Non-Commercial Poultry Production in Papua New Guinea

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ABSTRACT: Chickens have been in Papua New Guinea since the time of the Austronesian settlements some 2000-3000 years ago. In historical times, new types of poultry were introduced. Chicken keeping slowly spread but only recently into the highlands. From the late 1960s through the 1980s, serious attempts were made to improve village poultry production through the distribution of dual-purpose chickens and Muscovy ducks, together with suggestions on improved husbandry. No real attempt was made to improve the husbandry of native village chickens. Most of this activity had little obvious impact resulting in a hiatus in activities throughout the 1990s. Concern for food security and protein supply for village households, particularly in remote areas with few economic opportunities, has led to a renewed interest in non-commercial poultry production. A workshop convened by the National Agricultural Research Institute in August 1999, identified serious gaps in knowledge and suggested some possibilities for action.

Key words: Papua New Guinea, Poultry, Chickens, Ducks, Non-commercial

INTRODUCTION

This paper sets out the history and present situation of non-commercial poultry production in Papua New Guinea, as far as these are known, and proposes actions for the future. Non-commercial production is primarily for household consumption although there may be opportunistic sales or barter. Birds may also be involved in obligatory or customary wealth exchange. While commercial poultry production, especially of processed and live broilers but also increasingly of eggs, is growing rapidly in pace with population growth and increased involvement in the cash economy, human development indicators continue to show a poor, if not worsening, nutritional status of families. Hence, home produced animal protein will remain or should increasingly become a vital component of household food consumption in both urban and rural areas. For historical as well as technical reasons, poultry will be the main source of this protein, except for coastal or inland river fishing communities. The National Agricultural Research Institute (NARI) is investigating means to improve household poultry production.

PREHISTORY

There is little doubt that the domesticated chicken was brought to Papua and New Guinea from South East Asia by Austronesian settlers perhaps 2000-3000 years ago. Chickens are associated with the Lapita pottery culture which is the record of mobile groups of colonists and explorers who expanded rapidly through Melanesia some 2000 to 2500 years ago and eventually settled Polynesia (Bellwood, 1978). Baldwin (1990) has thoroughly documented and mapped the prehistoric distribution of the chicken in the Southwest Pacific. With respect to Papua New Guinea, the distribution was largely north coast and island with a spread along the south-west Papuan coast and up the Sepik River. There would appear to have been little demand for a third domestic animal, after pigs and dogs, in the highlands since the native avifauna was rich and hunting was easy. Ethnographers have generally paid scant attention to chicken husbandry and have been dismissive of its importance. Productivity was probably extremely low and there would have been little surplus production for trade. Chickens and their eggs are highly vulnerable to a range of effective predators - rats, snakes, pigs, dogs and birds of prey. Several writers (see Baldwin, 1990) have reported on the value ascribed to chickens for their feathers as items for body decoration.

HISTORICAL DEVELOPMENTS

New types of poultry were introduced by the colonial administrations and missions, largely from Australia. There would appear to have been little impact of these introductions on village poultry keeping until the 1960s and most highlands or inland societies did not have chickens until at least the 1950s. The spread of ducks was even more recent with the first recorded organised introduction of Muscovy ducks being made by the Department of Primary Industry (DPI) in 1974. No other poultry species, including geese and guinea fowl, achieved any significant acceptance.

In 1961-62, a Survey of Indigenous Agriculture and Ancillary Surveys by the Australian Administration recorded 697,000 chickens in the surveyed villages, an average of 41 per 100 persons. The current rural population extrapolated from the 1980 Census data is 3,607,210 (NARI estimate) in 721,442 families. At the 1962 level of ownership, the current chicken population would be 1,500,000 birds. This is an estimate for village poultry only and does not take account of commercial developments. The 1990 Census, although considered unreliable, suggests chicken ownership by 27 percent of families, indicating about 200,000 households today with an average of 7-8 birds each.
In the only known report on the performance of village chickens, 30 farms were studied over six months in the Eastern Highlands (Department of Agriculture & Livestock, 1990). Management systems were scavenging only (five farms), semi-intensive with kitchen scraps and night housing (15 farms), and intensive with commercial feed (10 farms). Percent hatchability of eggs brooded was 71, 65 and 76 for hens in the three systems but percent hatched chicks surviving to six weeks was nil, 75 and 100 respectively. The benefit of simple management improvements on chick survival is obvious.

POULTRY DISTRIBUTION SCHEMES

The concept of improving village chicken production through the distribution of “improved” breeds and presumed resultant crossbreeding was initiated in 1964 (Bilong, 1990). There were four regional rearing and distribution centres for imported chickens (Turner, 1972). Initially it was thought to stimulate raising chickens for cash income, but the objectives evolved to emphasise fresh eggs and meat for improved family nutrition. Breeding flocks of Australorps and Rhode Island Reds were established but eventually most distribution activities used Australorps. Muscovy ducks were added to the programme in 1974 and efforts made to develop a suitable management system and test acceptance by farmers.

While actual data are not available, very large numbers of chicks and ducklings were distributed from the breeding centre and later from a private Australorp breeder over the years up to 1992. It has been stated that the centre developed the capacity to produce 2000 day-old chickens and 200 ducklings per week (Moat and Bilong, 1999). Over one million birds were distributed (Bilong, 1990) through a number of rural development programmes, but is not recorded what happened to any of these birds and data on numbers of chicks and ducklings were distributed (Bilong, 1990) through a number of villages. Percent hatchability of eggs brooded was 71, 65 and 76 for hens in the three systems but percent hatched chicks surviving to six weeks was nil, 75 and 100 respectively. The benefit of simple management improvements on chick survival is obvious.

RECOMMENDED EXTENSION PACKAGES

The extension materials produced by DPI in the 1970s and early 1980s (McKillop et al., 1976; Bauer, 1980; Perry, 1980; Kikala, 1982) generally concentrated on the management of Australorps and Muscovy ducks. However, in the Rural Development Series Handbook on poultry (McKillop et al., 1976) there is useful information for all poultry keepers. A number of simple rations containing feed components such as peanuts, soya beans, maize, sorghum and meat meal as well as the root crop staples and green leaf materials are suggested to help upgrade the management of free-range village chickens.

The Australorp chicken package was for 10 hens and one male. Village chickens or Muscovy ducks were to be used for incubation with the chicks removed and reared separately. A simple deep-litter house was proposed for the first six weeks with the chickens on commercial feeding. After that the birds would be allowed free range with night housing and one evening supplementary feed of cooked staple foods and greens. The Muscovy duck package was very similar but with a family unit of five females and one male. All birds of both species should have easy access to clean water and special attention should be paid to preventing chick or duckling mortality through good husbandry and control of predators, both animal and human.

EVALUATION OF DISTRIBUTION SCHEMES

Two trials were carried out by Turner (1972) in an attempt to evaluate the poultry distribution scheme. Crossbred Rhode Island Red x Native chickens were reared in the centre to eight weeks and then distributed to villages in eight highland and lowland sites, 50 birds to each site. Management was left to the recipient. Survival was low with most deaths in the first two weeks. Only 28 percent survived to 32 weeks (range 0-60 percent across sites). The main causes of death were exposure and predation, mainly by dogs. At one site where some supplementary feeding with vegetables and fruit was practiced, birds reached 1.86 kg by 32 weeks. The average weight of the remainder was 1.18 kg. Age at first egg for the larger birds was about 28 weeks and some were already sitting by 32 weeks.

Because of the high mortality in the first trial, a second trial was designed in which birds were reared to 10 weeks, one group on commercial feed and one in which diets were converted to the expected village situation gradually between four and six weeks. At 10 weeks, 42 birds in group one averaged 900g while those in group two averaged 540g. After distribution to villages, birds reached 1.18kg by 22 weeks of age and there were no effects of earlier rearing. Survival to 30 weeks of age was 43 percent of those distributed. A comparison among individual farmers revealed that some daily supplementary feeding (14 - 42g layer pellets per bird) enabled birds to have 50-60 percent survival and come into lay between 26 and 30 weeks. The conclusion was that these crossbred chickens had the capacity to produce eggs and hatch chickens, provided reasonable supplementary feeding was practiced.

A follow up of 50 crossbred Australorp x Rhode Island Red pullets, distributed at one week of age in groups of 10 to five farmers in the Upper Ramu District (Bakau and Colombus, 1993), revealed large differences among farmers and in pullet performance.
In general, chickens were housed for the first four weeks and fed items such as cooked sweet potato, maize, coconut and termites. Three farmers also gave some commercial feed. From six weeks all birds free-ranged but were still fed some supplements. After eight weeks they were left to fend for themselves. Eight week weight ranged from 231 ± 9g to 389 ± 16g across farms. By 20 weeks the range was 407 ± 24 to 1523 ± 123g. Age at first egg ranged from 42 to 53 weeks. Survival was good up to 16 weeks (80-100 percent) but by age at first egg had dropped to 50 percent and at 56 weeks to 20 percent. Sixty percent of the losses were from presumed theft or consumption, 20 percent due to dogs and, since these villages were on a road, 12.5 percent due to motor vehicles. Once again the conclusion is that these “improved” dual purpose birds cannot perform to expectations without adequate supplementary feeding and protection.

Limited village observations indicated that Muscovy ducks performed better than Anas species of ducks because they were more competitive in finding food and better able physically to handle food in a range of forms. Moreover, of course, they readily sat on their eggs. Abdelsamie (1979) reported the first attempt to test and document the feasibility and results of raising ducks by subsistence farmers. Six families in two coastal villages were given 19-20 birds each, mostly Muscovy but also a few Pekin ducks. Each built a small house and was given enough commercial broiler starter feed (2.6kg) to raise each bird to six weeks. After that they were to be kept free-range with night housing and one evening meal similar to that prepared for the family. From 18 weeks the farmers were to keep all females and one or two breeding drakes and sell or consume the surplus males. Seventy percent of the ducks survived to 36 weeks or were disposed of post 18 weeks. Major losses were from disease (53 percent with botulism a major cause), pigs (11 percent) and theft (11 percent). At 36 weeks Muscovy males weighed 2.85 kg and females 1.72kg. All females started to lay at 30-32 weeks. After that they were to be kept free-range with night housing and one evening meal similar to that prepared for the family. From 18 weeks the farmers were to keep all females and one or two breeding drakes and sell or consume the surplus males. Seventy percent of the ducks survived to 36 weeks or were disposed of post 18 weeks. Major losses were from disease (53 percent with botulism a major cause), pigs (11 percent) and theft (11 percent). At 36 weeks Muscovy males weighed 2.85 kg and females 1.72kg. All females started to lay at 30-32 weeks. After that they were to be kept free-range with night housing and one evening meal similar to that prepared for the family. From 18 weeks the farmers were to keep all females and one or two breeding drakes and sell or consume the surplus males. Seventy percent of the ducks survived to 36 weeks or were disposed of post 18 weeks. Major losses were from disease (53 percent with botulism a major cause), pigs (11 percent) and theft (11 percent). At 36 weeks Muscovy males weighed 2.85 kg and females 1.72kg. All females started to lay at 30-32 weeks. After that they were to be kept free-range with night housing and one evening meal similar to that prepared for the family.

In a follow-up study, Abdelsamie and Bauer (undated) compared the village performance of Muscovy ducks raised to six weeks on station or distributed day-old with 0.24 or 6 weeks feed. There were 27 farmers with 20 ducklings each. The ducklings raised on station were significantly heavier at six weeks with a reduction as farmers used less commercial feed. By 16 weeks the weights had evened up and there was certainly no advantage in using commercial feed for only two weeks. For practical reasons, including the problem of transportation of six week old birds, it was decided to adopt the 4-6 week feeding model and this was developed into the Muscovy duck extension package. Mortality in this trial was 21 percent to 16 weeks and not related to treatment. The main identified causes were dogs (17.5 percent but due to a few individual dogs only), pigs (8.8), and unspecified disease (24.6). Age at first egg was 31-48 weeks, unrelated again to treatment but related to individual farmer care and skill.

**CURRENT DEVELOPMENTS**

It is clear that egg eating is becoming more popular and that Australorp chickens as dual-purpose birds, or perhaps Brown Hybrid layers, may now find a more acceptable role as egg producers for subsistence. Non-Muscovy types of duck may also find a niche as layers. A small selection of breeds of such ducks (Rouen, Khaki Campbell, Pekin, Indian Runner and Crosses) is kept by NARI and birds are available on request. However, no attempts will be made on further promotion until the problems of maintenance in villages of breeding populations of birds lacking broodiness is solved both for chickens and ducks. More information is needed about the willingness and ability of people now to adopt improved husbandry methods, and about the current distribution and use of Muscovy ducks.

There have been changes since earlier attempts to improve village production in that there are now farm families able to adopt improved systems of household poultry production with some investment of cash in supplementary feeding and breeding stock.

Possible interventions may include those in the earlier packages but with emphasis on better egg recovery, protection of brooding hens, care of the young in the first 4-6 weeks, prevention of predation and suitable supplementary feeding. However, the most suitable composition of supplements is not yet clearly defined.

The research and development objective is first of all to identify the constraints to production and the sub-set of these that might be reduced by some clear interventions. This can be done through a consideration of past experience as outlined in this paper and through surveys of farmers to determine what birds they have, what management or husbandry practices they use, what they want or are able to do, and what information or assistance they need to accomplish their objectives. Once possible interventions have been defined, a research programme can test them one by one or in logical combinations, in a selection of test households.

For supplementary feeding, use would normally be made of foods used by the household for their own consumption. However, there are not only the wide range of subsistence garden staples, greens and minor food items but also relatively inexpensive agro-industrial by-products in situations where access is possible. A number of unpublished trials have been done using copra meal as the major protein source together with root crops (cassava and sweet potato), both with Australorps and Muscovy ducks and in formulated ration or free choice systems, and it is clearly a useful supplement. Fresh coconut or residual from coconut cream making, sago (both pith and spent pith after flour extraction) and fish wastes and...
residues are important supplements in places where these are available. The NARI research programme will investigate the most appropriate supplementary feeding systems and develop decision guides as to how best poultry owners can use the feeds at hand to reach realistic production objectives.

One problem with the adoption of Australorps and non-Muscovy ducks is the maintenance of breeding populations in a village or the replacement of non-productive birds. It would seem desirable in the circumstances of subsistence and poor communications to opt for internal replacement rather than centralised breeding and supply. The latter tends to be costly, organisationally difficult, inequitable and unreliable. However, moderate sized provincial or regional hatcheries using fertile eggs from a central breeding flock are an option, especially if the operation can be combined with the supply of day-old broiler chicks to smallscale local commercial farmers. A study should be made of the feasibility and economics of local level hatching of fertile eggs. Australorps cannot be reliably expected to go broody and it is illogical to suggest the development of a comparable bird with broody characteristics. The options come down to:

1. Setting under native village hens.
2. Setting under Muscovy ducks.
4. Still air incubation using kerosine or, where feasible, electricity.

Bilong (1984) compared the first three methods with 100, 50 and 180 eggs set. The artificial method was a failure due to poor technique. However, hatchability was 71 percent under village hens and 40 percent under ducks. Nevertheless it would seem desirable to have available a suitable household or village artificial incubator and designs are available for small, efficient, inexpensive still-air units made from polystyrene or balsa. Asian basket systems require considerable skill. NARI will develop decision guides for householders as to how to deal with the situation and information on the various options and consequences of adoption will be given to farmers and extension agencies.

CONCLUSION

The recent NARI workshop (Quartermain, 1999) recommended the types of research and development proposed in this paper. The time has come to re-visit the concerns for improving household meat and egg supply from home production, to learn from the earlier efforts, test likely interventions and develop decision guides for farmers and extension agencies to enable best use of the birds and feeds available.

REFERENCES


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