

A Program to Improve Family Poultry Production in Africa

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Abstract

The Joint FAO/IAEA Division of the International Atomic Energy Agency has initiated a coordinated research program (CRP) to improve family poultry production in Africa. The program assists 12 scientists working in National Agricultural Research Systems (NARS) during a period of five years with research in the subject. Regular research coordination meetings bring together all participants involved in the program to exchange results and experiences and to adjust work plans and protocols. Initially, a standardised survey was used to assess the characteristics of family poultry production in 24 different farms in two ecological zones in each country during the wet and dry seasons. Analysis of the survey will clarify the major constraints affecting family poultry production. Interventions will be initiated ranging from vaccination and other disease preventive measures to supplementary feeding, simple housing structures and improving marketing opportunities. The Joint FAO/IAEA Division has a successful history in managing and organising similar programs: in the distribution of the necessary equipment, kits and reagents; in the use of serological monitoring for epidemiological and disease control activities; and in the wider dissemination of results from such field studies in the form of guidelines and manuals.

WITH the exception of urban areas in northern and southern Africa, most poultry production in Africa is undertaken through an extensive system at village or family level. Almost every village household keeps domestic fowl (on average between 5 and 20 birds) and it is estimated that village fowl make up more than 80% of the total fowl population in Africa estimated at 1068 million in 1995 (Guèye 1998).

Under these circumstances, poultry provides a good source of protein and ready cash for villagers, which in turn helps to sustain the village economy and contributes to the prevention of urban migration. The benefits from family poultry production go directly to the rural poor, in most cases to the women who are the principal caretakers.

Constraints to Increasing Family Poultry Production

Family poultry production suffers from the constraints of disease, particularly Newcastle disease,

insufficient feeding and lack of housing. Together, these factors result in a low level of productivity for this traditional system. If these constraints could be removed, productivity would increase, to the direct benefit of the marginal farmer. The immediate objective of a five-year research project is to develop strategies to overcome production constraints through a coordinated research program (CRP) involving 12 African investigators in collaboration with the Joint FAO/IAEA Division and with assistance from international experts in the subject.

In order to increase production, the importance of each factor needs to be investigated in the different countries in a coordinated fashion and, subsequently addressed by designing a package of disease prevention, improved housing and strategic supplementary feeding protocols. This goal can best be achieved through a close collaboration of international organisations, universities with an expertise in poultry management, and the National Agricultural Research Systems (NARS) in Africa.

Disease

One of the constraints for increasing poultry production is poor health. Newcastle disease (ND) is regarded as the principal factor limiting rural poultry

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production in Africa (Awan et al. 1994). ND can typically kill up to 80% of household poultry in Africa (Spradbrow 1993–94). The survivors have high antibody levels and are resistant for a while, but as the level of antibodies and the level of protection fall, the population becomes susceptible again, and the cycle is repeated. The disease is spread by contact between birds, which is exacerbated by the practice of taking birds to market from a flock where disease is incubating. However, many aspects of the epidemiology of the disease in the village situation have not been fully understood (Awan et al. 1994).

Another important disease, especially for small-scale intensive broiler flocks, is Gumboro or Infectious Bursal Disease (IBD). This can kill up to half the chickens in a susceptible flock. IBD also has an immuno-suppressive effect, resulting in a poor response to vaccination and increased susceptibility towards other pathogens. Much less is known about the importance of IBD in African village chickens compared to ND, but in the few countries from which reports are available, the sero-prevalence seems to be high (Bell et al. 1990).

Intestinal and ecto-parasites are also of importance in traditional poultry production and can cause high mortality (Permin 1997).

Other pathogens that have been shown to be present in family poultry include *Salmonella* (Bouzoubaa et al. 1992), *Mycoplasma*, infectious laryngotracheitis, chicken anaemia agent, *E. coli* and fowl pox virus. Very little is known about the effects of these pathogens on poultry populations in rural Africa.

Housing

Other constraints to increasing poultry production in rural areas are losses due to predators and insufficient feeding. In some African countries, a large proportion of village poultry are lost due to nocturnal predators (Bell and Abdou 1995). In other countries, simple night shelters are constructed from locally available materials. Attention will be given to the possibility of providing overnight shelter to family poultry. This will involve assessment of the availability and cost of local building materials as well as an assessment of the benefits of overnight protection (resulting in a lower mortality).

Feeding

Family poultry survive by scavenging and generally, no feed supplements are provided. However, sometimes, household waste is fed to the birds and under other circumstances, the diet is supplemented with grains. If losses due to disease and predators are removed, it is very likely that the feed resource base

will become the major factor limiting production increase. Small amounts of strategically administered supplements are likely to increase production and minimise mortality once the other constraints have been removed. Various locally available food supplements can be tested for their effect on production levels (Gunaratne et al. 1993). Supplementation protocols will vary according to production system, ecological zone and the availability and cost of food-stuffs.

The interaction of the three constraints, disease, housing and feeding, underlines the necessity for an holistic approach to interventions. However, other constraints to poultry production should also be considered, such as marketing increased numbers of locally produced poultry products. A cost-benefit analysis should also form part of the activities to assess the economic advantage of the proposed interventions to the small farmer.

Activities of the Joint FAO/IAEA Division

Various interventions are being developed, validated and transferred to the counterparts through an FAO/IAEA coordinated research program (CRP). A unique feature of the CRP is that a similar approach to technology development can be applied in a concerted manner to a large number of poultry production systems in a number of different countries. Another feature is that a modest amount of funds (US\$5000–8000 per year per person) allows scientists in developing countries to initiate applied research within their own environment. Experts in the subject matter have been selected as research agreement holders (RAHs) in order to assist the program with scientific advice, to solve specific scientific problems (as beneficiaries of technical contracts) and adjust the program to achieve its objectives (Table 1). The project is managed in the field through research coordination meetings (RCMs), bringing together all participants in the program to exchange results and experiences and to adjust work plans and protocols. The first meeting established the various protocols and delineated the activities and responsibilities of the participants.

Meetings will be held in the second and third year to discuss results and modify protocols as required. A final meeting will be held in the fifth year to produce conclusions and recommendations for sustainable implementation on a national scale.

The Joint FAO/IAEA Division has a successful history in managing and organising similar programs, in the distribution of the necessary equipment, kits and reagents, in the use of serological monitoring for epidemiological and disease control activities and in the wider dissemination of results

from such field studies in the form of guidelines and manuals. Advice is sought from collaborating partners concerning the integration of gender issues, a cost-benefit analysis and the sustainability of interventions (Table 2).

The aim of the program is to assist in the development and transfer of an integrated package to improve rural poultry production in a number of selected African countries. The applied research will ensure that vaccination protocols, improved feeding systems and husbandry adjustments are developed and applied in a manner which is most appropriate for each poultry production system. In addition, actions should be taken to ensure sustainability in health and management improvements of rural poultry production as a result of project interventions.

First research coordination meeting

Each research contract holder (RCH as listed in Table 3) outlined the present situation and characteristics of family poultry production in the country of origin (Figure 1) during the first RCM in Rabat, Morocco. In addition, various aspects of family poultry production, and techniques for disease prevention and serological monitoring of immune status were presented.

The only practical way to tackle the viral diseases, ND and IBD, is by vaccination. The objective of vaccination is to establish a flock with a high immunity to prevent disease and the spread of virus (Spradbrow 1987). Four types of vaccine can be used for ND: conventional live vaccines, heat-resistant

Table 1. Research agreement holders.

Country	Institute	Name of RAH*
Denmark	Royal Vet. & Agric. University, Frederiksberg	A. Permin
Netherlands	Fort Dodge Animal Health, Weesp	F. Davelaar
USA	University of Wisconsin, Madison	B. Goodger
United Republic of Tanzania	Sokoine University, Morogoro	U. Minga
Nigeria	Obafemi Awolowo University, Ile-Ife	E. Sonaiya
Morocco	Institut Agron. et Vet. Hassan II, Rabat	J. Bell

* RAH = Research agreement holder.

Table 2. Partners.

Country	Institute/organisation	Name of observer
United Nations	AGAP, FAO, Rome	R. Branckaert
United Nations	AGAH, FAO, Rome	K. Wojciechowski
United Kingdom	VEERU, Reading	R. Oakeley
Australia	University of Queensland, Brisbane	P. Spradbrow

Table 3. Research contract holders.

Country	Institute	Name of CSI*
Cameroon	IRZV/IRAD, Bamenda	F. Ekue
Côte d'Ivoire	LANADA, Bingerville	T. Danho
Ghana	Accra Vet. Lab., Accra	G. Opoku-Pare
Kenya	Central Vet. Lab., Kabete	S. Njue
Madagascar	DRZV, Antananarivo	Kokoz
Mauritius	Agric. Res. Ext. Unit, Reduit	V. Juggessur
Morocco	Institut Agron. et Vet. Hassan II, Rabat	F. Kichou
Egypt	AHRI, Cairo	A. Amin
Sudan	Univ. of Khartoum	M. E. Mohamed
Uganda	LIRI, Totoro	J. Illango
United Republic of Tanzania	ADRI, Dar-es-Salaam	H. Msami
Zimbabwe	Central Vet. Lab., Harare	J. Nqindi

* CSI = Chief scientific investigator.

live vaccines, injectable inactivated vaccines, and recombinant vaccines. The different types of vaccine are compared by Bell elsewhere in these Proceedings.

FAO/IAEA Coordinated Research Programme to improve family poultry production in Africa



Figure 1. Map of Africa showing the countries, where research contract holders are located participating in the coordinated research program.

Similarly, the various diagnostic and serological techniques to monitor Newcastle disease control campaigns have been assessed (Cadman et al. 1997). It was decided that the RCH should come to the next meeting with a recommendation as to which vaccine should be used or tested in his/her country to protect the birds against Newcastle disease. If production is feasible locally, the use of a thermostable vaccine I-2 as an eye drop application should certainly be considered. In addition, the most appropriate way for serological and diagnostic monitoring of immunity was discussed.

An existing detailed questionnaire for collecting baseline data on family poultry production was distributed (Kitalyi 1998). The questionnaire was considerably revised during the meeting, with the assistance of comments from field workers in Zimbabwe who had tested the form extensively.

Guidelines for the fieldwork were designed to assist the RCH in the research activities during the first year. It was decided that during the first 18 months baseline data should be collected from 24 different family poultry farms by each RCH (2 different ecological zones; 3 villages in each zone; 4 farmers in each village). The farms will be sampled twice (once during the rainy season and once during the dry

season). It was advised to translate the survey into the local language and test the survey in the field before use. In addition, the RCH were strongly advised to explain the various steps of the research project (survey, sampling, interventions, training) to the village elders or chiefs before entering individual farms. Two different surveys will be conducted by the RCH: a baseline survey in 24 farms (twice) and a disease survey (continuous). Completed questionnaires will be entered into a standardised Excel data input sheet and analysed for factors constraining family poultry productivity in each ecological zone. The spreadsheet will assist uniformity in data collection and facilitate data analysis.

Furthermore, serum samples are to be collected as part of the continuous survey from at least 6 adult animals on each farm. Sick or dead chickens will be collected for post-mortem examinations as described by Permin and Hansen (1998). Sample collection may be facilitated by employing a veterinary assistant stationed in the village.

Second research coordination meeting

During the second RCM planned for September, 2000, in Morogoro, Tanzania, the results of the surveys will be presented by each RCH. Analysis of the survey results will highlight the regional constraints in poultry production during the two seasons. The RCH will propose protocols to test the most appropriate interventions, measure production increase and immune response and propose improvements in market accessibility. An in-depth analysis of the data obtained from the country surveys will be presented by scientists from the University of Wisconsin to identify differences and similarities between poultry production systems in the different zones.

Following the second RCM, interventions will be initiated on the selected farms in order to improve productivity, as measured by number of eggs produced, number of chicks reaching adulthood and number of birds and eggs sold. Interventions will consist of providing one or more of the following measures depending on local conditions and the factors limiting production: vaccination, other disease preventive measures, supplementary feeding and simple housing structures.

Future Activities

The project intends to develop specific sets of guidelines for increasing family poultry production adjusted according to region, country and season. The guidelines, together with the research results from the individual scientists, will be published as an IAEA

Technical Document. The practical guidelines will be distributed to a wider audience in a more simplified form. To assure sustainability of production improvements it will be important to involve extension workers and village community organisations.

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