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Case Study: Observation on Challenges to Adopt Intensive Livestock Farming Systems in East New Britain Province

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Abstract:- The study was done in Gazelle District of East New Britain Province from October-November, 2020. Cluster farmer groups of four ecological communities were randomly selected for the study. It was conducted to assess the adoption of two farming systems; extensive and intensive farming systems. Four constrains were introduced to the farmers to provide likelihood evidence on lack of livestock intensification. The data was processed using spread sheet MS 2010 to present the parameter proportions in pie charts. Lack of livestock knowledge and skills (53%) was identified as one of the main challenges of livestock intensification in rural farming communities. Livestock farmers require evaluation strategies from the co-corporative efforts of government agencies, economic facilitators and institution to design a sustainable training package for livestock farmers.

Keywords:- *Gazelle District, Cluster Farmer, Intensification, Challenges.*

I. INTRODUCTION

Livestock is reared using various husbandry practices to produce food (meat, eggs, milk and other by-products) to sustain food security for the growing population (Cornut et al., 2012; Gonzalez and Rodenas, 2020). Gonzalez and Rodenas, 2020, stressed the importance of livestock as it contributes 40% of total agriculture value to support livelihoods of 1.3 billion people and is among the fastest growing sector in Agriculture. This is achieved using different animal species (swine, poultry, small and large ruminants) utilizing different sets of resources, in a wide spectrum of agro-ecological and socio-economic conditions (Steinfeld *et al*., 2006). Given the diversified livestock species there are certain patterns of farming systems that have been categorised into various livestock production systems. These systems have been defined on the basis of land use by livestock, and for this purpose the distinction between grazing systems, mixed farming systems and industrial (or landless) systems has been widely accepted (FAO,1994). This research is discussed based on the adoption of livestock farming systems in East New Britain province. Investigations are based on the interests to identify the constraints since establishment of DAL or other government institutions in Papua New Guinea.

The current investigation reveals that there is no adoption of intensive livestock system in Gazelle district representative of East New Britain Province. Higher number of farmers (53%) responded with the reason being "lack of training" for livestock farmers.

II. MATERIALS AND METHODS

➢ *Ecological zones*

East New Britain province is demarcated with four administrative zones, Rabaul, Kokopo, Gazelle and Pomio with a land mass of 15,816 km^2. East New Britain province has a population of 328, 369 (2011 national census) shares a land border with West New Britain province and a marine border with New Ireland province. The province operates its cash economy heavily on subsistence sector, cocoa and copra being the main cash earners for the farmers. (wikipidia.org, 2021). Gazelle district was included in the study involving 40 local livestock farmers. Gazelle district has the largest land mass with the highest population density of 35km^{-2}. Most people live on the Gazelle Peninsula where the dominant ethnic group is the Tolai population with expected high living standards (>200PGK $person^{-1}year^{-1}$) relative to most other regions of PNG (Hanson *et al*., 2001). Most people living on the Gazelle Peninsula have road access to their villages. However, the Bainings and the Pomios, are away from government services such as road links which take several days to travel by foot from the nearest road to excess services from their villages (Liu. *et al*., 2002).

Face-to-face interview using the designed questionnaire was conducted based on the farming systems. Four reasons were investigated to support significant adoption skills while the responses of the farmers were recorded from four clusters of ten farmers. Farmers of Vudal block, Kereba block, Vunapalading block and Napapar2 village were selected as study zones. The assessment include; assessing the farm structure, water supply, waste management, flock size, production level, feeds and feeding systems as primary indicators of intensive farming system.

➢ *Livestock Farming Systems*

Extensive and intensive livestock farming systems were assessed during the interview from October-November, 2020. Extensive farming is practiced with small flock size, small land area, low productivity per animal, and

the farmers require less capital and resources (Gonzales and Godenas, 2020). Livestock is not a committed responsibility for a farmer. Most of the commercial practices are absent in this farming system.

On the other hand, intensive farming system is defined as a self-sufficient system with flock size targeting high productivity per animal, proper housing, adequate watering and feeding system, full time labour employment and fixed market outlet. The animal system is calculated as total impact per unit of product driven by production efficiency (Garnsworthy, 2012).

Village chickens, swine, ducks and broiler production systems were observed during the survey. These livestock require small land area to become as an indicator of intensified farming system of the surveyed zones.

Given a certain arable land area, mixed farming systems ("integrated farming system") or other farming systems defined within either subsistence or extensive farming systems (Rutenberg, 1971 & 1980) are options left for the farmers. Sere and Steinfeld, 1996 described the land use in proportions (cropping-15%, >10% dry matter produced from crop residues or > 10% of the total value of production comes from the non-livestock activities). A commercial criterion has to be set inclusive of 10% threshold production level (Thornton *et al*., 2002). However, Kambou 1995 criticized stating that "there is no organised livestock system, traditionally. The pigs, fowls and the village chickens comprised the total complex system the subsistence farmer engages.

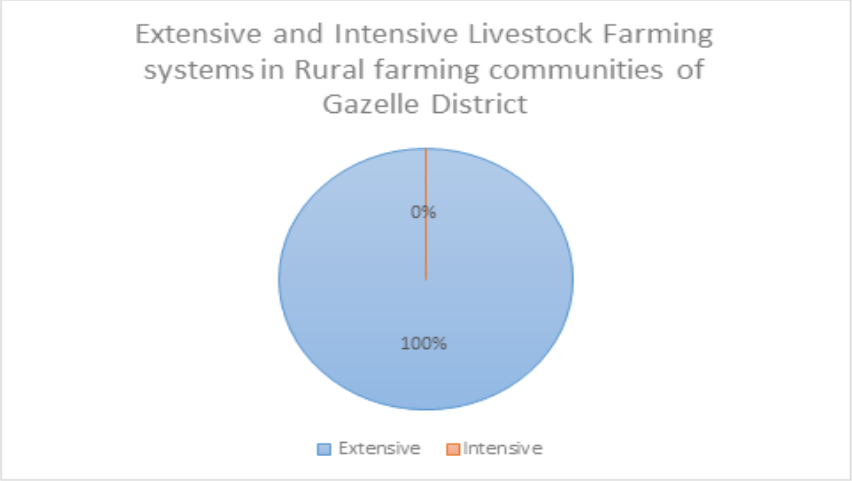
➢ *Data Analysis*

The questionnaires were collated to calculate the frequencies of observed farmers. The parameters; intensive farming, extensive farming and the four challenges were analysed using pie charts in the spread sheet 2010. These results are represented in the percentages with their respective proportions.

III. RESULTS AND DISCUSSIONS

➢ *Common Types of Livestock Farming Systems*

There is 100% responses indicating existence of extensive (conventional) farming practices within Gazelle District. Extensive farming system is a free-range production practices with less commitments to improve husbandry practices or increase production. These responses are relevant as it stretches to compliment the observations done with Muscovy ducks (n=30 farmers) in 2012. In the survey of 2012, only 6% of farmers from Kokopo district had an experience to raise Muscovy ducks while 56% (Gazelle 15%, Kokopo 13% and Rabaul 29%) have no knowledge on duck farming. The survey also indicated that in the last twenty years adoption of Muscovy duck management practices had been given less attention to improvement. The current observation showed no signs of intensification in livestock farming system. Village chickens are also farmed on free range in their back yards with poor management practices in the observed backyard farms affecting reproduction and other economic traits.



Despite Muscovy ducks raised under various roofs (50%-sago roof, 33% -kunai grass and 33% -coconut fronds), production of Muscovy duck was low. Production constraints exist in three districts (Gazelle, Kokopo and Rabaul) affecting 67% of farmers in Gazelle district producing less than 10 duckling^{-1yr}. Kokopo District has 44% of farmers producing less than five to ten ducklings^{-1yr}. Observations on swine production system are similar. Farmers raise swine on free range only to meet their cultural obligations. There are doubts to intensify livestock production related to reasons admitted by farmers interviewed.

➢ *Challenges of Livestock Intensification*

The farmers admittance on the none adoption of intensive farming system was directed towards lack of funds (incentives), Lack of knowledge & skills, Limited land area and seasonal production. These are in the respective proportions of 17%, 53%, 15% and 15%. Higher number of farmers lack required livestock knowledge to increase their

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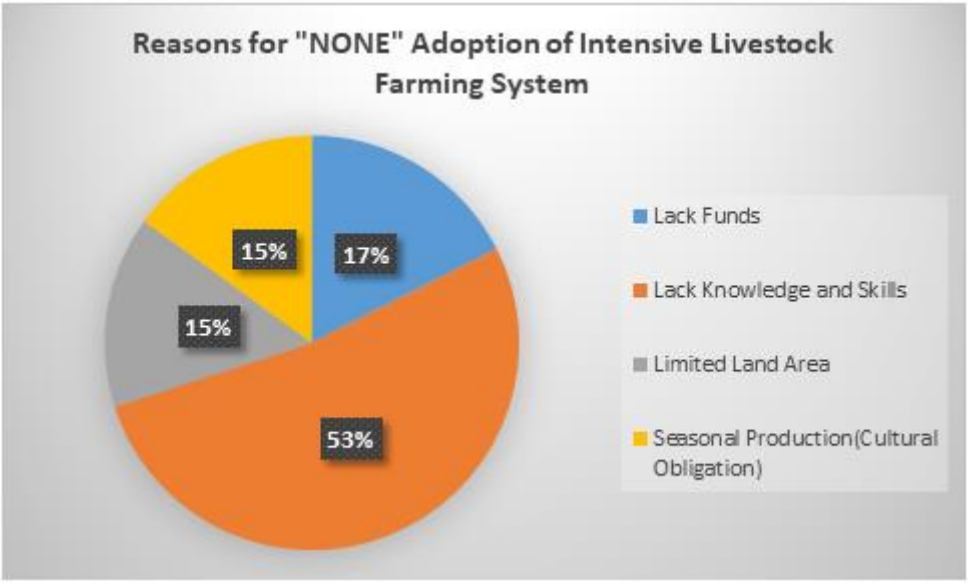
capacities and level of innovation. In Muscovy duck survey of 2012 responses on extension and training received the claim that low duck production was experienced due to total absence of extension services. Farmers of Gazelle, Kokopo and Rabaul districts lack improved duck farming skills which had badly resulted in very poor management practices related to feeding, breeding and marketing of ducks. It is believed from observations that similar constraints are faced by farmers concerning other livestock species leading to experience low livestock production curves.



Limited land area was expressed with concerns that expansion to farm livestock on a larger production scale is inevitably impossible. Most farmers of surveyed areas are settlers after the volcanic eruption in 1994. Each farmer occupies an approximate land area of $500m^2$ with an estimation average of less than 200 cocoa trees and residential area. Most farmers identified land issue as one of the main socio-economic factors related to high population density ($91m^{-2}$). Cornut *et al.*, 2012 emphasised that the dynamics of family livestock farming in extensive livestock farming territories are crucial for the future of farming communities. Since the farmers are sharing close boundaries raising livestock species like swine has its extended cultural problems related to production environment, intensities and purposes of production (Delgado. *et al*, 2007). Swine farming has its serious concerns drawing attention to its behaviour involved with damages to food crops in the gardens. Costales. *et al*, 2006 supports this by stating that these systems are shaped by prevailing biophysical and socio-cultural environments, and without external inputs they have traditionally been mostly in sustainable equilibrium with such environments. This is a common observed problem with high cultural threats exposed to prevent farmers to expand livestock farms converted into larger scales.

Limited land issue only creates a low-income option for farmers to participate in livestock production. The farmers are scaled down to raise only less than five swine, less than ten village chickens and a batch of broiler birds per three months production cycle. They have marginalized livestock production only to meet cultural obligations or only to earn certain amount of income (Wilson, 2007) rather than to optimize economic returns. The production practices have increased production cycles and have lowered the interests of repeated farming. The husbandry practices of formulating required feed nutrients, breeding programs, housing and diseases management skills are poorly adopted to affect livestock intensification.

Farmers also claimed to blame low income as one of the four main constraints identified during the survey. Low income is exceptionally correct for the farmers to state their opinions relating to pricing challenges (Gonzales and Godenas, 2020) to invest in their Small-Medium Enterprise targeting the markets with uncertainness. Farmers are unsure of sourcing funds such as from National Agriculture Development Bank (NADB), commercial banks or other micro-banks to facilitate the intended livestock farms. Establishing livestock farm is expensive with irregular income earners relying heavily on cocoa as the main income generator. Low income has affected house hold livelihoods with increasing living costs experienced elsewhere reducing the chances of potential livestock farmers to excel. To assist farmers excess funds based on livestock farming evaluations would help the farmers expand the production (Anton *et al*., 2016; IPC, www.AgriFin.org).

IV. CONCLUSIONS

Adoption of livestock intensification farming systems is poor as observed eight years ago during Muscovy duck survey in 2012. Lack of knowledge and skills (53%) of a livestock farmer has affected the growth on livestock improvement in farming systems. Livestock intensification requires a corporative effort from government agencies, economic facilitators and institutions to formulate the better livestock training package for the rural farmers. Evaluations with strategic approaches are relevant and should be

designed to capture sustainability in livestock production for rural farming communities.

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