chickens are often cared for by women and children and so programs that improve production will simultaneously improve the income and knowledge of these household members.
- Smallholders can produce chickens at little or no cost, which has a very significant competitive advantage over almost any other income-producing activity that they may choose. As such, the activity is essentially financially risk free, with or without ND control.

Interventions and improvements should be designed to take advantage of the natural competitive advantages inherent in village chicken production. There will still be significant risks of disease, predation and theft following ND control and other management improvements. Any interventions that need more than minimal purchased inputs or other cash outlays should be avoided in the first instance, as such may increase poverty and food insecurity.

Table 1 compares the conditions and resources required for extensive, semi-intensive and intensive smallholder production of chickens.

Criteria	Extensive rural production	Semi-intensive smallholder production	Intensive smallholder production
Local conditions			
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
Inputs required			
Training	Basic: Newcastle disease (ND) control, highly pathogenic avian influenza (HPAI) control (in affected areas); fowl cholera control (in some areas); poultry husbandry and management	Moderate: control of ND, HPAI, infectious bursal disease/Gumboro disease, 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

Table 1. Comparison of chicken production systems

Source: adapted from Alders (2004)

1.5 Gender and village chickens

Knowing who is responsible for raising village chickens is of the utmost importance when planning to improve production.

The analysis of gender relations is of major importance for any type of intervention in rural areas, because the paradigms of access, control and benefits of the resources and consequently of exclusion are based on the social relations between men and women. As a consequence, the understanding of gender relations and their implications for livestock raising are important to promote appropriate interventions.

The different members of the household can have different, even contradictory, interests in agricultural production and livestock. The processes of decision-making in households and communities are complex and dynamic. Although male and female farmers have a lot in common, they often have different interests and problems. Men and women may have different interests in relation to animals they have access to and control over. With the animals raised, each species plays a specific role and is owned and cared for by different individuals in the household. These issues have to be considered in the interest of establishing successful collaboration and dialogue with male and female farmers.

1.6 Newcastle disease and avian influenza control, and other production improvements

It is estimated that control of ND alone could increase household income derived from village chickens by 40–60%. Furthermore, when ND control is coupled with other simple production initiatives, household income could increase by around 80% above pre-ND control levels. Although these figures are only estimates, they illustrate the value to be gained from a holistic approach to ND control, where the potential impact of ND control can be doubled if some additional measures are adopted by farmers. These measures involve little additional expenditure by government, donors and households.

Case study:

Sra Luisa Arnaldo, a 36-year-old widow with three children lives in Chirodzi-Ponte, Mozambique. She started raising three chickens in 2000 but the number did not increase due to regular outbreaks of ND. In the middle of 2003, she started to vaccinate her chickens and has since participated in five vaccination campaigns, paying Mozambican metical (MZM) 500 (US\$0.025) per bird to the community vaccinator. In October 2004, she had 25 chickens and decided to sell 5 roosters. The roosters sold for MZM45,000 each (i.e. US\$2.25), raising a total of MZM225,000. She used MZM150,000 to buy a goat that has subsequently become pregnant. At the time of the interview, all of her children attend primary school. The effective control of ND, and the associated reduction in mortality, contributes greatly to the early detection of HPAI. HPAI must be considered when high mortality occurs in a flock already vaccinated against ND.

1.7 Village chicken production and HIV/AIDS mitigation

Village chickens require the lowest capital investment of any livestock species and they have a short production cycle. They also play an important role in households where there is a lack of able-bodied workers, such as those affected by HIV/AIDS or which have a disabled family member. Goats and cattle require herders to stay with them during the day, but this is impossible in households without working adults.

In households headed by widows, children or grandparents, chickens represent the easiest species to raise for sale and home consumption, providing a source of high-quality proteins, energy and vitamins, all of which play an important role in the nutrition of HIV/AIDS patients. It is generally acknowledged that poultry production is the most efficient and cost-effective way to increase the availability of high-protein food. Eggs are also a good source of other essential nutrients and can be stored under village conditions more easily than most foods of animal origin.

Families affected by HIV/AIDS will be more likely to make use of the benefits of chickens and eggs if veterinary services work in collaboration with education and health ministries. Improved chicken production and use of chicken meat and eggs can be incorporated into an overall strategy for supporting households affected by HIV/AIDS.

1.8 Organic village chicken production

As economies grow, consumer preference tends towards high-quality meat and eggs that are free of undesirable residues. Examples of the marketing and export of village chickens to supply this growing market already exist in South-East Asia and opportunities exist in Africa.

Farmers interested in producing organic village chickens should therefore avoid the use of antibiotics, insecticides and other products that could leave chemical residues in their birds. Products such as antibiotics and insecticides tend to be expensive and, in many cases, their use in village chickens is of questionable long-term value. Indeed, the misuse of antibiotics can cause the development of resistant strains of bacteria, making the antibiotics less effective.

1.9 Village chicken production and wildlife conservation

The development and maintenance of national parks in many countries must address the multifaceted needs of biodiversity conservation, sustainable tourism development and communities living in the vicinity. Initiatives that bring government, communities, non-government organisations (NGOs) and commercial ventures together to stimulate economic linkages, local participation and partnerships promote both biodiversity and increased wellbeing among local communities. Improved village chicken production in communities surrounding national parks can reduce hunting of wildlife for consumption and income.

2 General information about village chicken production

2.1 The village chicken system

Chickens are kept under a variety of husbandry systems, ranging from scavenging flocks to birds confined in pens and cages for their entire lives. Village farmers have flocks made up of chickens of various ages of both sexes. The flock is generally allowed to forage freely (or scavenge) in the village, forest, fields and along roadsides. This is very different from the commercial chicken production system which requires far greater management of the chickens and is more costly (Table 2).

Factor	Village chickens	Commercial chickens
Labour inputs	Minimal	Considerable
Housing	Trees; chicken houses of local material; inexpensive	Chicken unit using conventional materials; expensive
Nutrition	Scavenging feed resource base, leftover food, cereals, no supplements; inexpensive	Balanced commercial ration; expensive
Water	Well water, used water, natural sources	Clean water supply essential
Production	Low; could improve with better nutrition, disease control and shelter from predators	High; but requires a high level of inputs
Meat quality	Little fat; pleasant flavour; tougher texture	Broilers have more fat; less flavour; softer texture
Adaptability	Good: good flight skills, more likely to escape predators, can scavenge for own feed	Limited: poor flight skills, easily caught by predators, less skilled at scavenging
Reproduction	Good hatching and mothering ability; hens lay, brood, hatch and look after young	Poor hatching and mothering ability; commercial breed hens often do not go broody; new birds are bought to replace old birds
Veterinary inputs	Very limited; Newcastle disease vaccination	Control of many viral, bacterial and parasitic diseases essential for efficient production
Environmental impact	Minimal: can be positive through provision of organic fertiliser and pest control	Negative: intensive production of cereals for rations; occasional improper use of antibiotics; excess ammonia production

Table 2. Comparison of village and commercial chicken production factors

The unimproved scavenging chicken system has the following characteristics:

 Low input/low output. Owners put in small amounts of time and money with the expectation of low returns. This is especially so where there is no ND control, as there is a high chance that most of the chickens will die from this disease in endemic areas.

- Care of chickens is generally one of many female domestic tasks. People like to have chickens around but spend only a relatively small amount of time or labour on them every day. Their care is mainly the responsibility of women and children. As frequently happens with activities performed by women, chicken raising is often not recognised as 'real' work even although the birds must receive daily care.
- **Small-scale.** On average, a family has 5–15 birds and, since the mortality rate is high and few eggs are produced, they barely manage to maintain these numbers from generation to generation.
- **Subject to high mortality rates.** Causes of mortality include predation, malnutrition, disease and exposure to the elements; with exposure to the elements often occurring in the first few weeks of a chick's life.
- Well-adapted to village conditions. Due to their scavenging ability and the agility to escape predators, village chickens can survive where improved breeds would not. Productivity is relatively low due to genetic potential, low levels of feed and other inputs and, in the case of egg production, the requirement for the hen to brood around three batches of chickens each year.
- Can make use of locally available feeds. The chicken finds its own feed around the house or village. This feed is finite and variable, depending on the area and time of year.
- A source of high-quality nutrients and income. Despite the relatively low productivity in terms of meat and eggs, village chickens are an important source of high-quality protein for household nutrition. They also provide income for poor rural people. The village chicken can convert feed not eaten by humans into high-quality food. Neither do village chickens require large quantities of human food such as maize, so they do not compete with families for scarce food resources.
- Independent of large financial investment. Some form of housing may be provided for the chickens but this is often rudimentary. Owners may house chickens inside the family home at night-time to protect them from predators and theft. They do so despite the increased risks of infection or infestation, as very poor families put immediate security concerns ahead of uncertain biosecurity risk.
- Self-replicating. The traditional hen is a good incubator and mother: she arranges her own nest, lays a clutch of eggs, incubates the eggs and looks after the chicks that hatch.

2.2 Comparisons between village chickens and commercial chicken production

Village chicken production differs considerably from commercial chicken production not only in terms of inputs and productivity but also in the occurrence of and susceptibility to diseases. The differences are related to the type of birds used as well as to husbandry and flock management.

Tables 2 and 3 outline the main differences between village and commercial chickens and the factors that influence the health of chickens kept under each production system.

Table 3. Differences in flock health management between extensive (village) and intensive (commercial) chicken production systems

Village chicken production	Commercial chicken production	
Advantages:	Advantages:	
 Local breeds are adapted to harsh conditions, and resist diseases and poor husbandry conditions much better than breeds used for commercial production. 	 'All-in – all-out' principle (all birds of a flock are bought and sold at the same time) allows thorough cleaning and disinfection before the introduction of new birds. Prope cleaning and disinfection guarantees good 	
 Scavenging chickens are free to choose their feed (provided that there is enough) and escape difficult conditions. Due to this, the consequences of poor husbandry and nutrition are not as severe as in intensive production systems. 	 cleaning and disinfection guarantees good conditions for the new flock. Hygiene measures (e.g. limited contact with other birds, people, animals or equipment that might transmit an infectious disease) are quite easy to implement. 	
 A village chicken flock consists of birds of various age groups. Since several diseases affect only certain age groups, the effect of these diseases will not be as devastating as in flocks where all birds are the same age. 	 Veterinary interventions such as vaccination or application of commercial drugs are easier to conduct when birds are confined. 	
Little veterinary input is required.		
Disadvantages:	Disadvantages:	
 There are almost always birds in the flock (no 'all-in – all-out' principle) that could transmit any infectious agent to powly introduced birds. 	 Commercial breeds with high productivity are less resistant to diseases than village poultry. 	
newly initioduced birds.	Commercial flocks require comprehensive	
 Under scavenging conditions it is difficult to avoid contact of chickens with other birds, 	vaccination programs and regular veterinary observation to ensure efficient production.	
• Under scavenging conditions it is difficult to avoid contact of chickens with other birds, people, animals or equipment that might transmit an infectious disease.	 Vaccination programs and regular veterinary observation to ensure efficient production. Birds kept in intensive production systems rely completely on balanced putrition, good 	
 Under scavenging conditions it is difficult to avoid contact of chickens with other birds, people, animals or equipment that might transmit an infectious disease. Chickens on free range without supplementary feeding will suffer when the scavenging feed resource base is low (because of the server of the se	 Vaccination programs and regular veterinary observation to ensure efficient production. Birds kept in intensive production systems rely completely on balanced nutrition, good housing conditions and veterinary care. If any mistake is made, the health of all birds will decrease. 	
 Under scavenging conditions it is difficult to avoid contact of chickens with other birds, people, animals or equipment that might transmit an infectious disease. Chickens on free range without supplementary feeding will suffer when the scavenging feed resource base is low (because of the season or because there are too many chickens) and consequently can have poor health. 	 Vaccination programs and regular veterinary observation to ensure efficient production. Birds kept in intensive production systems rely completely on balanced nutrition, good housing conditions and veterinary care. If any mistake is made, the health of all birds will decrease. Since all birds in the flock are the same age and should be in the same condition, any outbreak of disease will affect all birds. 	

2.3 **Production characteristics of village chickens**

Basic production characteristics for village chickens are as follows:

- Hens start laying when 24–30 weeks' old (Figure 1). At any given time, only about half the hens are productive and some 8–10% never lay.
- Egg weight averages 40 g (range 27–65 g).
- Most birds produce 2–4 clutches per year, although some birds may produce 5–6 clutches. There are about 10 eggs per clutch, with a range of between 5 and 20.
- About 70–90% of the eggs will hatch (this varies with the season).
- Typically, about 8 chicks per clutch will hatch, with a range of between 4 and 15.

- Only 20–50% of chicks hatched will reach adulthood. Approximately 85% of these losses occur in the first 3 weeks of life. Adult mortality is very variable and depends on specific local conditions and the occurrence of diseases.
- Both sexes have a body weight of about 0.5 kg at 10–12 weeks (although males are slightly heavier). Adult hens weigh between 1.0 and 1.5 kg, while roosters weigh between 1.3 and 2.5 kg.



Figure 1. The life cycle of a typical village chicken

2.4 The scavenging feed resource base

Scavenging for feed is a major characteristic of extensive poultry-keeping systems. Birds are free to forage and they usually manage to get a reasonably balanced diet. Nevertheless, their diet is restricted in quality and quantity to what they manage to find. The locally available feed is called the 'scavenging feed resource base' (SFRB). The SFRB is limited and has to be shared by all birds in the area.

The scavenging feed resource base:

- comprises household waste, crop by-products and a range of food from gardens, fields and wastelands
- varies from one area to another, with season, with the size and wealth of the household, and with the area that the chickens have to roam (the village population density)
- is generally greater during the wet season, reaches its peak following the harvest (with increased crop residues and waste from higher family food intake) and gradually declines as the dry season progresses and green grass and leaves disappear
- is generally greater in areas where rainfall is higher and there are more-diverse household-sourced feeds such as coconut waste, cassava and horticultural waste
- may be limited in arid areas where the poorest families survive on a minimal area of crops such as maize, sorghum, millet or cassava. They cannot afford animal draft power and so the area cropped depends on family labour only, and household gardens provide few pickings.

The SFRB is an important aspect to consider when promoting improved village chicken production. Control of diseases and improved management will result in a larger number of birds in a village. If this is not carefully managed (through the consumption and sale of additional birds) then the village environment will not be able to support the nutritional requirements of these larger flocks.

3 Working together with male and female village chicken producers

3.1 Introduction

When commencing a program to support village chicken production, it is advisable to first work with male and female farmers in the village to determine:

- what is the current level of chicken production in the village or area?
- · what are the main constraints to production?
- what options are available to reduce the impact of the identified constraints?
- what is the best way to promote the chosen options?

Newcastle disease is often, but not always, the most important constraint to village chicken production. It is best to work with a village community to understand the role that chickens play within the farming system and the major constraints that limit production. This process is not only helpful to the extension agencies, but also assists men and women to think about the crucial role of chickens and to encourage the community, and specifically the women, to work with extension services to improve production.

Once ND has been controlled, participatory techniques may also be useful to identify other production constraints and to help the community to evaluate the changes that follow ND control and other management activities.

This section outlines how an extension agency can work with a village community to promote informed decision-making and problem resolution based on a respect for male and female farmers and the principles of community participation and gender sensitivity.

Gender-sensitive methodologies and gender awareness should be included in:

- training of trainers, extension staff and vaccinators
- the introduction of activities into villages with participatory rural appraisal exercises and selection of vaccinators
- a baseline survey and subsequent application of a questionnaire for evaluation of the impact of ND vaccination campaigns
- participatory monitoring and evaluation of the impact of ND vaccination campaigns and other interventions
- ongoing monitoring and refinement of the program.

The process is divided into a number of phases that involve:

- awareness-raising activities and problem identification
- deciding what are the best means of overcoming the identified constraints and planning activities within the community

- implementing the activities
- monitoring and evaluating the results.

3.2 Phase 1: Raising awareness and identifying problems

1. One or more meetings should be held with male and female village leaders to discuss the importance of, and constraints to, chicken production and what can be done to improve production. Leaders can include government representatives, traditional and religious leaders, farmers' and women's organisations, school teachers, healthcare staff and cultural groups. The objective of these meetings is to introduce the extension team to the leaders, discuss the types of support and activities that can be implemented, confirm villagers' interest and define the ways in which the community and its leaders will participate. The importance of the role that women play in chicken raising should be discussed, and ways proposed to ensure their active participation in all phases of the intervention.

A meeting should then be held with the whole community to discuss the constraints to village chicken production. The agenda for the meeting should enable coverage of items such as:

- an introduction of the extension team and an explanation of their various roles
- emphasis that the major aim of the program is to help villagers fight poverty by improving poultry production
- a reminder that you are there to help them to resolve problems relating to local chicken production, not to distribute free goods to people
- a number of group exercises with the community to help characterise chicken production, identify the role that men and women play in this activity and the main constraints to production in the village
- facilitation of community planning and implementation of activities that aim to resolve the identified problems
- confirmation that the community is interested in working with you to improve chicken production.
- 2. The final part of this phase involves organising and conducting a number of participatory exercises with the community; with men and women separately, if possible. Examples of participatory exercises are described in detail in Appendix 2, but the list there is not complete and other exercises could be used. Furthermore, it may not be necessary to conduct all of the exercises described in Appendix 2, and extension agents should select those that they think are most appropriate to local circumstances.

The main aim of the participatory exercises is to use techniques that involve as many members of the community as possible and to work with male and female farmers to describe the current situation and identify problems and possible solutions.

Organising community meetings

Community meetings should be organised with the permission of, and in conjunction with, village leaders. Select a day and time when the maximum number of people can attend. Village leaders will probably know the best way of informing the community about the meeting, although extra publicity could also be provided by the extension services, if necessary. This could include the use of notices, megaphones, and informing teachers and religious leaders about the meeting.

It is important to encourage the participation of men and women, and of poorer or more marginalised families in the community. Women are often responsible for the care of poultry, while poorer families stand to benefit most from improved chicken production. Promote this participation in any discussion with village leaders and in any publicity activities. Remember to consider the needs of these groups when planning the time and location of meetings.

3.3 Phase 2: Identifying solutions and planning activities

Phase 2 is implemented immediately after Phase 1.

- Organise a meeting with all the residents to give feedback on the information collected from the participatory exercises in male and female groups and to decide how best to solve the constraints identified.
 - The results of the exercises are presented and discussed with the community.
 - Further participatory exercises can be used to explore the best solutions to the problems and constraints that the community has identified (see Appendix 2 for examples of exercises).
 - It may help to ask the community if they would like to nominate a poultry group or committee that would be the main focal point for organising and implementing poultry activities in the community. A group such as a livestock or agricultural committee may already exist in some villages. While the group should be selected by the community, the extension agents should try to ensure that its members are representative of male, female, and poor and disadvantaged people as well as leaders. A balance in terms of gender should be achieved.
 - According to the decisions taken, other meetings and interventions can then be planned.
- If a group has been selected, organise a meeting with its members to help define their roles and responsibilities and to start planning activities based on the discussions held with the community. Appendix 2 contains ideas on how to assist this process.

3. Once plans have been made, meet with the community to discuss and approve the final strategy.

3.4 Phase 3: Implementing activities

Activities should be implemented as a joint process between the community, the local poultry group (if there is one), other leaders and community groups, and the extension agency.

It is important to encourage discussion within the community so that everyone can constantly evaluate what is being done and have an opportunity to comment on activities and suggest improvements. Although it is good to try to follow the plans drawn up with the community, activities should be flexible enough to adjust to unforeseen problems.

3.5 Phase 4: Monitoring and evaluating the results

Monitoring and evaluation (M&E) is an ongoing process of continually looking at plans and activities to try to improve what is being done. The extension agency and community may wish to organise a formal M&E strategy so as to better guide the whole extension process. However, even if that is not possible, extension agents and community members should continually evaluate what they are doing in an informal way so as to identify and resolve problems at an early stage and always be seeking to improve the way they are doing things. This mainly involves promoting an attitude of persistently questioning how things are going and how they can be improved.

Evaluation activities should include, at the least, regular meetings with the community and/or the community poultry group to discuss the implementation and results of activities. Some of the earlier community exercises in same-sex groups can also be regularly repeated (perhaps once per year) to see what changes are happening. These exercises may include:

- · family roles related to chicken raising
- chicken-raising calendar
- · ranking of activities according to their contribution to household income
- · ranking of problems related to chicken raising
- focus group discussions
- case studies.

Appendix 2 describes how to conduct these exercises.

