SPFS/DOC/22
Annex 1

FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS

SPECIAL PROGRAMME FOR FOOD SECURITY (SPFS)

DIVERSIFICATION COMPONENT

Guidelines for the Inclusion of Improved Household Poultry Production

Rome, May 1997

SPECIAL PROGRAMME FOR FOOD SECURITY

Diversification Component

Guidelines for the inclusion of Improved Household Poultry Production

Preamble.

The Special Programme for Food Security (SPFS) consists of four components: Water Control; Intensification, Diversification; and Constraint Analysis. A major element of the Diversification Component will be the inclusion of livestock, particularly short-cycle species such as poultry, pigs, sheep and goats, which provide income generation and add stability to the overall farming systems.

This paper is one of a series that will cover the major livestock interventions that could be included in the SPFS. The objective of the paper is to provide formulation missions, core teams, FAORs and national project staff with the necessary insight into the potential and constraints for the inclusion of an improved household poultry programme into the Diversification Component. The document also outlines the range of interventions that are available, the likely benefits, required inputs, impact assessment verifiers and potential risks.

Clearly such a document can only provide broad guidelines and the exact details of individual programmes will be both country and location specific. Further assistance is available from the Animal Production and Health Division (AGA).

Introduction.

Both poultry meat and egg production have seen substantial growth, 448% and 287%, respectively, in the developing countries over the last two decades. However, much of this growth, especially in those countries that have access to feed grains, is accounted for by the increase in commercial production. This is not the case in the majority of Low Income Food Deficit Countries (LIFDCs), where access to (imported) feed grains, protein supplements, improved breeding stock, drugs and vaccines may be limited and expensive, and where disposable incomes result in a comparatively low demand for poultry products.

In most developing countries, keeping a few household poultry, usually chickens, is a common practice in the rural and many urban areas. These are primarily minimum input systems with little or no supplementary feeding given and investment in improved housing, disease control or husbandry is rare. As a consequence, although output is low it is relatively risk free. Women are often the main beneficiaries with eggs and live birds offering a valuable source of income, as well as a welcome supplement to the household diet and to meet family and social obligations.

Experience in many developing countries has shown that a combination of disease control and improved poultry husbandry can have a substantial impact on the household economy. Improved back-yard poultry production often provides the foundation of more intensive and commercially orientated production systems to evolve as the market develops.

Prerequisites for Successful Programmes

Most LIFDCs have potential to establish improved household poultry programmes. There are, however, a number of prerequisites for the rapid and successful implementation of such a programmes and these include:

- a tradition of keeping poultry and consuming poultry products;
- an understanding of the markets (inpits and outputs), available feed resources and the disease situation;
- a local willingness to participate in and contribute to a programme;
- an institution (government or NGO) capable of initiating a poultry programme in rural areas;
- advisors/extension staff trained in rural poultry development and with a good understanding of the local integrated farming systems;
- functioning women's, producers or credit groups; and
- access to reliable drugs and vaccines.

For a more intensive, semi-commercial or commercial systems additional prerequisites include:

- feed compounders with a knowledge of feed mixing and the requirements of various types and ages of birds and motivated by competition rather than unenforceable legislation;
- new (improved) breeding stock;
- suitable and locally available feed resources with knowledge of their nutrient content; and
- a local demand for eggs and poultry meat.

Target Beneficiaries

The primary target beneficiaries should be the poorest households and women (especially widows and female headed households), the disabled (often as a result of civil conflict) women's groups, and schools.

Potential and Constraints

Constraints. The main limitation to improved household poultry production is the extremely high loss of birds before they reach maturity caused by inadequate nutrition and disease. This loss means that a high proportion of all the eggs laid have to be kept for replacement stock leaving little, if any, surplus for sale or consumption.

The main causes of loss are:

- **Poor nutrition** is the major cause of loss and predisposes birds to disease, poor immune response to vaccines and predation.

- **Disease,** especially the highly infectious viral Newcastle Disease (ND) which is believed to be endemic in most rural flocks. Clinically the disease is cyclic and occurs at times of climatic and nutritional stress. The virulent (velogenic) strain common in Africa and Asia can, but not always, cause up to 80% mortality in unvaccinated chickens. Fowl Cholera (pasteurellosis), Coccidiosis, Gumboro disease (infectious bursal disease) and Fowl Pox can also, to a lesser extent, cause problems in rural flocks.

Poor, or non existent housing, is also a major predisposing cause of the high losses. Without being able to confine birds at night it is almost impossible to catch and vaccinate them, although new types of ND vaccine can be administered in the feed (see section on heat stable vaccines). Shelter can also provide protection for young birds against predators and can ensure that all the eggs are laid in the proper place and not lost.

The majority of indigenous breeds or strains of chicken/fowl have evolved to survive under harsh conditions where they largely have to fend for themselves. Such hardiness, however, is at the expense of higher levels of productivity and they are less able to exploit the advantages of improved management, nutrition, etc. than breeds with a greater genetic potential for egg production and feed conversion (growth).

Potential. Improved management and disease control can have a substantial impact on household economies. Under traditional management the majority of eggs are hatched to ensure sufficient replacements with only the male birds being sold or consumed. Reduced losses will ensure that more birds could be successfully reared and, assuming the extra birds can be properly fed, this will allow more eggs to be collected and consumed or sold as a regular source of income.

Design Considerations.

- **Constraint Analysis:** An initial review of poultry production in the pilot area, and any external factors that affect it, needs to be undertaken in order to assess what interventions would be appropriate. In addition, an assessment of the likely demand for additional poultry products will be required. Most information can be obtained from PRAs either undertaken specifically for poultry or, more likely, as an element in a more general PRA covering the pilot area(s). Guidelines to the type of information required is given in the final section "Type and Sources of Information". It is important that constraints beyond the scope of the SP, but that could be addressed by other parties, are identified - for instance: supply of drugs and vaccines, hatchery facilities, quality control of commercial feeds etc.

- **Level of intervention:** The choice of intervention: simple improved husbandry, improved husbandry combined with the introduction of improved (dual purpose) breeds, or more specialised small-scale layer or broiler production, will depend largely on local circumstances. Factors to take into consideration include: access to markets, access to inputs and services (extension, vaccines, hatcheries etc), available feed resources, existence of functioning producer/women or credit groups, capacity of the target producers to accept the increased risk associated with higher inputs.

- **Approach:** In the context of the Special Programme (SP) a phased approach is considered most appropriate. Starting with ND control on a communal basis, closely followed by the introduction of improved husbandry packages for interested participants and leading, eventually, to the selection of a few more specialized farmers producing meat, eggs or

breeding stock. Farmers are naturally not interested in making investments in feed, improved breeds or housing were losses from ND remain high. It is, however, important to understand the relationship between disease and poor nutrition and they should not be seen, or tackled, in isolation.

The SPFS should not assist in the development of capital intensive, large-scale, commercial egg or broiler production which are best left to the private sector to support.

At an early stage it is necessary to identify a master farmer(s) within the community who will be capable of putting into practice, with inputs and assistance from the SP, improved husbandry practices. These farmers' units will act as local demonstrations as well as providing a focal point for vaccination programmes and training, a local source of advice and, possibly, for the supply of inputs. The use of schools and school clubs (Young Farmers Clubs or 4H Clubs) may also provide a valuable focal point for the programme.

- **Organization and Management:** In the initial stages it will be difficult to establish a programme without the involvement of government-run services. The longer-term aim should be to make the programmes as independent as possible and this will entail the eventual commerialization of input supply. This would entail encouraging entrepreneurs and the private sectors to be involved in the supply of inputs (feeds, chicks, fertile eggs, vaccines etc) and services (vaccination, marketing, extension). The development of producer groups can provide the necessary critical mass and purchasing power to access, or provide for themselves, goods and services including informal credit.

For an interim approach, it might be possible to contract some of the input supply and management activities of the programme to either an international or local NGO. The contract could specify the timing and extent to which the responsibility of programme's activities are transferred to the producers.

Potential Interventions

The basis for any improvement programme will be improved husbandry, notably housing, nutrition and disease control, primarily Newcastle Disease. Subsequent interventions would concentrate on further improving nutrition and the introduction of improved breeds/strains.

- **Improved Feeding:** Most household flocks rely on scavenging and household scraps and, depending on conditions, this is usually adequate for survival and a low level of production. Although inadequate nutrition, excaberated by marked seasonal fluctuations, remains a major predisposing factor to disease and high mortality. As investments are made in improved animal health, housing and, especially if improved birds are to be introduced, then attention must to be given to diet supplementation or feeding a complete diet in the case of totally confined birds.

Conventional feed materials such as maize, wheat, barley, oil cakes, fish meal etc. are rarely available to the back-yard producer. In many developing countries these are in short supply and even compounded feeds may be of dubious quality. For household production systems, however, there are usually a wide range of locally available feedstuffs that can be used in addition to household scraps and include: surplus/broken or second grade grains (cereals, maize, sorghums and millet); roots and tubers (sweet potatoes, cassava etc.), green material (legumes and leaf meals, sweet potato vines etc), residues and agro-industrial by-products

(brans, rice polishings, oil-seed cakes, etc.). Unless a complete balanced ration is available, then the ability to free range is important to allow the birds to feed on insects and worms, green material, etc. so that they can balance their essential amino acids, mineral, vitamin, as well as energy requirements. Where appropriate, improved feeding systems (troughs etc.) should be supplied to reduce wastage. Access to clean water is always essential and a source of calcium (ideally ground oyster shell) is highly recommended.

- **Control of Newcastle Disease (ND) and other health constraints.** Effective vaccines have been available against most strains of ND for a long time. However, the vaccination of rural chicken has always been a logistical problem, because:

  - Until recently, the potency of vaccines were highly sensitive to temperature which meant that the provision of an effective vaccine at village level required a 'cold chain' of refrigerators, cool boxes etc. from the manufacturing laboratory through to the farm. The majority of vaccines are still highly sensitive to temperature and fall within this class;

  - Conventional vaccines are sold in large dose vials, usually 1000 doses, aimed at the commercial producer but unsuitable for use at the village or household level;

  - Village flocks are usually small, scattered and multi-aged which makes them difficult to target by mass vaccination campaigns. Catching free range, often semi-feral chickens to vaccinate them individually has always proved difficult, and

  - Vaccination of a multi-age flock has be undertaken on a continuous basis (monthly) to be effective.

  A new 'heat stable' oral vaccine has been developed and widely tested in Asia and Africa. The primary advantage is that it no longer requires a complete cold chain to maintain its potency. It is also possible to administer the vaccine orally by applying the vaccine to the surface of certain feeds (commercial pellets, cooked rice, barley and wheat), but not all, foodstuffs are suitable as carriers. In many countries it will be necessary to test their own vaccine/feed/water interactions to find the most suitable carrier. The cost of a controlled, replicated trial examining three different grains would be in the region of $5-7,000. If birds can be easily caught then the vaccine can still be given via the more traditional conjunctival sac or nasal cavity routes.

  Oral vaccination is not, however, the most efficient route and birds really need to be vaccinated two to three times. Trials in Ethiopia have shown that the Haemagglutination Inhibition (HI) levels in birds were not high enough to resist a full ND attack until after the third feed-mixed vaccination

  Queensland University in Australia have made available free to laboratories in developing countries a seed virus, designated I_2, to those who wish to explore the possibilities of vaccine production. This opens the door for producing with intermediate levels of technology, the fresh (not freeze dried) vaccine at regional laboratories for use within a few weeks of production. In addition, a commercial V4 vaccine is also available, but not in large quantities and it remains expensive.

Potentially these vaccines offer the possibility of overcoming the problems of transport, storage and the difficulty of catching individual chickens. They are not, however, available everywhere, and applying the vaccine to feeds is not without problems. The question of who produces the vaccine remains an issue and experience has shown that projects may be able to introduce the technology but often production ceases once external inputs are removed.

Conventional vaccines remain a viable option if there is a reliable 'cold chain' and if housing is provided that allows the birds to be caught easily and that sufficient numbers of owner's participate making the use of large vials economic, although their is often little difference in cost between 200 and 1,000 dose vials. A major problem with the larger vials is to find and catch 1,000 village chickens within the two hours or so that these 'old' heat sensitive vaccines remain viable.

Almost all birds in rural flocks are infected with a variety of internal parasites which cause reduced growth rate, weight loss and lower egg production. Strategically timed treatment(s) with inexpensive anthelmintics (eg. fenbendazole and other benzimidazoles) given in the feed can easily eliminate the majority of these parasites.

- **Improved Housing:** The basic aim should be to provide simple (using local materials wherever possible), yet secure housing for the birds at night. Approximately $0.1m^2$ ($1ft^2$) should be adequate per bird. Housing should provide: perches for birds to roost on; access to clean water, a creep feed for chicks, and nest boxes for laying and brooding. Location should be close to the house to deter thieft and preferably raised off the ground to provide protection from predators and to reduce dampness. The shelter should have easy access to allow for catching the birds with the minimum of disturbance. Such housing can usually be provided cheaply using local materials (timber, mud, thatch etc.), but more complex designs may require more expensive sawn timber and wire netting.

- **Improved Breeds:** Once standard levels of husbandry (housing, feeding and disease control) have been achieved, then improving the genetic potential of the birds offers the next step in increasing productivity. One strategy is to use local birds to incubate and rear higher egg producing breeds.

Two choices are available. The introduction of pure-bred, dual purpose breeds (eg. the Rhode Island Red or Australorp) or the commercial hybrids which are usually selected either for meat (broiler) or egg production. Traditionally, the dual-purpose breeds have been the exotic breed of choice, the exception has been the White Leghorn, a laying breed that has proved unsatisfactory in adapting to village conditions. Obtaining grand parent stock of these breeds is becoming increasingly difficult and expensive. Some commercial companies now offer a more hardy, dual purpose type of hybrid bird that could be used in certain situations.

Securing a regular source of healthy birds from well managed hatcheries can be problematic. Traditionally, government services have maintained poultry farms with imported parent stock and have supplied day-old-chicks (DOCs) or point-of-lay (POLs) birds to farmers. However, as with so many state run operations, there are real problems in managing such enterprises efficiently. Lack of working capital and staff incentives have resulted in most operating at a very low level of productivity and at a financial loss. The alternative of placing such activities in the private sector as soon as possible is to be encouraged. Initially this may involve a phased approach through increasing cost-recovery to full privatization of

government services. NGO's can have a role in providing skills, start-up loans etc. to assist private entrepreneurs establish themselves. Wherever possible the incubation, brooding, rearing and production of hatching eggs can be undertaken by separate specialized producers within the village.

In the majority of LIFDCs improved birds have to be imported. There are a number of options that can be considered:

- Importing grand-parent stock to produce parent stock in the country. This requires high levels of management, a regular supply of quality inputs, and a sufficient demand for parent stock.

- Importing parent stock as either fertile eggs or day-old chicks to supply commercial birds for distribution. This is usually the most economic option if acceptable levels of production can be maintained.

- Importing commercial fertile eggs or day-old chicks for direct supply to farmers. This option might be feasible to establishing a programme but it is costly. Although the full costs involved in producing DOCs locally from parent stock may exceed the cost of importing commercial DOCs if managment and performance is low. With full cost recovery, these costs will have implications for the financial viability of the enterprise that must be understood.

There are other issues that also need to be considered. The indiscriminate distribution of imported breeds could have long-term adverse effects in diluting the advantageous traits in the indigenous breeds, especially broodiness in local hens.

There is potential for improving locally adapted breeds by selection. Virtually all the indigenous breeds have not been subjected to any selection process, other than natural selection. The consequence is that there is a large variation in production traits (ie. number of eggs laid etc.) between individuals in the overall population. By identifying and selecting the top performers for a given trait, and given the chicken's short generation interval, it would be possible to make substantial gains in genetic potential within the existing production environment. Care must be taken, however, since some traits are genetically negatively correlated ie. broodiness and egg production. The logistical constraints in successfully implementing such a programme are formidable, however, and would be beyond the scope of the Special Programme.

- **Training.** The transfer of knowledge and skills must be an important component in every programme. Training is required at different levels:

  Awareness: Senior officials, politicians and decision makers and community leaders need to be aware of the potential for improving household poultry production if they are to support such programmes.

  Technical: Ideally there should be a Subject Matter Specialist(s) available to the programme that have undertaken specific training in rural poultry production and, ideally, epidemiology. There are relevant 3-12 months post-graduate courses available at agricultural colleges and universities in both developing and developed countries.

Advisory level: Extension and advisory staff need the necessary background theory to understand why certain interventions are necessary and how they work. More importantly they need the practical skills to be able to demonstrate interventions to farmers. This level of training can be povided through short in-service courses

Awareness of Farmers: Many farmers may not be aware of the consequences of disease, poor feeding and housing. Master farmers, school teachers or demonstrators need to be given the necessary knowledge, skills and confidence to set-up successful units and to assist other individuals or groups to develop similar packages. Ordinary poultry keepers, preferably in common interest groups or associations, also need access to the same skills and information. This type of training should be undertaken at village level wherever possible and should include the active participation of master farmers as resource persons.

- **Institution Support.** The promotion and development of producer groups, as the basis for self-sufficiency, should be supported through: training (technical and business management) and start-up capital in the form of goods or services. Involvement and support for the private sector in the provision of goods and services should be encouraged and, initially, this would involve the introduction of cost recovery for government goods and services that provide a 'private' than a 'public' benefit.

Input Requirements.

To establish an improved household poultry project the following elements will be required:

Technical Assistance: Some technical assistance will be required in designing, establishing and monitoring the programme. The options are:

- **International**. AGA has access to a number of highly experienced consultants, many from developing countries, working in the field of rural poultry development.

- **National:** Many national experts are already working for the Ministry of Agriculture and could be provided with travel allowances and small incentives to secure their services. Universities and the private sector may also be a source the necessary expertise and co-operation.

- **AGA Staff**. Specialist staff may be available to assist in the design of the programme and provide the supervision and technical backstopping.

- **TCDC, South-South Co-operation**. A number of countries have developed very successful national, small-scale poultry programmes and have valuable expertise and experience that could be shared with other countries. Bangladesh, Sri Lanka and Burkina Faso are a notable examples.

Training. National expertise or consultants may be required to prepare and undertake in-service training for extension workers, master farmers and vaccinators or Primary Animal Health Care Workers. Inputs would include; honorariums, DSA and allowances (trainers and trainees); accommodation; hire of rooms; refreshers and stationery, etc.

Village level training will require allowances for the trainers, refreshments for the trainees and, possibly, hire of classroom etc. Farm visits or study tours can be effective and will require transport, living allowances etc.

Provision may be required for the preparation and duplication of training and extension material.

Equipment and Materials. A certain amount of equipment must be provided to establish a successful programme. These may include:

- Vaccines and drugs;
- Equipment, spare parts, supplies and chemicals/reagents to rehabilitate existing diagnostic and/or vaccine production laboratories;
- Equipment and supplies to rehabilitate existing hatcheries;
- Supply of new grandparent or parent breeding stock;
- Supply of commercial grade day-old-chicks (DOCs) or fertile eggs;
- Housing material, ie. wire netting etc., if justified; and
- Fridges, cool boxes, droppers etc. necessary to maintain a cold chain for drugs and vaccines.

Operation and Maintenance. Support for running costs of vehicles, staff allowances and utilities may be required to initiate the programme.

Transport. The provision of transport may be required to establish the programme. Caution is required to ensure that the type of transport provided is a) appropriate and b) that it will be used for the purpose intended.

Credit. At farm level all interventions should be financially viable and producers, once established, should be in the position to finance their own inputs. Assistance may be required to help producers establish themselves and seed capital for a micro credit or group lending scheme may be required for housing, the acquisition of birds and the initial feed requirements. This may require some form of Revolving Fund with either cash repayment or in-kind replacement.

Benefits.

Indicative levels of expected performance under the various management systems is given below. Financial models will need to be determined on a case-by-case basis depending on local prices and costs.

	Unimproved	Improved Management	Improved Management and Breeds
Eggs laid	20-40	50-80	80-150+
Eggs hatched	20-40	20-40	20-40
Chicks reared	5-10	15-20	20-30
Surplus eggs	0	30-40	40-80

Impact Indicators

A number of indicators may be used to assess the impact of the programme and these are summarized in the following table.

Impact Indicator	Impact Verifiers
Community awareness	• attendance at training courses or programmes; • number of demonstrations established; • number and membership of common interest poultry groups; • requests for assistance;
Uptake of improved production and supply systems	• number of new poultry enterprises established; • number of improved technologies taken up • number of common-interest groups established • changes in livestock ownership patterns • demand for ND vaccine (recorded sales) • demand for improved birds (recorded sales/distribution)
Participation of the disadvantaged (women, disabled, poor etc.)	• attendance at training courses or programmes; • number and membership of common interest poultry groups; • enterprise ownership • requests for assistance; • changes in poultry ownership patterns
Technical Coefficients	• changes in flock mortality (% chicks reared) • changes in eggs laid and hatchability • changes in flock size • occurrence of recorded disease outbreaks
Economic indicators	• changes in household income levels • sales of chicken and eggs • number of new enterprises established • credit repayment levels
Welfare indicators	• changes in household consumption patterns • changes in the occurrence of nutrition related disorders
Human resource indicators	• number of government, NGO staff and farmers trained • level or type of training
Access to goods and services	• number of vaccinations, deworming and treatments undertaken, • changes in disease occurrence • number of farm extension visits • uptake of credit

Risks

There are a number of risks of a programme failing to meet its expectations, these include:

- use of either the wrong vaccine or vaccine that has lost its potency and/or misdiagnosis leading to continued high losses;
- breakdown in the supply of inputs, notably vaccine, feed, improved birds and informal credit;
- introduced breeds more susceptible and prove less productive than expected;
- unwillingness of producers to participate in the programme on a cost recovery basis; and
- an over-dependence of government run services

Type and Sources of Information.

Official statistics on back-yard poultry operations are almost meaningless given the problems in collecting such data and the variation between villages, districts and regions. Therefore, such information must be supplemented by household surveys and Rapid and/or Participatory Rural Surveys (R/PRAs) within the actual pilot areas.

Any R/PRA undertaken by the Special Programme should ensure that following information is collected:

- number of households owning poultry;
- average flock size and breed type;
- flock structure: number of laying hens, cocks, chicks and immature birds;
- average number of eggs laid per clutch and number of clutches per year;
- use of eggs (hatching, sale or home consumption);
- details of any seasonal variation in production, mortality etc.;
- use of male birds and cull hens (sale or consumption);
- selling price (and seasonality) of live birds and eggs at the farm-gate and local market;
- estimated income from sale of live birds and eggs;
- estimate of any production costs ie vaccines or feed;
- type of housing provided;
- feeding regime;
- disease control/ vaccinations (type and frequency)
- estimate of losses (disease, predators, theft etc);
- access to goods and services (extension, input supply, marketing);
- perceived constraints;
- opportunities for expansion

Other sources of information could include:

- Livestock and/or agricultural census figures;
- Veterinary Department records (vaccination campaigns, number of vaccines given, supply of local produced and imported vaccines and their costs, subsidies, etc.);
- Ministry of Agriculture, Poultry Research Institutes and/or parastatal organizations for information on the technology available, past development experience and the supply of breeding stock - usually from state farms;
- FAO country production data (based on government information);
- Locally undertaken household surveys or PRAs (check Universities, Nutrition and Home Economic Departments, Agricultural Census Office and NGO and bilateral agencies;
- Crop data allows for conversion factors to estimate waste/broken grain; agro-industrial by-products (availability, some have alternative uses, and costs are important factors);
- Reports on availability of non-conventional feeds;
- Veterinary Department should have information on the major epizootic and parasitic diseases that occur in a country and increasingly there are sections dealing with epidemiology.
- Import statistics can give an indication of the level self-sufficiency for the main animal products, including eggs and poultry meat.

- Government household surveys, agricultural census data and local RP may also provide information on levels of household consumption.

If a commercial sector exists they may provide additional information on:

- the type of goods (feeds, chicks, drugs, vaccines etc) and services (veterinary, public health, abattoirs etc) that are available and how accessible they are;
- the disease situation;
- supply and demand.

For Further Information:

Please contact:

Simon Mack
AGA Divisional SPFS Focal Point
Tel: 39 6 57053764, Fax: 39 6 57055749, Email: Simon.Mack@fao.org