SUSTAINABILITY AND GENE CONSERVATION AS GUIDING PRINCIPLES OF THE HUNGARIAN-VIETNAMESE POULTRY RESEARCH FOR DEVELOPMENT

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Summary

Nearly ten year history of co-operation in small animal breeding and research between KATKI (Division of ATK since 2006), Godollo, Hungary and NIAH Hanoi, is characterized by the primary consideration of sustainability and gene conservation aspects regarding introduction of Hungarian small animal genetic resources (poultry and rabbit) into Vietnam. Adaptation experiments of old Hungarian poultry gene bank stocks in Vietnam, suitable for sustainable way of production in poor regions revealed, that breeding of certain species are highly acceptable by Vietnamese breeders and producers. The breeds included some old Hungarian chicken, Godollo variety of New Hampshire chicken, Hungarian duck, Hungarian Guinea fowl, and Hungarian turkey. Nevertheless, if gene conservation considerations of local breeds are taken into account, Guinea fowl and turkey breeds can be chosen for further studies of production, as these species have no special and local Vietnamese varieties, and therefore are suitable for family farming in the countryside. In this paper, sustainability and gene conservation components, present status and future prospects of Hungarian-Vietnamese poultry research for development are dealt with.

Keywords: sustainability, gene conservation, poultry production, exotic breeds, Vietnam

Introduction

Sustainability and gene conservation aspects of Hungarian-Vietnamese poultry research for development have been determined as most important elements of co-operation since the start of the nearly ten year history of co-operation in small animal breeding and research between KATKI (Division of ATK since 2006), Godollo, Hungary and NIAH Hanoi. Introduction of old Hungarian poultry breeds *(Szalay, 2002a)* into Vietnam started with chickens of old Hungarian breeds, sent for adaptation experiments from KATKI Godollo poultry gene bank to the Poultry Research Centre of NIAH, Thuy Phuong in 1999, followed by Yellow Hungarian and Godollo New Hampshire chicken in 2000, Hungarian wild-color duck in 2002, Guinea fowl varieties in 2002, and finally, Hungarian Bronze and Hungarian Copper Turkey breeds and their crosses in 2006. The latter was organized by the Association of Hungarian Small Animal Breeders for Gene Conservation (MGE, Godollo), serving as the authorized breeding organization of old Hungarian poultry breeds. On that basis a NEFE (ODA-type) project was started by MGE, financed by the Ministry of Foreign Affairs of Hungary and the Canadian International Development Agency (CIDA, Canada). For gene conservation considerations of local breeds, Guinea fowl and turkey were chosen for further studies, as these species have no special and local Vietnamese varieties, and therefore are suitable for family farm production in the countryside. Suitability of breeds, however, are determined not only for their

production traits, shown in their new environment, but also on their high quality products, possibility to keep them in a sustainable way in family farming, doing no harm to the genetic bases of local poultry. Sustainability and gene conservation principles of co-operation are highlighted in the following chapters.

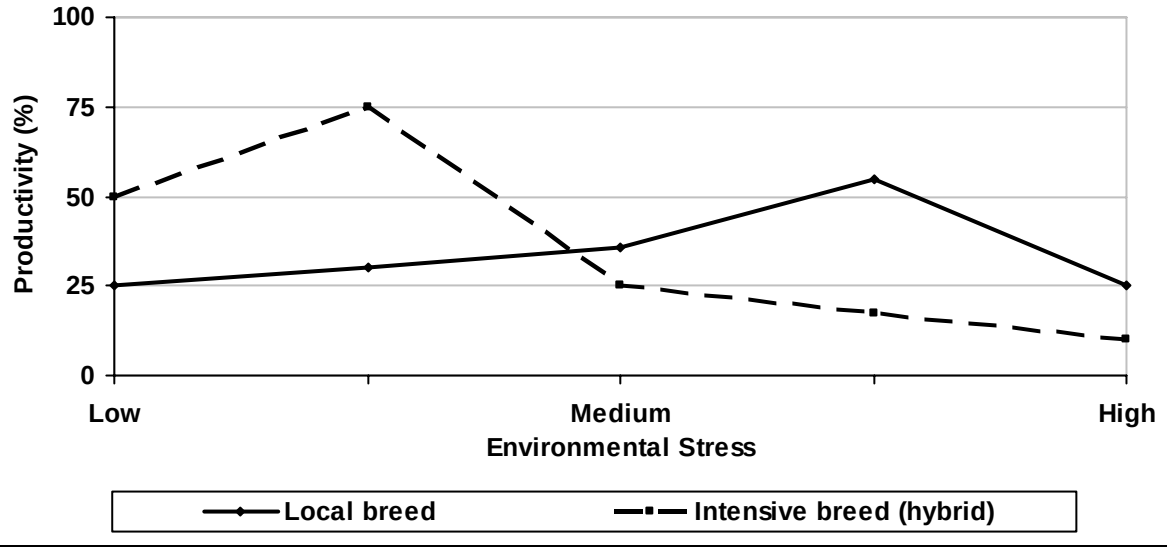
Sustainability aspects of poultry research for development

Definition of sustainability in a broad sense is "meeting the needs of the present without compromising the ability of future generations to meet their own needs". Many authors distinguish ecological (or environmental), economic and social sustainability. Ecological sustainability is defined as the maintenance of the global ecosystem or of "natural capital" both as a "source" of inputs and as a "sink" for waste. The ecological dimension of sustainability is fundamental to overall sustainability, as it is a prerequisite for the economic and social dimensions *(Goodland, 1995, van der Werf, 2002)*.
Ecological explanation of sustainability can also be formulated as configuration of civilization and human activity so that society, its members and its economies are able to meet their needs and express their greatest potential in the present, while preserving biodiversity and natural ecosystems, and planning and acting for the ability to maintain these ideals in a very long term. Consequently, preservation of agro-biodiversity and agro-ecosystems is the basis of sustainable agriculture.
Sustainability and conservation of animal genetic resources (AnGR) are considered interdependent concepts. On the one hand, sustainable use of agricultural resources can be achieved only with the conservation of traditional local domestic animal breeds as part of local agro-biodiversity. On the other hand, only sustainable agriculture can handle animal genetic resources, as integrated part of local, nature-dependent farming systems, in a way that allows maintaining agro-ecosystem. Traditional mixed farming in developing countries meets, while ecological (organic) type farming in developed countries tries to meet these demands, in the latter case though, creating new traditions for the lost ones is not an easy task.
Authors of this paper are convinced that developing countries are still in the position of maintaining their original agricultural sustainability, instead of taking over the western pattern. Nevertheless, local governments are under permanent pressure of global animal breeders to change for intensive production, which can be characterized as "simple minded on profit" (Hodges, 2006). The higher the developing rate of a country, the bigger the pressure.
When appropriately stocked and managed, grassland–ruminant ecosystems are an efficient, sustainable method of producing high-quality protein with minimal environmental impacts *(Tilman, 2002)*. It is much more complicated in the case of pig and poultry production, representing the most intensive systems of global animal production industry with highly specialized and – in some respect – overselected breeds.

Gene conservation aspects of poultry research for development

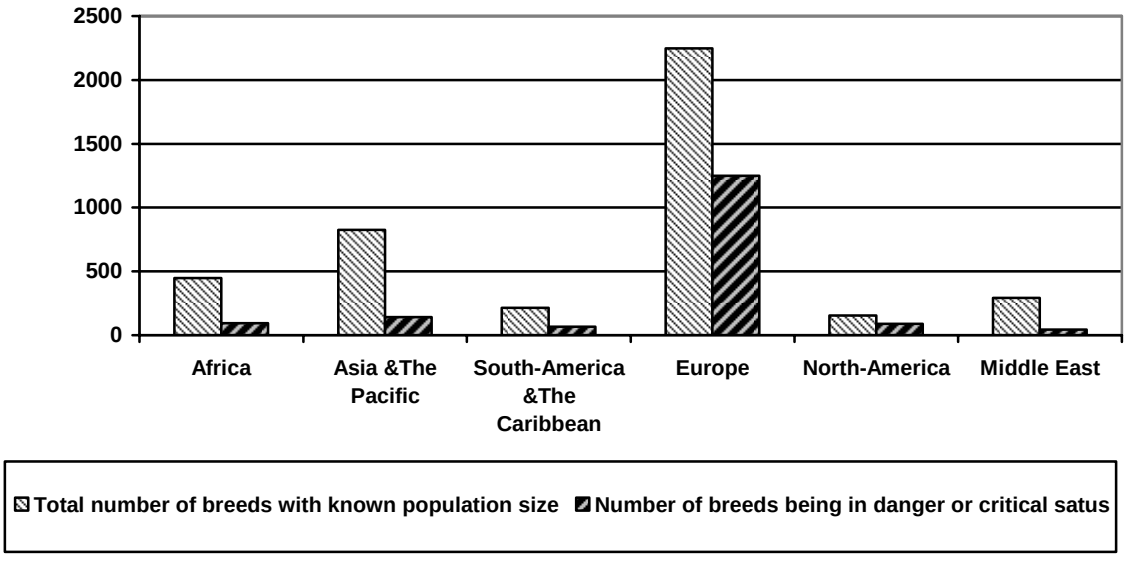
About 40 species of livestock and birds have been domesticated. Nowadays, majority of all poultry breeds are found in only 5 species (chicken, duck, turkey, goose and guinea fowl). Within those species, there have been about 1,000 avian breeds, providing a huge pool of genetic diversity. Evolution and formation of the local breeds is the result of natural adaptation process of animals to the local natural and human environment, which is the basis of their sustainable use in present agricultural practices. On the contrary, breeds, selected for production in artificial environment, cannot be used efficiently in sustainable way *(Figure 1., Steinfeld et al., 1997)*. The main value of local breeds is therefore their local, sustainable use, which is clearly represented by family mixed farming in South-East Asia.

Figure 1. Comparison of relative productivity of local, indigenous breeds and intensive breeds (hybrids), affected by low, medium or high environmental stress (after Steinfeld et al., 1997)



Regrettably, many of old domestic animal breeds have become extinct, or have got into extreme danger: 35.6% among mammals and 63.5% among poultry (FAO, 2000). Actual loss by extinction has been greatest in Europe because of the rapid introduction of intensive farming. By handling its animals in this manner, as John Hodges pointed out in a recent paper, high Western civilization is loosing not only its local domestic animal breeds and varieties, representing a significant part of agro-biodiversity, but loosing also its culture and original values and becoming simply the top animal species by using its power selfishly *(Hodges, 2006)*.

Figure 2. Number of AnGR being in danger or critical status of the total number of domestic animal breeds with known population size, by regions (Source: FAO, 2000)



Traditionally in Vietnam and in other South-East Asian countries, various kinds of indigenous domestic animal genetic resources supplied a great deal of animal products to the people over thousands of years *(Dong Xuan et al., 2006)*. Conservation of domestic AnGR is sustained spontaneously through the daily life of traditional, mixed farming system, without any direct conscience. To save these most valuable resources in poultry too, these countries have to learn from the western examples. Fortunately, they are still in a position to choose the right way of keeping the balance between sustainable, low input and intensive, high input production in developing their own animal production *(Figure 2.)*.

Concept of Hungarian poultry in Vietnam

Our basic concept about introducing Hungarian poultry into Vietnam has always been determined by sustainability and gene conservation factors *(Dong Xuan and Szalay, 2003; Dong Xuan et al., 2004; Szalay et al., 2003)*. It was expected, that species originated from the tropics a couple of hundred years ago (e.g. guinea fowl and turkey), adapted to the harsh continental climate of Central-Europe, should be successfully raised in tropical conditions again, without any danger to the local poultry. Major concerns of choosing the proper exotic breed for sustainable poultry production in the South-East Asian region are summarised below:

1. Choosing the proper exotic breed should mean that local breeds and their position in agricultural traditions and present practice and the possible effect of introduction of exotic breeds on them are under serious and permanent control.
2. Choosing the proper exotic breed should also mean, that the breed is adaptable to that climate, rearing and feeding conditions. Adaptation studies of a breed for productivity and reproduction in the host country are necessary, in order to determine its suitability for local conditions, before selling it to farmers.
3. Isolation of exotic breeds from the local ones of the same species can be ensured, to prevent crossings with local breeds. It is achieved by either physical or biological isolation. Physical isolation means that breeding and production on farms are strictly separated from local breeds, even if crossings occur (example: Hungarian chicken or duck breeds). However, it does not always meet the criteria of sustainability. Biological isolation is a much more reliable method, meaning, that no local breeds of that species can be found in the country (examples: Hungarian guinea fowl and turkey). Biological isolation also means that individuals of an exotic breed can be kept by local family mixed farms in a sustainable way.
4. Introduced exotic breeds have to be market oriented, meeting the farmers' and consumers' expectations of productivity and quality of products.

Future prospects for development

Present day world poultry production systems, mainly broiler chicken, turkey, duck meat and table egg production branches, are characterised by intensive type of farming. Low quality products of poultry industry however are offered for cheap mass consumption in the developed world, while consumers being particular about their food look for highly processed products, which are controlled at all stages of production. Well-known representatives of the latter products are the ecologically produced (bio, organic) poultry meat and egg. Ecological type poultry production is characterized by serving sustainable agricultural production and should be characterized by serving gene conservation of old, local domestic animal breeds, involving both the low input alternative production systems and alternative – mostly local – poultry breeds used for production *(Szalay, 2002b)*.

A considerable part of the agriculture of Vietnam and other South-East Asian countries is a real example of ecological type farming for the western civilization. These countries are practising ecological type poultry farming in its natural forms. We are convinced that ecological farming will (or should) be a determining factor of the agriculture in South-East Asia, if conservation of the environment, landscape and traditions are of concern.
Any kind of variability has to be ensured in all parts of sustainable farming. Diversity of the environment, breeds (both plants and animals), production systems and products have an equal importance in maintaining agro-biodiversity and sustainability, all of which should be of major concern if the aim is to develop real, ecological type production. In this process, local poultry breeds, together with the properly chosen exotic ones, should play an important role as genetic bases for sustainable production, even in the near future.

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