

**Australian Centre for International Agricultural Research (ACIAR) project
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**Improving the profitability of village broiler production in Papua New Guinea
(PNG)**

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Project Leader: Dr Phil Glatz (South Australian Research & Development Institute)

Co-authors: Dr Ian Black (deceased), Dr Workneh Ayalew, Dr Janet Pandi, Klaus Neumeier, Anton Kapua, Andrew Mari and William Kerua.

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Executive Summary

Improving the profitability of village broiler farming using locally available feedstuffs has been a high priority in the PNG livestock sector since 2000. Lowland provinces close to the feed mills account for 60% of broiler production with 40% in highland provinces. The village broiler Industry was valued at \$67m in 2007. The viability of village broiler farms in both geographical regions has been continually threatened by the rising costs of imported ingredients used in commercial feeds. An earlier ACIAR project developed a feeding system whereby PNG protein meals (plus minerals and vitamins) were used to produce a concentrate that could be mixed with 50-80% of local ingredients and fed to broilers. The feeding method resulted in good bird growth.



Village broiler farmers



Sweet potato processed in mill and mixed with concentrate

This project focused on delivery of the feeding system to village farmers through the participation of Non-Government Organisations (NGO's) which included Christian Leader Training College (CLTC) in the highlands, Lutheran Development Service (LDS) in the lowlands and OK Tedi Development Foundation (OTDF) in the Western Province. The NGO's either renovated or built poultry housing facilities to make them suitable for conducting regional specific broiler feeding demonstrations for village farmers.



Group photo of all PNG partners involved in broiler feeding project

Initially the Apparent Metabolisable Energy (AME) was evaluated for concentrate diets that had low energy (AME 2300 Kcal/kg, Crude Protein (CP) 40%), medium energy (AME 2500 Kcal/kg, CP 43.5%) and high energy (AME 2800, Kcal/kg, CP 41%) at the PNG National Agricultural Research Institute (NARI) broiler feed evaluation unit in Lae. The diets were further evaluated by NARI in grow-out trials with the most suitable found to be; 1) 50% sweet potato + 50% low energy concentrate; 2) 70% sweet potato + 30% low energy concentrate; and 3) 50% cassava + 50% high energy concentrate. These selected diets were then tested in regional broiler grow-out trials in the highlands at CLTC's Banz Campus, in the

lowlands at LDS's Mahalang Campus and at OTDF Agricultural Resource Centre at Tabubil in the remote Western Province.



OTDF broiler grow out facility constructed during project to test diets. Broilers fed test diet

The demonstration feeding trials conducted at CLTC indicated that the diet with the greatest potential in the Western Highlands Province was 50% of the low energy concentrate supplemented with 50% of sweet potato. The demonstration activities conducted at LDS showed that the diet best suited for lowland chicken meat production was 50% high energy concentrate supplemented with 50% cassava. At OTDF broilers grew equally well when fed poultry concentrate supplemented with 50% cassava or 50% sweet potato.

As a result of the promising results obtained in the regional trials each NGO selected village farmers to run trials to compare the concentrate feeding system with a standard broiler feed. Four regional village broiler feeding trials were run which involved feeding sweet potato with a low energy poultry concentrate to broilers in the highlands and cassava with a high energy concentrate in the lowlands including demonstration activities in the Western Province. The trials were conducted at Malahang, Finschafen and Madang in the lowlands; in the Banz and Kainantu districts in the highlands and at Kiunga, Star Mountains and Tabubil in the Western Province. Broilers performance (particularly the sweet potato diet) compared favourably with standard feed in all the village farm trials. Birds reached market weight (>2 kg) soon after 5 weeks of age. The sweet potato-based diet compared very favourably with the commercial control diets.

Most of the village farmers involved with the trials indicated an interest to continue using the concentrate mix. There was also strong interest expressed by other broiler farmers not involved in the trials. Some farmers wanted more information about other alternative feed resources to use with the concentrate especially in the coastal regions. The feeding system was appropriate and boosts village broiler income by reducing the cost of feeding broilers. Farmers prefer the flavour of meat from birds fed with the concentrate + sweet potato/cassava mix. Goodman Fielder International conducted similar trials in Fiji using the concentrate feeding concept and further trials were run in PNG in conjunction with Lae Feed Mills and New Guinea Table Birds to further demonstrate the feeding system.

The critical issue as to whether the feeding strategy would be adopted by village farmers is whether the concentrate feeding system is profitable. An economic assessment was made to determine the cost of locally milled broiler concentrate compared to the price of the commercially available alternative at several key sites in PNG. Spreadsheets of the cost of producing concentrate feed from mini-mills and profit of village broiler grow-out operations were developed to assist with the economic assessment.

At approximately K(Kina) 800/t, the mini-mill concentrate was more than competitive with commercial full rations (K2000/t) and a commercial concentrate (K2400/t). The mini-mill concentrate price was based on costing of local ingredients and mini-mill equipment, as well as setup and running costs. Fishmeal, copra meal, mill run, and premix were the ingredients intended to be used to produce the concentrate. The technology will achieve village enterprise broiler production market penetration if the local based feed ingredient price including labour is less than 70 percent of the import-based feed ingredient price including labour. The calculations indicate that the mini-mill concentrate plus local carbohydrate including labour represents 56% of the full commercial feed plus labour costs, and the commercial concentrate concept plus local carbohydrate and labour is 69% of the full costs. Hence both "local" feed systems could achieve market penetration, but especially the mini-mill concentrate system. The local carbohydrate source was either sweet potato or cassava at K0.7-1.0/kg in the lowlands and highlands.

A benefit-cost analysis of the economic impact of the R, D & E program to improve the profitability of village broiler production in PNG was carried out. Other options include a commercial high protein concentrate feed plus local carbohydrate source and a dilution strategy of half normal commercial feed plus local carbohydrate source. The estimate of the research costs was 3.3 MK. On the core assumption of 35 percent market penetration of these new technologies, the analysis showed an internal rate of return to the program of 25% p.a. and a net present value of 45.6 M K. The benefits were attributed to a producer surplus of 16.3 M K and a consumer surplus of 32.7 M K.

Strategies that were implemented to publicise the benefits of the broiler feeding system in PNG included field days, training and demonstration sessions run by NARI and other NGO partners and distribution of publications. NARI and partners also used radio programs, newspaper articles and reports on the NARI website to disseminate the technology. Fact sheets of feed resources available in PNG for broiler feeding were developed for College, University and NGO curriculums. A video on how to use the feeding systems was produced by NARI as part of the dissemination activity.



PNG village farm involved in feeding trials

For further details on the project see final report at <https://www.aciar.gov.au/node/11961>

Broiler feed research papers are also listed in the ACIAR monograph See <https://www.aciar.gov.au/publication/Local-feed-resources-pig-poultry-and-fish-production-Papua-New-Guinea>