Improving Technology Adoption and Sustainability of Programs to Increase Bali Cattle Productivity in West Nusa Tenggara Province, Indonesia

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ABSTRACT: Programs to improve productivity of Bali cattle should be based on results of research projects conducted locally, as they have been proven to better suit the socio-economic and biophysical conditions. There have been many research projects conducted on improving productivity of Bali cattle in West Nusa Tenggara Province. These research outcomes provide options for local government authority to develop evidence based programs that better suit local conditions and can be expected to have greater impacts. Unfortunately, these readily available options have not been seriously explored by local authority due to limited understanding of the comparative advantages of the innovations, hence there were no adequate support from national government. Some outstanding innovations have been demonstrated in small and medium scale in the farmer situation has proven to improve the cattle production capacity. An integrated village management system (IVMS) was introduced to match local biophysical conditions with biological cycle of the cattle and succeed in increasing the cattle productivity (Panjaitan 2008; Dahlanuddin *et al*, 2011; Sutaryono, 2008; Dahlanuddin *et al*, 2014). Key to the success is the simplicity of the innovation so it can be adopted easily by the farmer to solve complex problem (Poppi *et al*, 2011). These innovations have not been widely exposed to the beneficiary stakeholders because has not been incorporated into government program. There were some innovation incorporated into local government programs such as Bali cattle breeding programs in NTB, Mass leucaena planting program in Sumbawa, Master Plan for pasture improvement in Sumbawa, but none of the innovations were implemented as a complete package, hence it is fail to produce as an expected outcome.Incorporating of the innovations into local government programs so far is not effective because local authority is unable to make local programs as part of the national program so the scale out of the innovation is limited. Engaging farmers with private sectors is proposed to be an option to improve beef cattle production, farmer income and sustainability of the industry.

Keywords: Bali cattle, innovation, government program, adoption

INTRODUCTION

Improving productivity of Bali cattle (*Bos javanicus*) is a strategic national program as Bali cattle is one of the most important native cattle of Indonesia. Martojo (2012) suggests that Bali cattle are the most suited cattle breed for the smallholder farmers in Indonesia.

Programs to improve productivity of Bali cattle should be based on results of research projects conducted locally as they have been proven to better suit the socio-economic and biophysical conditions. These local specific innovations also built upon local wisdoms and practices so they can be easily adopted by the farmers as they solve limitations and barriers to improving cattle productivity in the region.

In the last 15 years, there have been many research projects conducted on improving productivity of Bali cattle in West Nusa Tenggara Province (Nusa Tenggara Barat, NTB) involving

many national and international agencies and funding bodies. These research outcomes provide options for local government authority to develop evidence based programs that better suit local conditions and can be expected to have greater impacts. Unfortunately, these options have not been optimally utilised due to limited understanding of the local government on the comparative advantages of the innovations.

At demonstration level, the innovations have changed farmer practices towards better cattle management systems that resulted in increased productivity. Due to simplicity of the innovations farmers do not necessarily require more inputs and dramatic changes from the common farming practices.

To scale out and sustain these practice changes, there is a need to identify incentives of each stakeholder to improve adoption of these innovations and build them inherently into government programs. A multi-stakeholder approach needs to be established to develop business enabling environment so that all parties can gain benefits from beef cattle industry.

This paper discusses opportunities and challenges in improving adoptions of appropriate innovations and sustainability of programs to improve Bali cattle productivity in west Nusa Tenggara Province.

1. Local specific innovations on improving Bali cattle productivity in NTB

Since 2000, there have been a series of research projects conducted to improve Bali cattle productivity in NTB. These projects have been reported to significantly improve Bali cattle productivity and consequently farmer incomes. An integrated village management system (IVMS) was introduced to match local biophysical conditions with biological cycle of the cattle to increase efficiency of available resource utilization to optimize cattle productivity. They components of this innovation are controlled mating and early weaning of calves. Its supporting components include mating of cows with selected bulls, stimulating cows to shorten post partum anoestrous and better feeding for newly weaned calves. Panjaitan *et al* (2008) reported that implementation of the IVMS markedly improved Bali cattle productivity in Kelebuh village central Lombok, indicated by high rate of conception (70-80 pregnancy rate per mating), calving to conception interval averaged 70 days, 80% of first lactation heifers and 90% of mature cows reconceived by the end of the controlled mating period. This enables 80% of cows to wean a calf and improve the weaning weight of 6 months old by 20 kg.

Similar improvements have also been reported by Dahlanuddin *et al* (2011) when the IVMS concept was scaled out to 36 farmer groups in central Lombok district. In this scale out project, the calving rate was recorded at 87%, calf birth weight averaged 16 kg, the mean calf mortality was 4.8% and the mean weaning weight was 90 kg. These records are much better that the corresponding values of 52% for calving rate, 12.7 kg for birth weight and 15% for calf mortality reported by Talib *et al*. (2003).

The combination of improved reproduction and feeding management enabled male Bali cattle to reach slaughter weight 6 months earlier. Panjaitan *et al* (2008) reported weight of Bali cattle at 18 months of age in Sukadamai Dompu reached 185 kg. In addition Sutaryono (2008) elaborated that farmers adopted the use of tree legumes such as Gliricidia sepium and Leucaena leucocephala that cow liveweight increased steadily from mid-late wet season to mid dry season in response to availability of adequate supplies of good quality forage of shrub legume such as *G. sepium* and *L. leucocephala* as both dry season fodder banks and "living fences". Further use of Leucaena tree legume for cattle fattening in Sumbawa (Panjaitan *et al*., 2013) and Sesbania grandiflora in Lombok (Dahlanuddin *et al*, 2014) has successfully doubled growth rate male Bali cattle. This improvement was due to adoption of a participatory farming

systems approach (Lisson *et al*, 2010), which is easily adopted by farmers because it relies on simple technology to solve complex problems (Poppi *et al*, 2011). These examples demonstrate a huge opportunity to improve Bali cattle productivity and farmer income but this practice has not been incorporated into government program that limit the scale out of the practice.

2. The development of local government programs based on research outcomes

To enhance the effectiveness of local government programs on cattle development, appropriate innovations were communicated to the local government to be incorporated into their development programs. The expected outcomes of this initiative are a) government have suitable programs that can be effectively implemented by relevant institutions to support cattle development programs (change in functioning), b) farmers are motivated to improve cattle productivity and quality (change in circumstances) and c) farmers use recommended technology in cattle production and benefit from increased cattle price due to improved quality (change in attitude). Below are some examples of programs developed based on research outcomes.

2.1. Bali cattle breeding programs

West Nusa Tenggara province is the most popular source of Bali cattle breeding stocks because Bali cattle in NTB are free from contagious strategic diseases especially Anthrax, Brucellosis and Septicaemia Epizootica (Anonymous, 2009). The supply of Bali cattle breeding stocks in NTB have never been able to fulfill the increasing demands. Innovations to increase productivity and quality of Bali cattle breeding stocks are available to increase production but these innovations have not been incorporated into government programs. An approach on how to develop government policy and program based on research outcomes has been facilitated by an AusAID funded initiative (Dahlanuddin *et al*., 2010). This project successfully produced; a) Strategic plan for Bali cattle breeding in NTB province, b) Governor decree on Bali cattle breeding program, c) Recommended price for Bali cattle breeding stocks based on grade and d) Central Lombok Bupati decree on collective housing system for cattle development. These local government policies were established to ensure that programs to improve Bali cattle productivity can be implemented to improve farmer income.

This initiative is an incentive tool to motivate farmers to produce high quality Bali cattle breeding stocks and create business enabling environment to attract private sectors to invest in Bali cattle breeding industry. The price incentive based on cattle quality was regulated to stimulate farmers to implement better management practices. Conducive business environment is expected to attract private sector investment, to improve the industry scale, to create jobs and significantly increase economic impact.

These programs and policies have not been effectively implemented because the local government authority unable to incorporate these regional programs as part of national program. Most of local government programs on cattle development are funded by national government and only a small proportion of the budget come from the local government. Consequently, local government programs will only be funded if they are listed in the national budget.

2.2. Mass leucaena planting program in Sumbawa

Successful demonstration of leucaena based cattle fattening system attracted Sumbawa district government to launch the mass leucaena planting program to overcome feed scarcity in the region especially during the dry season. The local government expected

that this will encourage the community to plant leucaena especially in the less utilized dry land. The ultimate objective of this program is to increase live weight gain of Bali cattle and eventually improve farmer incomes from cattle production.

In the implementation, however, this program failed to adopt the complete package which consists of improving awareness of the farmers on why we need to plant leucaena, technical capacity building for leucaena nursery, seedling transplanting, plant management and the use of leucaena as cattle feed. This program has been merely a leucaena seed distribution program and most of the seeds distributed did not planted properly resulting in a poor survival and growth of leucaena.

This program also has lack of resource because it is not sufficiently budgeted costs for capacity building of staff (trainers) to properly train farmers how to establish cattle fattening system based on leucaena.

2.3. Master Plan for pasture improvement in Sumbawa

A Master Plan to develop a cattle production in Limung area of Sumbawa district has been established to improve cattle productivity. This area has been supported by national government to be developed as a model for extensive cattle production system in Sumbawa.

The starting point to develop this program was lack of feeds and drinking water for cattle. Programs and activities were developed based on participatory approach and utilizing documented best practices exist in the area. To improve cattle productivity, proven management and feeding practices have been use as the basis for developing activities. To ensure availability of high quality feeds all year round, it was recommended that drought tolerant tree legumes and grasses to be established and to conserve excess forages for use in dry season when feeds are scarce. This approach followed by improving the awareness of the farmers and strategic capacity building activities.

However, most of the resources were spent on building infrastructure such as deep well pump, feed barn, compos processing unit which are not effectively functioning. Not enough resources are spent on establishing tree legume forages as recommended and to improve awareness and capacity of the farmers to implement good management and feeding practices.

3. Future option - A market-led approach to improve technology adoption by Bali cattle farmers

The NTB government is highly motivated to create added values from beef cattle within the region. The priority of the local government is to stimulate processing of beef cattle that require cattle to be slaughtered locally and sell end products. This means reducing export of live beef cattle to other provinces. This is a very good initiative as price of beef cattle in Jakarta (the biggest market) is sometimes similar to the price of live cattle in NTB so there is no margin for the traders. However, selling boxed beef to Jakarta is equally difficult as beef from NTB has to compete with imported beef.

The only opportunity for NTB beef to be competitive in Jakarta market is to make it a special beef that has competitive advantages over exported beef. A Jakarta based beef company has been successfully marketing Sumbawa beef as being natural, healthy and halal. The sale volume is restricted by availability of suitable beef cattle to be slaughtered. Therefore this company has the motivation establish mutual partnership with the farmers to adopt appropriate

technologies to improve productivity and quality of local beef Bali cattle.

To synergise the needs of the farmers, private sector and the government, a multi-stakeholder program to improve beef cattle productivity and beef quality will be carried out using outcomes of various research activities conducted in the region. The main focus of the program is to improve farmer capacity to adopt technology and innovations, and to ensure market and pricing transparency through the engagement of farmers with private sector.

The cattle price will be developed to take into account of the quality aspects of beef cattle such as live weight (higher price per kg live weight for heavier cattle) and weight for age (higher price for cattle which reach slaughter weight at younger age) and higher price for cattle with higher dressing percentage. This pricing system should be supported by good recording system at farmer group level. This pricing system is expected to motivate farmers to improve quality of their beef cattle and to maintain good partnership with the company. Successful implementation of this farmer-private sector engagement will increase sale volume (and profit) of this company. Selling this special beef at premium price will enable the company to buy beef cattle from farmers in cash and at a competitive price.

The government roles in this partnership providing necessary facilities that can not be provided by the private sector and the farmers. This may include slaughter house, road, transportation and electricity. The government should also develop regulations that ensure mutual benefit of farmers and the private sector to sustain the industry.

CONCLUSIONS

Local specific innovations based on proven long term research are available to be used for improving Bali cattle productivity in NTB. However these innovations have not became the basis to develop regional programs to boost cattle production. Incorporating of the innovations into local government programs so far is not effective because local authority is unable to make local programs as part of the national program so the scale out of the innovation is limited. Engaging farmers with private sectors may be regarded as an option to improve beef cattle production, farmer income and sustainability of the industry.

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