

LIVESTOCK AND FOOD SECURITY: HEROES OR VILLAINS?¹

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1. INTRODUCTION

Livestock are often thought to pose a threat to human food security rather than having a role in improving food security. In particular, livestock are thought to pose a threat to food security of the rural poor. However, livestock provide many benefits and act to increase net agricultural production as well as adding to the strength of the agricultural system by increasing diversity of that system.

Because negative aspects of livestock production are often emphasised the benefits from livestock production are neglected and little information is available on the role of livestock in food security with some exceptions such as Sansoucy et al. (1995). This neglect has resulted in the actual and potential role of livestock in food security in the Pacific being poorly understood in the region and amongst development organisations and funding bodies.

This paper examines the role of livestock in provision of food security. In this paper food security is defined, followed by an examination of the role of livestock in providing food security. This paper is an early step towards understanding the relationship between livestock production and health and food security in Pacific islands and demonstrates the need for food security to be considered as an outcome of livestock production activities.

2. DEFINING FOOD SECURITY

Food security is a difficult concept to define and has been defined in a number of ways and at various levels. Therefore, in any discussion on food security it is important to clearly state what is meant by food security. In general food security infers all people at all times have access to enough safe and nutritious food to maintain a healthy active life. However, such a definition is too broad to act as a working definition and a more useful definition is required for practical use.

Food security operates at various levels of aggregation including; global, regional, national, household and individual. At national level food security has often been equated with a balance between availability of food and requirement for nutrition based on assumed needs per individual, known as food balance. Food balance at any level is not an adequate criterion for defining food security because poor distribution and lack of purchasing power means not all have access to sufficient food.

Household food security relates to the ability of a household to meet its requirements from a variety of activities including; food production, income generation, and gifts or assistance that can be used to provide the household with food. However, meeting household needs does not ensure individual food security because within a household

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food distribution may be based on social status, age and sex rather than need, which makes estimation of individual food security a complex task.

It is important to note food security is affected by a variety of factors including social, political and economic factors as well as agricultural production. The factors are not only those within a country and with increasing globalisation food security in one country can be linked to decisions made in another.

2.1 A working definition of food security

For the purposes of this document food security is not defined in precise terms but rather is defined in relation to the following concepts:

- Quantity of food
- Quality of food and appropriate dietary composition
- Self determination
- Distribution of available food
- Resilience of the system to shocks, and
- Intergenerational equity.

In this paper the role of livestock production in food security is considered for each of the points outlined above. From the above terms it is clear food security is about distribution of food as well as aggregate food production and consumption.

In summary, the above definition food security relates to economic development, poverty alleviation, income distribution, self sufficiency, diversity and sustainable development. The definition implies individuals either have the means and ability to produce sufficient food for themselves or alternatively earn sufficient income to purchase enough to provide adequate nutrition for themselves or a combination of the two. In addition, the principle of not disadvantaging future generations is an important feature of the working definition. Access to relevant information and understanding of that information to enable people to work towards food security is an overarching principle of food security and is not included as a specific concept in the definition.

3. THE ROLE OF LIVESTOCK IN FOOD SECURITY

Livestock can have both positive and negative effects on food security. The effects depend on how livestock are managed by people and the ways in which livestock products are prepared and consumed. In addition, the effects of livestock on food security can be both long and short term and whether livestock have a positive or negative effect on food security may depend on whether a long or short term view is taken. The breadth of view taken can also affect the direction of benefits from livestock and food security, for example grazing cattle may help assure food security for those who own the cattle but decrease food security for their neighbours who may no longer have access to land that they once had access to and additionally need to guard or fence their crops to ensure the crops are not damaged by the neighbour's animals.

In this section each of the concepts in the working definition are explained and the role of livestock in relation to food security for each concept is examined.

3.1 Effects of livestock on the quantity of food availability

Quantity of food relates to food balance and means availability of enough food to feed the population.

Livestock can have several effects on the quantity of food available to the population. The major effect in many countries, but one rarely seen in the Pacific islands with the exception of Fiji and Tonga is the use of livestock for ploughing which has produced large changes in the area of land cultivated by a farmer and the time needed for cultivation.

Livestock are able to make use of plant products that cannot be digested by people (especially in the case of ruminants making use of grass forages and crop residues). Because of this ability land not suitable for crop production can be made productive through livestock raising.

Use of livestock manure as fertiliser enhances the amount of food available by having direct effects on crop production. In some countries the conversion of low quality feed into manure is the major benefit from livestock production.

Livestock can also reduce the food available to people if they are not managed appropriately. Animals can have devastating effects on crop yields if they gain access to crops destroying the crop through trampling or eating of the crop. Damage to gardens by pigs results when food gardens are not fenced to keep pigs out, or pigs are not adequately controlled by owners to prevent them from roaming into food gardens. If pigs are confined the cost of production is increased due to the need to build fences and provide food for the enclosed pigs, also a higher level of husbandry skill is required to raise the pigs. Alternatively if gardens have to be fenced it could be that the person who does not gain benefit from owning pigs has an additional production cost from having to fence their garden.

3.2 Livestock and food quality

Food quality relates to two factors in provision of food security. First people's diet consists of a variety of foods of appropriate quality to ensure nutritional needs are met. Second food available is of sufficient quality both in provision of nutrients and that the food is healthy and not contaminated with toxins or pathogenic organisms.

Livestock products can provide significant improvements in food quality through provision of high quality protein, concentrated energy and other nutrients such as calcium in milk. While dietary requirements for carbohydrates/energy can be met from grain and root crops protein deficiencies are often not, especially in the case of children and pregnant and lactating women. In most Pacific island countries protein requirements have traditionally been met from fish. However, reductions in inshore fish stocks make protein from other sources increasingly important.

While livestock products generally have positive effects on human health, through improved nutrition they can also have negative effects. Over nutrition is a problem mainly seen in developed countries but is an increasing problem in the Pacific. In particular excessive consumption of fat and cholesterol have resulted in increased

incidence of heart disease. Transmission of food-borne diseases is a risk to food security. Food-borne diseases include zoonotic diseases and pathogens such as *E. coli* and salmonella species which can contaminate food during and after processing.

3.3 Livestock and self determination in food security

Self determination in food security relates to the ability to produce and purchase food without excessive demands being placed on any individuals nor reliance being placed on food hand-outs.

Ownership of livestock assists people to be independent and produce their own food. Production of livestock products and with it cash income can be especially useful to people with limited access to land. Some livestock species such as cattle, goats and bees can provide a regular cash flow through sale of milk and honey. In this situation the owner is able to sell the product and keep the animal to enable further production. Once a cash income is being derived livestock owners are able to purchase foodstuffs they do not produce themselves from other sources. However, it is possible development of livestock industries could have negative effects on self determination and such effects need to also be examined.

3.4 Role of livestock in distribution of food

This concept relates to distribution of food to members of the population based on physiological need. The concept of distribution is important because there is little point having enough food in a country if most of the population do not have enough to eat while a small proportion have too much.

Livestock provide an easily disposed of cash “crop” enabling livestock owners to generate income through sale of animals and animal products. Livestock are particularly useful in this regard because they can be sold at any stage of the production cycle and irrespective of their state of maturity, unlike plant crops that generally cannot be sold until they have matured.

Livestock play a role in maintaining position in society and maintenance of social structure. Livestock can be owned and raised by landless farmers thereby providing them with an opportunity to produce food and generate income. Under present land tenure systems and quantity of available land landless farmers are virtually unknown in the Pacific region. However, with increasing population sizes and aggregation of land holdings in some countries access to land cannot be guaranteed for all in the future.

3.5 Livestock in resilience of the agricultural system

Presence of a resilient agricultural system helps to ensure the four factors above are met under a variety of conditions (including normal seasonal variation and major crises such as cyclones, droughts, floods and outbreaks of plant and animal diseases)

Livestock provide an additional form of agricultural production in addition to plant production and thereby increase the flexibility of the agricultural production system. Therefore, if for example there is an outbreak of a plant disease and a crop cannot be

harvested livestock provide an alternative source of income and food to assist farmers and their families until the crises has passed. Once again it is the flexible nature of livestock production and the fact that animals can be sold at any stage of the production process that make them so useful as a store of wealth to be realised in emergencies.

In some situations livestock can also decrease flexibility in the agricultural system. This is so where large animals (such as cattle) are the dominant livestock species. Each animal has a high value and therefore can be a large proportion of a farmer's wealth. Loss of one animal through death or theft is therefore a major loss. In addition, sale of an animal brings a large amount of cash to the household, which may be in much more than needed to meet current needs. Policies to encourage farmers to take land out of gardening and crop production and plant pastures can introduce a monocultural system with associated risks. Damage to gardens by pigs results when food gardens are not fenced to keep pigs out, or pigs are not adequately controlled by owners to prevent them from roaming into and damaging food gardens. If pigs are confined the cost of production is increased due to the need to build fences and provide food for the enclosed pigs, also a higher level of husbandry skill is required to raise the pigs. Alternatively if gardens have to be fenced it could be that the person who does not gain benefit from owning pigs has an additional production cost from having to fence their garden.

3.6 Livestock and intergenerational equity in food security

Intergenerational equity is a term used by economists and basically means that resources are retained so as not to disadvantage future generations. In the case of food security intergenerational equity means provision of food security to current generations does not reduce the opportunity for future generations to attain food security.

Livestock have been blamed for environmental degradation and reducing the resource base for future generations to produce food. For example, animals can be kept in such a way or in such large numbers that they pollute the environment through both nutrient excess and bacterial contamination. However, while animals can have negative environmental impacts they can also be used to improve environmental conditions and ensure maximum benefits are gained from land. For example use of livestock manure as fertiliser and as an alternative form of energy for cooking.

4. INCREASING THE ROLE OF LIVESTOCK IN FOOD SECURITY IN THE PACIFIC

The role of livestock in provision of food security in Pacific island countries has not been fully examined or widely understood. However, there is a need to relate any proposed changes to livestock production to the above criteria for food security to see if a change will affect food security. In addition, any livestock project should be examined in light of the projects effects on food security to determine the net effects on food security.

A number of options exist to modify livestock production. Options include making greater use of available resources, changing the production system components (eg type of animals), and making greater use of outputs. Alternative options include:

- Increasing the number of animals (on the assumption that more animals equals more production)
- Increasing food fed to animals already present
- Improving genetic make up of animals already present
- Making livestock production more commercial
- Making greater use of available resources, and
- Decreasing the total number of animals so there is more food per animal enabling greater production.

Each of the options above has an opportunity cost associated with it, that is there is a trade off that must be made. This means to increase livestock production a producer must sacrifice something else and it is important that the trade off is not in food security.

5. THE FUTURE

An important issue addressed in this paper is that it is no longer enough to say we are increasing livestock production or we are preventing or controlling disease and these activities are by definition good things. It is now necessary to provide evidence of the benefits received from actions in livestock production and animal health. The need to determine the benefit from actions is part of changes taking place throughout the world and livestock production is not alone in having to come to grips with the problem of defining our role and the benefits from our actions.

Food security is an important issue and agricultural production including livestock production plays an important part in providing food security for small scale farmers in the Pacific islands. While not a final or definitive explanation of livestock in food security this paper provides a framework to examine the effects of livestock production and the effects of changes to the livestock production system on food security.

7. CONCLUSIONS

Food security is one aspect of livestock production and livestock production is one aspect of food security. Livestock production needs to be viewed in the broader context of sustainable rural development and food security is part of that broader context.

While the definition of food security suggested in this paper is not perfect it does provide a framework in which impacts of livestock production and changes to the production system can be examined in relation to food security. Therefore, it is important to consider the concepts described in this paper as part of any livestock development or improvement activity in an attempt to determine its likely impact on food security.

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9. REFERENCE

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