

## ***Background Paper***

### **3.2 c Trends, issues and options in applying long term biosecurity measures on production systems and sector structure**

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#### **SUMMARY**

During the past decades the rapid growth of the poultry sector has created a multitude of different production systems leading into complex and often unregulated value chains. The HPAI crisis has shown that in many countries the biosecurity of those production systems and the food safety measures applied to value chains are not sufficient to prevent the spread of disease and major losses from disease outbreaks and control measures. Biosecurity is defined as the application of health control measures to prevent introduction and spread of new infectious agents into flocks ("bio-exclusion") and to prevent the spread of current and existing diseases ('bio-containment'). Integrated value chains exist alongside dynamic semi-formal chains and backyard flocks serving local markets, each with different exposure to risk and different challenges for bio-containment and bio-exclusion. Restructuring of the poultry sector, which is defined as the change of the production or marketing systems through external interventions, in particular through Government authorities, is seen as a solution to these problems, by creating a simplified production and marketing system that will be easier to regulate and control. However, without introducing adequate animal health services, restructuring does not automatically guarantee lower risks.

Farms of all sizes and production systems have been affected by HPAI. Differences in the structure of the poultry production systems present challenges in the design of appropriate disease mitigation strategies. Improving the biosecurity level of the different systems may involve both structural and behaviour changes. Responsibility for improving biosecurity measures of larger farms (sector 1 and 2) has been largely left with the producers assuming that they will take the necessary measures. However, if their biosecurity breaks down they have the potential to spread disease rapidly through the value chains. Backyard flocks have little or no investment in biosecurity, but if they are in remote and sparsely populated areas they are little exposed to risk and have limited chance to infect others. Biosecurity improvements for the smaller producers (sector 3 and 4) are considered more difficult to implement and measures have been therefore suggested or implemented which restrict or ban the existence of these producers or the marketing of their products. Production and income opportunities for sector 3 producers have been affected by these measures, but so far efforts to close live-bird markets and to reduce the number of small producers have shown only limited success. Producers and traders have found ways of hiding birds which contribute to cases of reduced cooperation with the authorities. To improve biosecurity a comprehensive plan to restructure the poultry sectors 3 and 4 has been proposed for Vietnam and similar ideas are discussed in Egypt and other countries.

A review of the conditions for restructuring in Vietnam revealed significant difficulties and the need for a complex process which would require the involvement, participation and interaction of a large variety of stakeholders. Limited availability of land to relocate farms to safer locations has been found an important constraint for improving biosecurity. This is especially affecting sector 3 farms which are often located close to each other and in residential areas. Lack of credit to invest in structures for improved biosecurity and the production of specific types of birds which are recognized by the consumers through live-bird markets are additional constraints for changing into new production practises with improved biosecurity. Specific support programmes would be required to allow sector 3 farmers to change production practises or to move to other sources of income generation. For ducks, changing from grazing systems to feeding of confined birds as suggested for Vietnam may be even more difficult to implement. Instead of imposing restrictions on producers, a change of consumer preferences for specific products could have more impact on production systems and related change of biosecurity conditions. However, both the quality and

safety of birds marketed slaughtered fresh or frozen do not yet match the expectations of many consumers.

In Vietnam investigations show that few small sector 4 producers have changed their production practises in order to improve biosecurity. Opportunities for such changes have been investigated for the specific production conditions in Egypt. Appropriate carcass and litter disposal, reducing contact with wild birds and adequate quarantine for sick birds have been identified as feasible options to improve biosecurity of small producers. Confinement of birds may only be possible under specific conditions as for the rooftop systems.

It appears that there is substantial opportunity to increase knowledge and promote changes of behaviour of poultry producers through training and awareness campaigns. Such interventions are required for all types of producers, but for smaller producers they might be the main intervention. It would be important that such training is focussed on good husbandry practises and not only on the protection of humans from HPAI.

In order to improve overall on-farm biosecurity it is recommended that:

- More investigations are needed to better understand the functioning of the value chains and the levels of risk at different points, as well as possible consequences of changes to sector structure for livelihoods of smaller producers.
- Training and awareness campaigns for improved biosecurity should take a high importance for all sectors and production systems.
- Official control and enforcement of good biosecurity status by the veterinary services will be required for the larger poultry producer (sector 1 and 2).
- A proper consultation and involvement of the concerned stakeholders, especially from the private sector should be part of planning and implementation for restructuring of poultry sectors from the very beginning.
- If relocation or closing of production and market chains are required to improve biosecurity, consequences for the livelihood of smallholders should be taken seriously into consideration and necessary means of compensation included in the interventions.

### **Trends, issues and options in applying long term biosecurity measures on production systems and sector structure**

#### **Background and Selected References:**

During a recent workshop to examine the experience and findings of a series of socio-economic studies in Vietnam ([FAO/MARD, 2007](#)), the discussion revealed a need to define carefully what is meant by the words "biosecurity" and "restructuring" since there is no uniform understanding of the terms.

Biosecurity includes the concept and measures of preventing introduction and spread of new infectious agents into flocks ("Bioexclusion"), and the potential and need to reduce the risk for flocks to spread disease to others ('Biocontainment'). It is affected by exposure to risk as well as actions to mitigate risk. Large commercial producers invest the most in measures to mitigate risk, but they may also be highly exposed to it. In Viet Nam the largest commercial flocks are in the most densely populated and exposed areas and have the potential to spread disease rapidly through value chains if their biosecurity breaks down. Backyard flocks have almost no investment in biosecurity but many are located in remote and sparsely populated areas where they are little exposed to risk and have limited chance to infect others. Although the term biosecurity is sometimes applied to markets, it is more accurate to talk of "hygiene" in a market.

Restructuring can be defined as deliberate changes to the structure of the sector and its value chains, as a result of government policy, rather than the sectoral changes that tend to take place over time as a result of market forces. The two processes are of course not independent. Restructuring can include a) changes in the type of production that is permitted; b) changes in the location of production, generally with the aim of moving poultry further from human dwellings c) processing to prevent live bird markets and d) changes in animal health and food

security regulations, that may in turn affect the participation of certain actors in certain value chains, such as regulations to improve traceability. Many of restructuring interventions result in raised market barriers for sector 3 producers.

The following sections examine the analysis of biosecurity issues among different types of producers, arising from findings of various FAO supported studies.

Permin (2007) considers the general requirements to improve management and biosecurity practices in smallholder poultry producers:

- Strategies to reduce the evolution of influenza and the emergence of pandemics include the separation of species, the development of new vaccine strategies, increased biosecurity at farm and market, better basic knowledge of the virus, its epidemiology and spread from farm to consumer.
- HPAI might be controlled by stamping-out procedures or vaccination, but with an endemic situation vaccination is the most cost effective method of control.
- Biosecurity is a mindset of actions taken to prevent disease outbreaks in a flock. State-of-the-art biosecurity has been developed for sector 1 and 2 farms. Transfer of basic biosecurity knowledge to sector 3 and 4 is possible.
- By applying simple biosecurity rules to sector 3 and 4 farms, disease outbreaks might be controlled or prevented.
- Restructuring of sector 3 and 4 farms and markets based on training of farmers and vendors is needed.
- More effective co-operation between scientists and veterinary and public health officials and livestock services is required to achieve these goals.
- In the long term it is anticipated that survival of birds in sector 4 will improve the overall food security.

### **Possible interventions for improving biosecurity in Egypt**

Pagani and Kilany (2007) examine the interventions for improving bio-security of small-scale poultry producers in Egypt (extract from summary). In the last fifty years, poultry production in Egypt changed radically making it one of the most important poultry producers of Africa and the Middle-East. Up until recently the sector grew fast, with a shift from traditional to commercial and industrial production. Nevertheless, liberalisation and privatisation over the last fifteen years has revealed weakness and inefficient performance within the industry and recently production has steadily declined. Before the outbreak of HPAI there were nearly 30 000 poultry farms in Egypt, the vast majority being small to medium-size farms. It was estimated that 75 percent of the Egyptian broiler production was carried out on farms of less than 15 000 birds per cycle.

While the transformation of the Egyptian poultry production was driven by policy and economic forces, it was facilitated by the widespread practice of rearing poultry at home. The result is that the Egyptian poultry sector today is a combination of modern poultry rearing and a well developed traditional sub-sector. For example, traditional hatcheries successfully incubate annually hundreds of thousands of eggs destined primarily for home rearing. With agriculture limited by land and water availability, improving and intensifying household poultry rearing remains an important tool to reduce rural and peri-urban poverty. The most notable feature of the traditional sector is the popularity of urban/peri-urban poultry keepings – almost exclusively chickens – fuelled by the growing human population and urbanisation. The traditional flat roof being the most common place to rear chickens but also balconies, basements, backyards, unfinished buildings and the streets themselves are also used. These systems provide a simple and affordable way to improve the household diet and generate some income for the poorest households. The poultry sector as a whole is also a source of employment with many ancillary jobs throughout the poultry chain: processing, retailing and supplying goods and services.

In general bio-security is weak. Larger farms are usually located in the countryside (and often close to each other), while smaller farms are more peri-urban. All farms confine their birds but contact with other birds is frequent. Most farms rely on veterinary advice and have scheduled

prophylactic plans, but general hygiene is often poor and the condition of the infrastructure is often inappropriate or damaged. Backyard flocks are usually a mix of birds of different ages and species partly free-ranging, semi-confined or confined. In addition, it is a common practice for many households to also keep a separate, second flock of either layers or broilers of the same age and breed. In general the husbandry standards are poor.

At the beginning of 2006 HPAI was officially detected in Egypt. The reaction of the public administration was to ban live bird markets, restrict bird movement, undertake vaccination campaigns and to cull over 40 million birds. However, the policy was not always clear and some interventions were technically unjustified and the implementation was neither systematic nor particularly effective. There was a high level of panic amongst the general public. Many scared producers wanted to get rid of birds and simply threw them in the street, the result was many breeders closed down and backyard producers stopped their activities. There is now a higher sense of awareness about good husbandry practices and several of the old habits have partially changed. Even though HPAI is still present in the country, many farmers are now resuming production and backyard producers are restocking.

The report identified the following management practices with high bio-security risks that are feasible to change by modifying: Inappropriate carcass disposal; inappropriate litter disposal; high density and proximity between poultry farms; workers' contact with other flocks; contact with wild birds; and inadequate quarantine for sick birds.

The report highlights the importance of:

- An appropriate HPAI vaccination policy aimed at reducing the spread of the virus as part of the overall eradication plan.
- Public and producer awareness of culling and compensation policies and the important role religious authorities have in influencing change.

Simple, clear and affordable technical advice is the starting point for persuading farmers to improve the management and bio-security. Implementing such measures will not only reduce the risk of the spread HPAI but it will make the whole sector more efficient and profitable. This will benefit both producers and consumers.

### **Biosecurity of the small scale poultry sector in Cameroon and Togo**

Biosecurity has been examined between October and December 2006 in the small scale poultry sector in Cameroon and Togo (Bebay, 2006. Extracts from English summary). The two countries have a number of points in common: sector 4 forms large parts of the whole poultry production, smallholders are important, there are risks in poultry marketing and weakness of veterinarian services. The paper analyses measures to strengthen biosecurity in sectors 3 and 4. In Africa, the virus of HPAI has been mostly found in commercial poultry sector since its first outbreak in Nigeria, January 2006. Furthermore, the role played by the commercial sector in Niger, Cameroon, Burkina and Côte-d'Ivoire is strongly recognized. As the biosecurity levels in sector 3 and 4 are generally very poor, they are habitually considered as potentially source of virus dissemination. On the other hand the role of small-scale poultry production in providing nutrition for family and for income generation is now well documented in West Africa. The challenge is how to build up a biosecurity strategy to ensure safety for millions of birds and population.

Generally speaking, insufficient resources negatively influence capacities to deal with animal diseases and veterinary service in West and Central Africa: This affects service of laboratories, regulations and control (farms, market places, frontiers...), and a lack of human resources in the public services. Private services are largely located in towns. On the other hand initiatives to strengthen community Animal Health Workers (CAHW) and private vets - have been a good means to keep rural population in contact with veterinary service. Several projects in traditional poultry development projects (sector 4) have been recently implemented, with positive results in terms of increasing income for the poor particularly for rural women and strengthening private veterinary service.

In sector 4 the risk of virus dissemination is strongly related to the scavenging system with frequent and close contact between various species of animals (ducks, migratory birds...), and the risk is the proximity between birds and human, particularly those working with poultry. However, the low density of human and bird population in the rural areas of Cameroon and Togo is a good point against HPAI virus dissemination. FAO has carried out some research and the outcomes clearly highlight that sector 4 is not the prior sector affected by outbreaks of HPAI. Traditional poultry development programmes with an emphasis on housed poultry keeping, vaccination against Newcastle Disease and other poultry diseases, training of producers and CAHW, assisted by large dissemination of information on simple biosecurity measures and good hygiene practices, are recommended.

Sector 3 is principally conducted by civil servants, businessmen and unemployed as a secondary activity. As the space in cities is limited, poultry production units are very close to human houses and the people working inside are not sufficiently trained. Even identifying every poultry production unit is a heavy task for public services. Identifying and training poultry owners on biosecurity are the first step, through producers' organisation such as IPAVIC in Cameroon and ANPAT in Togo.

In Cameroon and Togo birds sold from both sector 3 and 4 are mainly live birds. Two mixed marketing strategies are commonly used: a small percentage of poultry is sold at farm level, and the majority in market places. Various transport means are used which are often unclean: old cars, motorbikes and bicycles, and the transport may over distances of several hundred kilometres. Birds are sold in live-animal markets which are poorly regulated and hygienic measures are not carried out. Leftover from dead birds are not properly disposed and often taken by scavenging animals (like dogs, pigs...). Poultry collectors and poultry sellers should be identified and trained about biosecurity and good hygiene practices. Reducing the importance of live bird marketing, and controlled slaughtering should also be an objective. An additional measure to ensure biosecurity at marketing level is promoting an "all-in all-out" production strategy in sector 3 by facilitating slaughterhouse development.

Otte et al. (2006), examine some of the biosecurity risks associated with different scales and types of production, using data from Thailand (extract from Abstract). There has been little analysis of the general assumption that smallholder backyard poultry flocks are inherently at higher risk of highly pathogenic avian influenza (HPAI) than confined and commercial scale operations. Data from Thailand was utilized, collected in 2004, to test the relative risks of HPAI infection in poultry flocks, by species, type of operation, and geographic location. The results indicate that backyard flocks are at significantly lower risk of HPAI infection compared to commercial scale operations of broiler or layer chickens or quail. These results are plausible in terms of the opportunities for breach of biosecurity in commercial scale operations. Both experimental and observational studies in developed country settings have demonstrated the capacity of microbes to enter and leave these larger operations despite the implementation of standard biosecurity measures. The results of this study should be considered by policy makers and public health officials when developing plans to control or prevent HPAI while aiming to limit adverse effects on the livelihood of smallholder poultry producers in developing countries.

### **Possible effects of changes in biosecurity and restructuring – the case of Vietnam**

FAO commissioned a study (Agrifood 2007) examining the effects of biosecurity measures on different poultry value chains in Vietnam, by looking at the effects before and after HPAI outbreaks (extract from summary). The study shows that HPAI has resulted in significant economic costs to the poultry sector in Vietnam. While 80 percent of the poultry in Vietnam is produced by smallholder producers, HPAI has mainly impacted on larger, more commercial producers as well as traders and processors of poultry products. Since smallholder poultry production only contributes a small percentage of total household income, smallholder producers have been relatively less affected by HPAI outbreaks and their associated control measures. In the post-HPAI environment, the poultry industry has rebounded and most of the remaining stakeholders are actually obtaining greater profit margins than before because of a resurgent demand for safe poultry meat. While commercial producers are well placed to capture this market, smallholder producers have been relegated to serving bio-insecure local markets at the

commune and district levels only. The inter-district and inter-provincial trade provides the biggest source of risk for biosecurity breaches, and efforts should be made to restrict these markets to bio-secure producers. For the vast majority of smallholder households poultry production is a marginal activity undertaken by surplus labour, and for non-economic reasons. Therefore, adoption of biosecurity measures which impose an additional cost of production is unlikely to be an attractive option for those households.

Thieme et al 2006 examine the plans for restructuring of the poultry sector in Vietnam (Extracts from executive summary). Their report represents the first phase of a study on the restructuring plan as outlined in the Operational Program for Avian and Human Influenza (OPI), known as the Green Book, by a joint Vietnam, FAO, World Bank and donor team.

The Department of Livestock Production (DLP) has developed a restructuring plan for the poultry sector which proposes a centralisation and industrialisation of poultry farming until the year 2015. The aim of the DLP plan is to reduce the number of poultry keeping households by 2015 to 5 million which means that 3.3 million or about 40% of the existing households would have to stop poultry production. Out of the reduced households, 3.2 million would be small-scale poultry producers. The proportion of commercial production for chicken is planned to reach about 50 percent and for water fowl between 65 and 70 percent.

The restructuring of the poultry sector is planned to change the characteristics of the produced poultry products towards processed and cooled poultry meat that has been produced in an industrial and safe way and to eggs from commercial layer breeds. In urban centres a change in consumer preferences towards processed and cooled poultry meat from supermarkets and other outlets can be observed but the marketing infrastructure needs to be developed.

#### Some of the key issues

The availability of land for constructing new production sites and the means of exchanging land between different owners are key constraint which need special attention and assistance by the public sector. The present conditions for bank loans are also not sufficient to establish new poultry production facilities and due to high market risks banks are also reluctant to give loans for poultry production.

Increased commercialization of an expanding poultry industry will require the parallel upgrading of the animal health services. Restructuring of the poultry sector will thus also require a restructuring of the veterinary services. Such reform will be necessary to provide the institutional, technical and regulatory frameworks. None of these goals can be attained if no sustainable financing mechanisms are built in to provide the necessary funding. Without introducing adequate animal health services the production risk in newly restructured production areas may actually increase rather than decrease. As hatcheries are major distributors of day-old chicks and ducklings, hatcheries pose a significant, presently poorly controlled source of spreading infectious disease. Establishing a safe system for marketing of slaughtered poultry and its products needs increasing consumer confidence which will not only require new marketing chains but also an effective system of controlling food hygiene at all levels of the marketing chain.

Environmental issues are highly dependent on the production practices and especially on the manure management practices. In addition moving away from the current integrated farming practices may have secondary effects of the restructuring project such as increasing pesticide use or fossil fuel consumption. The restructuring plan proposes a ban on free ranging waterfowls flocks, and in particular of the traditional practice consisting in introducing waterfowls in harvested rice fields. Such practice allows controlling pests in rice fields (e.g. Golden Apple Snail), and its ban would require to develop other pest control practices, probably relying on pesticides

The present conditions for restructuring favour the very few better-off households and allow only very few of the medium commercial poultry producers to move their production to the new production areas. Many of the existing small producers with regular income from selling eggs,

chickens or breeding stock are willing to improve their poultry practices. But they lack knowledge and capital to meet the regulations. Local authorities should engage the farmer's and women's union in the decision making processes for the allocation of land and resources in connection with the establishment of new production areas. As the income from small-scale poultry production is essential to a large part of the rural poor local authorities suggested to continue and improve the live bird markets in order to ensure better controlled and less risky handling of the poultry which should ensure food safety and limit risks of disease spread such as avian influenza. It is recommended that the restructuring programme is complemented by initiatives for poor households in the rural and remote areas for improving the poultry production practices and alternative income opportunities where they would have to leave poultry production. Future actions and assistance by the public sector is recommended as follows:

#### Small producers:

- Prepare and disseminate to the provinces a clear definition of the production system.
- Specify conditions for the biosecurity requirements including vaccinations.
- Restrict marketing beyond district borders.
- Enforce poultry ban only in urban areas; a general banning of small scale poultry production is neither realistic nor desirable.
- Develop economic viable biosecure small scale poultry production models.
- Enforce keeping of only one species on a farm.
- Improve and develop the system in specified locations where it should be promoted to medium commercial production.
- Provide assistance for the exiting small scale poultry producers to find new income options within or outside the agricultural sector.

#### Medium commercial producers:

- Provide possibilities and funds to acquire sufficient land for new production sites.
- Ensure availability of medium-term credits for investments and technical and financial assistance to up-scale capacity.
- Arrange the breeding of suitable local type birds through Government institutions and production of chicks through licensed contract farmers.
- Specify where live birds can be marketed and provide opportunities for safe marketing and slaughter of live birds.
- Assist with establishing private marketing organizations to urban centres through private slaughter houses.
- Develop a phased approach with pilot locations.

#### Large-scale farms:

- Identify and agree with the private sector conditions for suitable provinces and locations to set-up and develop this type of production.
- Allow the private sector to produce and arrange breeding stock according to the requirements of the markets.
- Encourage private investments in marketing and processing facilities.

#### Duck Production:

- Calculate details of the profitability of confined duck production.
- Study the efficiency of HPAI control in ducks through vaccination.

To further guide and assist the restructuring process the following suggestions are made:

- Developing a roadmap for the future of the three main categories of poultry producers (small, medium commercial, large commercial);
- Investigating alternative livelihood opportunities for the small producers;
- Stakeholder consultations with poultry producers in selected provinces;
- Stakeholder consultations with industry and service providers to define the role of public and private sectors;
- Mapping of the production areas for Hanoi and Ho Chi Minh City with respect to natural conditions and production parameters; and

- Defining Government standards for environmental aspects and bio-security requirements and preparing an operational manual for the restructuring programme.
- Revision and up-dating of the restructuring plan.

### **Further examination of impacts and risks from different poultry production systems is needed**

Clearly strengthening biosecurity of small-scale poultry producers and restructuring processes are complex processes, with potential negative impacts on households (see box below on some of the anecdotal effects of market and slaughterhouse regulations in Jakarta). Such impacts need to be carefully considered and addressed. In addition it is imperative to better examine and understand the relative risks of different systems, so as to better target regulations, and so reduce unnecessary impacts.

#### **Sonny Krishnan (2007) Poultry Seller: 'People Scared To Buy My Chickens'**

JAKARTA, Feb 22 (FAO) - "Move away from here? Never in my lifetime," says Kebayoran Lama poultry seller Syamsuddin, who like most Indonesians goes with only one name. "I've been here for five years and all my customers know me," he adds, speaking from his pavement stall in the South Jakarta suburb. "The price of chickens and ducks have fallen sharply because of the current bird flu scare and now, they're asking all of us to move. Haven't I suffered enough losses?" asks Syamsuddin.

The Jakarta Administration has planned to relocate all bird markets in the capital city to Cibubur, East Jakarta, in 2008 in an anticipation of HPAI outbreaks. The city authorities will also rearrange locations of poultry slaughter houses. Jakarta at present has two official poultry slaughter houses and around 1,200 non-official ones. According to Syamsuddin, before the Jakarta poultry ban was announced he could sell a free-range chicken for 45,000 rupiah (about 5 U.S. \$). Now he's lucky if he can get 35,000 to 40,000 rupiah (3.85 to 4.40 U.S. \$) for each bird. "There is an oversupply of *kampung* chicken because consumption has dropped. People are just scared to buy poultry because they think all Jakarta chickens have bird flu. That's just nonsense," he says angrily. "The media is to be blamed for stories that scare people." "I used to be able to sell at least 20 chickens a day before the ban. Now it's just 10. My earnings have dropped by 50 percent," reveals the poultry seller. When asked whether he knew how to take precautions against HPAI, he said no. "The authorities should educate us about bird flu. We know about it on TV, but still we need to know how to prevent it." In the Jatinegara market in East Jakarta, Sukarman says he used to earn about 300,000 rupiah (33 U.S. \$) a day from selling his *kampung* chickens. "That was before the poultry ban in Jakarta," he clarifies. But now he says his daily takings have dropped to 200,000 rupiah (22 U.S. \$). "The ban will soon force us out of business," he says shaking his head.



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