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Enabling poor rural people
to overcome poverty



Opportunities of poultry breeding programmes for family production in developing countries: The bird for the poor

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Opportunities of poultry breeding programmes for family production in developing countries: The bird for the poor

PART I

Background document

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Introduction

The International Network for Family Poultry Development (INFPD) is a network of researchers, policy makers, educationists, students and development workers. It was established with the assistance of FAO to promote and facilitate the development of the small scale poultry sector in developing countries. With the support from the International Fund for Agricultural Development (IFAD) and in collaboration with the International Rural Poultry Centre of the KYEEMA Foundation, FAO is implementing a project, entitled "Smallholder Poultry Development Programme". The purpose of the project is to raise the international profile of family poultry production and to strengthen and further develop the INFPD. The overall goal of this project is to increase knowledge, awareness and recognition of smallholder poultry production as an effective tool in poverty alleviation, household food security and the empowerment of women. Among the activities of the project is the organization of three electronic conferences (e-conferences) to discuss specific issues related to family poultry development. The first e-conference will discuss issues of poultry breed development for family poultry under the title "Opportunities of poultry breeding programmes for family production in developing countries: The bird for the poor". The e-conference will address the following topics:

1. What types and how many birds are required by family poultry producers?
2. What are the organizational structures for the existing and suggested breeding programmes?
3. What strategies of multiplication and distribution networks can be adopted?
4. What marketing is appropriate for breeding stocks?
5. What conservation is appropriate for existing genetic resources?

The following sections are developed in order to stimulate the discussions.

1. What types of bird are required by family poultry producers?

Traditional backyard poultry keeping has been practice since time immemorial. As reported by Besbes (2009) worldwide, this poultry sector consists of chickens (63 percent), ducks (11 percent), geese (9 percent), turkeys (5 percent), pigeons (3 percent) and guinea fowls (3 percent). In most developing countries, indigenous poultry genotypes constitute between 80 and 99 percent of the poultry populations that are kept in villages (Sonaiya and Swan, 2004). Typically each family keeps a few hens only (5 to 20), which are mostly looked after by women. Small poultry houses/coops and temporary shelters are used to protect the birds during the night, from adverse weather and predators or to provide laying shelter. Supply of feed is limited to kitchen waste as and when available and small amounts of grain. The birds largely subsist on scavenging in gardens, village alleys and surroundings of the farms by feeding on crop residues, insects, worms and green forage. While for the poor members of society this system provides a subsidiary income, the present dimensions of traditional backyard poultry production have changed drastically and crossed the boundaries of the economically weaker sectors (Singh, 2007). Being called 'Family Poultry', 'Smallholder poultry', 'Scavenging poultry', or "Village poultry" the different systems of poultry rearing with various levels of intensification are now adopted by poor, marginal as well as richer members of the society with intensification according to their economical status and requirements.

Three family poultry management systems that have been described by Guèye (2005) and Singh (2007) are:

- a. Traditional scavenging backyard or village system.
- b. Semi-scavenging system.
- c. Small-scale intensive system.

The choice of system is largely determined by the availability of resources and inputs, which in turn depend on the keeper or household's socio-economic circumstances. Requirements of the different systems are quite different from each other including the type of germplasm to be used (Singh, 2007). The knowledge of requirements of the different system is essential before recommending the type of bird for a particular system.

Traditional scavenging backyard system

Guèye (2005) has defined two forms of the traditional backyard system:

1. Unimproved backyard system: Use of low-input, low producing native birds, brooding, scavenging, no regular water or feed supply, little or poor night shelter, no vaccination and medication .
2. Improved backyard system: Use of genetically improved birds, scavenging, regular water, supplementary feeding, improved shelter, care of chicks in the early age, vaccination against prevalent diseases and deworming.

To identify the right type of birds it is essential to evaluate and understand the local production systems, their limitations and opportunities, the circumstances under which such traditional systems came to existence and how they can be gradually improved. The traditional free range system is based on limited inputs which result in low outputs. The village poultry populations can be pictured as a gene pool that is challenged in many ways, principally by diseases, predation, lack of feed, low quality drinking water and poor housing. Nondescript native fowls are mostly used to this production system and have acquired during long term natural selection considerable adaptability to local climatic environments, stress of feeding management and considerable resistance to tropical diseases. They are good foragers, efficient mothers, require less special care to grow and have thus characteristics that are essential for raising poultry under village conditions. Generally, however they have a low production. Most of the germplasms that is introduced to replace the non-descript low producing birds under this system are either crosses of two high yielding coloured exotic breeds (meat or egg type) or crosses of two lines/strains of the same breed. A high mortality rate, malnutrition and adverse environmental conditions in the villages are antagonistic to the successful raising of modern commercial broiler and layers. Farmers are aware that these foreign 'laying machines' can produce many eggs if they are fed and cared for properly but will not be able to look after themselves very efficiently. The negative phenotypic correlation between productivity and low broodiness will ensure their progressive elimination from the gene pool as they cannot multiply and establish themselves. The association of high egg numbers with a lack of alertness to predators, their poor colour camouflage (except the colour plumage birds) and short legs which reduces the ability to run fast will, in all likelihood, cause that their presence in the gene pool will be reduced quickly (Tadelle *et al.*, 2000). Even the frequently recommended replacement of the nondescript local birds by crossbreds of coloured plumage breed is probably not correct under the scavenging system (Khan, 2002). The essential characteristics for scavenging

chicken that have been suggested by two workers (Rao, 2002; Singh, 2003) are as follows:

- i. **Colour of the bird:** A majority of people in rural areas has a strong liking for coloured birds, not from the aesthetic point of view but from the survival point of view. Compared to white or light coloured birds the coloured birds escape from the predators by being camouflaged by their colour.
- ii. **Morphology and temperament of the bird:** In backyard areas where there is always a presence of predators like wild cats, many stray dogs, prey birds, a lighter chicken with long shank and strong wings has a greater chance of escaping from predators by running fast and flying till they reach a safer place. If possible the birds should have an aggressive behaviour which may also act as deterrent.
- iii. **Productivity of the birds:** Under the multi stress environment of rural areas heavy dual purpose birds cannot perform as well as lighter egg type birds both from the point of survival and economic parameters. Low nutrient availability and long distances to be covered for gathering the nutrients favour light layer type birds. It has also been observed that females of dual purpose birds are often sold away early due to better market prices and they are thus eliminated from the gene pool.
- iv. **Disease resistance:** The birds for the scavenging system must have adequate immunocompetence as in addition to the lack of good-quality feed and drinking water they have to roam into dirty surroundings in search of food which increases the odds of contact with pathogens. Beyond that, appropriate prophylactic measures are not possible in remote areas.
- v. **Adaptability to the tropics:** Many major genes are found in scavenging local chickens in the tropics. These genes have been acquired through natural mutation and are essential for improved productivity in tropical countries (Fotsa *et al.* 2009, 2010). It would be desirable to incorporate such genes in new types of scavenging birds that are bred for the developing world (Fotsa, 2008).
- vi. **Self Propagation:** Self propagating capacity is an essential requirement for the scavenging bird. In remote areas and due to financial constraints of the weaker members of the population it might not always be possible to get the replacement chicks from the hatchery. Broodiness may therefore be considered as one of the important characteristics which are essential for self propagation.

Improved native breeds or a cross between a native breed and an exotic breed would be a good proposition for the ideal replacement of native scavenging chicken. Utilization of native chicken breeds for the development of suitable scavenging chicken is being practiced in countries like India, China and Bangladesh. Crosses between large exotic breeds and small size local hens were produced in most African countries to improve the body weight of the offspring (Belot and Hardouin, 1982; FAO, 2004) and to improve fitness characteristics. In India the Central Avian Research Institute, Izatnagar developed four types of high yielding chicken types based on four different native fowls. These are suitable for scavenging conditions in the different climatic regions of the country. Males of the Aseel, Kadakanath, Frizzle and Naked neck breeds / ecotypes of Indian native chicken were crossed with CARI Red females for development of the CARI NIRBHEEK, CARI SHYAMA, UPCARI and HITCARI genotypes of scavenging chicken, respectively. These birds have 50 percent

native and 50 percent exotic blood and possess characteristic features for backyard / scavenging poultry production. Phenotypically the birds look like their original native breed but have a two or three times higher egg production with bigger egg weight, better tropical adaptability and disease resistance along with the capability of bearing the stress of poor feeding and management. Self propagation capability is also characteristic of these germplasm. By that way the native breeds are being conserved and improved for use under the traditional scavenging system.

Semi-scavenging system

The term semi-scavenging is used to describe small poultry flocks that are raised partly under an intensive system of management and partly under free range system with the scavenged feed accounting for a substantial part of the total feed consumed. Breed requirements for the semi-scavenging system are genetically improved birds that perform well with scavenging in the field, but also with the addition of substantial supplementary feeding, proper housing and management and proper vaccination and medication (Singh, 2007). Very high yielding commercial genotypes are not suitable for the semi-scavenging system as they are tailor made for highly specific intensive management system. They are therefore unable to scavenge and to gather a substantial part of their feed requirement from the field. Low input cost high yielding birds are recommended for this system.

Small-scale intensive system

For birds that are to be reared under an intensive system with full feeding, standard management practices, disease control and proper medication the best high yielding birds should be kept as rearing of low productivity birds will not be economical. Hence high yielding commercial genotypes are recommended for this production system.

Following the above classification of the production systems one can raise a number of questions regarding the types of bird that are required by family poultry producers in developing countries:

- What types of genotypes (egg type, meat type or combination of both) can be used in developing countries for family poultry?
- What breeding programme(s) could be utilized to enhance disease resistance and tropically oriented major genes mutations that are available in the local poultry populations?
- What procedure(s) should be adopted for the improvement of the local breeds that have specific characteristics and how to achieve its conservation and proper utilization?
- Will the use of improved local poultry breeds lead to improved poultry production and enhanced financial capacities of women, or can this better achieved by keeping existing birds under with improved environmental conditions (feeding, veterinary care, better housing and proper management of birds) or by a total replacement of the local poultry breeds by improved breeds?
- Would the latter approach lead to a total loss of indigenous germplasm?
- Which breeds/strains of poultry will be of major interest for a larger population of the country and what assumption could best attract their attention?

2. What are the organizational structures for existing and suggested breeding programmes?

The economic importance of single purpose highly productive breeds and lines are distorting the perception of the value of multipurpose breeds that are adapted to the local conditions. During the last years, poultry breeding companies have become extremely large in size and very few in number. There are only two multinational firms on the egg-layer side and four on the broiler-meat side which collectively own the commercial poultry primary breeder companies and three multinational firms own the turkey production stocks (Gura, 2007). The narrowing base of the genetic stock may lead to a sensitivity of the remaining stock to new diseases that could destroy a genetically uniform population as it happened in the past with maize (Duvick, 1978 cited by Arthur and Alders, 2003).

As discussed above the genotypes of birds that are required for the three types of family poultry production are different from each other. Multinational companies are marketing their high yielding broiler and layer stocks through their franchise in most of the countries both for large and small scale intensive poultry farms. They possess an appropriate organizational set-up, the required infrastructure and their own breeding programmes for further improvement of the breeding stock.

The utilization of improved native breeds or its crosses with high producing coloured breeds has been found to result in a suitable bird for the traditional scavenging backyard system (Singh, 2003). Sørensen and Berg (2010) have also recommended the use of improved native chickens for this sector. The crossbreeding model of a native male with high yielding coloured females has yielded success in India (Aseel x Cari Red = CARI Nirbheek, Kadakanath x Cari Red = Cari shyama, Naked neck x Cari Red = Hitcari and Frizzle x Cari Red = Upcari). These F1 crosses possess broodiness characteristics, are capable of self propagation and are very popular in India. Similarly the Bangladesh model with crosses between Rhode Island Red x Fayoumi has become very popular. The results of these models are better if the F1 crosses are made available to the farmers for replacement continuously and a local breed of the particular region/locality may be preferred as one of the parent. Local breeds with tropical adaptability and disease resistance genes should be included in these crosses.

Improved native breeds/types of the particular region might be the bird of choice as replacement stock for scavenging chicken. The difficulty for improvement through selection of the native breeds would be the gradual decrease of the broodiness behavior which is negatively correlated with increased production.

Two distinct approaches are adopted for breeding suitable chicks for Semi-scavenging system (Khan, 2002): (i) Use of slow growing broiler lines, (ii) Use of inter-se breeding of egg type / dual purpose type or cross of light weight bird with slow growing broiler line. A large number of such genotypes both for eggs and meat have been developed and tested with good success by the various institutions in India (Vanraja, Giriraja, Kroiler and CARI Devendra for meat and Krishna-J, Krishipriya, Grampriya and CARI-Gold for egg) and in Bangladesh (Sonali). Similar approaches are being practiced in China and African countries.

The organizational set-up for the breeding of germplasm for the semi-scavenging and the traditional scavenging backyard system is available in only very few countries. Private commercial hatcheries hesitate to take up the breeding operations of these germplasm due to a very limited profit margin (one commercial hatchery is in operation in India). Development of the parent lines of the germplasm for these

two methods of family poultry production and their field testing is therefore taken up by Government institutions like Poultry Research Institution or Agricultural Universities of the respective country. For successful breeding of these germplasm organizational support of the public sector is essential like in India. Even in Bangladesh model the Government/Non Government organization (NGO) support is available for the successful operation of the family poultry. In most of the developing world, various projects for poultry development are in operation under which the infra-structure facilities for breeding of these germplasm may be created.

From the above background the following points are opened for discussion:

- What are the conditions that are required so that breeding will take place for the specific needs of family producers?
- Is poultry breeding for family producers the responsibility of Government institutions or research institutes and how can this be achieved or is it possible to get the large breeding companies engaged?
- There are examples of private breeding for the family sector in India. Could such examples be applicable for other countries and if so how?
- How could small countries deal with such issues?
- What are existing breeding companies or other national institutions that are engaged in development work of the family poultry in developing countries?
- What kind of linkages are required between breeders and the family poultry rearers?

3. What strategies can be adopted for multiplication and distribution networks?

Breeding companies develop grandparents and parent stock of commercial broiler or layers for intensive system poultry producers. These companies have net-work of franchise hatcheries in most of the developing countries where the commercial germplasms are multiplied and distributed to the farmers as per the requirement.

The breeding programme for the germplasm for semi-intensive and scavenging system is mostly the responsibility of the Government sector. After development of suitable germplasm by the Poultry Research Institution or Agricultural Universities, the multiplication is usually done by the network of Government poultry hatcheries and then distribution through networks consisting of poultry development projects workers, NGOs, poultry development societies and different co-operative societies. Frequently, these Government set-ups are not successful in implementing the multiplication and the distribution of chicks to the poultry farmers.

A solution to a proper multiplication and distribution system requires answers to several questions:

- Which national strategies can be developed to create networks for development, multiplication and distribution of various types of germplasm for family poultry?
- What is the role and success of "Cock Exchange Programmes" for an improvement of the production potential of non-descript poultry population in developing countries?
- Should improved varieties of hatching eggs/chicks be distributed to the rearers without complementary assistance for management and health?

- Is it appropriate to market breeding stock from an ecologically different country?
- Could the existing breeding companies provide poultry producers with specific birds that are suitable for the local management conditions of developing countries?
- What will be the costs and benefits for a country if hatcheries for parent stocks are installed?

4. What marketing is appropriate for breeding stock?

Although marketing of breeding stocks is very complex, it is an essential component for the success of the business. After implementation of the WTO (World Trade Organization) and GATT (General Agreement on Tariffs and Trade) for the global marketing the availability of required breeding stock from the global market has become very easy. Each country may import the desired breeding stocks from a particular country under an agreed MOU (Memorandum of Understanding) between the importing country and exporting country. Thus, the marketing of the breeding stock among the different countries is possible. Before importing grandparent/parent stocks, comprehensive studies regarding the country needs, infrastructure facilities and approximate capacity for marketing of the commercial chicks should be conducted. The marketing scheme is essential to meet the needs of each developing country, including Africa.

Continuous supply of birds from a hatchery will be required due to two important reasons: Firstly, the number of required chicks for replacement under a semi-scavenging system would be higher than can be produced by the chick rearers and continuous supply is only possible through hatcheries. Secondly, a maximum utilization of heterosis requires that these chicks are produced professionally. However, the provided breeding stock should still provide the opportunity for self propagation. Services of breeding stocks are not required for self multiplier provided the supplied germplasm has self propagation capability which is only possible when the germplasm under use is either the improved native breed or F1 cross of native and high producing breed. In case of scarcity of chicks, self-multiplication may then be adopted for two or three generations taking care to avoid inbreeding from mating of close relatives.

5. What conservation is appropriate for existing genetic resources?

Most countries of the world are witnessing a fast decrease in the population of many native breeds and varieties of chicken, some of which are in danger of extinction. Late sexual maturity, poor egg production, slow growth, broodiness, smaller egg and body size can also be some disadvantages of native birds as far as intensification is concerned. In view of the necessity for rapid improvement of the productive capacity of poultry for eggs and meat, breeders have taken recourse to the introduction of high yielding exotic germplasm. As explained above the breeding systems adopted include crossing of exotic breed with local breeds or even total replacement of local birds with the exotic ones. The results are that many different genetic combinations are being produced and there is gradual diminution and even ultimate disappearance of some of the local breeds. By analyzing the State of the World's Animal Genetic Resources, FAO found that among 2000 avian breeds for which data were available, 30 percent were reported at risk, 35 percent not at risk,

and the remainder were of unknown risk status (Hoffmann, 2008). Introgression rates varying from 16 to 47 percent have been reported for Cameroon (Fotsa, 2008). According to the FAO database, it is estimated that around 25 percent of chicken breeds are included in conservation programmes, but there is no information about the efficiency of these programmes. According to FAO (2010), only 7.5 percent of developing countries have poultry conservation programmes covering 63 percent of local breeds and 11 percent of national populations of transboundary breeds. A global plan of action for animal genetic resources including the conservation of poultry genetic resources has been developed by FAO (Hoffmann, 2008).

Despite a drastic increase in import of high yielding strains from across the world local fowls still retain a preference in their native environments. They enjoy the favour of local people, especially in the tribal and rural sectors, mainly due to its believed special capabilities such as adaptability to unfavourable environments and better immunocompetence. They are good foragers, efficient mothers, require less cost and special care to grow and have thus have characteristics essential for raising poultry under village conditions and provide the economic benefits of the farmers. The eggs and meat from native fowl are widely preferred especially because of their pigmentation, taste, leanness and suitability for special dishes and often fetch higher prices.

A great variation is observed in morphological characteristics of the native birds. With respect to body weight three variants have been distinguished i.e. dwarf, normal and heavy body weights. Plumage pigmentation mainly tends towards blackish and brownish colours showing extended and pied colorations. Plumage distribution is mainly normal while special forms such as naked neck, frizzle and silkiness appear sporadically. The comb is mostly single but rose, pea, walnut; duplex and crest are also found. The shank and skin are also frequently pigmented showing green, grey and blue variants. In addition, melanin deposition in skin, meat, internal organs and bones are also encountered in some breeds (e.g. Kadakanath). Some of these variants are due to the presence of major morphological marker genes which increases the adaptability of these breeds to tropical climatic environments. Mafeni (1995), Mafeni *et al.* (1997) and other scientists conducted a series of experiments utilizing the native breeds of many countries and several major genes were identified. The study of effects of these genes on economic traits indicated that some of these are related to tropical adaptability. A list of such genes with direct and indirect effects has been presented by Horst (1988) which indicates that native breeds are 'gold mines' of genomes and major genes for improvement of high yielding exotic germplasm for tropical adaptability and disease resistance. Introgression of Naked neck and Frizzling genes have been done at the Central Avian Research Institute, Izatnagar, India in the high producing layer and broiler populations for improvement of tropical adaptability and BL- β II gene for disease resistance from Aseel breed on Indian chicken was cloned (Singh and Singh, 2004). Cahaner and co-workers have utilized the Naked neck gene for improvement of tropical adaptability of broiler in Israel. In addition to these examples where local genetic resources were utilized for breed development of commercial breeds they are also needed for the development of genetic material for family poultry production which is thus a strong argument for their conservation.

Once it has been agreed to conserve species or breeds, the question arises what is to be conserved? For academic and scientific reasons, all breeds and strains with minor variation are potential candidates for conservation. However, the cost of infrastructure facilities involved in conservation will make it necessary to prioritize breeds to be conserved. This decision must be made by responsible authorities such

as the Government of the concerned country and / or large poultry breeding companies. In some countries special organizations have been set up to supervise conservation of animal genetic resources. In India, the Bureau of Animal Genetic Resources has been assigned this task.

In any case a breed must be evaluated before one can decide rationally whether it should be preserved. FAO is recommending that the Government of concerned countries should study representative samples of clearly defined genetic stocks exposed to equally well defined environment. There should be a common stock present in the tests at the several locations. On the basis of such tests the breeds and breed combinations that offer the most efficient production of desirable product can be identified and conserved. Bowman (1974) already stressed that it is important to determine if possible the genetic relationships between breeds and to maintain those with distinctive characteristics indicative of unique genetic material irrespective of present economic importance. The aim should be to conserve as big a range of existing irreplaceable genetic variation as possible. Turner (1992) later also made the same suggestion. Besides these, the gravity of danger and genetic merit of the breed deserve merits for conservation of native breeds. Whatsoever, an appropriate method, desirable flock size and principle of conservation should be adopted. In countries without clearly defined poultry breeds, one has to undertake an inventory and characterization of poultry genetic resources as suggested by Tixier-Boichard *et al.* (2008) in order to overcome this situation.

Keeping in view the above background the following points are opened for discussion:

- How do we balance the objective for higher production with the objective of breed conservation?
- What are important strategies for poultry genetic resources preservation in developing countries?
- Which breeds or populations should be preserved and for what objectives?
- Which cost-efficient methods could be used for developing countries specifically for African countries?
- Who should bear the costs of conservation activities?
- Who can really implement the task of conservation and where? Should NGOs and the private sectors be encouraged to get involved?

Invitation to participation in and contribute to the conference

- The triple benefit of poultry production viz. generation of self-employment, additional income and availability of cheap source of protein to combat the malnutrition, has been globally recognized, and family poultry has been proved to be an effective tool to fight the protein malnutrition especially in the poor developing countries. The traditional free range system is the main component of the family poultry production, but the popularity of which is gradually on decline due to the various reasons. Natural feed resources are being reduced for scavenging birds due to reduction in kitchen gardens, concrete village alleys, multi-cropping in the nearby fields and use of insecticides and pesticides due to which feed supplementation of the birds have become essential. The need of supplementary feeding has turned the traditional scavenging poultry production into an uneconomical venture due to very low productivity of the non-descript native birds used under this system. The replacement of these birds with suitable high producing scavenging germplasm is a matter of concern to regain

the popularity of this system. Hence the burning topic of "*Opportunities of poultry breeding programmes for family production in developing countries: The bird for the poor*" has been chosen as the first topic of the e-conference. Development of the bird for the poor is very complex as it includes the very important technical, environmental and also economical aspect of the cost of chick's production which is to be purchased by the economically poor people. These issues are raised as the main theme of the conference, to come out with suggestions for a bird for the poor by discussing the five proposed sub topics.

- Being a very important global issue, the International Network for Family Poultry Development (INFPD) and FAO are inviting comments and suggestions for its concrete solution through an e-conference which will address each component separately. It is hoped that this will ultimately help to identify solutions for the development of better birds for family poultry and assuring their global availability particularly in developing countries. This is an open invitation for all to participate in this e-conference and to contribute with their best knowledge and experiences that have been achieved by their hard labour and working in this field. All contributions will be duly acknowledged. We hope for your active contribution for this noble cause.

How this e-conference will be run

The messages can be submitted at anytime of the day or night in English or French. The messages will be shared with the other participants in the original language of contribution and they will not be translated into the other language. The topics of the e-conference will be discussed with the following sequence:

1. Week: "What types and how many birds are required by family poultry producers?"
2. Week: "What are the organizational structures for existing and suggested breeding programmes?"
3. Week: "What strategies can be adopted for multiplication and distribution networks" and "What marketing is appropriate for breeding stock"
4. Week: "What conservation is appropriate for existing genetic resources?"

We suggest that you address the topics in the respective week but you can also submit contributions to topics that had already been discussed. Contributions submitted before 24 January 2011 will be posted after the start of the discussions.

The conference will be moderated. The Moderators will read all messages before they are posted to ensure that they are relevant to the e-conference and can refuse to post any message that is not. This is in no way to censor or limit the views expressed by participants. We welcome and encourage a diversity of views and opinions, and we want you to speak your mind. We retain the right to make copies of the messages for archiving the discussions. After the conference, a 'synthesis document' summarising the main issues that were discussed, based on the participants' messages will be prepared and sent to all the registered participants. Due recognition will be given to the contributors in this document. The 'synthesis document' and major contributions to the e-conference will be published electronically.

Before submitting a message, participants are requested to ensure that:

- The message is clearly related to the issues that are to be discussed for the different sub topics;

- The message should be no longer than 600 words;
- You may attach papers, articles or other material to your message if appropriate but moderators may decide not to forward that if its size is too large;
- Each participant should include his/her name and country of residence in any message sent for the discussion. A participant should never represent him/herself as another person;
- Participants should not send unfounded, defamatory, obscene, violent, abusive, commercial or promotional messages or materials, or links to such materials;
- Each participant is legally responsible, and solely responsible, for any materials, or links to any materials sent;
- Participants will be courteous at all times and exercise tolerance and respect toward other participants whose views may differ from their own.
- If you want to have a personal discussion on any message, please send a message to the individual only.

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E-conference of the International Network for Family Poultry Development (INFPD) in collaboration with FAO and supported by the International Fund for Agricultural Development (IFAD)

Opportunities of poultry breeding programmes for family production in developing countries: The bird for the poor

PART II

List of messages

Theme 1:

**What types and how many birds are required by family poultry producers? -
Quels types et combien de volailles sont élevés par les aviculteurs
familiaux?**

Message No 1

Datta Rangnekar, dattarangnekar@gmail.com

Thanks for indicating that I am registered for the e-conf. on "Opportunity of poultry breeding programmes for production in developing countries: The bird of the poor". I eagerly look forward to information and issues that would be discussed and exchanged. I am particularly eager to understand "how the bird of the poor is defined"? I presume the word 'Poor' is used for the families that are resource poor since these families 'are rich in experience of survival under very unfavourable conditions'.

Message No 2

Simon Wanangwe Wesechere, wesechere@yahoo.com

RURAL INFORMATION AND AGRICULTURAL DEV, CENTER, RIADEC

The local bird is the bird of the poor. It also suffers from other challenges especially on breeding. The growth rates are normally quite low to the extent that it is normal to attain a weight of 500gramms in 6 months. Upon realizing this, we try to infuse new blood through crossbreeding using improved cocks as well as selected local cocks. The arising challenge in this is that farmers have to be organized and a thorough selection process has to be applied. However, being the bird of the poor, the costs for the involved activities as well as the time frame within which to realize the results tend to be prohibitive to the very farmer to benefit. As a technical person, I have tried my best to keep aiming at the goal through not giving up or in so that farmers can always look at me as an example.

Message No 3

Sujit Nayak, sujit.nayak@nic.in, Livestock Officer, Government of India

At the outset, I would like to share Government of India's program on Rural Backyard poultry development. The organizational structure for breeding program and capacity building for rearing the suitable birds have also been briefly described.

The research is done at ICAR/State Agriculture / Veterinary University and the GP stocks shared with the Central Poultry Development Organizations at Regional Levels and Parent stocks distributed to State Poultry Farms which are adequately strengthened to maintain these stocks and produce the commercial birds. These birds, through the new program, are reared upto 4 weeks at mother units and distributed to beneficiaries. Details of the scheme are briefly described below. I have addressed some issues at the end for discussion and suggestion.

Government of India's Program on Rural Backyard Poultry for Below Poverty Line beneficiary families

Since 2009, a new (Centrally Sponsored) Scheme, 'Poultry Development' has been introduced by Government of India. Central idea of this scheme component revolves around providing higher potential birds to nearly 3.85 lakh Below Poverty Line beneficiary families to increase their income from their enterprise similar to small

agriculture farmers being provided with improved seeds to increase productivity & their income from same land holding.

The scheme component has created an intermediate step -'mother units' for rearing chicks upto 4 weeks of age prior to distribution to avoid high mortality when introduced as day-old chicks in the field directly. At the time of projectising the scheme, there have been an estimated 24 crore desi birds. Through this scheme it has been envisaged to replace nearly 10% of desi fowls through distribution of 4-week old chicks to target beneficiaries and assist rural backyard poultry farmers/families in terms of chick cost for 3 cycles in tapering numbers.

Beneficiary receives 4-6 week old birds & sells them at 14-16 weeks. Therefore farmer will realize cash returns in a lumpsum every 10 weeks. It was decided in the EFC meeting that target beneficiaries should comprise of below Poverty Line families.

Mother Unit level: 20% subsidy is proposed to be given (Rs. 20,000) towards total cost of a shed/other non-recurring asset, which is estimated to be Rs. 1,00,000/-. Also to kick-start their operation, it is proposed to provide interest-free loans to mother units, which will be 30% of fixed cost outlay of Rs. 1,00,000/-. NABARD will disburse loan through its set-up.

Similarly it is felt that to increase outreach, these 4-week old raised chicks will be taken further into remote villages by pheriwalas (cycle vendors) who in turn will earn from sale of these 4-week raised chicks. This is a popular model seen in the backyard sector. It is felt that they are a very important tier in delivery of inputs and services in remotest areas where backyard activity actually thrives. However, it is also felt to integrate their activities with each mother unit and an interest-free loan component is also proposed for them, which NABARD again will disburse. Considering two pheriwalas for each mother unit and cost for cycle, basket or cage, cost of feeder /waterer and cost of feed is assumed to be Rs. 2000/- per pheriwala.

Beneficiaries are helped to kick-start their poultry backyard activity by providing support in terms of chicks' cost for 3 batches with tapering assistance i.e. full assistance for 20 chicks in first batch (0week), 15 chicks in second (16 weeks) and 10 chicks in third & last batch (32 weeks) at Rs. 30/- per bird.

To sum up, it is 100% centrally funded grant comprising of subsidy toward chick costs of beneficiary family, subsidy towards infrastructure cost, and interest-free loan for part loan amount which will be given to NABARD for implementation to mother units and for link workers/ pheriwalas (cycle vendors).

Capacity building done earlier

The Department has established suitable infrastructure of which presently four large scale Central Poultry Development Organizations (CPDOs) located in Mumbai, Bangalore, Bhubaneswar and Chandigarh exist. Breeding program by these Central Farms has been re-oriented towards goal of making improved rural poultry a viable supplementary income generation venture. Stocks like Nirbheek and Hitcari etc. developed by ICAR are found particularly suitable for backyard farming and CPDOs are maintaining parent stocks for distribution to state Poultry Farms for onward multiplication and distribution to farmers. CPDOs are the major sourcing agencies for the seed of chicks required for Rural Backyard Poultry Development. CPPTC is also imparting valuable information on stocks available in the country and in fact some facilities in this Center needs further strengthening.

Accordingly, basic approach of the erstwhile 'Assistance to State Poultry Farms' scheme has been to increase egg and meat production especially in rural areas of

country with use of improved low input technology birds without putting substantial strain on feed resources and other inputs which small farmers are not able to absorb and also to meet specific rural consumer preference. Farms maintaining poultry species other than chicken, are also assisted on priority basis. Diversification with species like Turkey, Japanese quail, guinea fowl, ducks etc. is encouraged. The facility is also extended for farms in States, which may be run in collaboration with Co-operatives/private sector/NGOs etc. as before. This scheme during XI Five Year Plan has been subsumed under Centrally Sponsored Scheme, 'Poultry Development' as a component. Earlier the following birds have been kept in the list which were thought suitable for backyard rearing

It is time to review the list as some firms and agencies are not producing these birds or are unable to supply breeding stocks/ commercial chicks to the level required. We are looking towards 15-20 million birds annually.

Further as evident from the background paper, the above list also comprises of scavenging, semi-scavenging and small scale intensive production type of birds. However our present program as stated above is aimed at this stage for supplementary income generation and nutrition for the family. But as a national program, it is very difficult to use, say only 3 to 4 type of birds due to supply constraints.

I would like suggestions/ advice on following lines:

Are there any suggestions for agro-climatic-zone-wise selection of birds for the farmers?

In light of the newer findings and also the fact that public sector farms are not able to meet/ supply timely to fulfill the requirement, what should be the possible future interventions?

Name of the organization	Type of stock
PUBLIC SECTOR ORGANIZATIONS	
Project Directorate on Poultry, ICAR, Hyderabad	a) Krushibro b) Vanaraja
Central Avian Research Institute, Izatnagar	a) CARI GOLD b) Nirbheek c) Hitcari
Central Poultry Development Organization(ER), Bhubaneswar	Kalinga layer
Central Poultry Development Organization(NR), Chandigarh	CHABRO
University of Agriculture Science, Hebbal, Bangalore	a) Giriraja b) Girirani
JNKVV, Jabalpur	Krishna-J
Poultry Research Station, Nandam, Chennai Tamil Nadu	Coloured Layers
PRIVATE SECTOR ORGANIZATIONS	
Kegg Farms, New Delhi	Kuroiler
AVM Hatcheries, Coimbatore	Coloured Layers
Dee Jay Hatcheries, Bangalore	a) FR 295-Coloured Layer Coloured Mini Broilers
Kalyani Poultry Farms, Mumbai	Kalyani-DK Fowl

Message No 4

Dr Siva Prasad vadla,(M.V.Sc), 2nd year, College of Veterinary Science, Hyderabad. India., vadlasiva@yahoo.com

Most of the people in villages in India are looking for the bird which is a good meat producer and a reasonable egg layer and have good disease resistance as they do

not offer any superior commercial feed to them they have to survive on the vegetation, insects and domestic wastage. Presently in Andhra Pradesh there are two birds developed one by ICAR-PDP and another by Sri Venkateswara university, Hyderabad, these two are doing well, but failed to produce, to meet the demand of the rural people.

Message No 5

Farhad Mirzaei, Ph.D on Livestock production Management, Iran,
farmir2005@gmail.com

I think family poultry farming should be educated in new condition of rural families, because nowadays, we are seeing so many changes in rural areas and nomads livelihoods.

Therefore, please kindly give some examples about family poultry farms to bring participants out in this subject thoroughly.

Message No 6 (not distributed during the conference)

Mah Gertie Dasi, Faculty of Science, Dep't of Plant and Animal Science, (Fishery and Animal Production), University of Buea, Box 63, SW Region, Cameroon, Tel: 237 99435

The first idea I will give is that I think a feasibility study should be done by getting to some of the farmers, and to sensitize them on family poultry. I use the word "sensitized" because in my village for instance, many farmers are going more for broilers.

Also, the few farmers that have local birds, have just a few numbers say three or four. And it is purposely for consumption. Besides I attended an occasion where a meal was prepared with broiler and another with local bird but, more people went for the meal with the local bird meat.

I just want to justify the fact that there is and there will be ready markets for the family poultry. Even though from my own point of view, these birds use to be very less costly but now, they are getting expensive (in my village).

As concerns the multiplication and distribution networks, I think a cell should be created for farmers or a group of farmers that were identified during the feasibility study. This way, they could work with the nearby research centres by contributing fertilized eggs to be incubated or, the research centres provide them with chicks of this local bird if they can help manipulate the genetics of these breeds and come out with many more fertilized eggs.

I am a MSc. student reading Animal Production and also a poultry farmer. I also practice crop and tuber farming. I have all my farms in the village and only visit on weekly basis since I'm now a student. I'm writing presently from the University of Buea.

Message No 7

Dr. Syed Yousuf Hussain, Poultry Consultant Hyderabad (A.P.), India, Mob. No. 0091-9177511315

Thanks for your message regarding participation in E-conference on breeding in chicken. Please find attached here a success story in breed improvement of village chicken to be included in E-conference. This concept is unique and developed and implemented by me.

I appreciate your comments, please free to ask any clarification if you need.
I look forward to listen from you Sir/ Madam:

Cross Breeding Indigenous Female Chicken With High Yielding White Egg Commercial Male Bird To Increase Productivity

Introduction:

"Much has been heard, something has been done, but more is desired to be done yet in smallholder poultry developmenet in India" . Though the status of poultry production in India is reasonably satisfactory (being fifth in layer and eighteen in broiler production in the world in commercial sector) the need of the hour is more productivity indigenous type of birds for the rural community. The simple reason is more than seventy percent Indian population is agri-based rural community. Much of the poultry products produced in rural sector go to the urban / semi urban areas for disposal because of the great demand. This in turn, results in these products available to them at an exorbitant price (30% - 40% more) unable to be purchased by the poor farmer. Hence a big task rests with the scientific community to developed and produced native type of the birds at the village level with least maintenance cost, but suitable for rearing and adaptation for scavenging condition and also having genetic potentiality for higher yield of poultry meat and eggs than that of existing one.

Objective

The objective of this experiment/ intervention is to make village female chicken more productive for the rural masses and fit to be reared at a negligible maintenance cost. They should thrive in adverse habitats by scavenging on the available waste feed staff, disease resistance. The indigenous chicken has small body size with low productivity character. Research studies were done on village chicken to get high yielding cross breeding which are commercially available in market but no efforts is being made to introduce to new gene in village chicken at village level. Village female chicken lay 50 - 60 eggs per annum whereas the female of commercially available strain lay 320 - 330 eggs in a year. The male from these cross breeding strain taken for this intervention.,which is of no use for commercial purpose.

Methology

After training program on backward poultry activity to SHG (Self Help Groups) member to make any one activity suggested during training program as a livelihood. Day old commercially available male chicks were purchased from commercial hatcheries and reared as per the manage mental practices suggested by us in local charitable trust farm (NGO). Brooding, Medication, Vaccination, Feeding, Light management, Litter management, watering practices followed strictly as per suggestion given by us to SHG member who is responsible for day to day operation, has undertaken these activities in Nalgonda district of A.P. During brooding and growing period thorough monitoring was done and the mortality rate from day old to twenty weeks of age was 1.2% and uniformity 95%.

Funding part

Revolving fund released from the Project Director of Nalgonda district to village organization identify by district capacity building member (DCBC) concerned NGO. Budget preparation required for rearing male birds estimated in consultation with VO(Village Organisation) PD, (Project Director) DCBC member, concerned Veterinary Doctor for twenty weeks of age for 100 birds was Rs. 110/- per bird inclusive of

depletion , shed rent paid to charitable trust, these cost also include feed, vaccination, medication, electricity.

Prior to introduction of crossbred males with identified community member, following procedure followed

Identified women should be from SHG member and should possess village chicken at home.

She should be fully convinced about the interventions and cooperative with livelihoods coordinator, village poultry health worker for providing performance data regularly.

Prior to introduction of the male birds, she should cull village male birds at least one week before introduction, which fetches good rate and avoid in fighting, over mating and impact assessment correctly.

She should supplement daily by feeding broken rice, maize, wheat (locally available) at the rate 20 – 30 Gms daily to both male and female.

Ratio of 10:1 is followed for mating purpose.

Total village female chicken population has to be calculated for introduction of male bird

After introduction of crossbred male

A full mature male was introduced for mating purpose.

Initially for a week female chicken was reluctant to adjust with male after that she was cooperating.

Though male bird was introduced in villages in the month of February in 2003, summer temperature was all time high, livability was 98% in introduced flock.

Hatchability, egg size, chick weight, grown up birds weight, broodiness, aged of first egg, color, body confirmation was the main criteria for the data collection after mating.

Initially because of summer hatchability was 70 – 75% later on increases to 85 - 86% in village hatching procedure.

5-8 Gms of egg weight more than earlier production.

Hatched chicks weight 3- 5 Gms more livability 90% till eight weeks.

Number of eggs for female increase for the almost double 100-110 eggs.

Main gain by this intervention is less broodiness and body weight of bird, which is a main criterion in getting more number of eggs in village chicken.

Inputs require taking up these interventions

Capacity building of primary stakeholder and monitoring staff.

Availability of growing farm i.e. poultry shade with all facilities to rear to male birds from day old to twenty weeks, space require one sq. feet per bird.

The growing center should be near to villages where these male birds are to be distributed.

Availability of day old crossbred male birds chicks (in India commercial hatcheries discard, burn male chicks after sexing and female sells to farm, male chicks are available at the rate Rs. 1/- per chick excluding transport, packaging.

Supervision by qualified person to monitor manage mental process during growing.

Feeding, availability of raw material with in village for preparation of quality feed as per standard.

Budget estimated should be released fully at the time of introduction of male birds.

A comprehensive policy at village level to be developed as a backyard poultry activity as livelihood, which includes this concept to generate interest in community.

Crossbred male should be culled after one and half year of age and introduce new batch.

Regular time bound monitoring by grass root staff of Project implementing agencies, NGO, VO, should cooperate in providing data.

Problem found with these particular concept implementing

Backyard poultry is a part of livelihood activity undertaken in project that was implemented by identified selected PIA/NGO selected by project coordinator (head of the project). PIA field staff has number of activities to be implemented, monitor with other funding agencies to assigned NGO, there was no proper cooperation, coordination between project staff, VO for this activity to get impact assessment.

Administrative structure should be simple to take up this activity in mass by supporting financially on time to time. District level government staff (project director, government veterinary doctor, DCBC) must be convinced, take lot of time as they are the not people who are going to rear, once village chicken rearer convinced.

Majority of women rearer sold male birds before completion of age as these male birds fetches good rate.

The majority of SHG member, watering, in closer system did not follow supplement feeding.

Conclusion

Unique concept so far no one has taken lead in India in this area, there is some program of cockerel exchange program in some part of country, as a program taken, but results was not published. This activity required less research, more suitable for villages that keep chicken, in breeding depression is most common phenomenon leading to less egg production generation by generation. Involving local community making these intervention as a policy and executing by agencies who are interested to take up these concept with out much hassles which has great potentials for up scaling any where in the world.

This concept was introduce by me in DFID/APRLP joint venture project in Hyderabad, India, with lot of persuasion, but like other projects the life is over, no one will take interest to follow-up. Sustainability is important.

Message No 8

Timothy Gondwe, Associate Prof of Animal Breeding, Department of Animal Science, Bunda College of Agriculture, Lilongwe, MALAWI

Thanks to the coordinators for initiating this important topic. As for the Malawi case, we are also concerned about finding a suitable type or breed of chicken for family producers. For over 40 years, we have had a dual purpose breed called Black Australorp, distributed from three regional government hatcheries to the farming communities. The goal is to get improved egg and meat output from local chickens,

while maintaining adaptive traits through crossbreeding with the local, non-descript breed. Each year massive distributions take place by Government and NGOs. What is surprising there is no foreseeable impact, and two years down the line, all exotic get wiped out, of course with traces in local types that is worrisome as it is diluting the local types. It appears crossbreeding is juicy but needs lots of technical groundwork to be done before it can achieve effectiveness and sustainability. This makes some of us think of either improving the local ecotypes or developing composites. The need for an improved type is there and farmers always demand such. This demand by farmers has attracted lots of NGOs that have financial resources to procure and distribute the Black Australorp, but with no or limited technical backup at the farmer level. On the other hand, the local birds are nowadays seemingly losing their vigour. This might arise from its blood being diluted by the introduced breed or some inbreeding with time. Other poultry species exist but are not paid attention to. For all improvement, it would not work to change the existing free-range system abruptly to an intensified system. The majority of our farmers could not cope with that.

Message No 9

Haleem Hasnain haleemhasnain@hotmail.com, Livestock Foundation, Islamabad, Pakistan

Experience in several countries indicates that rural poultry development programs that envisaged introduction of breeds (pure or crossbreds) and other inputs from central facilities were not sustainable. Once the development projects ended, the new breeds introduced also disappeared. This is also likely to happen with the RIR-Fayoumi crosses in Afghanistan. FAO introduced Fayoumi and Doki in Pakistan several years ago. Today Fayoumi and Doki may be found, if at all, only as a fancy breed. Such projects make good reports. But such breeds are forgotten with the end of projects that introduced them. The only breed that survives in the rural areas is the indigenous breed that is the scavenging, slow growing, and low producing birds that gets broody. The poultry and development experts do not like these indigenous birds. They look for an ideal breed that produces more eggs, larger eggs with higher hatchability, has higher body weight, do not get broody, are less aggressive, not prone to attacks by predators, etc. Such a breed does not exist. However, scientist can develop a breed like that (RIR-Fayoumi Crosses). But the million dollar question is whether a breed like that can survive in the rural areas. It can survive and produce so long as the necessary inputs like feed, shelter, health cover and better overall management are provided. If all these have to be done then why not use the modern hybrid birds (broilers and layers)? We forget that the indigenous scavenging breed that produces only some 60 eggs does so at virtually no cost. Several trials have established that these birds have the genetic potential to produce around 100 eggs or so. These are producing 60 eggs only because they can scavenge only enough feed to produce only that many eggs. Every few years or so there is news about a new rural breed. But few years later no one hears about them because these disappear into oblivion with the development projects that introduced them and what remains is the original scavenging indigenous breed. Last year there was news from India about Rajgiri. Now comes the news about the RIR-Fayoumi cross from Afghanistan. If this crossbred produces 250 eggs, it must be getting quality feed plus other necessary inputs-thanks to the FAO project. What will happen when the FAO assistance comes to an end? Frankly speaking, there is nothing between the scavenging indigenous breed and the modern hybrid chickens. There are really two options for development of poultry in the rural areas:

- The indigenous breeds have been around for hundreds of years and are well adapted to the areas. Their major problem is high mortality due to diseases

(Newcastle and or pox and parasites). These can be easily prevented through vaccinations and treatment. Training rural women in these skills have been very effective. This has drastically reduced mortality and empowered women.

- Wherever possible organizing women to manage small flocks of modern bird (broiler/layers) has been a useful enterprise. These cooperative farming is sustainable particularly those that are close to markets for eggs and birds for meat. Once the farmers are organized and poultry farms operational, these will become self supporting because there are no operational subsidies in this enterprise.

Message No 10

Dr. S. D. Chowdhury, Department of Poultry Science, Bangladesh Agricultural University, Mymensingh 2202, Bangladesh, E-mail: drsdchow@gmail.com

E-conference on "Opportunities of the poultry breeding programmes for the family poultry production in developing countries: The bird for the poor". Theme for discussion: "What types of bird are required by family poultry producers?" There is no denying the fact that family poultry producers require a type of bird that could be reared in small number by following scavenging, semi-scavenging or small-scale intensive system of rearing. Currently, most of the family poultry, particularly in developing countries are of indigenous or native origin, the stocks who are usually low producers of eggs and meat. Efforts to improve their productivity, in the past, in many countries including Bangladesh by incorporating superior genes was successful but not sustainable due to a number of weaknesses both from Government and farmers' sides. One can't expect that the situation will change dramatically and future attempt of similar nature will yield a success. Consequently, the type of bird with more genetic potentiality suitable for the family poultry producers must be decided considering past experience and practical limitations but exploring local resources and environmental facilities. In my opinion, the indigenous (native) chicken of a country should be the real asset, the bird for the poor, for family poultry producers. The indigenous chickens of a country vary widely with regard to colour, size, behaviour, production and other economic traits. This inherent variability in characteristics have left a scope for selection and breeding for the purpose of developing a type of bird from them that is more productive, thrive well in harsh environment and could be reared through fullest utilization of local resources in a cost effective manner. For example, several varieties of indigenous fowl with distinctive characteristics exist in Bangladesh. Hilly, Naked neck, Aseel, Yasmine, native dwarf and common desi are well known. A well coordinated selection and breeding programme involving geneticist, breeder, nutritionist, health expert, management specialist may develop a type of bird with local germ-plasm for the family poultry producers. Dual purpose bird (meat and egg) should be preferred to meet the demand of the farmers as well as consumers. This endeavour will conserve the local germ-plasm in one hand and prevent the genetic dilution of indigenous stocks on the other. This will also allow us for a gradual development of local genetic resources to augment production. Neither the commercial broiler or layer type chickens be allowed for family poultry production nor it be used to mix up with indigenous stocks. The national poultry policy of a country should address this issue. The improved type of bird developed from local stocks, depending on facilities and inputs available to a family poultry producer, could be reared under scavenging, semi-scavenging or small-scale intensive system. This type of bird should be maintained in rural households to explore production for at least two decades. However, for a family poultry producer, the number should not exceed above 50

(fifty) in contrast to current number of 100 (one hundred) as outlined by the International Network for Family Poultry Development (INFPD).

Response to Message 10 from Timothy Gondwe, Malawi

Agreed entirely with Dr SD Chowdhury. We need to work on the dual purpose local breed. From my PhD research, I found that local chickens possess adaptive traits due to generations of natural selection. However, this natural selection has not wiped out genetic variability, and heritability

for productive traits were high and promising for selective breeding. These genetic parameters were estimated for birds under scavenging conditions. However, one notable challenge is to take care of small on-ground interventions to allow full expression of potential when breeding programs including crossbreeding to introduce improved genes are implemented. The theory looks simple but not as straightforward.

Message No 11

From: Dr.U.Rajkumar, Senior Scientist, Project Directorate on Poultry, Rajendranagar, Hyderabad 500030, India, Phone: 91-40-24017000, Mobile:919849561708, Fax:914024017002, ullengala@yahoo.com

Subject: Re: Breeding for Poultry Development, Message 2

It is very good point raised by Mr. Prasad. The birds developed for rural/backyard poultry are really doing well. Only the scaling up of the present facilities is required. PDP (ICAR) has taken up a mega seed project wherein the parents are supplied to different seed project centres, they will rear, reproduce and supply to the farmers in their respective regions. Presently six centres are in operation, the council is planning to expand the centres to meet the demand of the chicks.

Message No 12

From: Dulal C Paul University of Alberta Canada, dulal@ualberta.ca

Subject: Opinion about rural poultry, Rural chicken breed Bangladesh perspective

It is recognized that Bangladesh is one of the promising country in the world for poultry development with the highest growth rate of commercial poultry. However, still half of total poultry production is from indigenous poultry or rural poultry. The village people are interested to rear dual chicken with high disease resistance but mostly not providing commercial feed. They are surviving with homestead vegetables, kitchen wastage, insect, earth worm etc. Rhode Island Red or Australorp cockerel exchange is one of the successful projects to increase poultry production in rural Bangladesh. I have worked on rural poultry development about 15 years under National coordinated farming system research-extension and as a scientist of Bangladesh Livestock Research Institute, Bangladesh. There is huge potentiality of local germ-plasm in poultry of Bangladesh. I do believe selection programs based on climate or country wise conditions could be an appropriate approach to increase production and sustainability. Now I am a grad student of University of Alberta and working on broiler breeder management for better efficiency using core body temperature in different environmental temperature with dietary energy levels.

Message No 13

Dr. L. Hardi Prasetyo Poultry Breeding and Quantitative Genetics Indonesian Research Institute for Animal Production PO Box 221, Bogor 16002, Indonesia Email: hardiprst@gmail.com

Subject: Re: Breeding for Poultry Development

As described in the background document, family poultry management system in Indonesia also falls into 3 groups: traditional scavenging, semi-scavenging, and small-scale intensive system. Therefore, the type of birds required is different for each group. For the traditional scavenging system, local birds available in each area should be used because they are well adapted to the local conditions and farmers are familiar with them. The only improvement that should be done to these genotypes is in improving their disease resistance in order to reduce mortality in the young as well as adult birds. Egg or meat production should not be improved as they will require higher production cost. For the semi-scavenging and small-scale intensive systems, improved local breeds may be used for better productivity and production efficiency, through either within-line selection or crossbreeding with other local or exotic breeds. In Indonesia we have developed hybrid layer ducks by combining two local breeds with heterotic level of about 11% in egg production, with a very good acceptance by farmers in these two groups.

Response to Message 13 from Timothy Gondwe

I beg to differ slightly from views of Dr Prasetyo on the need to improve disease resistance only and leave the egg and meat traits as such. The Malawi situation showed potential to improve all three traits and also that both management and genetic approach can apply. On the other hand, improvement in egg and meat traits should be done to match farm scavenging environment that has room to accommodate improved traits but not going too far. Also, with simple supplement feeding, improved traits can do, and I am sure such management interventions can be afforded by farmers. Observations are also showing potential effect of inbreeding on viability that includes disease resistance. This trait is slowly weakening in local breeds. One could argue to be due to effects of crossbreeding. Regardless of cause, breeding approaches need to be integrated in disease management for local chickens.

Message No 14

Abraham Lemlem Ethiopia, Livestock seinor advisor, Relief Society of Tigray RE REST (Relief society of Tigray), Department ERAD (Environment rehabilitation and agricultural department), PO Box 20, Mekelle, Ethiopia, labraham356@hotmail.com

Performance of exotic and indigenous poultry breeds managed by smallholder farmers in northern Ethiopia

I had been doing a research on adaptability traits of poultry breeds with WLW, RIR, Fayoumi and local breed in village chicken management and like to report the results as follows:

Although there is no generally accepted definition for rural poultry production system, the system is characterized by small flocks, minimal input and output, and periodic devastation of flocks by diseases (Tadelle 1996; Tadelle and Ogle 2001). Many researchers (e.g. Jensen and Dolberg 2003; Tadelle et al 2003; Reta 2009) consider poultry production as a key to poverty reduction in the rural poorest sections of society. For this reason attempts have been made to introduce different exotic poultry breeds to the smallholder farming systems in Ethiopia. Four breeds of exotic chickens (Rhode Island Red, Australorp, New Hampshire and White Leghorns) were imported to Ethiopia and extensively researched since the 1950s (Demeke 2008).

Poultry development initiatives have been made in the semi-arid Tigray region of northern Ethiopia, focusing on White Leghorn, Rhode Island Red, and Fayoumi

breeds. However, despite the distribution of different breeds of poultry to smallholder farmers in the region, limited attempts have been made to assess their comparative performances. This study was carried out to evaluate the performance of three exotic (Fayoumi, Rhode Island Red, and White Leghorn) and an indigenous poultry breed managed by smallholder rural farmers in terms of egg production, hatchability, body weight.

The aim of this study was to compare age at first egg laying, hatchability, number of eggs produced per year, egg weight, body weight at 8 and 18 months, and mortality in three exotic poultry breeds (Fayoumi, Rhode Island Red, and White Leghorn) and an indigenous breed managed by rural farmers in two watersheds (Begasheka and Debre Kidan in the central zone of Tigray) in northern Ethiopia.

The key conclusions that can be drawn from this study are:

The age at first laying appears to be longer than other reports, and can be improved through better feeding and health care.

Under smallholder farmers' situation typical of the study areas, egg production was maximized from Rhode Island Red and White Leghorn breeds

The highest percentage of hatched eggs produced by the indigenous and White Leghorn hens suggests that a need to further investigate the poor hatchability observed in Rhode Island Red, which is a widely distributed breed in the study region.

There is a need to substantially reduce mortality of exotic and indigenous chicks managed by rural farmers through the provision of better and effective extension services.

The performance of RIR was better in egg production, size of egg and body condition but lower hatchability which is danger for continuing the generation of the bird. Fayoumi was low in body condition, small egg size and low egg production but very good in hatchability, and good in protection from prey and thefts and good taste of egg. The local was found to tolerate disease and had good hatchability and the WLH was moderate

Age at first laying varied between the two chosen watersheds, and ranged from 231-245 days. Rhode Island Red hens produced the highest number of eggs (185) while the highest hatchability was recorded in eggs produced by the indigenous (79%) and White Leghorn (76%) hens. Pullet and mature body weights were the heaviest for Rhode Island Red birds. The highest chick and pullet mortalities were observed in Fayoumi (68%) and White Leghorn (48.5%), respectively, while the highest adult mortality (52%) recorded in the indigenous birds.

It is concluded that Rhode Island Red and White Leghorn can be effectively managed for egg production under scavenging condition by smallholder farmers, with a need to shorten age at first egg production. The highest percentage of hatched eggs produced by the indigenous and White Leghorn hens suggests a need to further investigate the poor hatchability observed in Rhode Island Red. The high mortality rate in the four breeds should be substantially reduced through the provision of effective extension services.

Response to Message from Timothy Gondwe

The points raised in the attached messages show clear that a dual purpose breed of chicken is what is required as rural poultry. This breed should possess good features for adaptation and be able to reproduce under low input, often scavenging

conditions. As per Abraham Lemlem from Ethiopia contribution, results show antagonistic features between traits of production (egg yield and size) and fitness (hatchability). This is worrisome for sustainability of the RIR under village conditions despite the good traits, unless some interventions such as taking eggs for artificial incubation are included. Local breed showed good trait for hatchability but disappointingly, displayed high adult mortalities. The goodness for this is that it is controllable with little management intervention, unlike the hatchability issue. I would go for local breed and just aim at improving its performance through management enhancement and selective breeding.

Message No 15

Mr. Kiplangat Ngeno, Department of Animal Sciences, Egerton University

Po Box 536, Egerton, Kenya. Email: aarapngeno@yahoo.com or aarapngeno@gmail.com

Chicken breeding has been attempted through a variety of donor-funded projects. Most programmes aimed at improving productivity have concentrated on aspects of their physiology and nutritional requirements without due regard to their genetic diversity. For example, the cockerel/pullet exchange programme was implemented under the National Poultry Development Programme (NPDP) with the objectives of improving body weight and egg production. This programme used exotic cockerels for upgrading the indigenous chicken (IC). However, it was unsuccessful because the exotic cockerels and their progenies could not survive the harsh free-range conditions. There has been no other formal attempt at genetic improvement of IC until 2006 when smallholder indigenous chicken improvement project (INCIP), which is being implemented by Egerton University, Kenya Agricultural Research Institute and the Government of Kenya initiated extensive research. From the study, Kenyan IC comprised several ecotypes which exhibit a high between-and within-ecotype variations in meat and egg production. These variations are currently being used in designing both genetic and feeding interventions for each ecotype. Furthermore, the differences among the ecotypes presented the opportunity to choose the best parental lines for IC breeding and development of commercial stock through selection and/or crossbreeding between and within ecotypes which is currently going on at Egerton University. In my opinion, the type of birds that are needed at the rural or village level, are the improved IC ecotypes (selected and /or crossbred both between and within ecotypes) since they are adapted to the local conditions.

Message No 16

Dr. Sujit Nayak, Livestock Officer, Government of India

In the background paper we saw how colour, morphology, temperament, productivity, disease resistance, adaptability and self-propagation are important features influencing selection.

However, I have come across in large part of West Bengal, RIR (Rhode Island Red) as the bird of choice for family poultry by even the poorest. So I reflect my experience with Mr. Dulal C Paul University of Alberta Canada and also Mr. Abraha Lemlem, Ethiopia, Tigray, REST senior livestock advisor, though he has indicated low hatchability as a problem with RIR.

Therefore I believe, people's liking is also a major determining factor in a region.

I wonder if we can count RIR and Black Australorp as Low-Input Technology birds? And for which category? (Is it suitable for the poorest of the poor?)

I would also like to learn more about work done on disease resistance of indigenous birds especially in India's context.

Message No 17

From William Ngwira, wngwira@bunda.unima.mw

On the topic it is also important to look into the cultural values of the chickens in the local communities. The chickens have different values depending on the culture, so when we are going to recommend a breed we should also need to have in mind that the local communities do not only value the economic aspect of the breed. In this case it would be very required to find the breed or the strain that may combine some traits that the local communities regard as important apart from adaptability and productivity. I agree with Dr. Pius Lazaro Mwambene from Tanzania that there is need to characterize our breeds/strains. In the case of Malawi, some studies were conducted and revealed that we have a diversity of good traits among the local chickens that are kept across the country. So it requires purposefully identifying the traits that the local community consider as important without considering introducing the exotic breeds/strains.

Message No 18

Gregory Chingala MSc Student, Animal Science, University of Malawi

E-mail: gchingala@bunda.unima.mw

Malawi Government for the past 60 years has been encouraging families in villages to crossbreed Black Australorp with their indigenous chickens with an objective of increasing meat and egg production per chicken. The results have been always very disappointing such as poor survivability; and hatchability since crosses do not sit on eggs. Therefore indigenous hens are used to hatch the eggs. For all this long time in implementing this programme, no single cross is seen around despite stockpiling of Black Australorp breeder stock in Public Hatcheries.

The lesson that can be drawn from this experience is crossbreeding should be discouraged under village conditions. Instead indigenous poultry should be encouraged where a family cannot afford intensive production and in cases where the family can afford intensive production, it should be encouraged to keep exotic chicken specific for eggs or meat. As scientist we must understand that it is difficult to achieve more than one objective efficiently in breeding programmes hence dual purpose chicken should not be encouraged. In Malawi we have distinct strains of indigenous chickens that are for meat or eggs so breeders must improve these strains through selection so that farmers should be able to choose either to raise their chickens for eggs or meat.

Message No 18a (not distributed during conference)

Maxwell Smanga Thwala, Livestock Specialist, Lower Usuthu Smallholder Irrigation Project, Swaziland Water and Agricultural Development Enterprises, P.O. Box 198 , Siphofaneni , Swaziland , Tel 002683441671/1/2/3/3, Fax 002683441663, Mobile 0026876027643

Maslow theory describes five basic human needs as follows physiological, safety, love and belonging self-esteem, and self-actualization. Food and water are under the physiological need and are given the highest priority. People who struggle to meet the five basic needs especially food is regarded as poor. Poor people usually lack the means to increase their productivity, such as land, capital knowledge. Family poultry production is playing a very significant role as a source of protein for the poor

communities. Due to insufficient resources, family poultry breeds should be able to survive under the toughest environment and be able to adapt quickly into the ever changing environment like the Nguni cattle of Southern African which is now described as the breed for today, tomorrow and for the future.

Below are some of the characteristics of the bird that will be most desired by farmers.

Trait		Comments
Dual purpose	Efficient producers of meat and eggs	
Survivability	Genetically the birds should possess survival genes	
Adaptability	The good survival genes will be expressed phenotypically by the birds ability to quickly adopt to new environments	Urbanization is changing our natural environment, birds needs to adopt to new feed sources environment
Incubation	At least 80 percent hatchability	
Disease resistant	Not easily affected by seasonal changes and can be treated using local resources	For improved productivity and reduction in zoonotic diseases
Mothering ability / Broadness	Protecting and scavenging for chicks	
Scavenging	Being able to scavenge for high quality feeds	
Growth rate	The birds should reach table weight in about 4- 6 months	
Bird size	Medium size 1.2 - 1,5	
Number of eggs	40 - 60 eggs per year 4 cycle 10 15 per cycle	
Egg size	Medium size eggs	
Longevity	Birds should lay at a minimum of 80-100 eggs or live for at least 2 years.	
Plumage colour	No specific plumage but plumage should offer camouflage against predators	Predators account for more than 50 percent of chick mortality or losses

The number of birds that are required by family poultry producer will be influence by the following factors:

Factors		Comments
Environmental factors	Scavenging space Scavengeable resource base Quality of the scavengeable resources Farmers ability to provide supplements	Productivity tends to reduce if a high number of breeding stocks is kept due to the following reasons. Limited scavenge able area Feed scarcity Cockerels fighting over hens Hens fighting over nest areas
Objective of keeping	Poor families keep family	If family poultry is the only

family poultry	poultry mainly for food security by eating eggs and meat or by selling the products so that they can buy other food stuffs	source of income, daily sales should therefore be above 2 USD per day per head per homestead For instance if you sell eggs in Swaziland you will need about 15 hens per individual
Family size	Average family size in Swaziland is 10 people per household	For security reason one breeding hen per individual per homestead seems enough to provide the minimum annual protein requirement For example a family of 10 should keep 10 hens plus a cockerel

Conclusion

Genetically and environmental interaction will also have an influence on the type of breeds and number of birds kept per family. In the recent years the issue of markets and opportunities for trade in foreign markets seems to be shaping the breeds and the number of birds we keep.

Message No 18b (not distributed during conference)

S.M. Rajiur Rahman , Training Officer, MFTS Project, Palli Karma-Sahayak Foundation (PKSF), Bangladesh

I have attached my Bangladesh experience on backyard poultry which is replicated other project as well as country.

Three type of enterprises have been developed for strengthen the Backyard Poultry Enterprises in Bangladesh. 1) Small scale Parent stock using RIR cocks and Fayoumi hens 2) Mini hatchery using the method of a) Rice husk b) Sand c) Rice husk with quilt 3) Chick rearing unit (CRU) using DOC (named Sonali) from mini hatchery. CRU rear *Sonali* bird in two way i) up to 2 months both male and female with broiler feed for meat purpose ii) Rear *Sonali* up to 2 months with appropriate feed and sale female to the rural women for egg purpose by scavenging / semi-scavenging way. Male is use for meat purpose. Rural poor women manage those enterprises in cluster form due to inter market linkage.

The average net return per chick was earned by the Chick Rearers of Sylhet region (Tk. 24.60)³ followed by Brahmanbaria region (Tk.31.14) and Shariatpur region (Tk.41.17). The Benefit cost Ratios of Chick Rearing units on full cost basis were calculated at 1.45, 1.45 and 1.65 in Brahmanbaria, Sylhet and Shariatpur region, respectively. The average net return per bird of Model breeder was higher (Tk.90.18) in Brahmanbaria region than Sylhet region (Tk. 67.25). On the basis of full cost the BCR of Model Breeder in Brahmanbaria region was also higher (1.12) than Sylhet region (1.09). The net return per 100 eggs of Mini Hatchery was Tk. 1070.57, Tk 1317.40 and Tk. 588.72 in Brahmanbaria, Sylhet and Shariatpur region, respectively.

³ 1 TK =69USD

The Benefit Cost Ratios of Mini hatchery units on full cost basis were calculated at 2.24, 2.49, and 1.51 in Brahmanbaria, Sylhet and Shariatpur region, respectively.

Important recommendations on the basis of the field experience following recommendations should be followed for financially viable Backward Poultry Enterprise:

Small scale Parent stock should be established or kept functional by the NGOs support or by the entrepreneurship development for smooth functioning of the other enterprises.

"No production, no instalment" system may be adopted for the farmers. It means that the grace period should be consider which is related to return of their farm products (Fertile Egg/ Table Egg, DOC, Pullet) particularly in case of parent stock .

The support service by the NGOs and GOs (especially Livestock department, Banks etc.) should be strengthening rather than collection of instalment from the beneficiaries. The NGO's are always interested to collect their instalment rather much technical support.

SWOT analysis on poultry enterprise was done to identify constraints and recommended some suggestion to improve the poultry value chain. In addition farmer's perception and traders opinions were sought and recommendations were made.

For the proper development of poultry sector support strategies in four areas namely (i) laws and policy, (ii) capacity of poultry farmers and traders, (iii) participation of private sector and (iv) Government role were formulated.

Message No 18c (not distributed during conference)

Phan Dang Thang, Chercheur, PhD candidate, Centre d'études interdisciplinaires du développement rural, Université de l'Agriculture de Hanoi, Vietnam, Mobile (Belgique): +32(0) 483005959, Mobile (Vietnam): + 84 (0) 912610298, Email: pdangthang@yahoo.com, pdangthang@hua.edu.vn, tphandang@student.ulg.ac.be <http://www.ceidr.vn> <http://www.hua.edu.vn>

After reading the research "Cross Breeding Indigenous Female Chicken with High Yielding White Egg Commercial Male Bird to Increase Productivity", I think that it is a good initiative and researches but besides this approach, I also think that we have to see a good program in the field of conservation of local races. I would like to share some ideas and hope that I can receive your responses.

The development of local chickens in difficulties in Vietnam

In the framework of my PhD thesis in the North of Vietnam with an approach of supply chains of animal products, I think that the local races are always in good quality and have the capacity of resistance with different diseases. In particular, in the context of avian influenza caused by H5N1 which happened in poultry production in Vietnam. Local poultry races are really diversified and complex such as chickens of Ho, Mia, Ri, etc. In fact, these races are always not vaccinated and raised in poor bio-security systems with poor preventive sanitation. These races are usually infected with some diseases during the changes of climatic conditions between the seasons and high humid conditions.

But, productivity of these races is also still limited. The rate of mortality ranges from 15% - 27% in the backyard production systems. Broiler backyard production chicken has a high FCR up to 4.5kg of feed/kg of weight but these chickens are well

appreciated by poor farmers. Under the pressure of surface for animal husbandry in the Red River Delta and non agricultural activities for the money, these chickens are fading away now. In addition, enterprises would like to develop the industrial chickens for commercial farms. Investment or conservation conditions for local chickens are not existing or very limited. In practice, the epidemic diseases are often broken out from on commercial farms and spread to small producers. One the other part, the research institutes of animal production are often involved to develop cross-bred chickens or colour chickens between the local and colour imported races. These colour chickens have an intermediate quality. Broiler chickens weigh from 1.42 – 2.13kg/head, with feed conversion ratio (FCR) from 2.55–3.66kg of feed/kg of weight. Broiler Bau Canh Trang duck weighs 2.13kg/head, FCR is 3.89kg of feed/kg of weight; but this development is very limited for supplying to majority of smallholders and the prices of day old chicks are still always higher.

So I think that, the local chickens are good quality according to the poor conditions of smallholders. These races are maybe responding with resistance to some epidemic diseases. But the clear resources and quantities of these chickens are always an important problem. It is necessary to have the programs for conserving of such races on the national level in developing countries.

Message No 19

Sujit Nayak, Livestock Officer, Government of India.

My response is for Dr Siva Prasad Vadla wherein he mentioned failure of two birds developed by ICAR-PDP and Sri Venkateswara University, Hyderabad India to produce. Was there any particular reason found why they did not perform in field conditions?

I would also like to know the birds being propagated under mega-seed project by PDP, Hyderabad, India as mentioned by Dr.U.Rajkumar, Senior Scientist, Project Directorate on Poultry, Rajendranagar, Hyderabad. Are these included under low-input technology birds of GOI list (mentioned at message 3)? Also, how many seeds (Parent stock) are produced annually from each establishment? I also agree with Dr. U.Rajkumar on prioritize the strains/lines for conservation.

The details of bird being developed (Cross Breeding Indigenous Female Chicken With High-Yielding White Egg Commercial Male Bird To Increase Productivity) as mentioned by Dr. Syed Yousuf Hussain, Poultry Consultant, Hyderabad (India) may also be given.

A format has been developed by GOI to assess these Low-input birds so as to properly categorize into scavenging, semi-scavenging and semi-intensive categories, which I am attaching with this mail.

Kindly help improve the format and give suggestions so as to enable large scale implementation across the country.

I would also be interested to know the areas in India where even low-input birds may not be introduced for fear of dilution like in Jhabua (for Karaknath) etc. The specific regions may be indicated so that we do not introduce 'improved' germplasm but concentrate on conserving the indigenous blood

Genetic background of low -in-put technology birds for Centrally Sponsored/Centrally Sector Poultry Schemes:

1	Name & address of the organization
2	Whether the organization is a franchiser or breeder
3	If franchiser name of the breeder, detail address & NOC from breeder must be attached
4	Name of the breed/strain/line/cross/variety etc Egg type Meat type Dual type
5	No. of lines for production of commercial chicks
6	Phenotypes: Genetic status with origin/propagation Breeding in operation since how many years Plumage colour Body confirmation(length of shank, keel, neck, breast angle etc) Temperament Any special attributes/quality
7	Live body weight of male & female: Parent body weight at day old, 5, 6, 16, 32, 45 & 72 weeks of age Comm. body weight at day old, 5, 6, 16, 32, 45 & 72 weeks of age
8	Egg weight: Egg weight at 32 & 45 weeks of age Colour of egg including internal quality if any
9	Age at sexual maturity (ASM) in days
10	Age at 50 % production in days
11	Age at peak production in days
12	Parent egg production: No. of hatchable egg per hen No. of good chicks per hen HH egg production HD egg production Peak production Production at 72 Commercial egg production: HH egg production HD egg production Peak production Production at 72
13	Hatching performance: Fertility % (sex ration may be provided) Hatchability on TES Hatchability on FES
14	Feed & feeding: Parent feed consumption up to 5 th , 6 th , 16 th , 45 th , & 72 weeks of age Commercial feed consumption up to 5 th , 6 th , 16 th , 45 th , & 72 weeks of age Average feed consumption/bird/day up to 5 th , 6 th , 16 th , 20 th , 32 th , 45 & 72 weeks of age Average feed consumption/bird/day during laying period Average feed consumption/bird/day under scavenging system of

	rearing at different ages FCR at 5 th , 6 th & 12 th weeks of age FCR per kg of egg & doz. of egg
15	Dressing % : without giblets with giblets
16	Mortality % at 5th, 6th, 16th, 32th, 45th, & 72 weeks of age
17	Liveability % up to 16 th , and 72 weeks of age
18	Cost: to produce a parent day old female chick to produce a commercial day old chick to produce a parent hatching egg to produce a commercial hatching egg of female parent DOC (including package deals, it is essential to mention that whether male cost is including female chicks or extra cost of male and how much/male chick including desirable sex ratio) of commercial DOC including package deals
19	Adoptability under intensive as well as semi-intensive system of management
20	History of vertical transmitted diseases during last 5 years & any type of out break during last 3 years.
21	Intensive and field trial comparison in details with reference to places, climate, altitudes etc
22	Production of parent and commercial hatching eggs & DOC per week/monthly/quarterly/annually
23	Availability of parent and commercial hatching eggs & DOC per week/monthly/quarterly/annually
24	Supply of parent and commercial hatching eggs & DOC during last 5 years
25	Random Sample Poultry Performance Testing Reports/Central Poultry performance Testing Reports if any.
26	Economics of a desired sample size under semi-intensive may be provided
27	Male & female colour photographs of parent & commercial must be submitted in soft as well as hard copy
28	Any details

Note: If commercial is from more than two lines, the GP performance may be provided.

Message No 20

Abraham Lemlem Ethiopia, Tigray, REST Senior Livestock Advisor

I agree with Dr.Sujit Nayak, Livestock officer, RIR are seen to be best in egg production and body size in the scavenging system (In smallholder farms in the region though has problem on hatchability. Many farmers prefer it in the rural areas. The problem I face in hatching it in an incubator the hatchability is average of 40% but of WLH 70-76%. Can there be a way to increase hatchability, if so it will smart out other breeds in Ethiopia. Do not forget that the commercial layers Bovan brown are highly preferred by farmers (In scavenging) in Ethiopia both in body condition and egg laying but if it was not synthetic. I can assure RIR are good scavengers.

Participant farmers in the research were exposing them to disease. There was no vaccination, handful grain and simple enclosure. The problem I see is farmers were using handful grain, maize which is expensive and not economical, but if we could support them with concentrates the cost would be much reduced. Many of the rural farmers prefer also Fayoumi due to protective from prey and the egg taste.

Response to Message No 20 from Timothy Gondwe,

Layer strains seem to do well under scavenging conditions even in Malawi where localised studies have been done. Actually here it was an attempt to introduce alternative birds to the Black Australorp. But much as short-term gains could attract farmers, long-term consequences could be detrimental and likely to be discouraged. A strain is not to be recycled through reproduction, so is the recommendation in crop seed system. They however, allow recycling of composites. Likely we could go composites.

Message No 21

Lucy MAARSE, Advisor, LIVESTOCK & LIVELIHOOD - Learn from GOOD PRACTICES - Office: Jansbuitensingel 7,6811 AA, Arnhem, the Netherlands. Mobile: +31 (0)619092725, Tel: +31 (0)267511721, Fax: +31(0)263723724,

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Hakeem Hasnain just shared his experiences in Pakistan regarding RIR-Fayoumi crosses, confirmed by Quazi Md Emdadul Huque in Bangladesh while I can add that the numerous crosses developed by the research institutions in India concern no success or very limited due to protective project environments; i.e. in line with what Hakeem just narrated regarding Pakistan. A good exception concerns a commercial bred synthetic bird called Kuroiler. Please consult the documentation regarding this breed and the related delivery chain on the SA PPLPP website: <http://saplpp.org/goodpractices/small-holder-poultry/SAGP01-Linking-Business-with-Pro-Poor-Development/>.

However, on the same site one can find various Good Practices regarding strengthening local poultry keeping.

Message No 22

Prof. Funmi Adebambo, Professor of Animal Breeding and Genetics, Department of Animal Breeding and Genetics, University of Agriculture, P.M.B. 2240, Abeokuta.

Nigeria. fbambo0412@yahoo.com

What type of birds do we need in developing countries?

Since the beginning of commercial poultry production in Nigeria in early sixties, the country has depended and still depends on the importation of parent stocks and hatching eggs for its poultry industry. Unfortunately, the parent stock farms that sustain our national poultry industry have to go back for renewal of their stock through importation on an annual basis. This is because all these farms are multiplication (and not breeding) farms and as such are not able to produce parent stock on a continuous basis. Such dependence on importation has the negative effect of (a) putting a strain on the country's scarce foreign exchange/reserves (b) creating an avenue for the introduction of poultry diseases hitherto foreign to the country and (c) offering a high risk of death of chicks in transit over long distances. Furthermore, such imported stocks were developed to perform under a certain level of nutrition and management. During the process of selection, the birds are reared

on certain nutritional regime and therefore their genetic constitution is such that it permits them to produce well only if limitations are not imposed on their nutritional requirements. Animal feed problems are prevalent in most developing countries like Nigeria and locally compounded feeds are not always nutritionally adequate for the imported stock. On the other hand, poultry stocks bred to perform well on locally compounded feeds should possess a genetic make-up that permits them to cope with the inadequacies of locally available ingredients. Therefore a need to develop national poultry foundation stocks in order to minimize the dependence on imported bird was proposed during a national workshop on poultry production in 1979. Stock developed within the country will make annual importation of parent chicks unnecessary. In addition, they will be more adapted to the environment than imported stock.

Nigeria has over 13.4 million heads of cattle, 33.4 million goats, 22.7 million sheep and 140million poultry comprising, chicken (both indigenous and exotic varieties), turkey, ducks, guinea fowl and 3.4 million pigs.

Despite this abundant number, it is difficult to compare their performance with what obtains in global animal production systems. As disappointing as these animals performance records are, the relative adaptive value to local climatic and nutritional conditions can not be quantified in monetary terms.

While seed stock production might not be critical in ruminant breeds, the lack of improved seed stock and indiscriminate crossbreeding taking place within the monogastric breeds of poultry and pigs resulting in poor performance and inbreeding depression warrants that Nigeria needs to specify positional breeding to make improved seed stock of these species available in adequate quantities and quality.

The different sectors of the poultry industry which includes feed manufacturers, breeders, hatcheries, broiler and layer farms, meat and egg processing and distribution network, constitute a versatile conglomerate for generating employment and alleviating poverty in the shortest possible time.

Pedigree breeding is the process of developing improved animal breeds from combination of several strains of animals within the species. Pedigree breeding is long term, capital intensive, requiring adequate funding, continuous funding and absolute commitment on the part of the funding agency and the breeder. Pedigree breeding happens to be sustainable, cost effective, improvement attained is permanent, transferable from parent to offspring for several generations because it is generational. The full scale production from Elite, Grand Parent (GPS), Parent stock (PS) production ensures that corresponding commercial stocks are available regularly at various combinations for the environment for which production is expected and that, in the country of production to meet immediate demand of the livestock farmers at reasonable cost as it also meets consumer preference for taste and quality. Since farmers are expected to go back to the breeder to replenish stocks at regular intervals and at least once in 3 years for GPS and PS and as often as required by commercial producer, it is just right for the breeding company to be resident in the nation where the breed is to be utilized.

Utilization of indigenous stocks in crossbred formation is to address the issue of adapting the genes of the exotic breeds to the local environment through introgression of genes between the indigenous breeds and the available exotics in Nigeria in crossbred development. This we started in our University in 1994 with the characterisation using both conventional and Molecular procedure to characterize our indigenous chicken genotypes, followed by genetic improvement on the egg production under intensive rearing which today has enhanced the egg production

ability from 120 to 220 under the cage system, with a body size increasing from 800g to 1.1-1.25 at 18 weeks age at first egg. The current egg weight has similarly improved from 38-42g first egg to 45-52g as pure indigenous line.

The intention is that producers can either use improved purebred indigenous as female line or the Dihybrid, crossed to a specific male line to generate the egg or meat line for local backyard operation or in intensive breeding strategy for commercialization. Breeding operation involving large number of indigenous chicken has not been practiced to date in Nigeria. This we are trying to propagate to enhance Small Scale Indigenous Poultry Meat Production and economically empower the Rural Farming populace, women and youths in the country.

The development of improved indigenous meat line chicken genotypes in Nigeria resulted in Dihybrid and trihybrid formations with indigenous blood ranging from 12.5 to 37.5%. This was attained with the introgression of genes between 6 genotypes that were available in the UNAAB Poultry Gene Pool. (Adebambo et.al.1999, 2003, 2004, 2005, 2006a&b, 2007, 2008a,b&c, Ikeobi et.al.2001,2004; Peters et.al.2002a&b, 2004, 2005, 2007a&b, 2008a&b; Adeleke et.al. 2004,2005,2006,2007; Agaviezor et.al. 2004,2007Adedeji et.al.2004a&b and Adeleke 2009).

Despite the small body size, the local chicken is highly desirable in the development of stronger shelled eggs, tougher and tastier meat preferred by majority of Nigerians. It is adaptable to nutrition and climatic stress of the tropics and the meat is of acceptable quality in our local cuisine. These are attributes that are genetically regulated in the tropical birds. Our currently developed hybrids attain the 250 egg production in 52 weeks; the improved broilers weigh 1.4 – 1.6kg at 8 weeks with a decline in growth after 8 weeks to 12 weeks of age.

With the current ban on importation of poultry eggs and DOCs into the country and the high demand for poultry meat and eggs, it is high time that Nigeria begins to formulate strategies to put hybrid indigenous poultry breeds on the Nigerian market. Our present research is to perfect and project the development of these Chicken hybrids for accelerated meat production and enhanced animal protein consumption for the populace using both the available exotics and the indigenous chicken in hybrid formation for commercializable rural poultry production.

Message No 23

Dr. Pius L. Mwambene, Veterinary Research Officer (now a PhD Student at Sokoine University of Agriculture), Ministry of Livestock and Fisheries Development, Dar es Salaam, Tanzania. Mobile: +255 754 015035/+255 712 759761 E-mail: piusmwambene@yahoo.co.uk

Before embarking fully on the current theme of discussion, may I reiterate the situation of rural poultry, particularly rural chickens in Tanzania (East Africa). In my country there are many indigenous lines/strains of chickens that possess many adaptive and productive attributes but are not well known and majority have never been phenotypically and genetically identified and characterized. Therefore, before suggesting the types of birds required by rural family poultry producers in the developing countries, it would be worthwhile to first identify, characterize physically and genetically, prioritize the strains/lines for conservation and prospective improvement for rural poor since resources are limiting. There is no need of introducing either exotics or other strains/lines from other places because they may be lacking adaptive traits, and hence limiting their productivity in new environments. Instead, identification, characterization and selection of better lines/strains that

posses adaptive and productive traits are the solutions for the required rural family poultry.

Response to Message No 23 from Dr.C.K.Sivapalasingam, National Livestock Specialist

FAO Office/ Srilanka

I fully agree with your concept and finding. The backyard poultry is the best option for the developing countries to produce eggs and meat at low cost as well as to utilize idle family labour, especially of women and ensure the animal protein consumption at the rural level. But, the question is what is the best adaptive breed/s could be recommended for the different locality. According to my experience continuous selection for different characters is the best method for the viability of the breed/s. Crossbreeding the indigenous birds with the improved breed for the selective characters is also possible. But from the F1 onward continuous selection and line breeding should be practiced. Anyhow selection is the best method.

Message No 24

Dr Azmat Alam Khan, Associate Professor cum senior Scientist, Division of Livestock Production and Management, Faculty of Veterinary Sciences and Animal Husbandry Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir Shuhama, Alusteng, Srinagar 190006, J&K, E-Mail:alamkhan1231@yahoo.co.in

Subject: Type of bird

I am hereby narrating my experiences from a collaborative research programme on improving backyard poultry production in Kashmir. The programme is ICAR approved and is run by PDP Hyderabad and SKUAST-Kashmir. Vanraja bird developed at PDP Hyderabad was successfully introduced in adopted villages. The programme was well taken and invoked the interest of State Government as well. The farmers were quite satisfied with the performance of the bird initially but some inherent problems with respect to sustainability are there. Farmers who reared Vanraja birds could not propagate them further as the eggs laid by the bird could not be incubated by them through natural incubation as Vanraja hens seldom turn broody. So they always remained dependent for supply of chicks. Even if some farmers managed to incubate the eggs using local broody hen, the progeny was not as fast growing as the parents. The maximum mortality reported was on account of Predation. The Vanraja bird attains more than 2 kg adult body weight and becomes unthrifty so falls prey to common predators (Dogs/Foxes). Sustainability of any intervention is the main issue.

Message No 25

Dr.Md.A.Saleque, Secretary ,WPSA-BB, ma_saleque05@yahoo.com

Re:Message No 20

RIR is good for scavenging with some additional care. The problem we see is the availability of RIR pureline as a breeding stock for the breeding farm and hatchery. Regarding the low hatchability, there is one possibility that you can rear the male separately up to 18 weeks and monitor the body weight. You might then get better hatchability.

Message No 26

Dr. R.K.S. BAIS, Sr. Scientist, CARI, Izatnagr (UP) India, E-Mail:
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In my opinion the RIR can not be a good proposition for rural poultry production as a purebred, but the crosses of RIR females with local egg type breeds are doing well for egg production with multi-coloured plumage. We are maintaining the Purebred RIR stock and the hatchability has been quite good ~65-70 % on total egg set basis. We have produced the cross of coloured synthetic broiler male with RIR females to produce a multi-coloured dual purpose variety called CARI- Debendra with egg production of > 210 eggs and body weight of about 1 kg at 10 weeks of age and perform well under scavenging system with supplemental feed in succulent areas. The other crossed of CARI Red with Aseel & Kadaknath are also doing well for egg production.

Message No 27

ISAAC CHIPETA, isaacchipeta@yahoo.co.uk

I feel that the type of bird that is required by family poultry producers in developing countries should be a dual purpose bird. This should be a selection from the local genetic pool based on essential characteristics especially the scavenging that has been suggested by Roa 2002 and Singh 2003. The poor resource poultry households will not invest much in the production.

The improvement of the local poultry breeds that have specific desirable characteristics should be conserved by deliberately isolating some farms or villages to concentrate on the breed and multiply. Monitoring and evaluation of the breed should be done to avoid breed adulteration. The use of these improved local breeds will lead to improved poultry productivity and enhanced financial capacities of women. This can only be attained with improved environmental conditions (good management-disease control, housing and supplementary feeding)

The local poultry breeds should not be replaced by improved breeds rather one should be able get to the potentiality of the local by subjecting it to improved environmental conditions (good housing, better feeding and disease control and prevention). Poultry breeders should be mindful of not eroding indigenous germplasm.

Personally I would suggest that developing countries should concentrate on local poultry breeds and strains for a larger population of the regions especially if we are to address issues of rural resource poor women in developing countries though it is low input -low output but we have a base to build on.

Message No 28

Dr Eric Fermet-Quinet, efq@laposte.net

I would like to support the very strong statements and so clear understanding of Haleem U. Hasnain, Livestock Foundation, Islamabad, Pakistan. I support the gentle attitude of many of participants to explain all constraints and failures without appearing to be too harsh. The fact is that introducing new genetic breeds inevitably imposes a change of production systems for the farmers. Change of production systems answers only to change of environmental, sociological and economical situations. Initiating such changes is far beyond the capacity and the responsibility of "animal production scientists", whose techniques may help to answer to such changes, but cannot impose them through new techniques.

I just send you this PDF file (see below) which relates a true story in poultry development, where you could appreciate a kind of summary of what can the Aid business do in trying to invent a genetic improvement program outside reality, market demand and common sense. This could be a joke, a caricature. I hope you'll smile.... Unfortunately it is a real experience. Unfortunately it is also millions of USD (incidentally of tax payers) spent for the benefit of some people behind some institutions or firms. I'm sure that some of you have same experience in other countries.

To come back to reality should we not concentrate more on:

- how to avoid losing poultry biodiversity and rather to protect it ?
- what do the rural farmers can find on the market to improve their poultry production systems without subsidies and without changing of system?
- how to maintain diverse poultry production systems and markets for the best of consumers, public health, economy and environment?
- what are the positive experiences in the world on this matter?

A true comic in poultry development Aid (but real experience)

- To resettle refugees in a poor country, Aid spent millions of USD since years to give for free hybrid poultry for restocking of the rural poultry owners. It is supposed to be “resistant to harsh conditions” (is there a gene for that?) and to produce 180 eggs yearly.
- Of course to produce 180 eggs, this fantastic hybrid needs to be started, treated, vaccinated, fed with well balanced industrial feed and properly sheltered...Just like a true industrial breed producing 320 eggs yearly (so 70 % more) allowing a usual marginal benefit between 5% to 10 % only.... Apparently simple arithmetic is not part of the competence of Aid.
- In order to reduce this deadly arithmetic injustice, Aid decided to provide for free: two months old chicks, feed for 6 months, shelter materials for poultry, and big hatching machines to boost local reproduction.
- It has been so far, for more than 7 years, a very success for Aid: all donors and NGOs are working in very hard. Every 8 months, poor farmers are calling for tens of thousands of new chicks to improve their poultry business as follows:
 - shelter materials are very useful for refugees housing
 - feed is saved a bit to extend production up to 7 months
 - eggs are eaten during months number 5 to 7
 - chicken are slaughtered and eaten on month number 8
 - farmers are calling Aid for new chicks on month number 8, if they are well introduced in the Aid business
- Self evaluation of all Aid partners, Government and involved firms has been the following for the last decade:
 - ‘there is not any problem of genetic degeneration of these hybrids poultry in their self reproduction’ say the Aid agents, because ‘first they are eaten before they reproduce, as hens don’t even clutch and cocks don’t even compete local ones for reproduction business’ confirm the farmers
 - and finally it has been evaluated that the absence of eggs to hatch is not a problem for the functioning of hatching machines as there is no electricity in the country !!!
- Our non politically correct evaluation mentioned that ‘airborne frozen poultry dropping would have been perhaps cheaper to insure food security, more efficient to speed commercial exchanges and avoid corruption of poultry meat, but the current program had psychological comparative advantage of reinserting refugees in a production funny game, as well a huge financial benefits for all international Aid, governmental and companies lucrative businesses’
- Last but not least, local poultry breeds and their eggs are flowering on the local markets! The main impact of the program could thus finally be evaluated as a very successful program “to save poultry local biodiversity and local production during a famine and conflict period”.....
Probably the best option that we should hope and support.

Message No 29

Dr. Md. A. Saleque, Secretary, WPSA, Bangladesh Branch
ma_saleque05@yahoo.com

I am happy to become a participant of the very interesting and important topic “Opportunity of Poultry breeding programme for family production in developing countries: The bird for the poor”. The title itself consists of four main point /parts i) Opportunities for Breeding programme ii) Family production iii) developing countries and iv) Bird for the poor. In light of the topic the first issue of discussion is “What types of bird are required by the family poultry producers?”. There are three family poultry management system exist in developing countries: a) Traditional scavenging b) semi scavenging iii) Small-scale intensive system. On the other hand there are different categories of poor: poor, very poor, and non vulnerable poor. Their skill, capacity, choice, homestead area, availability of homestead resources is also different. It also differs from country to country. In reality homestead is reducing day by day due to dividing of homestead land. So considering the above points, we need to address the need of different categories of people and accordingly we need to

identify the specific type of bird for the specific group poor. One specific type of bird may not be suitable for all of these types of poor people.

For scavenging backyard – Local indigenous breed perform better with some extra care. A study conducted on local chicken in Bangladesh (ref. Sarker and Golam, 2008, Title: A move from subsistence to semi-commercial family farming with local chicken, Bangladesh experiences) revealed that management interventions like weaning and creep feeding reduce chick's mortality (from 57 to 7%) and increase laying performance of chicken (from 46 eggs in 3 clutches to 99 eggs in 6 clutches).

Semi-scavenging - Bird are reared partly under free range system and partly with the scavenge feed available in locality/homestead. It was found that crosses between RIR and Fayoumi called Sonali become very popular in Bangladesh because of the production of egg and a body size higher than local breed. It looks like local breed and farmers get good price. Kuroiler supplied by Keggfarm in India also found some good result. In this case strengthening of extension services including proper vaccination and other veterinary care are very important and crucial.

Small scale intensive system – It is suitable for the poor and non vulnerable poor but not for the very poor. A strong backyard and forward linkage are required for the small scale operation. Commercial strain both broiler and layer may be used. In Bangladesh, Sonali birds also become very popular because most of the farmers rear them from Day old to 50/60 days in intensive system and sell directly to the market. In some cases, after 50/60 days males are sold to market and female are sold to layer rearers for laying purpose. It is suitable for local environment. There are about 20 private hatcheries already in operations and there is good demand. The main challenges faced by the breeding farm and hatcheries are to get pure line of RIR and Fayoumi for the production of Sonali with desirable performance.

There is some Good Practice on small-scale poultry rearing documented by SAPPLPP (please visit www.sapplpp.org)

Message No 30

Timothy Gondwe, PhD. Malawi, Associate Prof of Animal Breeding, Head of Department, Department of Animal Science, Bunda College of Agriculture, P.O. Box 219, Lilongwe, MALAWI, Tel. +265 1 277260 / 250, Cell. +265 888386847 +265 1 927246

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I read the contribution from Sujit with interest and the form is comprehensive. My problem with crossbreeding for the village poultry is for farmers to systematically maintain mating strategy and breeding parents. Unfortunately these are conditions if crossbreeding has to be sustainable. If we breakthrough on these, then bravo. Otherwise, problems of failure will continue, or else we abandon advocating for crossbred chicken production. Layer strains seem to do well under scavenging conditions even in Malawi where localized studies have been done. Actually here it was an attempt to introduce alternative birds to the Black Australorp. But much as short-term gains could attract farmers, long-term consequences could be detrimental and likely to be discouraged. A strain is not to be recycled through reproduction, so is the recommendation in crop seed system. They however, allow recycling of composites. Likely we could go composites.

Message No 31

Rajali Yahya DVM, MBA, UN-FAO ECTAD, Indonesia, rajalivet09@gmail.com

In my mind, the suitable type of bird should be bred by farmer is the domestic recently available bird of that area. For example duck at north line coast of Java, Kampung Chicken at central java, and also duck at Kalimantan Island in Indonesia. We cannot change the original bird with the new bird at one area, because the new bird will hardly struggle in adaptation against environment and diseases at that area. The villagers will not accept the new bird directly; they need time, and need more introductions, more campaign, and technical training regarding the new birds. So just keep the original species of birds, develop their genetic line, arrange their small scale vaccination pattern, design suitable small scale cages, and use available local raw material in formulating feed. Next step is introducing to a farmer the simple hatching machine which will support a strong production cycle. I am sure in two or three years we will find high population of birds, enough production, and finally the farmers will get enough income from their birds business.

Message No 32

Dr. Ed Wethli, edwethli@absamail.co.in KwaZulu-Natal, South Africa.

I would just like to give my full support to Haleem Hasnain (Message-9). I entirely agree with all that he says - it's a very clear, succinct exposition of the situation with the Family Poultry management system (a) [Traditional scavenging backyard or village system]. In addition to disease control measures there are other simple, low/no cost management techniques that could be implemented, e.g., better protection and feeding of young chicks, better egg management, selective breeding within the existing gene population and the avoidance of inbreeding, and ways of improving nutrition (this latter deserves an e-conference on its own).

Finally, I'd like to make a small, perhaps petty appeal that we stop using the word "scavenging" as this has negative notations - why not substitute the word "foraging"?

Message No 33

Auvijit Saha Apu, Lecturer, Department of Animal Breeding and Genetics

Bangladesh Agricultural University, Mymensingh-2202, Bangladesh

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From my point of view, it is necessary to evaluate and understand the local production systems first, then their limitations and opportunities, the household's socio-economic condition before identifying and recommending the type of birds for a particular production system. Otherwise, the recommendation may not be suitable for the particular section of the poor. From my experience I observed that, in Bangladesh like other developing countries, indigenous poultry genotypes constitute 80-90% of total poultry populations that are reared in villages and mostly women are in charge of this. They rear the 6-8 indigenous birds as a source of income mostly in scavenging system (traditional scavenging backyard) for which they do not supply any feed except the temporary night shelter or in some cases they provide kitchen waste and little amount of grain as and when available which is also very irregular. So, these types of birds have to collect feed mostly in scavenging way and fight against predators and adverse weather. The situation prevails in most of the developing countries. Though the productivity of indigenous poultry is poor but the poor people chose this type of bird because they did not invest anything for rearing

them. If we introduce the commercial strain so called laying machine which productivity is many times higher may not be suitable for the poorer section because they have to provide feed, medicare and other necessary inputs for which they need to invest which is not possible for them. Moreover, the prevalence of diseases of the commercial strain makes them more economically vulnerable if they face any outbreak.

Using the genetically improved birds in improved backyard system is the best way from my opinion. In this regard, crosses of native females with exotic one is a good proposition. Besides these, from our country experience, in Bangladesh "Sonali" (RIR×Fayoumi) perform well in semi-scavenging condition as well as productivity in respect of body size and egg production is higher than the native one. Moreover, it can face all the adverse conditions well as the native birds. The popularity of this bird is mostly pronounced in the poorer section of the people to improve their livelihood. On the other hand, no doubt RIR is a good scavenger and performs well in rural areas but has some limitation especially in hatchability. In the same way Fayoumi has some limitation though gaining popularity in some regions. So, I think Sonali (RIR×Fayoumi) might be a good proposition.

Response to Message No 33 from Dr.C.K.Sivapalasingam, National Livestock Specialist and former Provincial Director North and Eastern Provinces/Srilanka

Dear Auvijit Saha Apu I also fully agree with you. Even I recommend the same to the North and Eastern provinces of Srilanka. We have laid the milestone in restocking the backyard poultry among the re-settlers with the assistance of UN-FAO. Indigenous country fowl is the best for the rural poor considering their capacity, experience earned traditionally and socioeconomic condition. We are proud to address the Provincial Department of Animal Production and Health operating three poultry farms in large scale to produce indigenous country birds, in order to distribute Day old and Month old chicks among the rural people, especially to make sure the availability of the eggs and chicken for their consumption. This is our first target.

Message No 34

Dr. S. D. Chowdhury, Professor, Department of Poultry Science, Bangladesh Agricultural University, Mymensingh 2202

I am very happy to see quite a good number of responses from scientists of various organizations who are commenting on the type of bird that should be considered for family poultry production. Some of the scientists are also focusing on their own research results and experiences with family poultry. Really, we are learning a lot. In principle, I quite agree with the fact that a few breeds/crossbreeds developed by researchers are able to show good results as scavenging poultry if adequate care is provided. Now the question is whether the farmers of a developing country (the resource poor farmers) are able to prevent them from genetic dilution or are in a position to provide them improved diets. Interventions by donor funded projects may make it possible but what will happen to these birds as soon as the project money is run out? Let us take lessons from Bangladesh situation. During the decades of seventy and eighty, F1 cockerels produced from a cross between RIR and White Leghorn were distributed in selected villages for mating with indigenous pullets/hens following complete removal of indigenous cockerels/ cocks. Chicks hatched out from eggs laid by such hens were treated as rural poultry/backyard poultry to increase meat and egg production. Farmers were advised to take special care of such cross-bred chickens and supports were given for mass vaccination. Both meat yield and egg production were increased so long the project was in operation. Such crossbred

birds no longer exist in Bangladesh. Now let us come to so called Bangladesh Poultry Model. A crossbred bird for rural people was produced from RIR X Fayoumi which was named as Sonali by donor funded project (PLDP). This was found to produce better than the indigenous. But now, you will not find Sonali in rural households of Bangladesh. Their parents are confined only to a few government farms and their purity is highly questionable. Some people prefer to rear such cross-breeds as meat birds commercially, similar to production of broilers, only because they look like indigenous and the size is small. Later, Smallholder Livestock Development Project (SLDP), decided to improve the productivity of indigenous (desi) chicken rather than Sonali. Through a series of trials, they proved that the productivity of indigenous chicken could be double (in egg number) if small intervention in terms of improved husbandry practices and improved diets are provided. Result of my own research shows that when fed balanced diet in confinement, such indigenous birds gained body weight double than those received feed only from scavenging.

On the basis of above, may I request the scientists and the policy makers to concentrate their efforts on two major issues whatever the type of birds they would like to recommend for the family poultry producers: (1) the sustainability and (2) the cost-effectiveness. These two major issues already been raised by some participants of this e-conference. Collection, conservation, characterization and attempts for improvement within local types, taking advantage of genetic diversity, as already pointed out by some participants, are also important. If we have been able to develop a high yielding breed/variety or strain, that will go for commercial production, not in the households of farmers for scavenging or semi-scavenging. I am in favour of two separate type of bird (meat and egg) for commercial broiler and egg production but I think, for rural farmers, dual-type (both meat and egg) would be the best one in a flock of not more than 50 (fifty) and such a production system should be geared up exploring the local resources as much as possible.

Message No 35

Prof. A. K. Fazlul Haque Bhuiyan, Livestock Biodiversity & Breeding Group, Department of Animal Breeding & Genetics Bangladesh Agricultural University, Mymensingh 2202, BANGLADESH, Phone: + 880 91 67401-6 Ext. 2614 (Office), Mobile: + 880 1715047767, Fax: + 880 91 61510, Email: bhuiyanbau@gmail.com<mailto:bhuiyanbau@gmail.com,>, Website: www.bau.edu.bd

I have some lesson and observation in this regard. While Dr.Quazi Md Emdadul Huque has iterated his doubt regarding the sustained maintenance of pure lines of RIR and Fayoumi - it is true and in Bangladesh it has been proved by now.

My opinion is in favour of the two options put forward by Haleem U. Hasnain. Through UNEP-GEF-ILRI FAnGR Asia project we are operating research program using option 1 with scavenging indigenous birds (eco-types !!) and finding it encouraging.

Professor Dr Md.Ruhul Amin, Faculty of Agro Industry and Natural Resources

UNIVERSITY MALAYSIA KELANTAN, Karung Berkunci 36, Pengkalan Chepa, 16100 Kota Bharu, Kelantan, MALAYSIA, Mobile: 0105401064 ruhulamin_bau@yahoo.com

There is no controversy in the fact that chicken native to every region of the world are going to be diminished. An exception to that what I am seeing here, in every household there are some chicken. Of course there are various types and

breeds/varieties (I am not sure whether they conform breed or not). In Kelantan state they are very similar in appearance. They look somewhat like Aseel (found in Bangladesh, India, Myanmar). Some important features are upright carriage, slow feathering, red and black plumage, bigger sized, longer shank, yellow skin, single comb. They produce flavoured quality meat that is of high demand in Malaysia. Egg production may be not being satisfactory but they have meat potential. As Malaysia is one of the top most commercial poultry developed countries, so less attention is paid to the family chicken.

Can you put some efforts to look into the genetic resources? I think genetic resource is not regional property, it's a global one.

Datta Rangneka dattarangnekar@gmail.com

Dear Dr. Abraham,

I cannot resist conveying some views - being involved in rural livelihood development with traditional poultry as one of the components, while conveying the views I am presuming you also have similar objective and that you are dealing with traditional local birds. In case these presumptions are true please consider the following aspects:

- * Consider net output of Fayoumi breed (mentioned by you) and others that you are considering for introduction. I get a feeling that the Fayoumi breed has all the characters to make it an ideal bird for backyard system.

- * Please compare with the Fayoumi breed, net out put in backyard system (accounting for all type of losses) of the bird proposed to be introduced.

- * Compare cost of production and net returns between the breeds - since eggs and meat of local birds fetch better price in many areas and meagre inputs are needed.

- * Consider possibility of improving net output of the Fayoumi breed through further reduction of losses and supplementary feeding - breeding intervention is not essential for improvement in all cases.

- * An important factor is preference of the producer families. In many cases the families rejected introduction of new breed and for some very valid reasons.

I hope the views expressed above would be of some help.

Quazi Md Emdadul Huque, Ph.D., Former Director General, Bangladesh Livestock

Identifying a suitable breed for rural poultry is not easy. Crossing between RIR and Fayoumi has been established in Bangladesh but maintaining a quality gene pool for both RIR and Fayoumi is not easy. I do not know how long it will be economically viable. The Bangladesh people like these chickens due to the taste of their meat, which is like LOCAL CHICKEN and because the management of the birds is easier than hybrids. Most of the restaurants use them as local chicken and have good market for that reason. But I think, in the long run there may be some problems with pure lines of RIR and Fayoumi. The country situation is also important for introducing these crosses. If anybody is interested to know more, please let me know.

Message No 36

Timothy Gondwe, PhD, Associate Prof of Animal Breeding, Head of Department

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I hear that good progress is made by Prof Adebambo at his university. A few observation is that crude trials on our local chickens showed a clear within breed GxE interaction with feeding (scavenging vs intensive, cage feeding). This means we need to develop this chicken under prevailing conditions. The issue is how? Hopefully this will be addressed in the coming week. On developing improved strains, I wonder if this should be Africa goal. We seem to have sufficient of these on global basis and they do well with improved, commercially oriented production. Their speed of development cannot match beginners. Our main goal should be to move our local bird for the poor to greater, optimal levels of performance to add value to a poor farmer without burdening him or her. It appears still we are heading for a breed of multipurpose. And that is where the challenge is, how to develop one with all combinations. Next week will be more interesting.

Message No 37

Datta Rangnekar dattarangnekar@gmail.com

I read with interest the background note of the E-conference and compliment the authors for this comprehensive work. I wish to convey some views for consideration of the organizers and the participants and request indulgence since I propose to convey my views through two longish notes. I want to be provocative since the tone of the background note makes me uncomfortable even though a development project for the benefit of the poor is the background of the conference and I am concerned. Have we not learnt enough lessons (often at the cost of rural resource poor families) not to pre-decide interventions but keep an open mind? We should decide as well as prioritize intervention after situation analysis with due consideration of perceptions and priorities of the poultry keeping family' – whether they need help and if so what kind of help - the kind of bird they would like to keep. While the background note has nicely described types of family poultry systems some of the crucial characteristics of the 'Traditional poultry production systems' are missed out and should be considered for the breeding programme in case it is aimed at supporting resource poor rural poultry keepers. The three major features of the traditional poultry production systems are:

- **Sustainability** and very low dependence on external agencies/persons. Traditional system is a highly sustainable system with good resilience and low dependence of outsiders (person or organization). Breeding intervention introduces high degree of dependence and sustainability is questionable since it is not considered in most research and development programs. Ignoring these aspects would ruin the rural – traditional poultry production system.

- **Consumer preference for eggs and meat of indigenous/local fowl.** The eggs and meat of local fowl fetches 3 to 5 times the price of products from commercial poultry and in almost all areas there is high demand for these products – no dependence on a single agency/trader for sale. This is an aspect research system should study while evaluating the new birds developed. On many occasions tribal women asked poultry experts that – if the local bird produces about 70 eggs with low inputs and fetches 3 to 4 times higher price why should they try improved bird.

- **Livelihood and cultural linkages.** Traditional backyard poultry keeping is a part of livelihood system of many rural communities and it niches well with the system.

The rural women who look after the poultry have many other commitments and can manage only certain type and number of birds within limited time and resources available with them. However, the number and type of birds they would like to keep would vary and has to be ascertained after situation analysis. There is also a cultural relationship which is strong in some pockets. These aspects are unfortunately ignored since most livestock and poultry research and development programs adopt commodity approach and improved birds are pushed through various projects.

I am confused reading a statement in the background note about 'conservation of indigenous breeds'. Under the subheading 'Traditional Scavenging Backyard system' in the last paragraph on page -5 while describing 'system of developing high yielding chicken types in India' it is stated that "these birds have 50% native and 50% exotic blood and possess characteristic features for backyard scavenging poultry production". The last line states "By that way the native breeds are being conserved and improved for use under traditional scavenging system". How can crossbreeding conserve native breeds of poultry? The improved birds produced from various research centres in India are being pushed through the so called Rural Poultry of Family Poultry development schemes without proper situation analysis.

Message No 38

Thomas Junne Kaudia, Program Officer, Winrock International

**Partnership for Safe Poultry in Kenya – Nairobi tkaudia@winrock.or.ke,
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I take this opportunity to make a contribution on this important subject. Kenya has more than 24 million indigenous chicken reared mainly under traditional scavenging system. However, there are farmers who are practicing semi-scavenging while others are already practicing small-scale intensive systems. The need to improve the productivity of the indigenous chicken is not a new concept in Kenya. The government, private sector and a number of NGOs have funded programs to improve productivity either through breeding and/or improved management with very good results as indicated by increase in number of eggs and rate of growth. However, the results were not sustainable, largely because all the players along the poultry value chain were not involved. For example, feed millers did not produce the right feed rations, thermostable vaccines were not available in remote areas where cold chain could not be maintained, no appropriate technologies to handle loss in broodiness, marketing systems were not addressed and skilled human capital was not developed.

I have visited many farmers practicing semi-intensive and intensive systems with a lot disappointment. Often times, the space, feed / supplemental feed provided is inadequate. Birds are underfed, weak with poor body conformations.

The chicken for the poor is the one which has stood the times under difficult conditions. We can improve productivity through selection and better management while retaining the original genetic configuration. In cases where there is better production and marketing systems, breeding for faster growth and egg production can be done but that will be a different product.

Message No 39

**Ko Awono Paul Marie Désiré, Institut de Recherche Agricole pour le Développement (IRAD), Station de Garoua, B.P : 415 Garoua, Cameroun.
Tél. : (237) 99 38 72 28; E-mail : koawon@yahoo.fr**

Veillez recevoir mes sincères salutations, et je profite de cette occasion pour féliciter le RIDAF, la FAO et tout le comité d'organisation pour cette initiative qui

s'annonce déjà enrichissante à travers les 1ères contributions sur le sous-thème N°1: Quels types de volaille sont élevés par les aviculteurs familiaux?

J'apporte une contribution principalement à la question N° 4 dudit sous-thème portant sur le Renforcement de la capacité des femmes et le type d'amélioration que l'on puisse apporter aux volailles locales.

L'aviculture familiale pourrait contribuer efficacement au renforcement des capacités financières des femmes et ceci passe indubitablement par une bonne maîtrise des facteurs intrinsèques (Facteurs propres à l'animal) et extrinsèques (facteurs externes à l'animal : conditions environnementales). Toutefois il est nécessaire d'établir un ordre de priorité parmi les propositions de solutions préconisées dans le sous-thème 4 de la conférence, bien que ces propositions soient synergiques et puissent s'imbriquer à certains moments d'où la justification de l'équation P (Phénotype) = G (Génotype) + M (Milieu), ainsi l'ordre de priorité de ces propositions de solutions pourrait être le suivant :

- Amélioration génétique
- Amélioration des conditions environnementales
- Remplacement partiel et non total des animaux locaux par les races améliorées

Comment ces propositions peuvent-elles accroître les capacités financières des femmes ?

1 - Amélioration génétique

L'amélioration génétique peut se faire à travers la sélection et les croisements.

1-1 La sélection.

1-2 La sélection massale peut être envisagée en vue de conserver les individus rustiques présentant les meilleures performances (production de viande et d'œufs).

1-2 Les croisements.

Les croisements sont importants car ils permettent d'améliorer les performances animales à travers l'effet additif des gènes (valeur génétique additive ou valeur d'élevage).

2- Amélioration des conditions environnementales

Les conditions environnementales précaires contribuent énormément à la baisse de la production avicole en milieu paysan, en l'occurrence, la performance de la volaille est dépendante de la nature de l'aliment consommé qui par ailleurs constitue plus de 60% du coût de production, cet aliment est en général qualitativement et quantitativement insuffisant; les soins vétérinaires lorsqu'ils ne sont pas bien administrés sont parfois absents; un habitat précaire et un mauvais suivi des animaux peut faire baisser la production par exemple l'éclairage insuffisant d'un bâtiment de pondeuses peut faire chuter la production d'œufs ou la survenue d'une maladie mal contrôlée peut décimer une grande partie ou tout le cheptel.

3- Remplacement partiel et non total des animaux locaux par les races améliorées

Pour les éleveurs des pays en voie de développement ayant des faibles revenus, leur objectif majeur est la lutte pour la survie. Ainsi toute innovation visant à améliorer leur production avicole pourrait ne pas passer lorsqu'elle exige assez d'argent. C'est pourquoi un remplacement partiel et non total des animaux locaux par les races améliorées pourrait être envisagé. Ainsi la diversité génétique des volailles locales

pourrait servir à l'amélioration génétique d'où la nécessité d'éviter l'extinction de ces animaux. De plus, les races améliorées sont exigeantes et nécessitent assez de moyens financiers et un suivi adéquat que ne peut toujours pas assurer le paysan, pourtant les races locales sont adaptées à leur environnement, leur rusticité combinée à la bonne productivité des races améliorées pourrait donner des races hybrides adaptées à chaque zone écologique contribuant ainsi à diminuer les mortalités, à augmenter les productivités numériques et pondérales des animaux et par conséquent à améliorer les capacités financières des femmes.

En définitive, le renforcement des capacités financières des femmes passe nécessairement par une synergie de l'amélioration génétique des volailles locales, de l'amélioration des conditions environnementales (aliments, soins vétérinaires, un meilleur habitat, un bon suivi des animaux et par un remplacement partiel des animaux locaux par les races améliorées.

Message No 40

Maxwell Thwala, Livestock Specialist, Lower Usuthu Smallholder Irrigation Project, P.O.Box 198, Siphofaneni, +268 344 1671/2/3, +268 344 1665, +268 7602 7643, www.swade.co.sz

I am also of the idea that rather than focusing on having a good poultry breed; we need to focus on conserving the pure indigenous breeds. Breeding is complex and breeding alone is not an answer to our problems. For me management seems to be the main issue. Literature has indicated that poor farmers are breeders, for example as in the case of Swaziland it is now impossible to find pure breeds poultry or cattle because local farmers have always been trying to improve their animal. The challenge we are facing now is that we now do not have pure Nguni Cattle in our local cattle population. This breed has been discovered to have almost all the good characteristics ideal for the poor farmers. Government is now spending a lot of resources trying to conserve and reintroduce the pure blood in the population.

To avoid wasting a lot of resources in future, we need to conserve what we have and distribute to farmers who know what they exactly need.

Message No 41

Simon Wesechere, wesechere@yahoo.com , Livestock /Poultry specialist, Rural Info and Agr. Dev.Centre,RIADEC (NGO),-2006 to date, Former civil servant,Kenya.-1995-2006, Part-time Lecturer (Non-Ruminants/poultry)- Bukura Agricultural College Jan.2011 to date

Lessons from the National Poultry Development Project in Kenya in the 1980s-1990s indicate that farmers need serious husbandry capacity-building before being given the options for improving their breeds. As a starting point, there should be a programme for training the locals on selection and breeding using the local breeds. Then the Parent stock from these selections for different characteristics can be crossed with for example RIR breeds that are dual purpose. While doing this, there should be no hurry. I suggest a ten year capacity-building programme for the rural farmers to be able to select for the best traits in the local breeds and another five year programme for intercrossing with the RIR, for example.

Message No 42

Ko Awono Paul Marie Desire, koawon@yahoo.fr , Researcher in Animal production, IRAD Garoua, Cameroon, P.O Box 415, + 237 99 38 72 28, + 237 22 63 30 73

What types of birds are required by family poultry producers? Thanks for the suggestions from all the participants about how to come out with a bird for the poor. From many contributions, it comes out that many countries went for crossbreeding of local fowls with exotic. That is why in most countries, breeding programs have been conducted between the local birds and improved breeds of poultry. This worked because of heterosis that benefits F1 for traits like broodiness, adaptation to difficult conditions of temperature and humidity, the scarcity of food and sanitary conditions. But let us keep in mind that these birds have a 50% improvement in their performances. Also, people need indigenous birds which will grow better and produce more eggs than scavenging ones we have in the villages and which will also take into account their traditional values. However, people must still import breeding stock to breed with local strains, which still creates the conditions of dependency vis-à-vis large breeding companies. Also, crossing F1 with local birds will reduce their performances and crossing them with exotic birds will reduce their adaptive capacities and the tastes of their products (meat and eggs). Thus, the question is: how to have a selection method that can afford to produce local birds locally which will give total satisfaction to the poor? In the past failures have been recorded in the operations of exchange of improved cocks for breeding with domestic chicken. These failures were due to non existence of follow-up of the farmers by government authorities in Cameroon and I guess that it was also the case in many African countries and the developing world in general.

Message No 43

Dulal C Paul, dual@ulbeta.ca , University of Alberta, Canada

1. Week: "What types and how many birds are required by family poultry producers? Probable answer to the above question- Family poultry could be either scavenging (free range system) or intensive system. In Bangladesh condition, local germplasm like Hilly and Naked Neck is suitable for scavenging system. Fayoumi is proved to sustain in local climate. RIR x Fayoumi crossbred (Sonali) is also adaptable for free range system. (10-15 for landless and marginal farmers) and 15-30 for other farmers. Family poultry for semi-scavenging- pure breed like RIR and Australorp (50-100 chickens). Family poultry for intensive system - any commercial hybrid (100-200 chickens). The subject or theme "The bird for the poor" seems to be discriminative term rather we can say "The bird for the family poultry". However, this is my personal opinion.

Second Message

This is right time for right topic regarding breeding strategies for rural poultry production. The ongoing practice in rural poultry is free range. Mainly, family poultry is classified in two ways: a. Use of local germplasms and/or b. Commercial stocks. So far emphasis is given here to use of local poultry. Many countries like India, Bangladesh, Pakistan, Malaysia, and South African countries already have developed few promising breeds mainly through selection for their local production. They are mostly reared under free range condition providing very minimum grains, kitchen waste etc. Sometimes almost no feed was supplied to them. They are survived with their own efforts as because they are hardy in nature and highly disease resistance. It is investigated that crops harvesting season influence their production performance due to availability grains. Considering this reality, Bangladesh Livestock Research Institute has initiated to collect and conserve the native but promising germ-plasms namely Hilly, Naked Neck, Aseel, Yasmine and Non-descript deshi from different parts of the country. A continuous selection procedure can explore the production potentiality established in different random sampling test centre based on

agro climatic zones. Thus these local germ-plasms of poultry could be an asset to alleviate poverty of rural people without expending a lot within the existing farming system. This is possible to rear by women and school going children in their leisure time. In this way the unproductive time can properly use. I partly agreed with Dr. S. D. Chowdhury, Bangladesh Agricultural University. Instead of 50, it should be the range from 10 to 30 depends on homestead area of the farmer in rural Bangladesh.

However, the proposed number of 100 (one hundred) as mentioned by the International Network for Family Poultry Development (INFPD) could be viable with commercial stocks under intensive rearing system. Moreover, less productive (100-140 eggs) local stock is not economically viable under intensive rearing system.

Message No 44

Prof. A. K. Fazlul Haque Bhuiyan, Livestock Biodiversity & Breeding Group, Department of Animal Breeding & Genetics, Bangladesh Agricultural University

Mymensingh 2202, BANGLADESH, Email: bhuiyanbau@gmail.com

Based on my experience and observation, my opinions against each family poultry production system are furnished below:

a. Traditional scavenging backyard or village system: within system available adaptive indigenous breeds or eco-types are required. However, some form of selection pressure will need to be applied to produce only seed cocks within and grow them up to full maturity before using them to breed hens and reproduce. Rigid preventive vaccination is essential.

b. Semi-scavenging system: Selected indigenous males and females (dual potential) would be required. May form producers' cooperative. Cooperation among the members with regard to exchange of breeding cocks may help enhance productivity to make better profit. Rigid preventive vaccination is essential.

c. Small-scale intensive system: Specialized breeds or strains. Rigid preventive vaccination is essential.

Today I have been reading Dr. S.D. Chowdhury's mail on this issue (Message No. 34) and agree with him in saying that now you will not find Sonali in rural households of Bangladesh. Further, Sonali is not a viable option for either production system 1 or production system 2 because sustained availability of pure RIR and Fayoumi is not ensured.

Message No 45

see Message No 40

Message No 46

Dr. Tike Sartika, IRIAP/Indonesian Research Institute for Animal Production. Indonesia. Telp +62-251-240751, Fax +62-251-240754, Email: tikesartika@hotmail.com

I want to share my experience for development of rural poultry production in Indonesia.

We have more than 40 breed local chicken in Indonesia. One of them call "Ayam Kampung" means "village chicken", (ayam = chicken, kampung = village), because the chicken are spread in all villages of Indonesia. The population of Ayam Kampung is about 80% of the total local chicken population. The rest are specific local chickens

in certain area in Indonesia such as in west Java, central Java, East Java, West Sumatra, South Sumatra, East Kalimantan (Borneo), North east Celebes and Papua where we have specific local chicken with limited population. The total population of Kampung chicken is about 240 millions.

After the AI outbreak in Indonesia, the program from the Government is to manage the rural poultry development by housing the poultry and not allowing for scavenging, even though the farmer keeps the poultry just only for the family. Although, some of them keep their poultry scavenge for limited area with bamboos fence.

Now, in Indonesia the farmers have developed an entrepreneurship by keeping the Kampung chicken from small scale intensive system to medium or large scale production through capacity building or farmer groups. The government funded some of the groups or gives soft loans to the farmer groups. Each group is divided into 3 stages of rearing capacities. In the first, they keep the hens and cocks to produce hatching eggs (Business 1). The farmers sell the hatching eggs to the hatcheries in their groups. They do not sell eggs for consumption which is not profitable (Business 2). The hatchery farmers sell the DOC to group members and (Business 3) these farmers keep them from DOC until harvest, 10-12 weeks of age with body weight 800 g – 1 kg for fried local chicken or baked local chicken which have a good taste and very popular in Indonesia. They are a special food with good price compared to broilers. Some of the chicken are selected to produce pullet and sold to the farmer which have Business 1. For the egg consumption of local chicken in Indonesia, the farmer keeps the "Arab chicken" which have 60-70% egg production. The Arab Chicken, it seems have originated from Fayoumi chicken and were developed in Indonesia 20 years ago.

Local chickens in Indonesia mainly have a low productivity, low egg production, low growth rate. To increase the egg production especially for Kampung chicken we in IRIAP (Indonesian Research Institute for Animal Production) have selected Kampung chicken to increase egg production, less broodiness trait by keeping the hen in individual cage, and recording egg production individual hen every day. Selection criteria are egg production 50% for 6 months and broodiness trait until 6 generation. Currently, IRIAP has improvement local chicken which produce 50% eggs hen day and less broodiness which have been distributed to farmer for multi location test performance. We have given our selected Kampung chicken the name KUB (KUB chicken, parent stock female line), KUB being the acronym for Kampung Unggul Balitnak, which means good productivity of local chicken. And for good growth rate, we cross male chicken from specific local chickens which have good body weight with KUB chicken to produce DOC final stock for meat local chicken. In the future, we plan to select several specific local chickens to produce male line and female line as parent stock, and the aim for the research we plan to produce Indonesian local chicken breed for produce meat or egg local chicken. What do you think about our proposal?, I will appreciate your comments.

Message No 47

Dr. Momoh O. Michael, mykemomoh@gmail.com , Dept of Animal Breeding and Physiology, University of Agriculture, Makurdi, Nigeria.

For any genetic potentiality to be fully tapped or manifested, the right environment is needed. Since family poultry production in most developing countries is carried out under very stressful conditions of inadequate feed supply, insufficient shelter, endemic diseases/parasites and very hostile climates, it is only logical to suggest the use of the bird types that respond to productivity under the given circumstances

(productive adaptability). These bird types are well known to the resource poor and they are undoubtedly the indigenous scavenging chickens of any given country. We should be talking about how to improve on their environment and perhaps, their genetic constitution to enhance their present level of performance.

Message No 48

Thomas Junne Kaudia, tkaudia@winrock.or.ke , Nairobi - Kenya

With reference to Message 37, I would like to state that the background document as a synopsis has covered the situation on the ground very well. From a number of documents, we know that many small holder poultry farmers are at different stages trying to improve the productivity of the indigenous chicken to boost income from poultry production. At the moment, these farmers are hardly making enough money much as the consumer is ready to pay high prices. The current high price is a demand and supply factor. If the productivity improves and more chicken is available, prices will go down with increasing consumption leading to an increase in revenue for the farmer. The farming households hardly eat chickens except during visits; therefore indigenous chicken is not adequately addressing protein malnutrition common among smallholder farmers. The product is consumed mainly by middle and high income consumers ready to pay this high price. The way forward is to explore ways to improve productivity, bring prices down and spur consumption.

In Kenya, we are promoting public private partnership in addressing a number of issues including farming. For example, in the livestock sector, a poultry bill is being prepared after elaborate consultations with all stakeholders. Let us initiate discussions with all stakeholders in each of our countries to harmonize issues and develop a common ground.

I support the remarks by Dr. Chowdhury regarding sustainability and cost effectiveness. However, I have some concern on dual purpose birds for the poor. Dual purpose birds have not worked well in Kenya. These birds tend to be large in size with associated high maintenance requirement demanding proper feeding which is beyond the ability of resource poor smallholder poultry farmers. The birds are common with resource endowed farmers. We may consider treating egg and meat production separately.

Message No 49

Irene Nafula OGALI, inogali@yahoo.com , Research Officer, Veterinary Research Centre, KARI, P.O BOX 32-00925, Kikuyu, Kenya, Tel:+254722625385

From my point of view, the local breed is adequate for poor farmers who cannot afford any input and whose management cannot meet that of an exotic crossbreed. However, there is another category of poor farmers who go for semi-scavenging system where input costs are incurred. The production of our local breeds may not be able to match such costs even under improved management. Exotic crossbreeds will then be important in the semi-scavenging system. Selection within our local breeds to come up with good local birds that are good producers may be possible but could take quite sometime. It is my opinion that both types of breeds, the local and the exotic crossbreeds are needed by the poor though at different levels of poultry production.

Message No 50

Duplicate of message No 46

Message No 51

Joseph Munyuma, jmunyuma@bunda.unima.mw

When we talk of the poor and more especially in the developing countries we talk of people whose income is very low. These people are in majority in the developing countries. Most of the times the simplest type of livestock that they keep is poultry and more especially chicken.

When there is an outbreak of a disease, their poultry are attacked heavily because they can not afford to buy medication or even vaccines. The poultry survive on scavenging full time. The poor people fail even to feed themselves throughout the year and they cannot afford feeding the poultry.

The type of poultry that is kept by the poor is mostly indigenous types that are associated with low productivity. The type of breed that is good to be bred for the poor should be high productive, able to sit on the eggs (brood) and should be more efficient in utilizing the little feed that it can scavenge into products. Such as production of more meat and more eggs that can be big enough.

And because the poor cannot afford vaccines and medication, the poultry should be able to tolerate most of the diseases that can attack it

I would like to agree with Mr Chingala that Malawi has been implementing a cross breeding programme in chickens from the 1950s where Black Australorp cocks crossed with the indigenous hens to get offspring that are dual purpose. It is true that the survival of these crosses is low and they do not sit on eggs. Surprisingly, the demand for Black Australorp chickens is very high.

I would like FAO to make evaluation and assess the performance of the projects that were undertaken to improve the breeds of the indigenous chickens in different countries including Malawi. Maybe the project was not initiated by FAO, but FAO is also an interested partner.

Indigenous poultry are the best poultry. However, we should not neglect the indigenous traits when coming up with better breeds.

Message No 51a (not distributed during conference)

GUEYE Souleymane, Chef de Division Alimentation, Responsable du Programme Avicole Centre National d'Elevage et de Recherches Vétérinaires (CNERV), Téléphone: + (222) 46 45 44 76 /+ (222) 22 05 69 26, Nouakchott, Mauritanie

L'aviculture villageoise est pratiquée à grande échelle en République Islamique de Mauritanie.

Bien que pourvoyeuse d'un appoint considérable en protéines et dans certains cas en ressources monétaires, elle reste toujours l'occupation des femmes et des enfants. Généralement, les oiseaux sont élevés en un nombre très limité (5 à 10 sujets). Ceci s'explique par plusieurs raisons:

1. des pathologies diverses non prises en charge par les services vétérinaires ;
2. une absence d'alimentation: les oiseaux sont obligés de rechercher leur nourriture dans la nature ;
3. une absence d'abris: ce qui expose les oiseaux aux prédateurs et aux intempéries ;

4. une mauvaise gestion de la reproduction.

Ces principaux problèmes, qui, associés à l'exploitation et à la génétique, font que le cheptel avicole au niveau familial a de sérieuses difficultés à se multiplier.

Les types de volaille élevés par la population restent toujours la poule locale. Cet oiseau est mal connu car n'ayant fait l'objet d'aucune étude approfondie surtout au niveau de la caractérisation.

Les travaux jusqu'ici menés sur ce type de volailles, portant généralement sur l'amélioration génétique des animaux par le croisement, l'amélioration de l'habitat et la formulation des rations alimentaires, restent insuffisants. Ces rares tentatives sont circonscrites à des zones isolées.

En conclusion, le nombre de volailles de type traditionnel élevé au niveau familial n'excède guère une dizaine traînant avec lui de nombreuses contraintes.

Message No 52

Dr. Aimable UWIZEYE M. from Rwanda, Catania University (Italy),
uaim@hotmail.com

The majority of families in rural area keep between 5-15 chickens; all of them are indigenous strain and are not genetically evaluated. A few numbers, keep exotic layers brought from commercial production or local market. The average of eggs by chicken is around 60/year. It is necessary to identify and to characterize the existing strains in order to find a resistant strain that should be adapted by family poultry producers locally. But that is very costly and will take time. Actually, there is a need of introduction of a new strain (hybrid) that should resist to the hard conditions of breeding and also to train the families about the basic techniques of poultry breeding. Women and children are the important keepers of the chicken, but the lack of basic breeding techniques and the management of chicks make them very exposed to diseases and to predators. The products of indigenous poultry are highly appreciated by people in Rwanda.

Message No 53

Patrice GAUTIER, Hanoi, Vietnam, Director of ASVELIS, patrice@asvelis.com

I am not sure that the below message is relevant to the discussion. I am indeed not sure the focus should be at helping poor families to slightly improve their backyard chicken system, but rather think that the challenge is to bring a proportion of them (and the more the better) to small professional chicken farming. Over the past 3 years, I have worked on this second option in Vietnam and Thailand – Myanmar.

Layers: commercial breeds like ISA Brown, Hy-Line Brown, etc. behave very well as long as the basic vaccination programs and the adequate feed are used in family poultry systems (poor or less poor – from 100 to over 1,000 heads), and usually generate very good incomes. The problem is not poor / not poor or family / not family, but ACCESS TO PULLETS. Simply ask farmers in Mali, Burkina Faso or Vietnam, Thailand etc. CONCLUSION: for egg production, the key challenge is to have a better access to pullets, through either better geographical share of hatcheries and / or better distribution of pullets. In South East Asia, the issue of access is mainly due to the fact that hatcheries are linked with some animal feed companies, and these companies only allow medium and large scale farmers to buy from them and as long as they buy the feed too. In West Africa, some countries simply do not have enough hatcheries and imports from neighbouring countries are not sufficiently facilitated.

Meat chickens: as opposed to egg production, here it really depends on what consumers want: cheap industrial meat versus tasty / expensive slow-growth chicken meat (70-90 days of age at slaughtering) or very slow-growth (150 days). Consumers (urban and rural) in developing countries usually prefer the slow-growth or very slow-growth (French like the slow-growth) but are more and more tempted by the industrial chicken because of the lower price. Vietnam is a lucky country with thousands of small / medium hatcheries (DOC for meat) and some remaining local breeds used in crosses for commercial purposes.

Overall: I believe that over the last decades, too much attention has been put in trying to improve technical performances of a multitude of small backyard flocks (5-10 hens) without much efficacy, while very few families (poor or less poor) have been concretely supported to move from backyard to small but professional poultry production. Is the priority to help a poor family remain a backyard chicken farmer (for which I am not sure it is anyway valuable to improve the genetic nor to vaccinate) or to help this family become a small professional chicken farmer (with a farming system that is more market driven, generating cash incomes that enable the farmer to pay for feed and vaccine purchase).

Another experience of ours is on: <http://www.naturallyvietnam.com/en>

This may seem complex and far to reach for the poor, but actually as long as the market demand exist, even poor farmers can do it (meaning also in a sustainable manner) as long as they have the adequate support.

Message No 54

Sofjan Iskandar PhD, Senior poultry researcher, IRIAP (Indonesian Research Institute for Animal Production) P.O. Box 221 Bogor 16001 Indonesia Ph. Office: +62 251 8240752 e mail: sofjaniskandar@yahoo.com

Breed development, however, it should be adapting two or three community's condition:

1. For poor rural community, the breed should be able to survive under scavenging activities. The breed should also good in brooding and rearing her own chicks;
2. For higher economic level of families, where they can be able to manage semi-intensive, the breed should be improved in egg and/or meat production, either improved native breed or crossbred with modern chicken;
3. For smallholder commercial families, the breed could be improved native or modern breed, which is depended on market demand.

Message No 55

S.M. Rajiur Rahman; Training Officer Micro Finance & Technical Support Project; Palli Karma-Sahayak Foundation (PKSF) PKSF Bhaban; Agargaon; Dhaka-1207. Rajiur_2001@yahoo.com

In reference to the message 34, 43 & 44, I want to supply some information based on my field experience and MFTSP research work. The NGOs (Partner of PKSF) of Bangladesh are implementing the poultry related IGAs (Income Generating Activities) through its group member especially women by (a) Traditional scavenging backyard or village system (b) Semi-scavenging system (c) Small-scale intensive system (see Message 44).

Project suggests to rear 10-20 Fayoumi, Sonali hen chickens only for egg purpose by the system of a & b. 50- 60 is suggested for small parent stock (Fayoumi hen X RIR

cock) and 200-500 for chick rearing by the intensive system which is called small enterprise.

MFTSP executed 18 livestock/poultry related different adaptive and socioeconomic researches and now all are completed. I want to share one of this research work, named "Density trial of poultry to determine the Optimum/Viable Flock Size Suitable for Smallholder Beneficiaries for the Reduction of Poverty: Review of Bangladesh Poultry Model" conducted by Prof.Dr. Gouranga Ch. Chanda and Md.Akhtar-Uz-Zaman, CVA S U. Chittagong.

The study was carried out in 11 villages of Sadar thana B. Baria district. Two elements of Bangladesh poultry Model viz. Key Rearer and Model Breeder were undertaken for the study with Fayoumi hens and Rode Island Red cocks. Farm sizes for key rearer were 20 hens, 15 hens and 10 hens and for model breeder were 50, 100 and 150 Fayoumi hens with 5, 10 and 15 RIR cocks (Cock-Hen ratio of 1: 10) respectively. A total of 15 batches of flocks of key rearer (10 hens, 15 hens and 20 hens each with 5 replications) and same batches of model breeders (50 Fayoumi hens with 5 RIR Cocks, 100 Fayoumi hens with 10 RIR cocks and 150 Fayoumi hens with 15 cocks each with 5 replications) were undertaken in this trial. Duration of the research was 12 months for Key rearer and 11 months for Model breeder. It was found that range of total profit increases with the increase of the size of the flocks in both cases, but profit per hen differed with between the cases. Highest was in 20 hen group for Key rearers and 50 hen group for Model breeders. Ages at 1st eggs were 21, 21 and 22 weeks for the hen group of 10, 15 and 20 hens of key rearers, respectively. Age at sexual maturity (40% egg) was 26, 26 and 28.6 weeks in 10, 15 and 20 hen group, respectively. Highest hen day egg production, hen housed egg production percentages were, 58.9 & 54.8% in 50 hen group of model breeder up to 166 days of production. In case of key rearer 48.62% hen-day in 15 hen group and 47.5 % hen-housed in 10 hen group were found up to 161 days of production. Total profit was highest 5,081/- per month/farm in 150 hen group of model breeder and Tk.481/- in 20 hen group of key rearer. Mortality was the highest 18% in 10 hen group followed by 17.33 % and 11% in 15 and 20 hen group, respectively. In model breeder the highest was in 50 hen group (13%) followed by 7, & 5.3 % in the rest two groups, respectively in 166 days. In case of key rearers the highest hen-day % egg production hen-housed egg production %, total egg production and lowest mortality % was, 50.84 ± 2.7 , 46.3 ± 4.3 , 126 ± 24.5 , $13.25 \% \pm 1.2$, respectively in 20 hen group of Key rearer up to 281 days of production. At the end of total 12 months production period the total lowest mortality was 18% & profit per hen was highest, Tk. 252/- in this group. In case of model breeder, the highest hen-day and hen-house egg production were 43.9 ± 15 , 37.6 ± 12 in 150 hen group and total egg production of 148 eggs /hen was found in 50 hen group of Model breeder. Mortality was 18% in 150 hen group whereas the lowest was 8.67% in 50 hen group. Highest return was Tk.145/- per hen in 50 hen group of model breeder up to 286 days of production. At the end of 11 months production total egg production was 168 eggs with lowest mortality of 10.47 % and highest profit per hen was in 10 hen group. It can be concluded that highest farm size of 20 hens is found profitable under semi scavenging and a farm size of 50 hens is proportionately profitable.

Message No 56

Tinni Sawhney, Sheila Koyyana and Ruchita Khurana, South Asia Pro Poor Livestock Policy Programme, NDDB House, Safdarjung Enclave, New Delhi, India, ruchita@sappp.org

We have been following the discussions with great interest. Of particular interest were the messages from Dr Haleem Hasnain (Message 9), Dr Pius L Mawbene (Message 23) and Dr Datta Rangnekar (Message 37). Recognition of the importance of traditional systems of poultry rearing, characterized by negligible or no external inputs, and the critical importance of such production systems in meeting household food and nutrition needs, and when required 'emergency' income needs, is necessary. In our view such systems do need to be supported.

The South Asia Pro Poor Livestock Policy Programme, which is a joint initiative of the National Dairy Development Board and FAO, has documented a number of Good Practices on the theme of Small Holder Poultry rearing in the South Asian region. These practices have been identified based on three main aspects namely technology/ management options, delivery mechanisms and institutional systems, and adaptability to different situations and needs.

Regarding what could be suitable breeds for small-holder poultry rearing, in our view, there can be no single answer. Breed suitability is dependent on a variety of factors such as resources that the household has (including time commitment), and whether the objective of poultry rearing is to meet household needs or to access markets and earn a sustained livelihood.

We have documented numerous poultry production systems commencing with production systems that focus on existing poultry resources that rural households have, largely the Desi or what are often referred to as non-descript breeds, indigenous breeds such as the Kadaknath and the Aseel, cross-bred or improved breeds that have attempted to combine the traits of the desi/ indigenous breeds with the higher productivity of exotic breeds (such as the Satpuda desi, the Sonali, and the Kuroiler) and small-holder commercial poultry production systems such as the cooperative poultry model promoted by PRADAN in large parts of Madhya Pradesh and Jharkhand.

In our documentation of good practices related to the rearing of desi (non-descript) poultry birds, a single input i.e. the provision of a dependable and regular system of preventive vaccination, through a cadre of village level poultry vaccinators, has led to a significant improvement in bird mortality and increased production (reference Government-Led Integrated Approach for Delivery of Services to Small Holder Poultry Farmers (SAGP05)

<http://saplpp.org/goodpractices/small-holder-poultry/SAGP05-govt-led-integrated-approach-for-delivery-of-services-to-smallholder-poultry-farmers/>

and Mitigating Diseases and Saving Valuable Assets - Poultry Vaccinators Delivering Services to the Doorstep of the Poorest in Bangladesh (BDGP01)

<http://saplpp.org/goodpractices/small-holder-poultry/BDGP01-mitigating-diseases-and-saving-valuable-assets/>.

Desi birds are well adapted to local conditions, thrive well on foraging and brood naturally. As pointed out by Dr. Rangnekar, both the birds and the eggs command relatively higher prices in local markets. If, as documented by the good practice from Bastar in Chattisgarh, support is provided by way of preventive vaccination services, these poultry production systems can emerge as important supplementary income earning activities for the rural poor.

Similar is the argument for supporting indigenous breeds that are well adapted to local conditions. Rather than focusing only on improving productivity, which is where the cross-bred and the exotic breeds 'score', the negligible costs of desi and indigenous breed poultry production systems, the absence of dependence on

external inputs and an accessible local market where such birds command a relatively higher price should also be recognized as key factors in the promotion of small-holder focused poultry production systems. The critical importance of such systems in meeting household food and nutrition security needs is also important. Most often such systems are managed by women, and even though income levels emerging from such systems are relatively lower, they contribute in no small measure to women's empowerment and an enhanced role within the household.

Reiterating the point raised by Dr Datta Rangnekar on 'not to pre-decide interventions but keep an open mind', we would also like to stress that for the poor, the focus should be on building and strengthening resources that they have instead of introducing new breeds which have limited adaptive and productive traits, and require significant investments in ensuring access to inputs (backward linkages) and markets (forward linkages). As backward and forward linkages (input and market access systems) are developed and sustained small-holders can be supported to 'graduate' to the relatively more productive cross-bred or exotic birds.

Many of these issues were discussed at a recently convened National Workshop on small-holder poultry rearing, jointly organized by SA PPLPP, PRADAN and the National Small-holder Poultry Development Trust. The critical importance of ensuring access to inputs (sourcing of birds, feed, vaccination and health services), and market access if small-holders are to participate in and benefit from the rapidly expanding poultry sector were high-lighted, including support for collectivization of small-holders to achieve economies of scale and facilitate market access. At the same time the importance of traditional poultry rearing production systems and the need to recognize and support such systems were high-lighted. The workshop concept note as also good practices documented can be accessed from the SA PPLPP web-site (<http://saplpp.org/mainpage-information-hub>).

With the objective of providing information on indigenous breeds of poultry in South Asia we have uploaded on our website, a detailed write up on the various indigenous breeds of poultry in India (<http://saplpp.org/Indigenous-Poultry-Breeds-of-India/Indigenous-Poultry-Breeds-of-India/>) and Bhutan (<http://saplpp.org/statistics-and-rearing-practices/indigenous-breeds-of-poultry-in-bhutan/>). The information is based on the documentation done by the National Bureau of Animal Genetic Resources and other institutions in India and in Bhutan based on information provided by the Department of Livestock Services.

Message No 57

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I have been following these interesting discussions and I am convinced now that we have different situations in different areas that need no blue print type of policies. There are cases where improved breeds can be introduced i.e. for egg production where layers should be brought in. In this case, there is no risk of diluting the gene pool of the indigenous chickens since pullets are generally used. But as far as poultry meat and cultural uses are concerned, local breed should be utilized, promoted and protected; they are certain resistance to most of the diseases but not against the Newcastle Disease. We have just completed a socio-economic study on the market of the thermo-tolerant vaccine in the Southern African Development Countries (SADC). Our findings were that villagers can afford the vaccine, it costs few cents per bird; it is not obvious that chickens constitute a cheap source of animal proteins because

fish and other edibles insects are alternative for animal proteins. We found that the major constraint is the maintenance of the cold chain and distribution channels of Newcastle and other vaccines to these small-scale farmers. Development is about people; they want their local breeds to be protected, developers and scientists should help them because these scavenging chickens and other poultry have more attributes than portrayed. There are cultural events that cannot be conducted with improved breeds but the local indigenous breeds. Efforts should be made to keep their genes for future generations.

Message No 57a (not distributed during conference)

Dr. Salissou Issa, Animal Scientist at INRAN Niamey, Niger and APA FAO in Mauritania, salissouiss@yahoo.fr or si.sallaou@yahoo.fr

I have read many contributions from different participants, and I found that in some cases the situation is similar than in Mauritania and Niger where:

- Most chickens are crossbred;
- ONGs, Producers Organizations, and Producers are continuously introducing new genes from Mali, Senegal, Nigeria, etc.;
- Intervention consists in intensifying family poultry activities in rural and suburban areas to alleviate poverty and increase income, but on micro basis (meaning producers will reimburse credit);
- Producers Organizations and Producers are asking for improved birds and better poultry houses, etc.;
- Production objectives are to provide more food for producers and commercialization in order to drastically reduced imported chickens.

I think for family poultry producers we need efficient birds which can grow faster or produce more eggs than indigenous. We should have in mind that family poultry production have to be competitive.

Message No 58

Pauline Djuiko, Ingénieur Agro/Vétérinaire, B.P. 3599 Douala Cameroun, Tel. (237) 33 18 93 65 / 99 93 80 13, E-mail: lynadjuiko@yahoo.fr

Quel élevage de volaille pour les pauvres? Quelle volaille pour nos familles dans les pays en voie de développement?

Le problème d'équilibre alimentaire est un réel problème dans nos familles pauvres; les sources de protéines sont rares. L'élevage à conseiller est celui qui pourra permettre à nos familles de:

- puiser directement leur source de protéines, donc de s'alimenter;
- d'éviter les grosses dépenses d'investissement pour s'y lancer;
- d'avoir moins de contraintes pour l'alimentation des bêtes;
- de pouvoir rapidement se générer des revenus dès qu'ils se trouvent dans les besoins.

Ces critères sont remplis par les variétés rustiques qu'ils élèvent déjà communément appelés "poules du village" et qui n'ont besoin que d'être améliorées.

En effet les "poules du village" comme couramment appelé au Cameroun n'ont pas besoin des bâtiments de référence pour leur développement. Elles sont pour la

plupart élevées en plein air autour des maisons d'habitation. L'éleveur n'a donc pas besoin d'investir beaucoup en matière d'infrastructure; il peut à la rigueur aménager des petits coins aux alentours de sa maison qui leur serviront soit de refuge, soit de pondoir. Elles sont rustiques et supportent les conditions difficiles d'élevage telles que les variations brusques de températures et bien d'autres facteurs qui peuvent influencer négativement sur leur physiologie. Parallèlement, elles résistent assez bien aux diverses attaques des prédateurs ou des maladies bactériennes. L'éleveur pourra néanmoins mettre sur pied un programme de prophylaxie (comme d'autres le font déjà d'ailleurs) mais seulement que ce dernier ne sera pas densifié comme c'est le cas avec les espèces améliorées.

Les poules du village ont un faible indice de consommation. Leur exigence alimentaire n'est pas très importante. Elles peuvent facilement fouiller et se procurer de la nourriture dans la nature telle que les vers de terre, les termites, les résidus des récoltes, les détritiques.... Malgré tout, l'éleveur peut leur apporter un supplément alimentaire mais seulement, il ne pourra pas tramer financièrement pour pouvoir les nourrir.

Tout comme bon nombre d'espèces de volailles, les "poules du village" sont prolifiques. Elles peuvent donner en moyenne huit (8) couvées par an. Elles sont généralement des excellentes pondeuses et peuvent produire dix (10) à quinze (15) œufs en moyenne par cycle de ponte. Les œufs pondus servent à la consommation humaine (la famille) et à la reproduction. L'éleveur n'a pas besoin des incubateurs artificiels pour réaliser la couvaison. La poule mère couve elle-même ses œufs d'autant plus qu'elle est dotée d'un instinct de couvaison fort et remarquable. En plus elle prend bien soin de ses poussins après éclosion.

La rentabilité est aussi bien d'ordre économique que socioculturelle:

- l'élevage est économique aussi bien en matière d'infrastructure qu'en terme d'exigences alimentaires;

- "la poule du village", loin d'être vouée à la consommation, est une espèce dotée d'une grande réputation dans certaines tribus ou régions du Cameroun notamment l'Ouest, le Nord Ouest et le Sud Ouest, pour les classer par ordre d'importance. Dans ces régions, l'œuf de la "poule du village" a des vertus thérapeutiques diversifiées; tout comme le poussin et la poule mère. Ils sont utilisés lors de multiples sacrifices. Vous n'avez qu'à observer dans nos marchés périodiques dans les villages et même en ville: les œufs, la poule et le coq coûtent plus chers que l'équivalent des poules hybrides. Curieusement même, les poussins coûtent plus chers que les adultes parce qu'ils servent à réaliser certains rites. Le "coq du village" est plus qu'un symbole car il occupe une place de choix dans des sacrifices et bien d'autres manifestations traditionnelles. Le fait qu'il soit un symbole fait que l'on ne l'offre qu'aux visiteurs de marque. Toutes les familles en ville nanties ou pas préféreraient un "coq" ou une "poule du village" pour ses repas à la place d'un poulet de chair standard ou poule reformée.

À la vue des points ci dessus, l'idéal serait de chercher à améliorer l'élevage de cette espèce avicole locale afin de rassurer l'équilibre alimentaire des familles moins nanties. Certains croisements naturels avec des souches améliorées ont donné des meilleurs rendements: poules ou coq adultes pesants plus de 3 kg.

Message No 59

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Je suis avec beaucoup d'intérêt les interventions des participants à cette conférence électronique sur l'aviculture familiale. Le premier thème abordé est "Quels types de volailles sont élevés par les aviculteurs familiaux?". À cette question, je pourrais répondre qu'en Côte d'Ivoire, l'aviculture familiale est dominée par l'élevage du poulet traditionnel à 80%. Il existe une seule race de poule traditionnelle. C'est d'ailleurs cette race qui est utilisée dans cet élevage villageois. Cependant, il existe une variabilité impressionnante au niveau phénotypique de cette volaille, surtout dans la coloration, la structure et la distribution du plumage. Ces caractères confèrent à ces oiseaux de basses-cours une rusticité et une adaptation exceptionnelle à leur milieu de vie. La question de l'amélioration de cette race a toujours intéressé les éleveurs villageois. Cela se juge par l'introduction de races exotiques (sexe mâle de préférence) à croissance rapide et gros format par certains éleveurs dans leur noyau d'élevage. Le constat c'est que ce troupeau amélioré perd la variabilité phénotypique. Or, les pratiques culturelles et religieuses exigent un certain nombre de critères dans le choix des animaux à sacrifier ou à offrir. Il est donc clair que toute amélioration de cette race doit tenir compte des exigences des éleveurs villageois et des consommateurs. Le second défi à relever c'est la conservation des caractères de docilité, de bonne couveuse et protectrice de la poule mère qui sont des caractères essentiels pour la survie des poussins dans le milieu villageois.

Message No 60

Dr. Mamadou Sangaré, CIRDES 01, BP 454, Bobo-Dioulasso, Burkina Faso

Les discussions sont vraiment passionnantes et plaisantes à suivre. Elles touchent un des aspects les plus complexes et difficiles à trancher. Le choix des races à adopter en aviculture familiale semble être un dilemme chez les chercheurs. Est-ce le cas chez les praticiens / producteurs? Ce dont je suis convaincu, c'est que les volailles de race locale (les poulets surtout) sont rustiques, parfaitement adaptées à l'environnement physique (conditions climatiques, sanitaires, hygiéniques, nutritionnelles, d'habitation, etc.) et socioéconomique (besoins culturels, matériels, etc.) des praticiens de l'aviculture familiale. La plupart des pays d'Afrique de l'Ouest ont connu dans le passé des programmes variés pour l'amélioration de la production d'œufs, de la vitesse de croissance, du format par l'introduction de races spécialisées (RIR, Leghorn, etc.). L'amélioration visait soit en race améliorée pure soit en métis à divers degré de sang de race améliorée. Les races pures finissent toujours par disparaître par suite de mortalité, et les métis par réabsorption presque totale par les races locales, avec quand même quelques vestiges par-ci par-là. Ce qui est sûr c'est qu'à l'heure actuelle, elles demeurent inadaptées soit à l'environnement physique, soit au contexte socioéconomique soit aux 2, mais surtout au second. En effet dans l'incertitude de rentabiliser les efforts et les investissements supplémentaires, les producteurs restent frileux devant le changement de leurs écotypes locaux. S'ils étaient favorables à tout point de vu au remplacement des races locales, ils auraient aidés à perpétuer les races introduites, car dans certains cas on procédait d'abord à l'élimination des coqs de race locale. Mais, finalement le poulailler se repeuple de volaille locale. La comparaison que je vais faire peut paraître peu appropriée, mais dans beaucoup de villages ou villes d'Afrique de l'Ouest, le Neem (*Azadirachta indica*) est entrain de supplanter toutes les essences d'antan plantées pour leur ombrage (arbres à palabre, haies vives, brise vent, bordure de routes, etc.). Parce que les

utilisateurs le trouvent plus adaptés à leur contexte. A mon avis, l'élevage en race locale reste encore la meilleure option au moins dans les 2 premiers systèmes parmi les 3 évoqués par un de mes prédécesseurs en aviculture familiale. Ceci permet non seulement de préserver et de sauvegarder une partie des gènes locaux dont on aura inéluctablement besoin, mais aussi à cause de leurs performances actuelles qui malgré tout ce qu'on en dit permettent à l'aviculture familiale de "nourrir son homme".

Message No 61

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Je vous envoie la contribution des auteurs ci-dessous pour avis et commentaires sur le thème :

Contribution de l'aviculture à la réduction de la pauvreté dans le delta du fleuve Sénégal

Par : El Hadji TRAORE Cheikh LY; Cheikh SALL et Fabrice NDAYISENGA

Contexte

L'aviculture familiale (AF) occupe plus de 70 % du cheptel avicole du Sénégal (GUËYE, 1998; LY et al., 1999). Elle est pratiquée dans toutes les régions du pays et tous les groupes ethniques sont impliqués. C'est une activité rencontrée dans 72 % des ménages ruraux sénégalais (ANONYME, 1999). L'exploitation de la volaille de type familial est constituée de petites unités de production dispersées, où les normes de conduite des volailles ne sont généralement pas rigoureuses. Les effectifs de poulets par ménage sont estimés à 10 dans les régions de Thiès et de Fatick (BULDGEN et al. 1992), 5,2±4 dans la région de Kolda (LY et al., 1999) et 10-14 en zone périurbaine de Dakar (MANDIAMY, 2002). Traoré (2001) trouve une moyenne de 5 à 20 sujets par concession. La gestion est le plus souvent confiée aux femmes (LY et al., 1999, MANDIAMY, 2002), avec parfois l'aide des enfants et le mode d'élevage pratiqué est généralement le mode extensif. En zone périurbaine de Dakar, les systèmes d'élevage suivants sont rencontrés: l'élevage en plein air (dans 84,6 % des 150 ménages enquêtés) et la basse-cour améliorée (15,4 %) (MANDIAMY, 2002). L'adoption de systèmes d'élevage plus intensifiés est déterminée par la disponibilité, au niveau des aviculteurs, de ressources et d'intrants (p.ex. volailles génétiquement améliorées, provendes, vaccins, produits vétérinaires, habitat, équipements et temps/attention). Pour l'essentiel des élevages de volailles en milieu rural, ce sont les races locales qui sont élevées et, quelquefois, leurs croisements avec des souches exotiques et la composition du cheptel est largement dominée par les poulets. En effet, l'espèce généralement élevée est la poule domestique appelée *Gallus gallus domesticus*, dont l'ancêtre est *G. ferrugineus*. Il s'agit d'une poule de petite taille, très rustique, à la chair bien appréciée. Son poids moyen adulte en 6 mois est d'environ 1 Kg chez la femelle et 1,5 Kg chez le mâle adulte. (GUËYE et BESSEI, 1995 ; ZOUNGRANA et SLENDERS, 1992). Le plumage est peut être blanc, rouge noire ou multicolore. Le plumage est le plus souvent soyeux, quelque fois on peut rencontrer des sujets à plumage frisé. Le type et la couleur du plumage sont souvent les critères qui déterminent l'utilisation du type de volaille pour les cérémonies. Il est difficile de qualifier génétiquement de race pure les poulets locaux élevés dans le pays et, que même une petite variabilité du poids est notée : dans les régions de Thiès et de Fatick (BULDGEN et al., 1992), le poids vif du poulet à l'âge

adulte (1 an et plus) est de 1,80 kg pour les mâles et 1,35 kg pour les femelles, alors que MISSOHOU et al., (1998) rapportent 1,70 kg pour les mâles et 1,15 kg pour les femelles dans les zones de Dahra et de Kolda. Les rendements d'abattage obtenus à l'âge de 25 semaines sont cependant élevés : 79% pour les coqs et 67 % pour les poules (BULDGEN et al, 1992). Selon Traoré (2006) plus de 50% des effectifs de volailles sont vendus ; environ 30% autoconsommés, constituant une véritable source de protéines ; 10% constitués de dons divers et le reste représente l'effectif utilisé dans les sacrifices divers. L'aviculture en milieu rural, est une activité socioéconomique de premier plan. Cette étude menée dans le cadre d'un projet de recherche-développement sur l'amélioration des conditions d'exploitation de l'aviculture traditionnelle dans la région du fleuve, a pour objectifs: (i) évaluer l'importance socioéconomique de l'aviculture traditionnelle dans la zone; (ii) identifier les facteurs qui bloquent ou limitent l'adoption des techniques d'amélioration de sa conduite, afin de proposer des solutions d'amélioration, permettant d'augmenter sa contribution à la réduction de la pauvreté dans la région.

Matériel et méthodes

Des enquêtes ont été menées sur un échantillon de 383 ménages dans 41 villages, répartis dans les 3 départements de la région de Saint-Louis. Ces enquêtes étaient conçues pour fournir les renseignements suivants : (i) adresse et identification du ou des propriétaire (s) de l'exploitation ; (ii) description zootechnique du cheptel et du mode de sa gestion ; (iii) renseignements sur l'utilisation des sujets, (iv) gestion sanitaire des sujets et ; (v) information sur les améliorations souhaitées dans la conduite de l'élevage. Les données ont été saisies sous EXCEL, les analyses statistiques effectuées par le logiciel SPSS (Statistical Package For Social Sciences) et ont porté sur des statistiques descriptives (fréquence, moyenne, analyse des écart-types).

Résultats

Il ressort de cette étude, que le poulet local décrit plus haut, représente 94,3% des espèces élevées et cela sous la responsabilité principale des femmes (82%). La volaille élevée connaît principalement quatre destinations : (a) la vente pour 53,3% ; (b) l'autoconsommation pour 38,9% ; (c) les dons pour 6,5% et enfin ; (d) les sacrifices qui représentent seulement 1,7% des effectifs. Les contraintes relevées, incluent les maladies (67,8%), la méconnaissance des techniques d'élevage (14,4%), les prédateurs (12,3%) et dans une moindre mesure, le faible potentiel génétique des volailles locales (5,5%).

Conclusion: Pour lever les contraintes citées ci-dessus, il faudrait former les acteurs, éditer et vulgariser des fiches techniques sur les méthodes de gestion de la conduite et de prophylaxies appropriées. Le développement de l'aviculture traditionnelle, peut aider à améliorer les conditions de vie des femmes rurales majoritaires dans l'activité ; ce qui peut contribuer à réduire la pauvreté en milieu villageois.

Message No 62

Dr DIALLO Amadou Moctar, Chef du Projet d'Appui aux Organisation féminines par l'élevage d'espèces à cycle court, Bamako Mali

Au Mali, il y a un programme volaille qui s'occupe de l'amélioration des races locales par le biais du croisement avec des races exotiques, afin de les rendre plus performantes en termes de production de chair et d'œufs. Cette recherche a abouti à la mise sur pied d'une souche appelée "Wassa chè". Elle est issue du croisement de la race mixte exotique "Rhode Island Red" (RIR) avec la race mixte locale "Kokochè"

(KKC). Le choix de la variété exotique RIR s'explique par les considérations pondérales. La femelle pèse entre 2,5 et 3 kg et le mâle entre 3 et 3,8 kg à l'âge adulte. La femelle RIR pond annuellement entre 200 et 220 œufs. Le poids moyen de l'œuf atteint 53 grammes. La RIR est réputée rustique. Elle s'adapte parfaitement à toutes nos conditions agro-climatiques. Elle est présente dans notre pays depuis le temps colonial. Par ailleurs, le mâle de la race mixte locale, la "Kokochè" ou "KKC" pèse 1,2 kg tandis que la femelle "KKC" ne pèse que 900 grammes à l'âge adulte. Elle pond annuellement entre 60 et 80 œufs. Le poids moyen de l'œuf est de 35 grammes. Le Programme volaille a travaillé sur le croisement de ces deux races mixtes en vue de trouver un sujet polyvalent performant (chair et œufs) avec le nombre et le poids de l'œuf améliorés. Le croisement a aussi pour but d'obtenir une souche rustique qui conserve l'instinct de couvain de la race locale. Le croisement a donné les 3/4 de sang qui répondent aux critères recherchés. Ainsi, la poule « Wassa chè » signifiant 'satisfaction en langue locale' et 2 kg à 8 mois est issue du croisement entre RIR et KKC. A l'éclosion, les poussins "Wassa chè" pèsent 23 à 28 grammes, 503 à 700 grammes à 3 mois et entre 1 et 1,5 kg à 5 mois. Le mâle "Wassa chè" pèse 2 kg à 8 mois d'âge (période de reproduction) et la femelle pèse 1,5 kg au même âge. Mais à un an d'âge, le mâle pèse 3 kg et la femelle 2 kg. Elle pond annuellement 173 œufs. Le poids moyen de l'œuf est de 46 grammes. La seule contrainte liée à sa large diffusion en milieu rural est sa difficulté à s'adapter à un environnement insalubre. D'où la nécessité de faire un suivi sanitaire assidu.

Réponse au message 62 de Dr. Dibungi LUSEBA, PhD, Department of Animal Sciences, Faculty of Science, Tshwane University of Technology, P. Bag X680, Pretoria 0001 Republic of South Africa, Email: lusebad@tut.ac.za

Je prends en référence la citation suivante de Dr Diallo dans le message 62. "La seule contrainte liée à sa large diffusion en milieu rural est sa difficulté à s'adapter à un environnement insalubre. D'où la nécessité de faire un suivi sanitaire assidu".

Il est évident que ceci est en fait la raison pour laquelle beaucoup d'efforts doivent être déployés pour caractériser ces races indigènes et promouvoir celles qui auront quelques caractéristiques pondérales élevées. Il y a des races indigènes qui pèsent plus que celles décrites par le collègue. Il est impossible d'assurer un suivi sanitaire assidu dans nos milieux ruraux. Les races améliorées et même les croisés ne peuvent être utilisés dans les milieux ruraux que dans le contexte des projets, donc pour une certaine durée, avec un budget couvrant toutes ces activités. Ces projets ont causé parfois beaucoup des maux que du bien. La conservation du matériel génétique est très importante pour la biodiversité.

Message No 63

Sodjinin K. EKOUE, Ingénieur Agronome Zootechnicien, Doctorant en Production Animale, Chef Programme Elevage à Cycle court/Aquaculture Pêche, Institut Togolais de Recherche Agronomique (ITRA), BP: 1163 Tel:(228) 225 21 48/225 30 96, E-mail: itra@cafe.tg , TOGO.

Merci pour la note introductive en attendant celle portant sur les différents sous-thèmes.

Pour le type de volaille qu'élèvent les aviculteurs familiaux on peut dire de manière générale que ce sont les volailles locales avec des géniteurs mâles qui, dans la majorité des cas, sont des races exotiques (utilisés dans le cadre de l'amélioration de la conformation des poulets locaux). Le problème qui se pose aujourd'hui c'est l'absence de la caractérisation de ces volailles locales dans chaque région d'Afrique en dehors de l'Égypte qui a développé "La Fayoumi". De nombreux pays ont entamé

la caractérisation phénotypique de ces volailles. Il s'agira de faire la synthèse avant de commencer une caractérisation génétique effective.

Message No 63a (not distributed during conference)

Dr NIYONSENGA Seraphin, Maitrise en Sciences Biologiques et Médicales (UCAD-Senegal), DVM (EISMV-Dakar), Master of Veterinary Sciences; Livestock Production and Management (National Dairy Research Institute, India).

I'm really overwhelmed by the quality of the discussions and views from participants.

As a field veterinarian, I've been frequently asked by urban consumers of my country the question of "why are you not giving us the quality meat of our local chicken?" Local poultry has become a dependable source of livelihood for our rural farmers and fetches high market price and low investment costs. The national hatchery of Rwanda faced some technical problems and was not able to supply Day old chicks and there was shortage of broiler and this gave great popularity to the village chicken and now village producers are requesting the government to help them in getting adequate veterinary care for their bird.

Let us learn from the example of the indigenous breeds of cattle (Kankrej, Gir, Sahiwal) in India which are performing well in Brazil and Kenya (Sahiwal) were they have been improved.

So why not for our local poultry? If we know that genetic progress can be achieved fast in poultry.

"The bird for the poor". This association with the poor or small farmers has often meant that our local poultry breeds have been neglected by those involved in research and development in tropical countries.

The bird for the poor is needed in a changing climate scenario, it is our local breed which is already adapted to harsh living conditions and by and large it has tolerance to heat stress and ability to survive, grow in and reproduce in conditions of poor nutrition, parasites and diseases, though at lower production potential.

Message No 64

Dr. D.P.SINGH, dpscari06@gmail.com , Principal Scientist, CARI, Izatnagr, INDIA

In response to the Message No 37 from Datta Rangnekar for the paragraph "I am confused reading a statement in the background note about 'conservation of indigenous breeds'. Under the subheading 'Traditional Scavenging Backyard system' in the last paragraph on page -5 while describing 'system of developing high yielding chicken types in India' it is stated that "these birds have 50% native and 50% exotic blood and possess characteristic features for backyard scavenging poultry production". The last line states "By that way the native breeds are being conserved and improved for use under traditional scavenging system". How can crossbreeding conserve native breeds of poultry? The improved birds produced from various research centres in India are being pushed through the so called Rural Poultry of Family Poultry development schemes without proper situation analysis." I have the following submission:

1. Once we decide to produce 50% & 50% crossbred of native and exotic breed respectively, the maintenance and improvement of pure native in each generation will be essential. Thus the native breed will be conserved. This method of conservation is known as the conservation through utilization. This will be clear when

the theme of the conservation will be undertaken. Conservation of native breeds and their utilization is being practiced at Central Avian Research Institute, Izatnagar, India.

2. In India, all three types of family poultry are coming up very well on scientific and sound base. Different types of germplasm of poultry to be utilized under three forms of family poultry production are being bred by scientific institutions or private hatcheries' and Government of India has developed huge infrastructure facilities to assure the availability & distribution of these germ-plasms throughout the country. Before recommendation of the particular type of bird, proper situation is studied and mass training programme of the poultry farmers of different levels are being created to create awareness and technical know-how. In India family poultry is coming up in good and organized way which should be followed by other developing country. For scientific breeding of the family poultry birds (scavenging and semi-scavenging) the provision of infrastructure facilities in Government sector is must. Kindly read Message No 3 from Sujit Nayak to share Government of India's program on Rural Backyard poultry development and the organizational structure for breeding program and capacity building for rearing the suitable birds.

Response to Message No 64 from Sujit Nayak, Livestock Officer

I agree with Dr. D.P.Singh's views and I am concerned as to whether replacement of desi birds with improved (even though low input technology birds) may inadvertently further dilute some indigenous breeds. Therefore, I would like to reiterate my request for the following for synergistic action by State Government:

- a) Areas / local regions where the State Govt has identified pockets/tracks of indigenous varieties should be kept out of the purview of such up gradation/replacement schemes. Kindly share information on the same
- b) Data on disease resistance studies of indigenous breeds may kindly be shared.

Regarding infrastructure requirement, GOI has invested nearly Rs. 1450 million over last 12 years in strengthening 218 State Poultry farms. The State-wise details of farms assisted may be shared on request. The major items for assistance were as follows:

Component wise financial statements of Centrally Sponsored Scheme "Assistance to State Poultry/Duck Farms" :- (Rs. in lakh)

Sl. No.	Components: Name of the items	Maximum ceiling
1.	Strengthening of infrastructures: Brooding, rearing, laying facilities, modifications and renovations of required poultry sheds, digging bore well, generator and poultry rearing, hatchery building with hatching egg store, hatchery and farm equipment including incinerator etc.	45.00
2.	Feed mixing plant and equipment for feed analytical laboratory:	10.00
3.	In-house disease diagnostic laboratory:	5.00
4.	Revolving fund: For purchase of hatching eggs, parent stock, feed ingredients, transportation, medicine, vaccine etc.	15.00

5.	Extension and training (no.of person trained)	4.50
6.	Marketing	5.00
7.	Consultancy	0.50
	Total	85.00

Message No 65

Monchai Duangjinda, monchai@kku.ac.th , Department of Animal Science, Faculty of Agriculture, Khon Kaen University THAILAND 40002

If the contribution for the first sub-topic from Thailand is not that late, I would like to share some experiences on how we manage the foundation and utilization of indigenous chickens in Thailand.

1. What type of birds is required by the family poultry producers?

I agree with several comments that indigenous is a breed for the poor. The appropriate type of bird required in Southeast Asia (also Thailand) for small holders should emphasize on indigenous chicken. From the past, native chickens have involved with their social life. The commercial or crossbred chicken, i.e. high egg production/high growth (such as commercial layers or broilers or even crossbreeds) have failed to promote for the poor in Thailand for many years. The DLD (Department of Livestock Development) and several extension researches concluded that there are several factors for lack of success. Not only inadequate management skills or financial supports, but also the social way of life is the most important key factor.

"Indigenous chicken" is the most required by the poor because the natural behaviours which have several advantages compared to developed breeds. The popular reason from the surveys is that native chicken can brood the eggs and raise their chicks by nature. As we know, these genes might be knocked out from the commercial layers already. Our previous studies show that crossbred between native chicken and commercial layers also lost this behaviour.

Further advantage characteristics of indigenous chicken that suits this breed for the poor are: tropical disease resistance, environment tolerance, mothering ability, and good scavenging ability. I think the scavenging ability is one of the most important criteria for breed selection for the poor. All farmers tend to feed them with local or left-over food in village such as rice-bran, broken rice, vegetables, waste food scraps, fruit scraps, and grasses. All commercial breeds required high protein and energy feed plus good vaccination programs.

Up to now, Thai native chicken were classified into several strains (or varieties) based on feather colours. All strains have specific colour standard of perfections for the specific parts of the body. The civilization and country development are now destroying the true breed of native chicken. However, in 2002, Department of Livestock Development (DLD) collaborated with Thailand Research Fund (TRF) and started to establish four foundation stocks of Thai native chickens which are Pradu-Handum (black colour plumage), Lueng-Handkhao (yellow collared plumage), Dang (red colour plumage) and Chee (white colour plumage) by collecting parental chickens throughout the country. The main purposes for these four foundation stock are genetic conservation and utilizations.

With conscientious breeding program, chickens that did not reach the standard of perfection were culled. Not much pressure was put on selection for growth or egg production traits to keep maternal ability and benefit behaviours. More than five

generations of these foundations were selected. Nowadays, DLD start releasing these indigenous chickens to the small holders and family producers. With some suggestions for managing chicken housing and local market, the acceptance was very high. Growth and egg production were higher about 10% to 20% compared to native chicken in the past. All chickens still have good scavenging ability in village condition, and good broodiness, mothering ability, resistance to disease and environments.

This is why we would suggest "Indigenous chicken" to be a real bird for the poor.

Theme 2-4:

2. What are the organizational structures for the existing and suggested breeding programmes? - Quelles sont les structures organisationnelles pour les programmes existants et futurs de sélection avicole ?
3. What strategies of multiplication and distribution networks can be adopted? - Quelles stratégies peuvent être adoptées pour des réseaux de multiplication et de distribution de reproducteurs.
4. What marketing is appropriate for breeding stocks? - Quelle commercialisation est-elle appropriée pour les reproducteurs ?

Message No 66

Datta Rangnekar, dattarangnekar@gmail.com

I am glad Dr. D.P.SINGH agrees with my view that the topic – 1 discussed earlier in the E – Conf was important and provided required backdrop for discussions on other topics. As suggested I have extracted views and suggestions on the remaining 3 topics, expressed in my mails of Feb 2 and 7, and put them in this mail for consideration of all the participants. From a breeding perspective I would like to ask – why can't scientists working on Livestock / Poultry breeding adopt 'Participatory Breeding approach' as is done by Plant Breeders (characters to be developed are selected considering farmer's priorities). As remarked by a few participants some of the poultry keepers are breeders and they have good understanding of the characters needed in backyard poultry to make it beneficial and sustainable. How about characterizing and assessing potential of the so called 'non-descript country fowl' – they are non-descript because the technical people have not tagged them. And instead of conservation think of development of some of these potential country fowl – many of these are identified as breeds by rural poultry keepers and each of these have some distinct characters. With regard to the 3 aspects to be discussed particularly 'Organizational Structure for Breeding Programme and distribution of stocks' I suggest adoption of a 'Differential Approach' for the three different production systems rather than a uniform / singular approach - suggested combinations: Informal - traditional system of breeding and supply of chicks (Indigenous bird) is strongly recommended for interior rural areas. The traditional system already exists and has its strengths (familiarity and acceptance by the rural families, no dependence on outsiders and they know the needs/preferences) - let us not ignore it. I suggest study of the traditional / informal system to understand their strengths and weaknesses and empower these rural families through some discreet technical support so that they can help themselves. This way we can avoid development of 'Dependency Syndrome' – risky for rural areas. A set up in partnership for other systems - could be Public - Private or Public - NGO or Farmer groups (SHGs/Interest groups) or totally private depending on the situation in the area/region (some private units are already operating).

Message No 67

Sujit Nayak, Livestock Officer, Govt of India

In the commercial high-yielding bird sector, the research, multiplication and distribution/ marketing channels are highly organized and consolidated mostly under one integrator. In case of backyard poultry sector, this is more disjointed.

However, in India, M/s Kegg Farms have developed their supply lines using Kuroiler (dual purpose) birds, which, as per the family poultry production would fall under the small intensive system.

Further, in India, in the public sector, State Governments/ University and even Central Government face the problems of distribution, primarily, I believe due to lack of dedicated workforce to overlook the distribution process. The veterinary workforce at the district/ block level are carrying out multiple jobs from healthcare (of all species), distribution of minikits, monitoring of Centre/ State sponsored schemes to even administrative works like verifying voters' list etc.

Therefore, we may also have to consider development through agencies which can offer dedicated time and expertise like Bangladesh has over the years developed the BRAC model distribution network.

However, for the development sector which address livelihood issues for the poorest of the poor the breeding strategies have to be kept with Government. For marketing and income-generating models, private sector or NGOs may play a role.

Other than BRAC, are there any good examples of health and input delivery system for the core family poultry system for nutrition and supplementary income?

Also, besides the mother unit concept of rearing the chicks and initial vaccination before distribution to beneficiaries (Like in GOI scheme and Kegg supply chain), are there any other interventions facilitating survivability of birds?

Are there any models/instances where there have been buy-back mechanisms by the Government to ensure uptake of the surplus produce from rural areas (not for commercial broiler)?

Message No 68

Joseph Munyuma, jmunyuma@bunda.unima.mw, Principal Livestock Development Officer, Ministry of Agriculture, Malawi

Thank you very much for bringing the second topic of discussion. I suggest that we should use the already existing regional structures like the SADC and others that we have globally. Their regional structures shall act as Secretariats to the breeding programme at regional level.

Every country within the region shall identify a team of experts to coordinate the programme in their country. The country coordinating teams shall be reporting to the regional office and the regional office shall report to FAO or any other organization agreed. I am bringing in the regional structure because most of our borders are porous, people and livestock move a lot across these borders without passing through immigration offices. Most of the people that stay along these borders are related. Therefore, countries that are sharing borders can agree and work together along borders to come up with a breed or breeds for a specific area along their borders.

The village poultry that is on scavenging full time, emphasis should be put on selection within the already existing indigenous breeds. No need to bring in exotic

breeds because the farmers will not be able to manage them. Local farmers should be imparted with knowledge and skills of identifying a good breed for meat or eggs or both.

I suggest that cross breeds should be developed for the semi-scavenging type of system to produce ideal poultry breeds for specific locations. By allowing local farmers to participate fully, experts should come up with indigenous breeds that can be crossed that have got very good traits.

Semi-commercial farmers should strictly use hybrids for meat and egg production.

Message No 69

Dr. Md. A. Saleque, Secretary, WPSA Bangladesh Branch

I appreciate all the participants for active participation in the e-conference as well as valuable contribution to the first theme. I believe that ongoing discussion on the three themes are directly related to the first theme and also play a critical role to decide the sustainable approach of the family poultry production. From the discussion it reveals that management system and genotype of birds varies for among the different categories of the poultry rearers and also from country to country. So developing/selecting suitable breed for family producers by any agency, it is needed a well organizational structure with all the facilities for breeding programme, appropriate multiplication and distribution network for supporting the poor farmers considering the respective country's situation. It depends on the 5 main points such as STEPS. This means:

S= Structure – Government, private org. or NGO's for breeding and distribution

T =Technology - Easily adaptable, available at grass root level etc

E=Environment - Kinds of support and extension services, adaptability, forward and backyard linkages etc.

P=People – (perception, choice, participation)

S = Sustainability - (Cost effective at service provider level and also farmers level)

Considering the limitations, potentials and interest of different agencies such as Government, private sector, Research institutes, NGO's, we should design a very effective and efficient programme which will be beneficial for the poor as well as for the country.

Message No 70

Isaac K.M. Chipeta, icchipeta@yahoo.co.in, MSC. Animal Science Student, University of Malawi, Bunda College of Agriculture, P.O. Box 219, Lilongwe, Malawi.

I want to make my contribution to the three topics of discussions that have been outlined for discussions. In the first place I need to say that really these topics are inter-linked, they need to be tackled in totality. Let me say this that "The Semi-Scavenging Model for Rural Poultry Holdings or the so called Bangladesh Poultry Model" sums up all. The Poultry Model production chain could be adopted and modified to suit the diverse local conditions in the resource poor communities.

The marketing behaviour of many poultry keepers reflects their poultry breeding strategies. Usually selection is done at homestead; poultry that are diseased, are weak or have poor mothering qualities are sold. That is why one should not attempt to buy poultry for breeding from the market place. This is applicable to all types of

livestock in the rural communities. Those with proven disease resistance and good mothering qualities are retained.

Message No 71

Abraham Lemlem, labraham356@hotmail.com , REST Senior Advisor, Ethiopia

For sustained structural organization specially for management systems of appropriate

Why is it not possible to function parent stock in respective countries by making them skilled and budget equipped because I see some lines such as RIR, Fayoumi, their cross are well functioning on farm level.

For appropriate lines such RIR it continues up to F5 and F6 are cost effective, this means with egg laying start 8 months at farm level they can be managed up to 48 months and then provided from poultry improvement centres. For sustainability the eggs of RIR can be set by local broody birds.

Why is it not possible to establish poultry improved centres at farmers cooperative level provided the cooperative is big enough to cover the salary of professional such as breeders?

REST is now providing 10 incubators to women headed cooperatives with a hatching capacity of 840 eggs.

At the farm level for local conservation selection is important at small holder farmers and trained them intensively the selection criteria and every development agent should keep in agenda the second is poultry improvement centres and researchers attention to local scavenging birds is important why not possible the centres multiply selected scavenging birds and dispatch to farmers. Big cooperatives also.

Message No 72

Timothy Gondwe, PhD, tgondwe@bunda.unima.mw , Bunda College of Agriculture, University of Malawi, Malawi

I read with interest contributions and it seems we agree that for the rural poor, we need to utilize and promote the indigenous chickens. Procedures are issues of this current discussion. However, I tend to agree with those going for selection within the breed to exploit its diversity and variability. Going through breeding strategy selection system, crossbreeding fails at farm-stead, with lack of means to maintain parent populations and lack of following systematic mating system. Also, breed evaluations do not take place to guide implementation. These disqualify usage of crossbreeding even for other livestock species. That leaves us with the option of selection from within, though not an easy and straightforward strategy. Opportunities arise in that farmers seem to select using physical appraisal methods. We might start from there and indeed need to work with farmers, select on farmstead. Traits to consider are many and some quite antagonistic. These can be compromised well when selection and evaluation is done on farm with farmers. Such programs need strong linkage to research and evaluation. However, a few researches could take place on stations to assess technical parameters not easily done on farms.

Let it be known that selective breeding has worked in crops, is doing well in aquaculture, but still a challenge for livestock in low-input systems. Likely cause is mobility of the animals and time required to realize response to selection. Donors also need to consider that livestock projects need more than five years to stabilize and starting seeing some fruits. Aspects of continuity need to be inbuilt from start.

Regional efforts could also be pursued as we might be having indigenous chickens with similar attributes, calling for common approaches.

Message No 73

Datta Rangnekar, dattarangnekar@gmail.com

This is in response to queries by Dr. Sujit Bhai Nayak (Message 67) about some models in India related to family poultry development. I indicate below some examples of NGOs (involved in family poultry development) that immediately occur to me - there must be a few others in India.

I suggest him to get information about the family poultry development work taken up by three NGOs viz. PRADAN, ANTHRA and BAIF and these are three different approaches. PRADAN provides total package ensuring backward and forward linkages. The BAIF (in Madhya Pradesh) and ANTHRA (in Andhra) train the families for improving practices and checking losses through vaccination and improved housing. They train locals for preventive health services. They also try to improve market links so that the families get better price for produce. BAIF in Madhya Pradesh had started encouraging families to produce and supply chicks (of Kadaknath) in view of limitations of the State Govt. hatchery.

Dr. Nayak may contact Madhya Pradesh Rural Development Project (commonly referred as MPRLP) and SAPPLP (Delhi office) for more information about work of these NGOs (if need be I can provide email contacts).

The statement of Dr. Nayak on limitations of 'Public Sector Units' clearly indicates that the problem lies more with the 'working systems of the sector' rather than the staff. How can you expect a person to do justice to Vet work in case he has to spend more time on other jobs. And having realized the 'limitations of the Public sector' how can we expect these to serve the 'Poorest of the Poor in rural areas'. Another limitation with these units is that 'they are Project Driven' and offer no choice to rural family.

Can Dr. Nayak provide information about a public sector hatchery that supplies chicks of country/indigenous fowl? There is hardly any (I hesitate to say there is none). Even though majority of participants of this E-Conference (as well as of the earlier one organized in 1999) state that for scavenging system of local bird is most appropriate, the public sector programmes want to replace the birds since funding in all the schemes/ projects are for supply of chicks of improved birds. I will be glad in case my statement is wrong.

Message No 74

Poul Sørensen, Senior scientist Dept. of Genetics and Biotechnology Faculty of Agricultural Sciences, Aarhus University, Blichers Allé 20, Postboks 50 DK-8830 Tjele

I am really impressed on all the contributions to this conference. I have read many of them and got the impression from some of them that a better understanding is needed of the complex of the crossing effects combined by an understanding of the concept genetic adaptation. For this reason I have here a contribution on crossing effect and will try to send you also some comments on genetic adaptation. A further support will be in the FAO report entitled "Chickens genetic resources used in smallholder production systems and opportunities for their development" that I refers to at the end of this e-mail.

Crossing effects and Heterosis

In reading through the huge numbers of contribution to the theme "What type of birds are required by family poultry producers" it came to my mind that a short discussion of the way to utilize crossing effect could be helpful to understand some of the problems reported from using crossing effects in an attempt to improve the local breeds..

Crossing effects: The advance in crossing two populations is to utilize that the two populations have different gene frequency on a considerable numbers of loci which means that there are a higher numbers of loci with heterozygosity in such a cross than in the two parent stock. This heterosis effect or "Hybrid vigour" may be considerable regarding fitness and reproduction trait (up to 25 to 40%), and that is why commercial poultry production always takes place by means of hybrids. Hybrids are always F1 crosses which means that the two parents derive from different populations, matings among the F1 results in the F2 population in which the crossing effect is considerable reduced and after few generations completely disappears. These topics are discussed in (FAO 2010) regarding poultry in family poultry production. A consequence of applying the Hybrid approach is that recruitment of young hens requires that the two parent stocks are available to produce the crosses in the neighbourhood. It is often seen that the farmer try to use the F1 as parent for next generation in order to save money for investment of recruitment, and that will dramatically reduce the hybrid vigour of the F2 generation and he will further experience that these F1 hens are poor to incubate and brood the new generation of chickens. Yet another version that often has been reported is the cockerel exchange program in which an exotic cock is exchanged with the existing cock. The first generation may show a certain effect on the performance of the offspring regarding body gain and egg yield due to the additive gene effect of the exotic cock and the crossing effect. Continuing in the following generation either by introducing a new exotic cock to mate the next generation or to mate within the F1 will in both cases lead to problems. In both cases the crossing effect will be reduced, and in the first case which is the backcross to the exotic breed having only 25% of the genes from the local breed the chickens often suffer from lack of the genes that makes the birds survive in the particular environment. An other problem exist if the hens have to incubate and brood the chickens, because the mothering ability is often poor in the exotic breeds as breeding for higher egg yield is antagonistic to the mothering ability (se page 13 in FAO 2010). The so called Bangladesh model in which crosses were used between RIR ♂ × Fayoumi ♀ worked with a model in which one of the smallholders had a parent stock flock of 7-10 RIR males and 40-80 Fayoumi hens kept in confinement and fully fed. The hatching eggs were passed on to Rice husk incubators or direct to the farmers who had the local hens to brood. After some period the parent stock keepers ran into financial problems as too many eggs had to be sold as consumer eggs, because the smallholder farmers (Key rearer) reproduced from their own crossbred hens. As a consequence they run into serious problems with this F2 generation of poor egg laying and no ability to brood. As consequences many farmers probably turned to local hens again.

Conclusion: Utilisation of crossing effect fundamentally requires two parent stocks that are bred as pure lines and they should be available throughout the year also to produce the F1 cross bred chickens that has to be transferred to the farmers at a price that make it attractive, and the quality of the chickens should be high in all aspects of importance for the farmer. If one of the parent stock in such a cross is the local breed it is of importance that these breed is kept isolated from the crossbred in order to get a continuous production of the right type of F1. In most of the productions systems termed as scavenging or semi-scavenging I believe that the capability for running the necessary organisations around parent stocks is not there

and therefore it will be better to use the local breed and then spending power to make a genetic improvement of that, because that improvement will persist even if the improvement program collapses.

Literature: FAO 2010. Chickens genetic resources used in smallholder production systems and opportunities for their development, by P. Sørensen. In: FAO Smallholder production paper no. 5. Rome Pp 1-62. Can be found at: <http://www.fao.org/docrep/013/al675e/al675e00.pdf> .

Message No 75

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Excusez-moi de prendre le train en marche et de revenir certainement sur des sujets déjà largement abordés par mes prédécesseurs. Permettez moi de relater une des péripéties que les programmes d'amélioration ont connu au Mali pour mieux faire comprendre mon point de vu sur le sujet discuté dans le forum. Tout comme dans la plupart des pays voisins, au Mali, pour l'amélioration du poids vif et de la production d'œufs des poules locales, le choix avait porté sur l'introduction de coqs exotiques en milieu réel. Les résultats espérés n'ont pas été satisfaisants. Par la suite, dans les années 1980, la démarche suivie a été d'identifier et d'évaluer d'abord en station un écotype du terroir appelé Koko-chè (KKC) assez cosmopolite dans le pays, puis de le croiser avec la RIR. Après l'évaluation des métis à différents degrés de sang de la RIR, le 3/4 RIR-1/4KKC a été retenu et multiplié, car toutes ses performances de production en génération F₂ dépassaient celles du KKC d'au moins 19 à 65 %. En outre, la plupart des croisés ont conservé leur instinct de couvaie (ce qui est très important en milieu rural), avec un taux d'éclosion de 60 à 83% et une rusticité assez bonne. Vingt ans après ces travaux, la diffusion des métis appelés Wassachè (Poids Vif = 1.3 – 1.9 kg à 5 mois) n'a pas connu le succès escompté auprès des producteurs. Ces derniers semblent préférer l'écotype local le KKC (Poids Vif = 1kg à 5 mois) caractérisé par la régularité de plumage blanc au niveau de la poitrine et le noir sur le reste du corps. Le déficit d'adoption de cette race améliorée me fait penser qu'au Mali et dans la plupart des pays voisins, le problème de race ne semble pas être la préoccupation primaire des acteurs de l'aviculture familiale en divagation totale ou restreinte. Il pourrait certainement l'être après la résolution de contraintes plus importantes. Actuellement, tout porte à croire que les pratiquants de ces 2 formes d'aviculture familiale préfèrent les écotypes locaux plus adaptés à leurs besoins divers (revenu monétaire, besoins culturels et nutritionnels). Ce sont pour la plupart des aviculteurs ruraux qui consomment d'habitude très peu d'œufs. Cette habitude s'est-elle incrustée dans leur culture à cause de la faible production d'œufs des races indigènes, ou vis versa? A mon sens, le problème n°1 qui se pose en aviculture en divagation totale ou restreinte/partielle dans cette zone est la santé et l'hygiène, suivis de l'alimentation et enfin de l'habitat. Les paquets techniques existent depuis longtemps, mais il faut chercher les voies adéquates pour les faire adopter par les acteurs des 2 systèmes d'aviculture familiale ci-dessus cités. Par exemple, une réduction du taux annuel brut de mortalité actuelle (80-90 %) de moitié (40-50%) et l'augmentation de la vitesse de croissance actuelle (? 1kg à 5 mois; ponte à 6-8 mois) par un statut nutritionnel relativement stable pourraient renforcer la productivité de la basse-cour du simple au double, de même que le revenu du producteur. L'adoption du 3ème paquet technique qui est l'habitat adapté

à l'élevage des poules locales, est celui qui pose de façon insidieuse le plus de problème, quand on veut passer de la divagation totale à la divagation restreinte. Tout semble marcher quand les poules partagent l'espace avec l'homme (chambre à coucher, cuisine, grenier, etc.). Quand 1, 2, 3 ou même 4 poules entrent simultanément en ponte, chacune cherche un coin sécurisé à son goût (dessous de lit, canapé, toilette, cuisine, bergerie, etc.), pond et couve sans gêner l'autre. Mais dès que vous tentez d'améliorer l'habitat en construisant un poulailler spacieux exclusivement réservé aux poules locales, il se pose un problème de gestion de l'effectif. Quand plus de 6 poules entrent simultanément en ponte et que vous voulez que toutes pondent dans le poulailler amélioré, les plus agressives chassent les plus faibles ou les obligent à partager le nid avec elles. Au moment de couvrir, 2 voir 3 poules se partagent le nid et se gênent. Et dès que 2 à 3 poussins éclosent, les 2-3 poules abandonnent les 20-25 œufs restants. Au lieu d'avoir 4-5 jeunes de 5-6 mois par poule, on a 2-3 pour 2-3 poules. Ainsi au lieu d'augmenter la productivité, l'amélioration de l'habitat annihile l'impact de l'amélioration du statut nutritionnel et sanitaire. La race n'apparaît pas au rang des premières préoccupations de l'aviculteur qui est confronté à ces 3 problèmes (santé/hygiène, alimentation et habitat). C'est pourquoi, j'ai un intérêt particulier pour l'essai de densité rapporté dans le message 55. Les résultats sont pertinents par rapport à cette gestion des effectifs: ils fixent une taille optimale dans les différents systèmes d'aviculture familiale. C'est une excellente source de bonnes pratiques qui méritent d'être largement diffusées pour être adaptées aux conditions des milieux différents.

Message No 76

Thomas Junne Kaudia, Program Officer, Winrock International, Partnership for Safe Poultry in Kenya tkaudia@winrock.or.ke or tkaudia@yahoo.com

In Kenya, the government started Kenya Agricultural Research Institute (KARI) to coordinate research and development activities both in crop and livestock production. For example, the KARI Naivasha Research Centre addresses all aspects related to nutrition/feeding, breeding and general management of dairy, dual-purpose Sahiwal cattle, the dual-purpose goat and poultry. The centre is a referral facility for development of technologies to support sustainable livestock production. The centre is actively involved in poultry breeding activities, has a 20,000 egg capacity hatchery and sells chicks and selected cocks to farmers.

Since breeding is a highly technical field, a central national coordinating mechanism is necessary. The coordination role can be articulated through a poultry development commission whose members are drawn along the poultry value chain but chaired by a government appointee. Through this arrangement, all breeding activities being carried out in a country shall be based on desirable government policies.

Strategies for multiplication and distribution may work out better if the private sector takes a leading role under the watchful eyes of the breeding commission mentioned above. The private sector would distribute the recommended genomes through service providers who are working directly with farmers. Service providers are trained animal technicians who advice farmers and even provider some of the required inputs. A number of service providers own agro-vet stores. Farmers Training Centers where they exist may be used as distribution points since such centers are normally located in several parts in a country. Innovative farmers initiatives like the Farmers Chicken Centre mentioned below may also serve as distribution centers.

Marketing is one area that has been a thorny issue for the smallholder poultry farmer. I would suggest a contract marketing system, where farmers buy breeding stocks knowing very well where to sell the adult market ready mature commercial

birds. In Kenya, a group of farmers are starting branded Farmers Chicken Centers to provide; ready market outlet for mature birds, source of required inputs including breeding materials, necessary extension services and training materials. These centers can be used for marketing breeding stocks.

Message No 77

Sujit Nayak, Livestock Officer, Govt of India

I would like to thank Dr. Datta Rangnekar regarding the information on NGOs taking up family poultry development activity. I was not aware of ANTHRA and BAIF working towards this. Actually, PRADAN in collaboration with SAPPLP organized a one day seminar on Rural Poultry on 28th Dec 2010 at New Delhi. A few models were discussed. I think the proceedings will be available over the SAPPLP website soon.

We need more clarity on:

a) Bird type, b) Size, c) Marketing/ distribution, d) Health coverage initiatives etc.

Thanks to this E-conf, there seems to be some consensus on first two.

On Dr. Rangnekar's apprehension that there are no local/ indigenous birds propagated in public programs, I would like to confirm to his fears that he is right as public programs focus more on replacing the non-descript desi birds (not same as indigenous) but when implemented at grassroots level, many indigenous varieties may be getting lost. Therefore, I too believe, like many, including Dr. D.P.Singh, that we should prevent further dilution (for which we should keep these public programs away from defined niche areas/ tracts of indigenous varieties, which again is not available clearly).

However, there have been some small interventions like support for a State Poultry Farm at Jhabua, Madhya Pradesh for propagating Karaknath under Centrally Sponsored Scheme component, 'Assistance to State Poultry Farms' and support for 'Chittagong' and for 'Indian Runner' etc. under Centrally Sponsored Scheme 'Conservation of threatened Breeds'. I too hope that we have soon have a program for in situ conservation of all indigenous breeds as so far efforts are for ex-situ conservation only.

Message No 78

Gregory Chingala, gchingala@bunda.unima.mw, MSc Student, Department of Animal Science, Bunda College of Agriculture, University of Malawi, Malawi

I do certainly agree with Poul Sørensen and Timothy Gondwe on promoting the use of indigenous chickens in scavenging or semi-scavenging production system. More often than not, chicken breeding improvement in this system has been modelled on organizational structures, strategies of multiplication, distribution and marketing of stocks for intensive commercial production as mentioned by Poul. But the results have not been impressive: F1 generation dumping to farmers who keep it as breeding stock. Since the model does not work, more importantly because the farmer needs are not taken into consideration which is more than economic, thus, indigenous chickens are ideal. Farmers have evolved together with them and what is needed is selection.

The organizational structures, strategies of multiplication, distribution and marketing of indigenous chickens should be as follows: farmers (stud breeders) should be identified in a community who shall be involved in selection of indigenous chickens. Private sector interested in being identified with the name/s of indigenous chickens

can also be involved. That is if a farmer wants to buy and raise pure and improved indigenous chickens can be referred to these farmers. Government should be involved in organizing and regulating the farmers and not running system.

Message No 79

**Sodjinin K. EKOUE, Ingénieur Agronome Zootechnicien, Doctorant en Production Animale, Chef Programme Elevage à Cycle court/Aquaculture Pêche, Institut Togolais de Recherche Agronomique (ITRA), BP: 1163
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Les poules locales jouent un rôle important dans la lutte contre la pauvreté et l'insécurité alimentaire. A ce titre, la volaille constitue un trésor ou un capital pour le paysan agro-éleveur. Un aspect qu'on ne doit pas oublier c'est le rôle socio-culturel donc la poule est bien intégrée dans la vie des producteurs surtout ruraux. Il y a des couleurs de plumage que l'agro-éleveur garde pour ces cérémonies rituelles auxquelles il est intimement lié. Un programme de sélection doit tenir compte de tous ces aspects avant de démarrer. Ce qu'on a commencé à faire au Togo, c'est de voir en milieu paysan ce qui intéresse l'éleveur au premier chef tel que la coloration et autres caractéristiques avant de commencer à voir les activités ou programmes à mettre en place pour satisfaire ses besoins. La recherche scientifique met en place, pour l'année en cours, un programme de production de géniteurs mâles performants pour les élevages familiaux afin de les accompagner pour l'amélioration de la conformation de leurs spécimens. Ce programme se fera de concert avec le laboratoire des sciences aviaires de l'Ecole Supérieure d'Agronomie (ESA) de l'Université de Lomé (UL) ; ledit laboratoire possède une unité expérimentale de production d'environ 10 000 poussins d'un jour. Dès que les géniteurs seront diffusés dans les élevages, la recherche et vulgarisation seront des structures interpellées pour le suivi afin de mieux apprécier l'adaptabilité des souches. Ce processus de suivi a été le maillon défaillant des opérations « coqs raceurs » des années antérieures.

En effet, chaque pays devra avoir une politique d'amélioration génétique qui prendra en compte toutes les espèces animales en l'occurrence les races avicoles locales. Etant donné les coûts très onéreux des programmes de sélection, il faudrait impliquer en amont les gouvernants et des institutions gouvernementales, les ONG et toutes les initiatives paysannes dans ledit domaine.

Le Togo, pour sa part, a déjà mis en place un programme dénommé « Programme d'Investissement Agricole pour la Sécurité Alimentaire (PNIASA) ». Ce programme prend en compte le développement de l'élevage traditionnel avec un accent particulier sur l'aviculture familiale.

Une chose est de produire et l'autre concerne l'aspect commercialisation des produits. Dans ce cas précis, chaque pays doit prendre en compte « l'aspect chaîne des valeurs » en mettant des relations de profit ou relation « gagnant-gagnant » entre tous les acteurs (Producteurs de poussins d'un jour, provendiers, éleveurs, vendeurs de produits vétérinaires ...). C'est cette chaîne de valeur qui mettra en confiance les grandes firmes pour se mettre en relation avec les acteurs de l'aviculture familiale.

Dans un programme génétique de sélection avicole, il faut tenir compte des gènes importants identifiés localement sur nos poulets et les conserver. Je pense aux cous nus, frisés, huppés, les plumes comme balai, les plumes comme poils de bélier ... Je crois en mon humble avis que c'est cela que les pays tropicaux pourront vendre sur le plan amélioration génétique.

Message No 80

William Muzomera Ngwira, Livestock Development Officer; Department of Animal Health and Development Livestock Blantyre A.D.D. , Msc Animal Science Student at Bunda College, Malawi

1. What are the organizational structures for the existing and suggested breeding programmes?

In Malawi at present there is a programme of poultry improvement which was introduced in the 1950s. The objective was to improve the local chickens through increasing the size of meat and number of eggs laid per hen in a year by crossing the Black Australorp cocks with the local hens. The organisational structure for the programme is; the government runs the hatcheries and maintenance of the pure Black Australorp chickens in its farms. When the chicks are hatched they are raised at the government farm to receive all the necessary vaccinations up to the age of six weeks and then they are distributed for sale through the government structures to farmers. The poultry breeding for family producers should be a joint effort for both the government institutions and research institutes where there are research institutes. The strategies to be used should be to target the specific areas where poultry selection should concentrate for development of the breed. There is also need to involve the farmers themselves on the identification of the required traits for the breeding programme. If farmers can be allowed to form co-operatives and assist them with necessary resources they should be given the responsibility of breeding the poultry. This can take the scenario of the Bangladesh model, however, on quality control it has to be monitored by the governments. In case of small countries there can be a special arrangement that a number of countries can work together as a block which in many case they may be sharing common gene pool of the poultry. This can assist them to develop the breeds that can be used in a number of countries that have similar conditions and share the same breeding objectives. The breeders and family poultry rearers need to be working closely so that there is adequate feedback on the developments and the response of the poultry on the scavenging or semi scavenging production systems. This can be done by formation of the association that should link the two sides.

2. What strategies of multiplication and distribution networks can be adopted?

There is need to have some farmers that should be organized to hatch the eggs and another group that should rear the chicks to reach the age that they can easily survive in the village. This age could be 4 to 6 weeks for distribution to other farmers. At this age the chicks can easily run away from the predators. The cock exchange programme should be used where the cocks are strictly reared for distribution to farmers without including their female siblings to avoid inbreeding. If not properly monitored the cock exchange programme can bring in the inbreeding problems.

3. What marketing is appropriate for breeding stocks?

The countries that can make a block for coming up with a breed the marketing system should use the farmer cooperatives.

Message No 81

Dulal C Paul, dulal@ualberta.ca , University of Alberta, Canada

Thanks for your nice summary of first session. Based on the thread bar discussion form the first theme of the E-conference, the following three themes are inter-related

and little complex in country to country, we need to keep in mind that the program will be sustainable and profitable in the existing condition . I agreed with Md. Saleque's statement (message-69). I can cite the rural condition in Bangladesh; all rural chickens are not under vaccination program and proper hygienic management. A huge number of organizations including Govt and NGO are trying to improve the health status of family poultry but not yet intensively. So, the revenue lost due to poultry death is very high. Therefore, safety needs to be ensured for end users by intensive routine vaccination and other precautions.

1. What are the organizational structures for the existing and suggested breeding programmes? Scattered, Govt and NGO are working to improve the family poultry production. Here for sustainability and profitability of this commodity, I do strongly believe to conserve the native chicken in established research centres and improve production traits through selection breeding. This stock will be ready for scavenging system of rearing in family production level. Pure breeds like Rhode Island Red and Fayoumi also could be kept in central breeding centre, lead to produce crossbreds. This could be used for semi scavenging in family poultry production. Commercial hybrid is available in private hatchery which could be use for intensive in family poultry production.

2. What strategies of multiplication and distribution networks can be adopted? Initially, breeding centre (existing or newly established) will multiply and distribute to the farmers in selected region/ area. Family poultry producers are not found integrated. Here a forum is very important to raise a common voice for their problem oriented approach.

3. What marketing is appropriate for breeding stocks? It is really hard to say without foundation work, chickens are not expected to survive. National authority should take necessary steps to get ready for chicken rearing. I do also believe it is needed to form a team or committee in every village and team leader will communicate with experts for any suggestion. One selected committee member will receive chickens from central breeding centre and s/he will distribute to other farmers, thus they will save individual family labour and relevant expenses. All members should compensate something to him/her. The same strategy could be applied to sell the products. An authority needs to ensure that the products are bought.

Message No 82

Prof. Funmi Adebambo, fbambo0412@yahoo.com , Professor of Animal Breeding and Genetics, Department of Animal Breeding and Genetics, University of Agriculture, P.M.B. 2240, Abeokuta, Nigeria.

Organizational structure for breeding programmes

As far as Nigeria is concerned we breeders don't believe that 5-30 birds kept at the backyard to empower women or youths can ever alleviate poverty among rural dwellers at this age. Rural dwellers also want to send their children to school and empower the youths- generations of the future categorized as leaders of tomorrow. A commercially viable option which is not necessarily fully intensive but which requires some input with commensurate output that will make our women, youths and graduates to be fully engaged/employed on livestock production is our present propaganda. If we cannot do it, then who will do it for us? We are no longer talking of 10 -20 chickens at the backyard for economic empowerment?

Let me affirm here that most rural dwellers may not have good roads or portable water, they have access to radio, some to television and most to telephone lines,

hence they could easily communicate and can be easily reached. They are willing to learn to improve their standards of living if assisted and with this enlightenment could rally round to help their communities

We believe the government through universities like ours and other research stations should continue on the genetic improvement of our indigenous chicken types as is currently being done at the University of Agriculture, Abeokuta, Nigeria to make improved indigenous chicken available to those who want it on a fairly medium scale, get indigenous crossbreds available for semi-intensive and intensive rearing and serve as the genetic conservation centre for both the indigenous and exotic germ lines.

Strategies for Multiplication and distribution

Central multiplication would require the establishment of 20,000-57,000 hatching incubators in zonal research centres to make pure line indigenous and the crossbreds available on regular basis for prospective farmers.

There is need of forming the farmers into co-operatives so that they could be assisted with purchase of chicks and inputs- (feed, drugs and vaccines) at subsidized rate.

It will also be necessary to make available 1, 2, and 4 weeks old birds to those who might want the drudgery of early rearing to be removed from them as well as point of cage, 14 weeks old birds available to those who might want to jump-start the production method for egg layers. These could be reared on the government stations or by farmers who might specialize in producing these types.

This multiplication and distribution system will be enhanced through organized monthly meeting with farmers to review their activities and assist them with training on quarterly basis.

It might similarly be necessary to form a farm gate cooperative marketing group to pool together eggs and broiler birds for central sale and or processing in order to eliminate the sharp practice of middle-men. Here, central cold room storage for eggs and processing facility for broiler meat might be required.

The cooperative organization will also enhance the farmers' access to bank loans or enable them to form themselves into local contributory groups to assist each other with small and medium scale loans.

To me, the rural poor don't necessarily have to remain poor but must be lifted out of poverty, be economically empowered and nutritionally benefited. When the rural poor is helped they can come together to help their families and communities.

Message No 83

Sofjan Iskandar, sofjaniskandar@yahoo.com , Indonesian Research Institute for Animal Production, Indonesia

Since the outbreak of avian influenza in Indonesia in 2004-2007, the government has been trying to increase local poultry, as it was found out that 67% local chicken are resistance to AI. Local chicken farmers groups have been encouraged to raise more and more local chicken. Indonesian Local Chicken farmer was established to help government program. One of the activities is confining local chicken, especially around the household area; semi intensify the husbandry. However, as it is suggested by Dr Singh, we should go for more thought on organization structures.

Particularly with marketing we could improve the middle men activities. It might be worth for the local poultry producers not only buying their chicken but also the middle men could sell vaccine and medicine to the producers.

Message No 84

Gregory Chingala MSc Student, Animal Science, University of Malawi

gchingala@bunda.unima.mw

I would like to respond to Prof Adebambo suggestions (Message 82). Chicken production is in two forms: commercial and subsistence scavenging or semi-scavenging. This conference is about how we can help people practicing scavenging chicken production. Most of these people live in rural areas and they are resource poor. This is to say farmers in rural farmers who have resources should go commercial using commercial broiler and layers as using improved indigenous chickens and it crosses would be a waste of resources. The suggestion of having central hatcheries for producing pure line of indigenous chickens and crosses of the said number is unsustainable. What's more, there is no mention of who would be responsible for setting up such hatcheries. In Malawi such breeding structure was established but it did not work. Your arrangement for marketing of the stock is best suited for those farmers practicing intensive chicken production which should be done using commercial layers or broilers not indigenous or its crosses. Hence I find the arguments very theoretical.

Message No 85

Kiplangat Ngeno, Department of Animal Sciences, Egerton University, Kenya. Email: aarapngeno@gmail.com

What marketing is appropriate for breeding stocks?

In my opinion, indigenous chicken farmers need to be mobilized to form group enterprises. Instead of each farmer being involved in all the stages of production as it is the practice in the customary poultry production system, specialization of production in the indigenous chicken value chain should be encouraged. Enterprises should be organized, where products from one enterprise will be an input in the next enterprise. To enhance efficient flow of products and services; capacity strengthening; equipment, drugs and vaccines; micro-credit scheme and a monitoring and evaluation system are put in place. The researchers and others e.g. staff from Ministry of livestock development and NGO's are needed to act as principal catalysts for the process of group formation, production and marketing. The principal benefit will be the a participatory, practical and sustainable indigenous chicken enterprises and governance, an efficient flow of inputs and service and establishing partnerships, trust and linkages between the enterprises

Message No 86

Amnuay Leotaragul, amnuay84@hotmail.com , Animal Scientist, Chiangmai Livestock Breeding and Research Centre, Sanpatong, Chiangmai. 50120, Department of Livestock Development, Ministry of Agriculture, Thailand.

What are the organizational structures for existing and future poultry breeding programmes?

In Thailand, the Department of Livestock Development (DLD) is working to target small farmers for long-term sustainability, which must be made in the form of a network for the raising of native chicken. The network is divided into 2 systems - producing chicks in a semi commercial farm system and producing chicks in the

normal scavenging system. The work involves cooperation with other agencies such as Thailand Research Fund supporting research and the universities doing research projects and with farmers while DLD has established a nucleus flock of native chicken for conservation and further development.

The basis of the development is that the breed must be true (phenotypically), to improve chicken performance for direct economic traits but still keeping maternal and survival ability in village conditions in mind. For the Pradu-Handum breed of native chicken, the DLD flock is in generation 10; having achieved the first ensuring breed type (with advice from the local farmer experts) and uniformity is now more than 95 %. The colour of egg shell is tinted. The economic traits when raising in semi-commercial farm condition include: total number of eggs 147 ± 34 eggs/yr, body weight at market age at 12, 16 weeks for male and female were $1,357 \pm 108$, $1,902 \pm 151$ and $1,092 \pm 84$, $1,436 \pm 117$ gm, respectively. When raised in local scavenging conditions the numbers of eggs and chicks are 42 ± 16 eggs/yr and 29 ± 14 birds/yr, respectively.

The Nucleus flock has 70 sires and 350 dams per generation, and produces 30,000 chicks per year. Selection is based on family selection and mating aims to minimize inbreeding of the flock. The traits selected include phenotypic characteristics, body weight and egg production.

What Strategies of multiplication and distribution networks can be adopted?

The research and breeding centre of DLD produced parent stock for the farm network which, in turn, can produce chicks for farmers who could buy chickens and chicks from both farm and farmer networks. For example Chiangmai Livestock Research and Breeding Centre produces 3,000 dams per year to four pure breed farms in a network and these could produce 270,000 chicks per year for further sale. It is necessary, in the near future, to analyze production costs of each level.

However the present structure which allows purchase from any level has limited dissemination possibilities and there are now some problems with supply from the nucleus since any farmer can request to purchase from that flock.

What marketing is appropriate for breeding stock?

To ensure that the demand can be met without further expansion of the nucleus, the research and breeding centre must sell only to those farms in a network registered with DLD and DLD must set clear conditions and guidelines for farms in this network.

After the cost analysis proposed, the objective will be to develop a system of vertical multiplication rather than the existing horizontal situation and one which reflects the correct pricing for genetic merit of the different levels.

Message No 87

Dr Aimable UWIZEYE, uaim@hotmail.com , University of Catania, Italy

I thank all participants for their contribution and I want to share again the experiences of Rwanda and to give my point of view on how local poultry sectors should be improved.

Structure

The scavenging system production is most practiced by rural families; this system is very vulnerable because chickens are exposed to many predators and diseases. It is important to mention the role of livestock extensionists who can train rural smallholders on basic knowledge of husbandry practices. Many chickens don't have

shelters with laying nest. A shelter done with low cost materials (materials available in village) can help to avoid the threats of night predators, bad weather and thieves, and also enhances hygiene, feeding and marketing.

Feeding: Many free-range poultry keepers let young chicks to follow the mother hen immediately after hatching. Most of the chicks in their early weeks of life do not get adequate nourishment because they are unable to compete with adult birds. Hence there is very high chick mortality during the early weeks of life. Other causes of chick mortality include chilling, diseases, predation by eagles and snakes, drowning in pools of water and road accidents. Consequently many birds die very young, often 50% of the chicks die within the first 8 - 12 weeks. Extensionists have proposed a day basket system which consists to protect young chicks and mother hen under a traditional basket to prevent the threats of predators,... where the keepers should distribute some feed available (rest of food, by products of agriculture,...) this practice can limit the mortality of young chicks and increase the population of local chickens in the village if is associated with vaccination campaign against New Castle Disease (NCD). As a consequence, the traditional poultry production remains rudimentary, with low monetary profit. An enabling environment includes training, availability of daily support services, feeds, water, treatments, proper care of chicks, growers, layers, brooding hens, veterinary services, possible availability of credits, Markets, Ways to reduce input cost and add value to the products.

Strategies of multiplication, distribution and marketing

The installation of hatchery for local chickens in different rural area is not sustainable, I think the productions of local chickens in local specialized farms, with a good assistance should be useful, and can facilitate the diffusion. The organization of smallholders in cooperative should also facilitate the intervention of veterinary services and extensionists in training and vaccination programme. The market is still very complex in different areas because this activity seems non profitable in general. However, in Rwanda, the price of 1 kg of local chicken meat is two times the boiler meat. That shows how this activity can be profitable for rural families who need incomes. They don't get incomes because there are many stakeholders around the traditional poultry value chains. Those stakeholders include traders, processors, consumers and transporters at different level of the chains and all profit on the incomes of these activities. The organization of all stakeholders with the regulations of the markets can improve the livelihood of smallholders who are for the majority women and children. Because I believe that every poor family is able to keep 15 local chickens, if they are well trained, this sector can contribute to the strategies of poverty and malnutrition reduction.

Message No 88

Prof. Funmi Adebambo, fbambo0412@yahoo.com , Professor of Animal Breeding and Genetics, Department of Animal Breeding and Genetics, University of Agriculture, P.M.B. 2240, Abeokuta, Nigeria.

Thanks for the Message 84. If the method does not work in Malawi, Nigeria is not Malawi. Just like the cock exchange programme did not work in Nigeria. Nigerians want to get out of poverty hence 10 chickens at the backyard reared under brooder hens will not work here except we are deceiving ourselves. Rural poor don't have to remain poor they needed to be empowered as cooperative groups as is being done with some crop programmes.

Message No 89

Mc Loyd Banda, bandamcloyd@bunda.unima.mw , Animal Science Department, Bunda College of Agriculture, University of Malawi

I would like to contribute to the discussion. Indeed as different contributions are pointing out, family poultry in many parts of the world does not have proper and sustainable organizational structures, strategies of multiplication, distribution and marketing. Academicians/researchers in poultry breeding have had efforts to organize rural dwellers to improve family poultry but soon as project phases out every thing (structures, selection etc) dies out. Some reasons to discontinuity are lack of incentives in terms of substantial income from initiated breeding output, no formal markets. In commercial sector organizational structures, strategies of multiplication, distribution and marketing exist, why? I think the economic benefit attached is a big incentive, which also comes from large number of birds, short production time period. If, similarly, the rural local poultry production is organized in such away that the producers benefit economically it would be sustainable, more importantly family flock size has to increase (not 5 - 20 chickens!). In Malawi it is observed that there is increasing preference for local chicken meat to broilers by consumers, so there is potential for indigenous chickens as a rural dweller income generating entity.

I agree with Paul (message 81) that research stations even universities should be working on genetic improvement within indigenous chickens and act as conservation centres while rural farmers, in organized set-up such as farmer cooperatives, can be producing for sale.

Some indigenous chicken types are relatively good layers that if their natural incubation and brooding of young ones are replaced by other means the flock sizes can increase significantly as laying period within specific time period (e.g. year) increases, hence more to sell out. Rural electrification taking place in some countries, like in Malawi, can be of advantage on multiplication strategy. Mini hatcheries can be established right there in the rural communities or use of other non electric incubators such as brick incubator, which has proved to hatch not only at research station but even under rural farmers' management in northern Malawi.

On marketing, Malawi fortunately has a programme called Malawi Agricultural Commodity Exchange (MACE) which uses media house and cell phones to market agricultural commodities. Apart from marketing crop produce it is also been used to market livestock and livestock products hence it is an avenue for marketing indigenous chickens raised in rural areas.

Theme 5:

What conservation is appropriate for existing genetic resources? - Quelle méthode de conservation est-elle appropriée pour les ressources génétiques existantes?

Message No 90

Auvijit Saha Apu, Lecturer, Department of Animal Breeding and Genetics, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh E-mail: auvijit_bau@yahoo.com

It is clear that native/local breeds have a wide acceptability still now and it is economically profitable not only in case of rearing but also marketing due to some of its unique characteristics, it takes the attention of the consumers and get higher price than the broiler/layer of commercial strain. Though the local breeds have special capabilities such as adaptability to unfavourable environments and better

immunocompetence, good foragers, require less cost and special care to grow but the productive performance is quite lower. From my point of view, we can preserve the local breeds of the particular area based on analysis of the representative samples of clearly defined genetic stocks of the areas which have available data on performance in several locations as per FAO recommendation. However, farmers and consumer preference, marketing facilities and productive performance of the breed should be considered to select a particular breed or breed combination to be conserved in developing countries. Besides these, as the productive performance of local birds are poor, we can balance the objective of high production with the objective of breed conservation by changing the management practices instead of breed. It is observed that the production performance can be increased if they feed supplementary feeding in addition to the traditional. The breeds which are good at both eggs and meat/growth performance should be preserved because the family poultry producers mostly like dual purpose breed. Now the question arises of who takes the responsibility for the conservation of local breeds? I think the govt., research organizations, NGO's and private sectors all should have to come under the same umbrella to take and implement a strategy for the sustainable preservation of the selected local breeds. Obviously the farmer's community who are key beneficiaries and keep it in their houses should be included to keep the programme sustainable. If we will not be able to take all the stakeholders under the same umbrella it would not be sustainable in the long run. As from our previous experience we observed that the donor funded conservation programme stays up to that day when the fund is available. When the program is closed, the conservation programme is gone to dusk. So all the stakeholders should be involved from the initial/baseline approach of selection of the breed to be conserved up to every step that needs to be taken to achieve a sustainable programme in the particular areas.

Message No 91

**Prof. Funmi Adebambo, Professor of Animal Breeding and Genetics,
Department of Animal Breeding and Genetics, University of Agriculture,
P.M.B. 2240, Abeokuta, Nigeria**

I quite agree with Dr Banda's contribution (Message 89). Conservation of the indigenous chicken could only be sustainable if they are utilized at the same time. The indigenous poultry at this stage will be used as one of the parental lines to keep it and conserve it as a selected line in both egg and meat production. Improved egg production will encourage the rural poor farmers as cooperatives to get them out of poverty. As I said initially and still stand by my submission, the rearing of 5-20 chicken in the backyard will not augur for poverty alleviation in this present millennium. The government, NGOs and private participation would be required to take rural poultry production to the next level for women and youth empowerment, job creation and poverty alleviation.

The FAO group needs to set target for conservation and utilization of indigenous poultry as a means of poverty alleviation and economic empowerment of the rural poor. If at the end of it all the rural poor still remain poor then we have not impacted this group of people. We have only worked in vain. Within the next 10 years, FAO and other agencies should be at the fore front of impacting the rural poor and contributing to their nutritional and economic upliftment. A well fed and economically empowered community will visit the health institutions less, knowing fully well that the egg is a wholesome and standard meal for children, pregnant mothers and the aged.

The communiqué at the end of this conference should emphasize the conservation for sustainable utilization of the indigenous poultry of every contributing nation and for global poultry development.

Message No 92

Thank you for this Thailand procedure that has combined the conservation strategy with production and distribution from Research Centre to Cooperatives. I think the utilization from the Nucleus breeding herd where appropriate selection could be adopted is a welcomed proposition.

Message No 93

Dulal C Paul, dulal@ualberta.ca , University of Alberta, Canada

Thanks a lot for your valuable descriptive analysis about native chicken conservation and other relevant aspects. Being a researcher on rural poultry production in Bangladesh, I am happy to participate in answering your set question.

-How do we balance the objective for higher production with the objective of breed conservation?

As we know, native chicken poses a low productivity in terms of BW, yearly egg production and egg weight. A probable way to increase egg production is through selective breeding. This could be possible by Govt or NGO or both together. Nobody wants to lose the local valuable asset. Therefore, FAO funds leads to make it meaningful at initial phase.

-What are important strategies for poultry genetic resources preservation in developing countries? As I mentioned above, initially collaboration of working protocol would be strong between respective country Govt and FAO, thereafter privatization will initiate slowly for sustainability of the program in 3rd world country.

- Which breeds or populations should be preserved and for what objectives? For an example in Bangladesh, Hilly and Naked Neck are already identified for egg production, now is the phase we need to multiply as much as possible and distribute to the local farmers while all existing chicken should be withdrawn. Thus, the farmer will get more eggs from the selective chicken. This type of demonstration will enhance and expand the program and motivate neighbours.

- Which cost-efficient methods could be used for developing countries specifically for African countries? My opinion, at the beginning of such pilot program in any 3rd world country, we have to subsidise for initial establishment and encouragement of the rural family poultry producers. And the best option is to form farmer cooperative for better marketing.

- Who should bear the costs of conservation activities? Conservation activities should be operated by autonomous research organization with proper guide line.

- Who can really implement the task of conservation and where? Should NGOs and the private sectors be encouraged to get involved? Regional based conservation centre of native chicken will be established by Govt or NGO. Definitely NGO and private sector is the best option. However, initial patronization is hoped by Govt or FAO. When it becomes profitable then it is better to privatize.

Message No 94

Dr. FOTSA Jean Claude (Ph.D), fotsajc2002@yahoo.fr . Senior Research Officer, Institute of Agricultural Research for Development (IRAD). Box: 4099 Bamenda, Cameroon.

What conservation is appropriate for existing genetic resources?"

I firstly thank the participants of this conference since its beginning. From all what have been said, indigenous chickens are generally accepted as poultry which can sustain family poultry production in the developing countries. I really thank the whole team for bringing up this topic. As far as the conservation of existing genetic resources is concerned, I agree with all the participants that this concerns mainly indigenous poultry as they represent more than 80% in each developing country. So, with reference to the current criteria of the World Union for Nature (IUCN) concerning the state of endangerment of a species and the list of species threatened with extinction, village chicken is not an endangered species. However, its vulnerability to outbreaks makes this threat to be a reality. Therefore, conservation measures should be considered while considering the natural character of free range poultry practices. Such conservation measures include in-situ where efforts to inventory, collection and preservation of genetic material would be undertaken within the national territory, and ex-situ through gene banks and cryopreservation of genetic material and semen of these varieties. On the other hand, blood samples of different genetic types should be collected to extract DNA for the enrichment of gene banks. These genes could be used in controlled introgression programs with the help of molecular markers. Nowadays, it would be necessary to establish a national conservatory of local populations of chickens in each country, a molecular biology laboratory for the development of a gene bank and equipment for cryopreservation of semen collected. All these methods would restore developing countries' genetic diversity in case of attack of an epidemic of avian influenza type. Thus, village chicken will sustain the family poultry production to alleviate poverty and fight against malnutrition while covering the socioeconomic, ritual and traditional needs of the population.

Message No 95

Maxwell Thwala, Maxwell@swade.co.sz , Livestock Specialist, Lower Usuthu, Smallholder Irrigation Project, P.O.Box 198, Siphofaneni

On the above subject, I think private sector is well placed to conserve the existing genetic resources. I like the Southern Africa Model whereby private cattle breeders will choose the type of breed they would like to venture based on a number of reasons and in most cases they are influenced by profits. Private farmers then form Stud breed association which provide extension service and quality assurance to all members. With such structures in place, producers are able to get the desired breeds or crosses at reliable sources.

In poor countries where resources are scarce, governments, NGO can play a very significant role in the establishment of family poultry breeding station. In Swaziland for instance the government established a Nguni cattle breeding station and farmers are able to buy or lease pure bulls for breeding. The only problem with government managed breeding station is that they are not profit driven, prone to corrupt practices thus their sustainability is not guaranteed and from time to time resources may not be sufficient

In conclusion, from my experience I have discovered that all poultry breeds have got a market. Breeds which are difficult to breed are the most sought after breeds. Thus all have got a market.

Message No 96

Dr. O. M. Momoh, mykemomoh@gmail.com , Dept of Animal Breeding and Physiology, University of Agriculture, Makurdi, Nigeria

We all in this conference have stressed the unique importance of the indigenous scavenging chickens to the rural economies of developing countries. This underscores the need for their conservation/preservation not only for utilization at the moment but also to hold these genetic resources for the future. To achieve conservation/preservation goals, we must discourage all forms of dilution of the local gene pool with exotic blood. If we must use the improved stock for product improvement, we could recommend crossbreeding to produce only F1, which should be a terminal cross for the market (meat/egg). Conservation through pure breeding is recommended and should be done in-situ at government farms/research stations. Ex-situ conservation methods are not appropriate for most developing countries due to absence of most sophisticated infrastructures and facilities required. Since conservation requires huge capital outlay, only government and organized private sectors (NGOs) can be involved. Rural farmers who are actually the custodians of these genetic resources can also be persuaded to be involved in preservation projects by provision of adequate incentives. This is particularly important if some unique genotypes of the indigenous fowls like naked neck, frizzle feathered, dwarf etc, which propagate tropically relevant single major genes (and are discriminated against in some communities), are to be preserved and safeguarded from extinction.

Message No 97

Rosa Costa, rosa.costa@gmail.com , ND regional project manager, KYEEMA Foundation, P O Box 1168, Maputo, Mozambique

First of all I would like to thank the participants of this conference since its beginning. I agree that local chickens are generally accepted as species which can sustain rural poultry production in the developing countries. These local breeds and populations which have evolved and adapted to various environmental conditions represent an important genetic resource for improving efficiency of production now and in the future. According to what I have seen, usually dual purpose breeds are preferred in the rural areas. It is also true that any strategy to increase production and productivity need to be combined with different interventions. Thus, my opinion is that conservation activities including: identification, monitoring, characterization and utilization for best short term use and to ensure management for longer term ready availability should be undertaken within the national territory by a government research institution with clear guidelines. It is very difficult to plan and implementing any strategy related to conservation without having accurate information: The first step would be to carry out a survey of the breeding tract: the present status of the breed, need and requirements of the farmers, their habit, management practices, availability of local feed; types of breeds existing locally. Usually this type of information is very scarce in developing countries. It is also important that countries report regularly on their national plans and progress with their implementation through the support of an international financial mechanism to achieve equal sharing of the benefits gained.

Message No 98

William Ngwira, Livestock Development Officer, Blantyre ADD, Malawi.

I have read most of the contributions that have been made and that the e-conference is coming to an end I have benefited a lot on the topic. Now I want to contribute on the conservation of the genetic resources. I suggest that the best to conserve the local poultry is through first of all knowing what we have as genetic material in the countries in terms of their trait values. For those countries that have already done the characterization exercise, they are able to use the traits say those poultry with superior traits for egg production, meat production or dual strains or

breeds that can be isolated and preserved. For those countries that have not yet characterized their gene pool on the poultry the first thing is to carry out the characterization so that the traits should be known.

On the question of how to conserve I want to suggest that within the blocks such as SADC and others they can have the centres that should be responsible for the conservation of the genetic material and then come up with the multipliers for the specific breed for distribution to the farming communities. The cost of conserving the genetic materials can be shared with farmers by including a small levy to the cost of the poultry and the governments that will be benefiting from the genetic resources should also be contributing towards the running of the conservation centres.

Message No 99

David Steane, desteane@loxinfo.co.th , Thailand

Knowing just a little about the efforts in Thailand - there are four such projects similar to that summarized by Khun Amnuay - there are several important points, not all mentioned so far, which contribute to the conservation and use of these resources. Firstly, a realization of the usefulness of the material to an important group of farmers, then some support to initiate action particularly in the formation of a nucleus (usually at a time when the breed does not show any major advantages for the small farmer), followed by the inputs of a dedicated technical person who appreciates the role of all people involved. The person also has to know how and when to impose assistance and also discipline to ensure the integrity of the scheme (especially if it involves marketing of products - which should be an integral component!) and an ability to learn from mistakes. The lack of any one of these is likely to spell a lack of sustainability. The contributions to this conference have been most interesting and will certainly contribute to a better understanding and improved efforts in ensuring that valuable genetic material is not lost. I am hoping that Thailand will now build further on what has been and is being achieved!

Message No 100

Frands Dolberg, University of Aarhus, Denmark

There are several interesting references to hatcheries in this conference.

In the Micro-Finance and Technical Support Project implemented in Bangladesh by the apex organization for micro-finance Palli Karma-Sahayak Foundation (PKSF) with support from the International Fund for Agricultural Development (IFAD) it is convincingly demonstrated that poor women can handle a mini-hatchery technology building on the Chinese Rice Husk Method. This technology is particularly useful in remote areas with poor infrastructure and can be used for both chicken, ducks and quail - at least that is what the experience shows in the project with about 200 women applying the technology. Hands-on training over a full incubation cycle has proven critical for successful uptake. The technology is now modified to not only involving the use of rice husk, but also sand. IFAD is about to complete a case study on the method and Edward Mallorie: emallorie@aol.com would know when the report is ready and where to obtain a copy.

In the meantime you can find a paper on the technology by searching in Google on the title "The experience with mini-hatcheries in Bangladesh" by Rota et al. This paper includes an appendix with some pictures.

Message No 101

Dr. S. D. Chowdhury, drsdchow@gmail.com , Professor, Department of Poultry Science, Bangladesh Agricultural University, Mymensingh 2202, BANGLADESH

I am very pleased to see that the e-conference on family poultry for developing countries has gained momentum and we all are commenting on various issues relating to this subject. Many scientists have, by this time, expressed their opinion with regard to indigenous genetic resources. If we agree, in principle, to prevent the erosion of existing genetic resources, their conservation is a must. To make it possible, we have to consider a lot of principles. In my opinion, as I have told before, indigenous poultry will be most suitable as family poultry of developing countries but their productivity needs to be improved, as much as possible, by avoiding genetic dilution with exotic stocks. Thus the challenges are (a) improving productivity, (b) ensuring sustainability and (c) making production and multiplication cost-effective. I have some suggestions in this regard:

1. Collection, conservation, characterization, selection, breeding and multiplication of various types of indigenous poultry should be undertaken by the researchers in a planned way.
2. Only the indigenous stocks should be allowed to rear as family poultry in a few number. Under no circumstances, distribution of high yielding chicken/duck would be allowed for crossing with indigenous poultry.
3. Farmers who are resource poor should be encouraged to family poultry production. Anybody interested to invest more money, depending on his ability, may go for small/medium/large commercial broiler or egg production. Such a production system should be excluded from family poultry concept and he/she should not be permitted to disturb the genetic constitution of indigenous stocks.
4. The Government, NGOs and Livestock Department of each country should assign the task of genetic improvement, nutritional manipulation and management intervention to the poultry scientists, not to the administrators or people having no research background. The scientists should be brought under accountability to yield fruitful results.
5. The donor funded projects should address local issues and must evolve a mechanism, in collaboration with researchers and Government for ensuring sustainability of results.
6. The developmental policy on the conservation of indigenous poultry should not be heterogeneous intra- and inter-institutionally.
7. Efforts will be needed to make family poultry production cost-effective at farmer's households.
8. Multiplication for quality DOC production could be successfully enhanced by the use of low-cost rice husk incubation system in addition to the use of broody hens.
9. Trial village people for housing and maintenance of nucleus flocks and conducting researches with indigenous stocks may be developed on regional basis keeping their scavenging nature as it is but to explore more production.
10. Genetic manipulation and improvement within the indigenous stocks, nutritional manipulation mostly with local feed resources, development of low cost management systems and vaccination with locally developed low cost vaccines should be the key

features for the conservation and development of family poultry in developing countries.

Message No 102

Poul Sørensen, Denmark

Suggestions how to breed local birds.

Following the discussion in the e-conference there has been quite a number of contributions that has focused on the local breeds as a source to be used under the management system termed scavenging and perhaps also the next step semi-scavenging, as reviewed by Dinesh Prasad Sing in e-mail of 15th February. It also seems to be an agreement that the praxis of using migration of exotic cocks is not the solution; neither the use of crossbreeds (Hybrids) seems suitable as it requires too many investments for this segment of family poultry farmers. Therefore it seems that two ways are open, the one is to continue without doing anything and the breeds will remain at the level they are. The other way is to try to make selection within the local breeds by methods that have demonstrated progress in similar situations. The first of these will satisfy the question of keeping the genetic resources, the second will satisfy the smallholder farmer as their birds will improve gradually over time and I guess still the question of keeping the genetic resources will remain perhaps even better as focus will be to choose the right type of chickens for the individual local breed. In the document (FAO, 2010), I have given thought and facts that lead me to the conclusion that the best way to produce a genetically improved breeding material for these segments of family poultry producers will be to make a genetic based improvement of the local breeds. This is not an easy task for various reasons pointed out below:

1. A selection programme has to involve a whole region with many farmers that have about the same ideas of keeping hens and how they should look like.
2. The project should start with a careful collecting procedure in which birds that have the desired phenotype regarding what could be seen on the bird, are collected across the region with sufficient numbers of males and females.
3. The selection procedure has to take place at a central station in the region, where the core of the population is found in a sufficient number to avoid inbreeding.
4. All forms of selection for higher production traits, better health and disease resistance should be based on information of sibs or offspring's that have been raised by the farmers in their own management system.
5. Among the traits to improve are survival, early body gain, egg yield and mothering ability. There are antagonistic relations between several of these traits, particularly between egg yield and mothering ability.
6. The improvement done in this way will be based on gene effects that are permanent and therefore if the breeds will change regarding production traits it should be considered to keep the original breed as an unselected line in a number of e.g. 50 males and 250 females and reproduce them without selection and breed them with a minimum increase in inbreeding.
7. In order to achieve an acceptable progress it is necessary, before starting the selection procedure, to analyse the datasets from recordings in order to calculate the level of Heritabilities for the individual traits and genetic correlations between these being able to construct a selection index that give you the best possible progress.

8. One of the constraints will be to measure the egg yield of the individual hen at the farm.

9. After a couple of generations of selection, males (either the sire or their sons) of the best progeny groups should be released to the farmers as they will be better than their own by a small amount regarding production traits.

I have not been able to find much documentation on genetic parameters from data in a family poultry managements system. I have tried through a simulation study to run various situations regarding genetic parameters varied within a range combined with variation in other factors of importance for the selection process using a program that made use of stochastic derived data. Based on prices of chickens at various ages and egg price from Bangladesh, the output of a selection procedure showed that if egg yield was included as selection goal it was possible to increase the egg yield by 3 % per year. A similar simulation with data from Uganda based on meat production neglecting the egg yield resulted in an increase of daily gain of 4% per year. The results of the simulation studies and the discussions were presented at 9th World Congress on Genetics Applied to Livestock Production in Leipzig, Germany August 2010 and can be found at <http://www.kongressband.de/wcgalp2010/assets/pdf/0019.pdf>

Conclusion:

Very few attempts if any have been proven to obtain a genetic improvement of local breed in their own environment. There are quite a number of factors that have to be considered before success can be expected, but with persistent efforts one should expect to gain progress. The improvement obtained in this way is permanent and remains in the populations even if the program collapses for various reasons and is therefore much less vulnerable than improvement based on crosses. In fact it is way that the European cattle populations have been improved since 1950. Such a programmes needs investments in education at the Ph.D. level, and building of a central station. Next the power is needed to sensitize a part of the farmer from (almost) all villages in the region to participate and some technicians to visit the farms about once a month to collect data. There are no requirements for further improvements of expensive feed or other supports, vaccination would be good but on the other hand high mortality due to infectious diseases is an excellent way in the selection procedure to find the families that survive during attacks of virus and bacteria.

FAO 2010. Chickens genetic resources used in smallholder production systems and opportunities for their development, by P. Sørensen. In: FAO Smallholder production paper no. 5. Rome Pp 1-62. Can be found at <http://www.fao.org/docrep/013/al675e/al675e00.pdf> .

Message No 103

**Ko Awono Paul Marie Désiré, Institut de Recherche Agricole pour le Développement (IRAD), Station de Garoua, B.P : 415 Garoua, Cameroun.
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La sélection des volailles est une affaire de tous (éleveurs, chercheurs, État et bailleurs de fonds), mais le niveau d'implication de chaque acteur n'est pas le même; l'éleveur est le premier maillon de la chaîne, au fil des années, il sélectionne les meilleurs animaux en se basant sur les performances phénotypiques, mais ses animaux représentent pour lui une épargne utilisable en cas de besoin, c'est

pourquoi l'Etat doit accompagner l'éleveur à tous les niveaux (financier et technique) afin d'éviter la disparition de ces volailles, sources de diversité génétique. La sélection des volailles nécessite des recherches sur tous les plans (phénotypique et génotypique) et les chercheurs présentent des potentialités pour effectuer ces recherches, toutefois la recherche ne dispose pas toujours d'assez de moyens financiers pour mener ces recherches coûteuses, c'est pourquoi la recherche a besoin de l'appui financier des bailleurs de fond et de l'État. Tout ceci nécessite la synergie indivisible entre éleveur-chercheurs-État-bailleurs de fonds.

L'opération échange de coqs est certes importante car elle permet d'augmenter les performances des volailles en évitant la consanguinité, mais la mise en place d'une banque de gènes permettra de conserver ces gènes car ces volailles ne sont pas à l'abri des épizooties capables de décimer des cheptels entiers.

L'identification du génotype local pour chaque pays est nécessaire car l'agriculture (définition au sens large) est considérée comme une science de localité et signifie donc que les performances d'un génotype peuvent être influencées par les conditions de milieu; la caractérisation phénotypique et génotypique des volailles s'impose et elle permettra d'évaluer les conditions d'élevage optimal de chaque type de volailles en spécifiant les zones écologiques et les biotopes appropriés de chaque espèce ou population.

Message No 104

Dr El Hadji TRAORE, DVM, Dr es Sc., Maître de Recherche, ISRA/ILNERV, Chef Service Alimentation – Nutrition, Tel B: +221 33 832 3878; fax +221 33 832 3679, Cel: +221 77 644 0781; +221 70 202 8711, BP 2057, Dakar - Hann, Sénégal

Je vous apporte ma modeste contribution pour le sous thème 2: Quelles sont les structures organisationnelles pour les programmes existants et futurs en sélection avicole?

L'une des contraintes de développement de l'aviculture familiale traditionnelle est le matériel génétique de petite taille à croissance lente et de faible capacité de ponte. Tout programme de sélection doit permettre d'arriver à la production d'un matériel génétique polyvalent (croissance rapide et bonne production d'œufs) tout en concevant l'instinct de couvaion. Ceci s'explique par l'absence de couveuses dans nos zones rurales.

Au Sénégal, plusieurs projets et programmes de développement ont tenté d'introduire des coqs 'raceurs' pour améliorer la productivité de l'aviculture rurale. Non seulement, les résultats obtenus sont médiocres mais tout s'arrête avec la fin desdits projets. Des ONG tentent actuellement la même chose mais sans grand succès.

L'échec est dû au fait que :

- les coqs introduits ne sont pas choisis parmi les races amélioratrices et leurs placements sur le terrain n'est pas suivi en terme d'effectif par rapport aux femelles existantes et les coqs qui meurent ne sont pas remplacés ;
- les sujets F1 femelles produits, n'arrivent pas à remplacer tout le troupeau d'un site donné et une fois la carrière de ces femelles terminée, elles ne sont pas remplacées.

Pour une réussite, je suggère ce qui suit :

- une organisation du placement des coqs 'raceurs' sur le terrain par une implication directe des structures de recherche en association avec les services décentralisés de l'élevage ;
- l'utilisation des stations et centre de recherche comme structures de reproduction et d'élevage de coqs 'raceurs' avant leur placement chez le producteur ;
- le suivi de la carrière des coqs placés et procéder au remplacement en cas de nécessité ;
- l'élimination des femelles locales pour les remplacer par des F_1 ;
- l'élimination des coqs F_1 ;
- procéder à un croisement coq 'raceur' x femelle F_1 et fixer le produit obtenu.

Late Messages

Datta Rangnekar

This is late communication (due touring) but reading some of the contributions and encouraged by the indication from coordinators of E- conf. that the lines would remain open for late contributions I could not restrain myself from conveying views in some aspects (for whatever worth these are).

My compliments and thanks to Paul Sorensen for very pertinent and useful contribution (24th Feb).

Traditional/backyard/family poultry and livelihood. I got the impression that a few participants felt 'drastic improvement in egg or meat production from backyard family poultry is needed so that the family earns enough to come out of poverty'. I only hope that this is not the objective. Several studies in India on livelihood systems of the resource poor/underprivileged rural families have shown that while keeping the birds is important for them but it is a small part of the complex livelihood system. Participatory studies have shown that majority of these families neither wish to change in the system nor the type of bird and no major in number of birds. They seek help mainly for checking losses (there is need for a thermostable ND vaccine). For these families traditional/backyard poultry is a small but important part of the complex of livelihood system as it has specific functions (nutrition/risk coverage and source of small cash). Other aspects that cannot be ignored are – premium price paid for eggs and meat of local/country (Desi) fowl and that selling is not a problem.

With regard to programme for characterisation and conservation (in situ) of indigenous poultry it is possible to involve a sizable number of traditional poultry keepers through NGOs and some development projects (like in state of Chattisgad) and take up such a programme with a participatory approach (so that perceptions of the families can also be considered).

Look forward to the outcome of the conference and with compliments to the coordinators for wonderful job.

Dr R K Sharma, INDIA

I am working in the area of poultry breeding for more than 20 years in India and got opportunity to visit 4-5 countries. It is possible to produce chicken crosses with reasonable productive-adaptability utilizing indigenous & exotic high yielding germplasm. The crosses developed by me at Pantnagar (INDIA) yielded more than 200 eggs, had better shell quality to withstand village transport, higher saleability and acceptability due to multi-coloured plumage. The crosses had higher resistance to various diseases as there was not even a single morbidity for Gumboro while 75-

85 % birds of commercial strain of WLH became morbid and 30-40 % died in the same house and age group. The success story of Kuroilers developed in early nineties by a team including myself at Keggfarms, New Delhi (India) and distributed for backyard poultry which helped in poverty mitigation in last 2 decades was also discussed & documented as a case study by Harvard Business School (USA). Bangladesh village poultry development model is another success story.

E-conference of the International Network for Family Poultry Development (INFPD) in collaboration with FAO and supported by the International Fund for Agricultural Development (IFAD)

Opportunities of poultry breeding programmes for family production in developing countries: The bird for the poor

PART III

Summary and conclusions

Prepared by
Dinesh Prasad SINGH⁴, Jean Claude FOTSA⁵ and Olaf THIEME⁶

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Executive summary

This document summarizes the major issues discussed by participants of the moderated e-conference "Opportunities of poultry breeding programmes for family production in developing countries: The bird for the poor". The conference was jointly organized by the International Network for Family Poultry Development (INFPD) and the Livestock Production Systems Branch of the FAO Animal Production and Health Division and took place from 24 January to February 18, 2011. It was one of the activities of the project "Smallholder Poultry Development Programme" which has the objective to raise the international profile of family poultry production and to strengthen and further develop the INFPD. This is to be achieved by increasing knowledge, awareness and recognition of smallholder poultry production as an effective tool in poverty alleviation, household food security and the empowerment of women.

This was the first of a series of e-conferences on family poultry development with the focus on poultry breed development for family poultry producers which discussed the following sub-topics:

1. What types and how many birds are required by family poultry producers?
2. What are the organizational structures for the existing and suggested breeding programmes?
3. What strategies of multiplication and distribution networks can be adopted?
4. What marketing is appropriate for breeding stocks?
5. What conservation is appropriate for existing genetic resources?

A total number of 168 participants from 30 countries had registered for the conference and a total of 123 e-mail messages were received. The largest number of contributions came from India (17%) followed by Malawi (15%) and Bangladesh (10%). These were followed by Kenya and Nigeria with each 6 percent of the contributions and, Cameroon and Indonesia with 5 percent. The majority of participants (52%) were from African countries while other countries included Canada, Bangladesh, Malaysia, Thailand, Denmark, Italy, Netherlands, Iran, Pakistan, Sri Lanka and India. About 98 percent of the participants were scientists from Universities and Research Institutions and 2 percent were advisers/consultants and extension workers.

Assisted by a technical and scientific committee a Background Document was prepared by the conference moderators and dispatched to the participants by email on January 17, 2011. The e-conference started on January 24, 2011 and continued until February 18, 2011. During these four weeks, 83 messages (67%) were received for the first sub-topic followed by 24 messages (19%) for the sub-topics 2 - 4 and 17 messages (14%) for the sub-topic 5.

The main theme of the e-conference pivots around the breeding of birds for poor families. The word 'Poor' is used for families that are resource-poor but rich in experience of surviving under very unfavourable conditions. Based on skills, choice, homestead area and availability of homestead resources that differ from country to country, three categories of poor people were considered: poor, very poor and non-vulnerable poor groups. A single type of bird may not be suitable for all these categories as suitability is dependent on a variety of factors such as household resources (including time commitment), and whether the objective of poultry rearing

is to meet household needs or to access markets and earn a sustained livelihood. Three systems of family poultry production that exist globally were defined:

- Traditional scavenging backyard or village system
- Semi-scavenging system and;
- Small-scale intensive system.

The requirements of these systems are different to each other with the following characteristics:

Traditional scavenging or village system:

Eggs and chicken meat are produced under this system at low cost by scavenging birds in the backyard and without feed supplementation with commercial rations. There is general consensus that the birds for this system should be local (native) breeds with improved productivity, adaptability and disease resistance. The use of native breeds will also favour the conservation of the native breed; its self-propagation capability will ensure sustainability and very low dependence on external agencies/persons; it will be cost effective and satisfy consumer preferences for eggs and meat of indigenous/local birds and cultural linkages. This satisfies the needs of those poor groups who are unable to cope with the requirement of improved birds or who keep these birds in very limited number only for families' nutritional security and subsidiary income generation. Priority for using improved native breeds or crosses of native with exotic breeds was also suggested for this system as these types of birds have better productivity than the unimproved native breeds. Using crosses may generate more money for livelihoods but they are only suitable for those farmers who are in a position to fulfill the additional requirement (supplementary feeding and proper housing) of the improved birds. The problem of non-sustainability of the F1 crosses was emphasized and the need to evolve a mechanism for ensuring sustainability was suggested.

Some participants recommended the use of dual purpose (i.e. for egg and meat) types of birds for the traditional scavenging system while others were against the use of dual purpose birds. It was reported that dual purpose birds obtained by crossing with exotics have not performed well under traditional scavenging systems due to their larger body size associated with high maintenance cost and reduced self-defence from predators. If the scavenging natural resources are limited they will be exhausted fast, and the same resources may be sufficient for a greater number of lighter egg-type birds. Dual purpose birds are often sold away early due to better market prices and they are thus eliminated from the gene pool before completing the egg production cycle. It was therefore agreed to consider egg and meat production separately.

Semi-scavenging system:

The term semi-scavenging is used to describe small poultry flocks that are raised partly under an intensive system of management and partly under a free range system with the scavenged feed accounting for a substantial part of the total feed consumed. Birds that have low input cost with improved productivity are recommended for this system. They may be crosses of native with the exotic or crosses of two exotic breeds/lines.

Small-scale intensive system:

This system is suitable for part or full time self-employment of rural youths, women, retirees or the handicapped. Commercial strains both broiler or layers should be used

for this system. For the success of this system regular and timely supply of chicks, good feed and proper marketing is a requirement.

The number of birds to be reared plays a very important role for the success of the production system. The discussions included very few responses regarding the number of birds to be reared under family poultry production, with a wide range in suggested flock size from those that responded. For traditional scavenging and the semi scavenging systems, of family poultry producers, some contributors suggested that the number should not exceed 50 (fifty) birds which differs from the 100 (one hundred) as proposed by the International Network for Family Poultry Development (INFPD). Others recommended 10 to 30 birds. A recommendation of the number for different production systems is very difficult as it depends on various factors. Previous situation analysis of the perceptions and priorities of the poultry keeper's family is a must before making recommendations about the number and type of birds that should be kept. Some participants suggested that in these days, 5-30 birds kept in the backyard are insufficient to empower women or youths and alleviate poverty among rural dwellers. Some suggested that farmers should be encouraged to move to semi-intensive and small scale intensive poultry production which may improve their livelihood security. After the Avian Influenza outbreaks the program of the Indonesian Government is to promote poultry development by housing the poultry and prohibiting scavenging, even though the farmers keep their poultry just for family use.

An agency or appropriate organizational structure with all the facilities for a breeding programme, appropriate multiplication and distribution networks for supporting poor farmers considering the respective country's situation is required for developing/selecting suitable breeds for family producers. The five main points that should be considered can be expressed by STEPS (S = Structure, T = Technology, E = Environment, P = People and S = Sustainability). Considering the limitations, potentials and interest of different institutions such as Governments, the private sector, research institutes and NGO's, one can conclude that a very effective and efficient programme should be designed which can benefit poor producers as well as the country

There is almost no organizational structure for breeding programmes of native breeds and their crosses within the private sector. The public/government sector addresses livelihood issues of the poorest of the poor and hence it is recommended that breeding strategies for improvement of the native breeds are dealt with by the Government institutions. The strategies should be intra-population selection for the improvement of the native breed. It is desirable to involve farmers' co-operatives in improvement programmes that are location specific for the native breed/ecotype. Pure exotic breeds (Rhode Island Red, Black Australorp, Fayoumi, etc.) should be kept in central breeding centres for producing crossbreds to be used for scavenging and semi scavenging family poultry production systems. Use of crossbreds will have the advantage of benefiting from heterotic effects (increase in the fitness and reproduction traits up to 25-40 percent) with the caution that F1 should be the terminal cross. A strengthening of existing informal - traditional systems of breeding and supply of chicks (Indigenous bird) was emphasized for remote rural areas where regular crossbred chicks supply is not possible. It was suggested to study the traditional/informal system to better understand their strengths and weaknesses and to empower the rural families through some discreet technical support so that they can help themselves.

Organizational structures for breeding programmes of native breeds/crossbreds for scavenging and semi-scavenging systems have been set-up under the Government

sector in many countries. These countries include India, Bangladesh, Thailand, Kenya, Nigeria, Malawi, Ethiopia and Vietnam which is a good indicator for a better future of family poultry. In the case of countries with limited resources, joint ventures may be attempted for future breeding programmes to share the infrastructure facilities and a common gene pool. This can assist to develop breeds that can be used in a number of countries with similar conditions and which share the same breeding objectives.

After the development of suitable germplasm by poultry research institutions or agricultural universities, the multiplication is usually done by a network of Government poultry hatcheries and then through distribution networks consisting of poultry development projects workers, NGOs, poultry development societies and different co-operative societies. Frequently, these Government set-ups are not successful in implementing the multiplication procedure and the distribution of chicks to the poultry farmers. Another approach was suggested by which universities/research institutions should be working on genetic improvement of indigenous chickens while rural farmers, in organized set-ups such as farmer cooperatives, can be assigned the work of multiplication and distribution. Mini hatcheries can be established right there in the rural communities. The International Fund for Agricultural Development (IFAD) has demonstrated that poor women can handle a mini-hatchery technology based on the "Chinese Rice Husk Method". This was successfully used in Bangladesh for hatching chicken, duck and quail chicks. Smaller size hatcheries with electrical incubators are being used in Ethiopia and Vietnam.

No specific message was received relating to appropriate marketing of breeding stock. However, it was suggested that indigenous chicken farmers need to be mobilized to form group enterprises. Instead of involving each farmer in all the stages of production, specialization in different components of the production value chain should be encouraged. The principal benefit of a stratified production system will be the development of participatory, practical and sustainable indigenous chicken enterprises are evolving. For establishing trust and linkages between the enterprises an efficient flow of inputs and services need to be created. Formation of cooperatives for marketing was suggested as an effective approach which could enhance the farmer's access to bank loans or enable them to form themselves into local contributory groups to assist each other with small and medium scale loans. For marketing, Malawi has a programme called Malawi Agricultural Commodity Exchange (MACE) and in Kenya the "Branded Farmers Chicken Centres" are an avenue for marketing indigenous chickens raised in rural areas.

Countries with limited resources which are not in a position to develop research and improvement capabilities on poultry breeding and marketing may benefit from the germplasm developed in other countries. Due to the implementation of the WTO (World Trade Organization) and GATT (General Agreement on Tariffs and Trade) for the global marketing the availability of required breeding stock from the global market has become relatively easy.

Conservation of a particular breed requires a complex management system which needs to be based on scientific principles and which is a very costly affair. It needs proper planning, a source of regular financing and follow-up of action plans. Very few messages regarding an appropriate conservation of existing poultry genetic resources were received. Identification, characterization and conservation of the native breeds/genetic resources were recommended by various participants. It is very difficult to plan and implement any strategy related to conservation without having accurate information: The first step would be to carry out a survey of the

breeding region. This should clarify the present status of the breeds, need and requirements of the farmers, their habits, management practices and types of breeds that exist locally. This type of information is rarely available in developing countries. Selection of the native breeds/ecotypes should be based on representative samples of clearly defined genetic stocks of the areas. They should have data on performance in several locations as per FAO recommendation along with farmers and consumers preference. As the productive performance of local birds is poor, the objective of higher production of breeds in conservation can be achieved by changing the management practices (including the supplementary feeding) instead of breed improvement.

It was suggested that research organizations, NGO's, private sectors and local farmers' community should all come under the same umbrella to implement a strategy for the sustainable preservation of the selected local breeds. To achieve the conservation/preservation goals all forms of dilution of the local gene pool by exotic blood should be discouraged. Establishment of a national conservatory of local chicken populations in each country was suggested for *in-situ* conservation of genetic resources within the national territory and *ex-situ* conservation through gene bank and cryopreservation of genetic material and semen for which establishment of a molecular biology laboratory was suggested.

Work on evaluation, characterization, conservation and improvement of native breeds is ongoing in developing countries like Malawi, Nigeria, India, Bangladesh, Indonesia, and Thailand. *In-situ* conservation is being done for Kadakanath and Chittagong breeds of native chicken and Indian Runner ducks under a centrally sponsored scheme in India, under which introduction of other breeds or its crosses is banned in the demarcated locality of the home region of that particular breed. Evaluation, molecular characterization and registration of 18 Indian native breeds of chicken have been completed. Six breeds are being conserved in research institutions without any improvement programme and those breeds are being used for the production of crossbreds. There was no mention of conservation programmes followed in other developing countries.

Introduction

An e-conference with the title "Opportunities of poultry breeding programmes for family production in developing countries: The bird for the poor" was organized from January 24 to February 18, 2011. The conference was jointly organized by the International Network for Family Poultry Development (INFPD), the International Rural Poultry Centre of the KYEEMA Foundation and the Livestock Production Systems Branch of the FAO Animal Production and Health Division. It was one of the activities of the project "Smallholder Poultry Development Programme" which is supported by the International Fund for Agricultural Development (IFAD) and has the objective to raise the international profile of family poultry production and to strengthen and further develop the INFPD. This is to be achieved by increasing knowledge, awareness and recognition of smallholder poultry production as an effective tool in poverty alleviation, household food security and the empowerment of women.

The main goal of the conference was to discuss issues of development of suitable birds, organizational structures for breeding, multiplication, distribution and marketing for the family poultry production as the global purview. Hence the theme was subdivided into the following five sub-topics:

1. What types and how many birds are required by family poultry producers?
2. What are the organizational structures for the existing and suggested breeding programmes?
3. What strategies of multiplication and distribution networks can be adopted?
4. What marketing is appropriate for breeding stocks?
5. What conservation is appropriate for existing genetic resources?

Assisted by a technical and scientific committee⁷ a Background Document was prepared by the conference moderators in English and French languages and dispatched before the conference to the participants by email on January 17, 2011. The document provided a description and overview of the main issues to encourage the participants to contribute and to generate a common idea about the conference. The description of the family poultry production systems in the background document was based on the existing practices in developing countries. The questions posed in the said document were to stimulate discussions that will lead to outcomes and recommendations for implementation in future family poultry production development activities. The background document included:

- an overview of the production systems that are used in family poultry production;
- an overview of the topics and issues that will be addressed by the e-conference;
- information on how to submit a message;
- information on how this e-conference would be run; and
- a checklist that was to be considered before submitting a message.

The e-conference started on January 24 and continued until February 18, 2011. The main conference moderator was Dr. Dinesh Prasad Singh (India) who was assisted by Dr. Jean Claude Fotsa (Cameroon) and Dr Olaf Thieme from the Livestock Production Systems Branch (AGAS), FAO, Rome, Italy. The moderator called at appropriate intervals during the e-conference for discussion on specific sub-topics and encouraged participants to respond which led to an informative dialogue. A total number of 168 participants from 30 countries had registered for the e-conference. During the four weeks, 83 messages (67%) were received for the first sub-topic followed by 24 messages (19%) for the sub-topics 2 – 4 and 17 messages (14%) for the sub-topic 5. This summary document presents an account of the views expressed in the 123 messages that were submitted by the participants. Table 1 show that with 76.4 percent the largest number of contributions came from developing countries (94 messages out of 123). The majority of participants (98%) were scientists and few were members of NGOs' consultants and extension agents. Although not purposely arranged in this way, the e-conference nearly exclusively addressed issues of chicken production and not those of other poultry species.

⁷ The Technical Coordination Committee included the following representatives: Prof Robert Pym, Australia; Prof Poul Sørensen, Denmark; Prof Kamal Saleh, Egypt; Dr Monchai Duangjinda, Thailand; Dr Joseph G. Mallia, Canada

Summary per sub-topic

Poultry farming has found special interest among rural people because of its ability to provide supplementary income in the shortest possible time, its simplicity of operation, its need for only a minimum of initial investment capital and the possibility to efficiently use infertile land. Since poultry farming has the flexibility to be operated from a range of very low input up to big investment, it provides opportunities for supplementary income up to full flagged business and for livelihoods to farmers of different economic groups. There are different forms of family poultry production systems and the requirements of the different systems vary quite significantly including the type of germplasm that is used. Selection of the suitable germplasm for a particular system of family poultry production is an essential component for maximizing the profit.

1. What types and how many birds are required by family poultry producers?

The contribution to this topic started with the definition of the word "poor". In the present scenario, the expression 'Poor' is used for families that are resource-poor but rich in experience of survival under very unfavourable conditions (Rangnekar, 1)⁸. Similar ideas were expressed by Smanga (18a), Dulal (43) and Seraphi (63a). It was suggested that "The bird for the poor" seems to be a discriminative term and one rather should discuss "The bird for family poultry" (Dulal, 43). There are different categories of poor: poor, very poor and non-vulnerable poor and their skills, capacity, choice, homestead area, availability of homestead resources is also different. They also differ from country to country. In reality the homestead size is reducing in many countries day by day due to division of homestead land. So considering the above points, there is need to address the requirements of different categories of people and accordingly also to identify specific types of birds for specific groups. One specific type of bird may not be suitable for all the groups (Saleque, 29). Further, bird suitability is dependent on a variety of factors such as resources that the household has (including time commitment), and whether the objective of poultry rearing is to meet household needs or to access markets and earn a sustained livelihood (Sawhney et al., 56). Three main types of family poultry production systems exist globally: i. Traditional scavenging backyard or village system, ii. Semi-scavenging system and iii. Small-scale intensive system (Prasetyo, 13; Saleque, 29; Haque, 44; Iskandar, 54) and their characteristics and requirements were introduced in the base document.

Traditional scavenging or village system

One must remember that the cheapest egg is produced by the scavenging hens produced under the traditional backyard system and without systematic supplementation with complete rations. It is not an occupation but a supplemental household activity. In this system few hens (5-20) are kept by the family which are mostly taken care by women along with other household chores. Birds are either not housed at all or have only night shelters and are fed minimally by kitchen waste as and when available and are left to subsist and scavenge by themselves in gardens, village alleys and farm surroundings feeding on crop residues, insects, worms and green forage. Barns and temporary homestead structures are used to protect the birds from adverse weather and predators or to provide laying shelter. There was

⁸ The references refer to the respective message number

general consensus that birds for this system should be from local (native) breeds with improved productivity, adaptability and disease resistance. Use of native breeds will also favour its conservation; its self-propagation capability will ensure sustainability and very low dependence on external agencies/persons; it will be cost effective and satisfy consumer preference for eggs and meat of indigenous/local bird and cultural linkages (Gondwe, 8; Hasnain, 9; Chowdhury, 10; Prasetyo, 13; Thang 18c, Cipeta, 27; Yahya, 31; Apu, 33; Ogali, 49; Munyuma, 51; Luseba 57; Niyonsenga, 63a; Duangjinda, 65; Gondwe, 72). This satisfies the need of those poor groups who are unable to cope with the requirement of improved birds or who keep poultry in very limited number only for families' nutritional security and not for subsidiary income generation.

Breeding of native birds can be dealt with in two ways either without planned interventions to change the characteristics of the breeds, or with selection within the local breeds by methods that have demonstrated progress in similar situations. The first method will satisfy the needs of conserving the genetic resources; the second will satisfy the livelihood issues of the smallholders as their birds will improve gradually over time. It was suggested that the best way to produce a genetically improved breeding materials for these segments of family poultry producers will be to make a genetic based improvement of the local breeds. A practicable approach for improvement of native breeds was also suggested (Sørensen, 102).

One group of participants expressed the need for using improved native breeds or crosses between native and exotic breeds as these birds have better productivity and fetch more money for livelihoods (Hussain, 7; Gondwe, 8; Rajkumar, 11; Adebambo, 22; Bais, 26; Apu, 33; Chowdhury, 34; Nafula, 49; Uwizeye 52, and Sørensen, 74). The crosses utilize the F₁ heterosis for growth, reproduction and viability traits. This satisfies the needs of that group of poor owners who are in a position to fulfil additional requirement (supplementary feeding and proper housing) of genetically improved birds. However, a larger number of participants were not in favour of using F₁ crosses due to the chances of genetic dilution of native breeds and non-sustainability of these germplasms in the system (Chowdhury, 10, 34, 101; Sujit Nayak, 19, 77 and Momoh, 96). This view is based on the failure of these crosses to survive post project-dependent efforts in many countries after the completion of the projects (Hasnain, 9 and Chowdhury, 34). It was suggested that donor funded projects should address local issues and must evolve a mechanism of collaboration with researchers and Government for ensuring sustainability of results (Chowdhury, 101).

The use of dual purpose (i.e. for egg and meat) birds for the traditional scavenging systems was recommended by some participants (Vadla, 4; Chipeta, 27) while others were against the use of dual purpose birds (Khan, 24; Kaudia, 48). It was reported that dual purpose birds obtained by crossing with exotics have not worked well under traditional scavenging because these birds tend to be larger in size, which is associated with higher maintenance requirements and which demand proper feeding beyond the ability of resource poor smallholder poultry farmers. It has also been observed that self-defence from predators is reduced due to heavy weight. The moderator's view is also against the use of dual purpose birds in traditional scavenging system. The scavenging natural resources are often limited and would only be sufficient for few dual type birds with higher body maintenance requirement while more bird numbers could be maintained of lighter egg-type birds. Because with light birds more numbers can be maintained on the same natural resources more income can be generated. Beyond that, females of dual purpose birds are often sold early due to better market prices and they are thus eliminated from the gene pool. It

was therefore agreed to consider egg and meat production separately (Chowdhury, 34; Kaudia, 48).

It was also suggested to stop referring to the traditional village poultry as 'Scavengers' but rather to call them 'Foraging birds' (Wethli, 32). However, this suggestion does not have a good scientific basis and replacement of scavenging by foraging therefore seems not appropriate. Foraging may have different meaning in general but particularly in Animal Science the forage means the fodder which is utilized mostly by the ruminants and not the avian species (caecal digestion to digest fibre is very limited). Further, the avian species are not only herbivorous but carnivores as well. The Genus Gallus (to which the domestic fowl belongs) has specific characteristics with feet that are particularly fitted for scratching enabling them to expose the hidden worms and insects on the superficial layer of the ground utilizing them as natural protein resources. Scratching of the ground is one of the most important characteristics of the chicken. In the Oxford dictionary the word scavenger has been defined as "an animal or bird feeding on carrion or refuse". The above points justify the scavenging which is being used since long time (Moderator's view).

Semi-scavenging system

The term semi-scavenging is used to describe small poultry flocks that are raised partly under an intensive system of management and partly under free range system with the scavenged feed accounting for a substantial part of the total feed consumed. Since this system requires good poultry housing, feeding, proper vaccination and medication substantial input costs are incurred. The productive performance of local breeds may not match these costs even under improved management. Low input, low cost birds with improved productivity are recommended for this system. These may be crosses between native and exotic breeds or crosses of two exotic breeds/lines (Hussain, 7; Gondwe, 8; Rajkumar, 11; Adebambo, 22; Bais, 26; Apu, 33; Chowdhury, 34; Ogali, 49; Uwizeye, 52; Sørensen, 74). Rearing low numbers of dual purpose pure breeds (such as Rhode Island Red (RIR), Fayoumi and Australorp) have also been found very successful under this system (Dulal, 12; Nayak, 16; Lemlem, 20; Saleque, 25; Haque, 35; Apu, 90; Costa, 97).

Small-scale intensive system

This system is suitable for the poor and non-vulnerable poor but not for the very poor. Under this system people like rural youths, women, retirees or the handicapped operate small size intensive poultry farms for part or full time self-employment. Since the birds are reared under an intensive system which requires appropriate scientific housing, full feeding with balanced rations, standard management practices, disease control and proper medication, the best high yielding birds should be kept under this system as rearing of low productivity birds will not be economical. The general consensus was that commercial strains both broiler or layers should be used for this system. For the success of this system strong backward (input supply of chicks and good quality feed) and forward (proper marketing) linkages are required.

The number of birds to be reared under the three different family poultry production system plays a very important role for the success of the production system. There was a very wide range of numbers of birds suggested to be reared under family poultry production (Chowdhury, 10, 34; Thwala, 18a; Rangnekar, 37; Dulal, 43; Rahman, 55). For the traditional scavenging and the semi scavenging system of family poultry producers, some contributors thought that the number should not

exceed 50 (fifty) in contrast to the current number of 100 (one hundred) as proposed by the International Network for Family Poultry Development (INFPD). Others recommended 10 to 30 birds. However, the number of birds for family production system cannot be fixed as it depends on the homestead area for scavenging; the natural feed resources available in the scavenging area which varies from season to season, the economical condition of the farmers to provide supplements, the objectives of keeping family poultry, family size etc. There was no message suggesting an appropriate number of birds for the small scale intensive system. Very small flocks under this system may not fulfil the purpose of part or full time self employment of rural youth. The size of the flock should be at least sufficient to earn enough profit to secure the livelihood of one individual family (Adebambo, 88 & 91). The flock size may thus vary from 500 to 5000 depending on the economic status of the family. Clusters of bigger size small scale intensive farms in rural areas are becoming very popular and achieve good success as this approach provides opportunities for timely and regular inputs at a minimum possible cost and maximizes the profit (Moderator's view)

From the above discussions, the selection of the appropriate type of birds for the different forms of family poultry production seems to be straightforward, but practical implementation is very difficult. Recommendations for the type of birds should be made only after conducting a situation analysis with due consideration of the perceptions and priorities of the poultry keeper's family; whether they need help and if so what kind of help. The number and type of birds they would like to keep would vary and can be ascertained only after situation analysis. There is also a cultural relationship between people and birds which is strong in some communities and need to be considered (Rangnekar, 37; Loukou N'Goran 59, Sangaré, 75).

A group of breeders from Nigeria (Adebambo, 82) expressed the view that nowadays 5-30 birds kept at the backyard will neither empower women or youths nor alleviate poverty among rural dwellers. They therefore no longer talk about 10-20 chickens at the backyard for economic empowerment? Farmers should be encouraged for semi-intensive and small scale intensive poultry production which will better help to provide livelihood security. With the current ban on importation of poultry eggs and DOCs into the country and the high demand for poultry meat and eggs, it is high time that Nigeria begins to formulate strategies to put hybrid indigenous poultry breeds on the Nigerian market (Adebambo, 22). This is to say that rural farmers who have resources should go for commercial poultry farming using commercial broilers and layers as the use of improved indigenous chickens and its crosses would be a waste of resources. According to Chingala (84) the suggestion to have central hatcheries for producing pure line indigenous chickens and crosses in small numbers is not sustainable. After the Avian Influenza outbreaks in Indonesia, the Government program is to manage the rural poultry development by housing the poultry without allowing for scavenging, even though the farmers keep the poultry only for their own family purposes. Some keep their poultry scavenging on a limited area with bamboos fence but Indonesia farmers have now developed an entrepreneurship by keeping the (local) Kampung chicken from small scale intensive system to medium or large scale production. This has been achieved through capacity building of individual farmers or farmer groups (Sartika, 46).

2. What are the organizational structures for existing and suggested breeding programmes?

An appropriate organizational structure with all the facilities for a breeding programme, including appropriate multiplication and distribution networks for supporting poor farmers considering the respective country's situation is required for developing/selecting suitable breeds for family producers by any agency. The five main points that should be considered could be expressed by the STEPS approach (Saleque, 69):

S=Structure	Government, private org. or NGO's for breeding and distribution
T=Technology	Easily adaptable, available at grass root level etc
E=Environment	Kinds of support and extension services, adaptability, forward and backyard linkages etc.
P=People	(perception, choice, participation)
S=Sustainable	(Cost effective at service provider level and also farmers level)

Considering the limitations, potentials and interest of different institutions such as Governments, the private sector, research institutes, NGO's, one may conclude that a very effective and efficient programme should be designed which has to be beneficial for the poor as well as for the country.

There are almost no organizational structures for breeding programmes of native breeds and their crosses within the private sector. Private commercial hatcheries hesitate to take up the breeding operations of these germplasm due to very limited profit margin. An exception is India where M/S Kegg Farm has developed their breeding farm and supply lines by using the Kuroiler (a dual purpose) birds (Nayak, 67). As the public/government sector addresses livelihood issues for the poorest of the poor the breeding strategies and work for improvement of the native breeds are recommended to be kept with the Government (Nayak, 67). Identification, characterization, conservation and improvement of the native breeds/ecotypes should be the responsibility of research institutes of the respective country. The strategies should be to target specific areas where intra-population selection should be practiced for the improvement of the native breed. It is imperative to involve the farmers for identification of the required traits to be included in the breeding programme (broodiness, meat pigmentation, flavour or other specific trait associated with the particular breed which is known to the local farmer). It is also desirable to involve farmer's co-operatives in improvement programmes that are location specific for the native breed/ecotype (Ngwira, 80). The breeders and family poultry producers need to work closely so that there is adequate feedback on the developments and the response of the poultry on the scavenging or semi scavenging production systems. This can be done by formation of an association that should link the two sides (Ngwira, 80).

Pure exotic breeds (Rhode Island Red, Black Australorp and Fayoumi, etc.) should be kept in central breeding centres (Dulal, 81) for producing crossbreds to be used for semi scavenging family poultry production. Utilization of the crossing effects fundamentally requires two parent stocks that are bred as pure lines and they should be available throughout the year also to produce the F₁ crossbred chickens that have to be transferred to the farmers. In most of the production systems termed as scavenging or semi-scavenging, the capability for running the necessary organization

around parent stocks is not available and therefore it will be better to support the genetic improvement of local breeds, because then the improvement will persist even if the improvement programme collapses (Sørensen, 74). In the case of countries with limited resources, joint ventures may be attempted to share the infrastructure facilities and a common gene pool. This can assist those countries to develop breeds that can be used in a number of countries which have similar conditions and that share the same breeding objectives.

Crossbreds utilize the heterotic effects or hybrid vigour due to which there is marked increase in fitness and reproduction traits (up to 25 to 40 %) which is the reason why in commercial poultry production hybrids are always used (Sørensen, 74). In the past, most countries in West and Central Africa (Ekoue, 69; Moctar, 62; Sangaré, 75) experienced a variety of programmes to improve egg production and growth rate through the introduction of specialized breeds such as Rhode Island Red (RIR), Fayoumi and Leghorn breeds in cross breeding to utilize the advantage of heterosis. These breeding programmes have produced crosses such as the 'Wassa Che' in Mali to meet the needs of the population for eggs and meat while keeping the broodiness, a better hatching rate and a significant hardiness. However, the dissemination of these crossbreds has not been as successful as expected because the producers were also interested in their local chickens which had desirable phenotypic characteristics. The crossing experiences of RIR with Fayoumi have been mentioned by some participants (Rahman, 18b; Saleque, 29; Auvijit Saha Apu, 33; and Chowdhury, 34). In South Asia this crossbred is called Sonali and there it is at the core of rural poultry production systems. Good results have been noted in Afghanistan with poor women with Sonali type birds that are laying up to 250 eggs (Hasnain, 9). The discussions noted the inadequate adaptation of purebreds to the physical environment and socio-economic contexts (Adebambo, 22; Thwala, 40). If the necessary organizational arrangements for the production of crossbreds can be established it would be better to use those under the family poultry production system rather than purebreds. However, this recommendation is made with the condition that the F1 should always be the terminal cross and replacement chicks would always have to be the F1 cross only.

Informal - traditional systems of breeding and supply of chicks (indigenous bird) were suggested for the remote rural areas where regular crossbred chicks supply is not possible (Rangnekar, 66). Such traditional systems already exist and they have their strengths like familiarity and acceptance by the rural families, no dependence on outsiders and the producers know the needs/preferences. It was suggested to study the traditional / informal system to understand their strengths and weaknesses and to empower rural families through some discreet technical support so that they can help themselves. This will avoid the dependency for chick's supply of farmers on other agencies and the system would be sustainable. Public Private Partnership (PPP) was suggested for all the components required for sustainable family poultry production (Kaudia, 48).

Organizational structures for breeding programmes of native breeds/crossbreds for the scavenging and semi-scavenging systems have been set-up under Government programme in many countries (although an exact number is not available) which is a good indicator for a better future of family poultry production. In Thailand (Duangjinda, 65), the Department of Livestock Development (DLD) is working to support small farmers for long-term sustainability through a network for rearing of native chicken. The network consists of two systems: production of chicks in semi-commercial farms and the village scavenging system. The work involves cooperation with other agencies such as the Thailand Research Fund and universities for research

and development while DLD has established a nucleus flock of native chickens for conservation and further development. The nucleus stock of the Pradu-Handum breed of native chicken has completed 10 generations of family selection. The traits that are considered for selection include phenotypic characteristics, body weight and egg production. For the selected traits between 10 and 20 percent of improvement have been observed compared to the base population of the native chickens (Duangjinda, 65). In Kenya (Kaundia, 76), the Kenya Agricultural Research Institute (KARI) coordinates research and development activities in livestock production including poultry. In Indonesia (Sartika, 46), the Indonesian Research Institute for Animal Production (IRIAP) has selected Kampung chickens for increased egg production while maintaining broodiness. In India (Nayak, 3), research and improvement of the poultry germplasm (including the native breeds) is done under the aegis of the Indian Council of Agricultural Research (ICAR) /State Agriculture / Veterinary University. Central Poultry Development Organizations at the regional levels maintain the grand parent and parent stocks and State Poultry Farms, which are adequately strengthened to maintain parent lines, produce the commercial birds which are supplied to poultry farmers.

3. What strategies can be adopted for multiplication and distribution networks?

Various approaches have been suggested by participants (Nayak, 3, 67; Dasi, 6; Gautier, 53; Rangnekar, 73; Adebambo, 82; Ngeno, 85 and Leotaragul, 86) for multiplication and distribution networks for family poultry. The breeding programmes for the development of suitable germplasm for semi-intensive and scavenging system are mostly the responsibility of the Government sector. After development of suitable germplasm by the poultry research institutions or agricultural universities, the multiplication is usually done by a network of Government poultry hatcheries and then through distribution networks consisting of poultry development projects workers, NGOs, poultry development societies and different co-operative societies. Frequently, these Government set-ups are not successful in implementing the multiplication procedure and the distribution of chicks to the poultry farmers.

Another approach was suggested where universities/research institutions should work for the genetic improvement of the indigenous chickens and act as conservation centres (Ngeno, 15; Adebambo, 22, 82; Chowdhury, 34; Lemlem, 71; Leotaragul, 86 and Banda, 89) while rural farmers can be assigned the work of multiplication and distribution in organized set-ups such as farmer cooperatives (Dulal, 81; Banda, 89; Adebambo 91 & 92). Mini hatcheries can be established right in the rural communities by using non electric incubators such as the brick incubator (Banda, 89). They have proved to be successful not only at the research station but also under rural farmer's management in northern Malawi. In Bangladesh the International Fund for Agricultural Development (IFAD) has demonstrated that poor women can handle a mini-hatchery technology based on the Chinese Rice Husk Method. This technology is particularly useful in remote areas with poor infrastructure and can be used for hatching chicken, duck and quail chicks (Dolberg, 100). REST (Relief Society of Tigray) is providing 10 incubators to women headed cooperatives with a hatching capacity of 840 eggs in Ethiopia (Lemlem, 71). Vietnam has thousands of small/medium hatcheries for the production of broiler chicks including some for local breeds that are used in crosses for commercial purposes (Gautier, 53). In Thailand the research and breeding centres of DLD produce parent stock for the farm network where chicks are produced for farmers. For example the Chiang Mai Livestock Research and Breeding Centre produces 3 000 dams per year

for a network of four pure breed farms which can then produce 270 000 chicks per year for farmers (Leotaragul, 86). According to Rangnekar (73) NGOs play a very effective role in the multiplication and distribution of chicks. Three NGOs viz. PRADAN, ANTHRA and BAIF are actively working in this field in India and BRAC in Bangladesh. These NGOs provide a total package ensuring backward (supply of chicks, feed, vaccination, medication and training) and forward (marketing of birds and eggs) linkages with the poultry farmers.

4. What marketing is appropriate for breeding stock?

In the present family poultry farming systems it is common practice that the individual farmer remains involved in all the stages of production. Ngeno (85) and Uwizeye (87) suggested that there is need to mobilize indigenous chicken farmers to form group enterprises and thus to put in place a complementary system among production enterprises. The enterprises should be organized in such a manner that products from one enterprise will be an input for the next enterprise. Similarly some authors (Ekoue, 79; Ngeno, 85; Uwizeye, 87) suggested encouraging specialization for particular components of the indigenous chicken production value chain (chick producers, distributors, traders, processors, consumers, transporters at different level) so as to enhance the efficient flow of products and services. To achieve this, researchers, NGOs and staffs from Ministry of Livestock Development are needed to act as principal catalysts for the process of group formation, production and marketing. The organization of all stakeholders under market conditions can thus improve the livelihood of smallholders the majority of whom are women and children (Uwizeye 87). The principal benefit will be participatory, practical and sustainable indigenous chicken enterprises. An efficient flow of inputs and service will be available which will establish trust and linkages between the enterprises (Ngeno, 85)

Formation of cooperatives for marketing was suggested as an effective approach. The cooperative organization will also enhance the farmer's access to bank loans or enable them to form themselves into local contributory groups to assist each other with small and medium scale loans (Adebambo, 82). Malawi has a programme called Malawi Agricultural Commodity Exchange (MACE) which uses media houses and cell phones to market agricultural commodities. Apart from marketing crop products it has also been used to market livestock products and indigenous chickens raised in rural areas (Banda, 89). A contract marketing system was suggested where farmers buy breeding stock knowing well in advance where to sell the adult mature birds. In Kenya (Kaudia, 76), a group of farmers are starting branded Farmers Chicken Centres to provide ready market outlets for mature birds, a source of required inputs including chicks, necessary extension services and training materials. These centres can be used for marketing of breeding stocks as well. In other countries agencies are in operation to look after such activities as well like in Thailand (Leotaragul, 86) and they are planned for the future in Togo with the "Programme d'Investissement Agricole pour la Sécurité Alimentaire (PNIASA)" (Ekoue, 79)

No specific message was received relating to appropriate marketing of breeding stock for those countries which are not in a position to take up the research and improvement work on poultry breeding and marketing. But countries with limited resources may benefit from the germplasm developed in other countries (Moderator's view). With the implementation of the WTO (World Trade Organization) and GATT (General Agreement on Tariffs and Trade) for the global marketing the availability of the required breeding stock from the global market has become very easy. Each country may import the desired breeding stocks from a particular country under an agreed Memorandum of Understanding between the importing country and

exporting country. Thus, the marketing of the breeding stock among the different countries is possible. Before importing grandparent/parent stocks, comprehensive studies regarding the country's needs, infrastructure facilities and approximate capacity for marketing of the commercial chicks should be conducted. A marketing scheme is essential to meet the needs of each developing country. Marketing of the breeding stocks through farmers co-operatives and through net working have been suggested by Ngwira (80) and Leotaragul (86).

5. What conservation is appropriate for existing genetic resources?

Conservation of a particular breed requires a complex management system which needs to be based on scientific principles. It is a very costly affair which needs proper planning, a source of regular financing and follow-up of action plans. Very few messages regarding the appropriate conservation of existing poultry genetic resources were received. Identification, characterization and conservation of the native breeds/genetic resources were recommended by various participants (Mwambene, 23; Choudhary, 34,101; Thwala, 40; Dulal, 43; Sartika, 46; Duangjinda, 65; Nayak, 77; Leotaragul, 86 and Apu, 90). However, most of the participants have suggested improvement of the native breeds for their growth and production traits which is against the basic principle of conservation.

Conservation activities including identification, monitoring, characterization and utilization for best short term use and to ensure management for longer term ready availability should be undertaken within the national territory by a government research institution with clear guidelines. It is very difficult to plan and implementing any strategy related to conservation without having accurate information. The first step would be to carry out a survey of the breeding region, the present status of the breed, need and requirements of the farmers, their habit, management practices and types of breeds that exist locally. Usually this type of information is rarely available in developing countries (Costa, 97).

It was proposed that local breeds of a particular area should be selected for conservation based on an analysis of representative samples of clearly defined genetic stocks of the areas with data on performance in several locations as per the FAO recommendation. However, farmers' and consumers' preferences, marketing facilities and productive performance of the breed should also be considered to select a particular breed or breed combination for conservation (Apu, 90). As the productive performance of local birds is usually poor, the objective of higher production from a breed in conservation can be achieved by changing the management practices instead of changing the genetics of the breed. It was mentioned that the productive performance can be increased by providing supplementary feeding in addition to the traditional scavenging feed resources (Apu, 90).

Apu (90) suggested that for the conservation of local breeds the Government, research organizations, NGO's and the private sectors should all come under the same umbrella to arrange and implement a strategy for the sustainable preservation of the selected local breeds. Obviously the farmer's communities who are the key beneficiaries and who keep the birds in their houses should be included to keep the programme sustainable. If all the stakeholders are not brought under the same umbrella the conservation programme would not be sustainable in the long run. From previous experiences, it was observed that donor funded conservation programme continue only until the availability of funds has ended. When the

programme is closed, the conservation programme is gone to dusk. Hence, all the stakeholders should be involved from the initial/baseline phase, starting from the selection of the breeds to be conserved up to every step required to achieve a sustainable programme of breed conservation in the particular areas (Apu, 90). In order to achieve the conservation/preservation goals, all forms of dilution of the local gene pool with exotic blood should be discouraged. Establishment of a national conservatory of local populations of chicken in each country was suggested for in-situ conservation of genetic resources within the national territory and ex-situ conservation through gene bank and cryopreservation of genetic material and semen for which establishment of a molecular biology laboratory was suggested (Fotsa, 94). Conservation through pure breeding is recommended and should be done in-situ at government farms/research stations. Ex-situ conservation methods are not appropriate for most developing countries due to absence of required sophisticated infrastructure and laboratory facilities. Since conservation requires huge capital outlay, only the government, organized private sectors and NGOs can be involved (Momoh, 96).

Work on evaluation, characterization, conservation and improvement of native breeds is in operation in some developing countries like Malawi, Nigeria, India, Bangladesh, Indonesia, and Thailand. In-situ conservation (Nayak, 77) is being done for the Kadakanath and Chittagong breeds of native chicken and the Indian Runner Duck under a centrally sponsored scheme under which introduction of other breed or its crosses are banned in the demarked locality of the home region of that particular breed. In Thailand (Duangjinda, 65), the Department of Livestock Development (DLD) in collaboration with the Thailand Research Fund (TRF) established four foundation stocks of Thai native breeds of chickens namely: Pradu-Hangdum, Lueng-Hangkhao, Dang and Chee for conservation and utilization. In Bangladesh (Dulal, 43), the Bangladesh Livestock Research Institute has initiated the collection and conservation of the native germplasm namely *Hilly*, *Naked neck*, *Aseel*, *Yasine* and non-descript *Deshi* from different parts of the country. In Nigeria (Adebambo, 22), primary work on the identification and characterization of all the native breeds in the country started in 1994 at the University of Agriculture, Abeokuta, using both conventional and molecular procedures.

Conclusions and recommendations

This e-conference was very successful as it allowed participants to make international contacts and gain valuable information through lively dialogue. The messages posted were almost all by individual scientists. The majority of Scientists he majority of Scientists were from developing countries who shared their experiences of undertaking research, development and extension activities in the field of family poultry production. The following conclusions can be drawn from the discussions:

1. Globally there are three main systems of family poultry production: (i) Traditional scavenging backyard or village system, (ii) Semi-scavenging system and (iii) Small-scale intensive system. The requirements of each system are quite specific.
2. A situation analysis of the perceptions and priorities of the poultry keepers is a must before recommendation for selection of type of production system and number and type of birds can be made. Preference for specific types of birds may depend on various factors; hence recommendations need to be location specific.

3. Native breeds / local chicken are considered the bird of choice for the traditional scavenging system. This ensures self sustainability and fulfils various values attached with native fowl and its conservation. Improved native breeds or crosses of native with exotic breeds were also suggested for this system for those farmers who are in a position to fulfil the additional management requirements (supplementary feeding and proper housing) of improved birds. For crossbred chickens the problem of non-sustainability of F1 crosses was emphasized and the need to evolve the mechanism for ensuring sustainability of the supply of crossbred chicks.
4. It was reported that dual purpose type birds have not done well under traditional scavenging systems due to various reasons. Hence, it was suggested that egg and meat producing types of chickens be considered separately
5. For birds that are reared under semi-scavenging systems the scavenged feed proportion should be a substantial part of the total feed consumed and low-cost feed compounded rations using local feed ingredients should be used. Birds that have low input costs and improved productivity are recommended for this system which may consist of crosses between native and exotic or crosses of two exotic breeds/lines.
6. The small-scale intensive system is suitable for part or full time self-employment of rural youths or women. Commercial strains both broiler or layers should be used for this system. For the success of this system regular and timely supply of chicks, good feeding, proper marketing and overall good management practices are required.
7. It was suggested to motivate producers for semi-intensive and small scale intensive poultry production systems which can help with livelihood security because the scavenging system has shown its limits in poverty alleviation. Problems associated with a shrinking homestead area and natural feed resources are critical to by scavenging birds and the system is being held responsible for recent outbreaks of emerging poultry diseases.
8. A Lack of sufficient organizational structures for breeding programmes in the development of suitable germplasm for scavenging and semi-scavenging systems was reported and it was unanimously suggested that the Government institutions be held responsible. Indeed, the identification, characterization and improvement of the native breeds/ecotypes and development of suitable crosses should be handled by research institutes. Local farmers / farmers' co-operatives should be involved in identification of the required traits to be included in the breeding programme. Potential traits may include broodiness, meat pigmentation, flavour or other specific traits associated with a given breed which is known to the local farmer. The support and promotion of informal-traditional systems of breeding and supply of chicks (indigenous bird) were suggested for remote rural areas.
9. For countries with limited resources, joint ventures may be undertaken in sharing infrastructure facilities and a common gene pool. This can help to develop breeds that can be used in a number of countries with similar conditions and which share the same breeding objectives.
10. Following the development of suitable germplasm by the poultry research institutions, the multiplication is usually done through a network made of Government poultry hatcheries and distribution networks through workers

from poultry development projects and NGOs. However, as this arrangement was found to be insufficient it was suggested that local farmer cooperatives should also be involved in the multiplication and distribution process for which mini hatcheries using non electrical incubators such as rice husk incubators or small size electrically operated incubators can be established right in the rural communities.

11. The problem of sustainability when using crossbreds was emphasized which is generally found after the end of donor funded projects. The development of the local multiplication and distribution infrastructure facilities (as mentioned above) should help to overcome the problem of sustainability of crossbreds.
12. Specific contributions concerning the marketing of breeding stocks were not received from the participants. However, various methods for marketing of input and output commodities of the family poultry production were discussed. It was suggested to encourage specialization in different components of production in the indigenous chicken value chain. Enterprises should be organized in such a way that products from one enterprise constitute an input for the other at a higher level. The principal benefit will be the creation of participatory, practical and sustainable indigenous chicken enterprises. An efficient flow of inputs and services will be available which will establish trust and linkages between the various enterprises.
13. Very few messages were received regarding the appropriate conservation of existing local poultry genetic resources. Systematic work for long-term conservation of native poultry genetic resources is however lacking. Works on evaluation, characterization and conservation of native breeds are ongoing in some developing countries but most of them are associated with the improvement of the native breeds at variance with the conservation principles. The research organizations, NGOs, private sector stakeholders and members from local farmer's community should build a working committee to develop and implement a systematic strategy for the sustainable conservation of the local breeds and their follow-up.
14. A national conservatory of local populations of chicken for in-situ conservation of genetic resources and a molecular biology laboratory for ex-situ conservation through gene bank and cryopreservation of genetic material and semen should be established in each country.

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Sivapalasingam C.K. (Dr.), Sri Lanka, National Livestock Specialist and former Provincial Director North and Eastern Provinces/ (Response to Message No 23 (23b), Response to Message No 33 (numbered 33b))

Sodjinin K. Ekoue, Togo. Ingénieur Agronome Zootechnicien, Doctorant en Production Animale, Chef Programme Elevage à Cycle court/Aquaculture Pêche, Institut Togolais de Recherche Agronomique (ITRA), BP: 1163 Tel:(228) 225 21 48/225 30 96, itra@cafe.tg (Messages No 63, 79)

Sofjan Iskandar PhD, Indonesia, Senior poultry researcher, IRIAP (Indonesian Research Institute for Animal Production) P.O. Box 221 Bogor 16001 Ph. Office: +62 251 8240752, sofjaniskandar@yahoo.com (Messages No 54, 83)

Sujit Nayak (Dr.), Livestock Officer, Government of India sujit.nayak@nic.in (Messages No 3, 16, 19, 67, 77, Response to message 64 (numbered (64b),)

Syed Yousuf Hussain (Dr.), Poultry Consultant Hyderabad (A.P.), India, Mob. No. 0091-9177511315 serpals76@yahoo.com (Message No 7)

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Tinni Sawhney, Sheila Koyyana and Ruchita Khurana, South Asia Pro Poor Livestock Policy Programme, NDDDB House, Safdarjung Enclave, New Delhi, India, ruchita@sapppp.org (Message No 56)

Wethli Ed (Dr.) KwaZulu-Natal, South Africa. edwethli@absamail.co.in (Message No 32)

William Muzomera Ngwira, Malawi, Livestock Development Officer; Department of Animal Health and Development Livestock Blantyre A.D.D. , Msc Animal Science Student at Bunda College, wngwira@bunda.unima.mw (Messages No 17, 80, 98)

Table 1: Distribution of contributions of the 168 participants per country

Countries	Number of messages	Percentage
Country not defined	1	1
Bangladesh	13	10
Burkina Faso	2	2
Cameroon	6	5
Canada	4	3
Côte d'Ivoire	1	1
Denmark	3	2
Ethiopia	3	2
India	21	17
Indonesia	6	5
Iran	1	1
Italy	1	1
Kenya	8	6
Malawi	19	15
Malaysia	1	1
Mali	1	1
Mauritania	2	2
Mozambique	1	1
Netherlands	1	1
Nigeria	7	6
Pakistan	1	1
Rwanda	1	1
Senegal	2	2
South Africa	3	2
Sri Lanka	2	2
Swaziland	4	3
Tanzania	1	1
Thailand	3	2
Togo	2	2
Vietnam	2	2
Total	123	100

Names of countries of participants and number of message in alphabetical order of country

Bangladesh (10, 18b, 25, 29, 33, 34, 35, 35d, 44, 55, 69, 90, 101)
Burkina Faso (60, 75)
Cameroon (6, 39, 42, 58, 94,103)
Canada (12, 43, 81, 93)
Côte d'Ivoire (59)
Denmark (74, 100, 102)
Ethiopia (14, 20, 71)
India (1, 3, 4, 7, 11, 16, 19, 24, 26, 35c, 37, 56, 63a, 64, 64b, 66, 67, 73, 77, 105, 106)
Indonesia (13, 31, 46, 50, 54, 83)
Iran (5)
Italy (87)
Kenya (2, 15, 38, 41, 48, 49, 76, 85)
Malawi (8, 10b, 13b, 14b, 17,18, 20b, 27, 30,36,51,68,70,72,78,80,84,89,98)
Malaysia (35b)
Mali (62)
Mauritania (51a, 57a)
Mozambique (97)
Netherlands (21)
Nigeria (22, 47, 82, 88, 91, 92, 96)
Pakistan (9)
Rwanda (52)
Senegal (61, 104)
South Africa (32, 57, 62b)
Sri Lanka (23b, 33b)
Swaziland (18a, 40, 45, 95)
Tanzania (23)
Thailand (65, 86, 99)
Togo (63, 79)
Vietnam (18c, 53)
Country not defined (28)

NB: Responses to messages are considered as messages. That's why extra numbers have been added to normal messages (like 10b, 13b, 14b, 20b, 23b, 33b, 35b, 35c, 35d etc.)