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Implications of investing in animal husbandry in Kiribati

The economic dimensions of extending the Tanaea Livestock Facility for the Government of Kiribati

Introduction

The Government of Kiribati has been examining options to increase food security through its chicken and pig breeding centre in Tanaea, Tarawa. In its present state of disrepair, the facility is able to rear only a small number of piglets and mainly focuses on chicken production. A preliminary economic analysis of renovating the breeding centre and extending its pig production operations was conducted as part of an activity under the SPC/USAID project and the SPC/GIZ programme, Coping with Climate Change in the Pacific Island Region (CCCPIR).

Key messages

Initial analysis suggests that continuing the chicken facility alongside extending pig production produces more financial benefits than costs over a 40-year period. Both options were estimated to yield a positive income. Focusing solely on chickens would, however, generate consistently higher commercial returns. Pig production is not financially feasible in isolation.

One of the likely barriers to the success of the livestock facility is insufficient water supply. To reduce the risk of water shortages, water containers with a total capacity of 30,000 litres are to be installed alongside the newly constructed barns. If the facility were to run at full potential, 1,220 litres of water – far more than could be collected from rainfall – would be required each day. To meet the shortfall, water from the Kiribati main supply would continue to be delivered to the facility; however, this arrangement could be adversely affected during droughts. At times during the dry season, there have been no supplies for months on end. Long-term average rainfall is expected to increase across both the dry and wet seasons with climate change[1], yet it is clear that water remains the greatest risk.

Methodology

The analysis was conducted using a cost-benefit framework, where the financial implications of continuing current chicken operations were compared to either (i) shutting down pig production altogether, or (ii) increasing production of pig stock at the facility. The total revenue expected from the sale of the centre's produce was compared to the expected running costs. The analysis accounted for a 40-year time period with future impacts discounted at a rate of 10%. It should be noted that no wider economic impacts (e.g. increased food security) are quantified.

The Government of Kiribati is expected to be responsible for running and maintaining the facility, and the cost of renovating and/or extending the facility is to be supported by development partners. To inform potential partners, the analysis provides an estimation of the lifetime economic returns of renovating the facility.

1 Australian Bureau of Meteorology and CSIRO (2014). Climate variability, extremes and change in the western tropical Pacific: New Science and Updated Country Reports. Pacific-Australia Climate Change Science and Adaptation Planning Program Technical Report, Australian Bureau of Meteorology and Commonwealth Scientific and Industrial Research Organisation, Melbourne, Australia.

SPC/USAID project: 'Vegetation and land-cover mapping and improving food security for building resilience to a changing climate in Pacific Island communities'

Assumptions and uncertainties

The analysis was conducted under 'best-case scenario' assumptions. There was assumed to be sufficient demand to match the total supply of eggs, chicks and pigs produced at the facility. It was also assumed that production at the facility was unaffected by adverse events, such as extreme weather or livestock disease epidemics. Appropriate waste management technologies were assumed to already be in place, ensuring environmental costs are at a minimum. Finally, a number of costs were assumed not to change significantly from those currently faced: medication/vaccination of livestock, labour requirements and the facility's power demand

Results

Compared with stopping pig production altogether, increasing pig production would reduce the facility's discounted lifetime net income by around AUD 140,000. Despite this, the expected revenue generated remains higher than the costs, resulting in a revenue-cost ratio of 1.32. This implies that the Government of Kiribati would receive AUD 1.32 for every AUD 1.00 spent.

Both with and without pig production, the expected net income of the facility is positive. When only chicken production is pursued, the Government of Kiribati can expect a higher return; expected revenue exceeds expected running costs, yielding a revenue-cost ratio of 1.53. The high cost of pig production is such that, if it were pursued in isolation, around 34 cents in every dollar invested would be lost.

When the cost of renovating the facility is included, the results remain consistent. The revenue-cost ratio of regenerating and running the facility with chickens and pigs is estimated to be 1.27. Similarly, regenerating and running the facility with chickens yields the higher revenue-cost ratio of 1.50. Pig production in isolation yields a revenue-cost ratio of 0.58 when renovation costs are included, implying donor funds invested in this manner would lead to losses.

What if?

It is assumed throughout the analysis that the facility will continue to produce chickens as it does at present and there are no adverse events, such as extreme weather or livestock epidemics, that could affect chicken production. If either of these assumptions fails, producing pigs may lead to costs over and above the revenue received from the sale of chickens. It was not possible to calculate potential losses due to a specific event but if, for example, production of chicken-based produce was to decrease by approximately 25%, the facility would incur overall losses and would require funding from elsewhere to maintain operations.

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Conclusions and recommendations

The analysis has been considered by the Government of Kiribati, which has stated a clear desire to develop a commercial piggery and has requested support from the Japan International Cooperation Agency to do so. The results suggest that pig production presents a financially feasible opportunity when, and only when, it is pursued in conjunction with chicken production. For every dollar spent on running the facility, the Government of Kiribati can expect to receive AUD 1.32 in revenue from the sale of chickens, eggs and pigs.

If the Government of Kiribati prefers to maximise the revenue created by the facility, then it could consider shutting down pig production altogether and focusing entirely on chicken production. The analysis suggests that the facility will generate AUD 0.21 in extra revenue per dollar invested under this strategy.

As a result of this finding, the SPC/USAID project and the SPC/GIZ CCCPIR programme have assisted the Government of Kiribati in refurbishing the chicken facility and installing a water catchment to service it. However, the analysis is only concerned with the financial feasibility of the proposed options, where the benefit of increased food security from the production of pig stock, for example, is not included. Further study into the wider economic impacts of pig production is required before the Government of Kiribati and its development partners can make a truly informed decision.