

THE ROLE OF ECONOMIC AND SOCIOCULTURAL FUNCTIONS OF ANIMAL PRODUCTION IN WELLBEING AND DEVELOPMENT OF RURAL COMMUNITIES OF TIMOR-LESTE

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ABSTRACT

Livestock production in Timor-Leste is predominantly familiar being chickens, pigs, goats, cattle, horses, buffaloes and sheep the main species.

The livestock species play very important economic and sociocultural roles for the well-being of rural households, such as food supply, source of income, asset saving, source of employment, soil fertility, livelihoods, transport, agricultural traction, agricultural diversification and sustainable agricultural production.

The aim of this work was to identify and characterize the different roles that livestock and livestock species play in rural communities of Timor-Leste, highlighting the importance of animal production for the wellbeing and rural development, and relate the functions performed by livestock production with economic, social and cultural attributes of the communities. The data used in this study were collected in 2011 through a questionnaire survey in three rural communities in the district of Bobonaro -mountain area, irrigation plain and coastal zone, and were complemented with secondary data.

KEY-WORDS

Timor-Leste, livestock, economic function, sociocultural function, wellbeing, development

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O PAPEL DAS FUNÇÕES ECONÓMICA E SOCIOCULTURAL DA PRODUÇÃO ANIMAL NO BEM-ESTAR E NO DESENVOLVIMENTO DAS COMUNIDADES RURAIS DE TIMOR-LESTE

RESUMO

A produção pecuária em Timor-Leste é de natureza familiar. As espécies pecuárias desempenham um vasto conjunto de funções económicas e socioculturais muito importantes para o bem-estar dos agregados familiares rurais.

A função económica é ser uma fonte de rendimento monetário, de alimentos e de acumulação de poupanças. A função social corresponde aos valores simbólicos associados a cada espécie e à utilização dos animais em ritos e em obrigações sociais das famílias e das comunidades.

O objectivo deste trabalho é identificar e caracterizar as diferentes funções que a produção animal e as espécies pecuárias desempenham; realçar a importância da produção animal para o bem-estar e desenvolvimento rural; e relacionar as funções da produção pecuária com atributos económicos, sociais e culturais das comunidades.

Os dados utilizados foram recolhidos em 2011 através de um inquérito por questionário realizado em três comunidades rurais do distrito de Bobonaro –montanha, várzea e costa -e complementados com dados secundários.

PALAVRAS CHAVE

Timor-Leste, pecuária, função económica, função sociocultural, bem-estar, desenvolvimento

1. Introduction

The livestock species play very important economic, social and cultural roles or functions for rural households once they contribute to improve income and wellbeing of the farm family. Livestock helps on food supply, family nutrition, family income, asset savings, soil productivity, livelihoods, transport, agricultural traction, agricultural diversification and sustainable agricultural production, family and community employment, ritual purposes and social status (Moyo et al., 2010).

Livestock functions can be classified in several ways. According to FAO (ILRI, 1995), two widely used classifications are based on kinds of output produced or in the uses in which these outputs are put. Among the kinds of output produced it should be mentioned the food, inputs to cropping, and raw materials. Among output uses is pointed out subsistence consumption by the livestock holder's household, direct supply of inputs, cash income through sales of live animals or their output, savings and investment and social functions such as paying bride wealth, or providing animals for communal feasts or sacrifices.

Another classification is to divide livestock functions in economic roles such as source of cash income and mean of savings accumulation, direct feed use for family subsistence, input supply such as fertilizer and animal draught and to comply with a set of social rules and obligations.

Livestock has an important contribution for food supply of rural and urban areas and contributes to the family nutrition supplying animal protein. As household income increases, the consumption of protein increases, principally from animal origin, allowing the substitution of vegetal by animal protein. Besides milk, eggs and meat use as a source of food other products are used for domestic consumption and local sale as skins, hides and horns.

Livestock feature as living savings can be converted into cash whenever the family needs it, is a security asset influencing access to informal credits and loans and be also a source of collateral for loans. In many rural regions, in special where financial markets are absent or non-existent, livestock stocks or herds are a source of asset accumulation and a measure of wealth. Livestock stocks or assets can be mobilized at any time, satisfying planned expenditures such as children school fees and bridewealth or unplanned expenses such as the illness and death of family members. This livestock property of asset or bank account is also an important source of family savings that can be used in years of low crop production, reducing income insecurity and household vulnerability, being an important source of risk reduction and security increase.

Cattle production is closely interrelated with crop production. The use of livestock and its sub product manure are important in crop production. Livestock is a source of energy providing draught animal power while manure improves soil structure and fertility, and water retention. Both uses are environmentally friendly improving energy and nutrient cycling. Livestock is also used to transport agricultural inputs and outputs and people.

Livestock production is an important mean of exchange between rural households and, when sold, contributes to boost and strengthen rural markets. Rural markets are an important piece in the operation mode of rural communities and a significant contribution for rural families' wellbeing and wealth.

The social function corresponds to the symbolic values associated to each species and the use of animals for the fulfillment of a set of rituals and social obligations of families and communities. Livestock gives social status to its owners once it is considered a common mean of demonstrating wealth, delivers economic status as it facilitates the access to informal credits and loans to the households, is used in traditional rituals, ceremonies and festivities and is given as a gift in worships (e.g. installation of ancestral spirits, ritual slaughter, bridewealth).

In some cultures, animals can be considered sacred (cattle in India) and in others cultures (pigs in Muslim countries) animals are impure. For both these cultures, those species are not consumed by the population. In other countries or cultures, animals play an important leisure role, being used for betting, like horse racing and cock fighting, or for sports, like horses in polo.

Animal health greatly affects livestock functions, not only by direct effects on animal productivity but also by indirect effects, namely concerning human health, costs associated to disease control, international movement of animals and animal products and animal welfare (Otte and Chilonda, 2000).

Concerning the direct effect on productivity, it can be due not only to the mortality and reduction of livestock herds, but also, due to the decrease on productive parameters, namely weight gain or milk production, or even through the decrease of quality of animal products. The existence of a great number of parasitary, infectious or metabolic diseases that affect fertility cannot be underestimated, despite the difficulty to quantify the associated costs.

Besides the positive effects of livestock to human welfare, livestock production and consumption can also be associated to some risks, namely the transmission of important diseases that are transmitted from animals to humans (zoonosis). The absence of rigorous animal health control programs represents a high risk to the human health. Moreover the rigorous control and restrictions to animal movement and to exportation of animal products, associated with the existence of animal disease, makes the existence of national animal health programs indispensable in order to allow international trade.

Livestock production in Timor-Leste is predominantly familiar, the main species including chickens, pigs, goats, horses, buffaloes and sheep, and each one performing several functions for rural communities and families.

The social and cultural functions of livestock are often ignored when estimating the total contribution of livestock to the development of rural communities. Since those functions are difficult to value in monetary terms, emphasis is mainly placed on the physical marketed livestock production. One key to smallholder competitiveness is its ability to capture non market benefits, however not well measured to date (Ouma et al., 2003).

It is relevant to know the present functions of the livestock sector, and to understand that expanding the output of one function may diminish the output of another. So, in order to evaluate its importance, from different points of views, and to ensure policies and practices, all of them have to be taken in consideration.

The aim of this work is, for three rural communities in the district of Bobonaro - mountain area, irrigation plain and coastal zone - to identify and characterize the different roles that livestock and livestock species play in rural communities, highlighting the importance of animal production for the wellbeing and rural development, and relate the functions performed by livestock production with economic, social and cultural attributes of the communities. The data used in this study were collected in 2011 through a questionnaire survey and complemented with secondary data.

2. Livestock production in Timor-Leste

The majority of rural households and a significant number of urban households, own some sort of livestock, 76.63% in total rear livestock. Livestock species per order of importance in head numbers are chicken, pigs, goats, cattle, horses, buffaloes and sheep (DNE 2006; DNE 2011).

From the household point of view, the most important livestock species are chickens and pigs. In 2004, more than 70% of the households had these two species while in 2010 that percentage decreased to around 67%. The percentage of households with cattle and goats is about 20% and for both species there was an increase between 2004 and 2010 in the number of household holders of 8.3 and 9.3%, respectively. In the same period, the households with horses decreased 19.3%, from 17.6% to 15.0%, while households with buffaloes decreased 13.6%, from 11.3 to 10.4%. The percentage of household with sheep is small, around 4%, with a reduction in the period of 11.9%. In overall terms, between 2004 and 2010, only in cattle and goat production, there was an increase in the number of households involved in those livestock activities.

The average number of heads of livestock per household is low, but some large producers are found throughout the country. In 2010, the average number of heads is 6 for sheep, 5.6 for chicken, 5.0 for buffalos, 3.3 for goats, 2.7 for pigs and 2.1 for horses. Between 2004 and 2010 the average number of livestock heads per household increased. The reduction in the number of households involved in livestock production and the increase in livestock density per family is a phenomenon that often happens simultaneously.

TABLE 1
Households producing the different livestock activities in 2004 and 2010

Livestock Species	Number of livestock (heads)		Number of households involved		% of households with livestock		Number of livestock per household	
	2004	2010	2004	2010	2004	2010	2004	2010
Chickens	659066	702474	141372	124658	72.5	67.5	4.7	5.6
Pigs	331895	330435	140697	123862	72.2	67.1	2.4	2.7
Goats	126977	152360	41902	45781	21.5	24.8	3.0	3.3
Cattle	133577	161654	39713	43028	20.4	23.3	3.4	3.8
Horses	63234	57819	34314	27691	17.6	15.0	1.8	2.1
Buffalos	95921	96484	22127	19119	11.3	10.4	4.3	5.0
Sheep	38965	41854	7897	6957	4.1	3.8	4.9	6.0

Source: DNE 2006 and 2011

As expected, the percentage of urban households with livestock is much lower than those of rural households. Around 79.9% of rural households have some sort of livestock production and only 56.1% of urban households do.

The livestock species more relevant for urban households are chickens and pigs, 41.3 and 41.0%, respectively. Regarding the average number of livestock heads per household, urban areas show higher stock rates (Table 2).

TABLE 2
Comparison of livestock in rural and urban households for 2010

Livestock Species	Percentage of households		Number of livestock per household	
	Urban	Rural	Urban	Rural
Chickens	41.3	76.7	6.3	5.5
Pigs	41.0	76.2	2.3	2.7
Goats	9.0	30.3	4.0	3.3
Cattle	6.9	29.0	4.0	3.7
Horses	2.7	19.3	2.8	2.1
Buffalos	3.3	12.8	6.3	4.9
Sheep	1.8	4.4	7.7	5.8

Source: DNE 2011

The comparison between 2004 and 2010 of urban and rural households with livestock shows that the number and proportion of urban households with chicken and pigs decreased, while the number and proportion for sheep increased. Regarding livestock heads, the urban number and proportion of heads increased for chicken and sheep and decreased for pigs.

Concerning the distribution of households involved in livestock production per district, one can conclude that the importance of pigs and chicken are similar for rural and urban districts, with exception for the urban district Díli. The most important districts involved in goat production are Liquiça, Aileu, Oecussi, Manatuto and Baucau. Almost half of households in Covalima (49.3%), Bobonaro (43.3%) and Oecussi (44,5%) have cattle production.

Horse distribution is higher in the mountainous districts, Ainaro (37.5%), Manufahi (29.7%), Manatuto (25.5%), Baucau (24.7%) and Aileu (24.0%). Household engagement in buffalo production is higher in Viqueque, Lautem, Manatuto, Manufahi and Ainaro. Sheep production is mainly restricted to Baucau and Manatuto districts.

TABLE 3
Percentage of households involved in livestock per district and animal species

	Chicken	Pig	Goat	Cattle/Cow	Horse	Buffalo	Sheep
Ainaro	72.3	73.1	24.2	17.5	37.5	15.6	2.6
Aileu	76.0	81.5	39.7	30.7	24.0	11.7	3.3
Baucau	77.2	76.7	30.2	7.1	24.7	13.6	17.8
Bobonaro	77.2	77.8	32.0	43.3	11.4	10.9	1.9
Covalima	72.1	79.0	17.3	49.3	9.1	6.0	0.9
Dili	34.0	35.7	10.4	2.2	0.9	1.0	0.9
Ermera	71.4	68.1	19.8	24.7	11.3	7.0	2.0
Liquiça	84.1	81.7	50.1	31.6	9.0	5.5	1.2
Lautem	75.0	71.0	17.4	24.9	19.3	22.3	3.1
Manufahi	75.8	71.2	21.6	26.0	29.7	17.5	1.4
Manatuto	73.2	73.8	32.8	23.0	25.5	19.2	6.1
Oecussi	73.7	72.1	35.6	44.5	5.0	3.7	0.6
Viqueque	77.1	71.6	24.3	24.9	27.5	24.2	3.4
Timor-Leste	67.5	67.1	24.8	23.3	15.0	10.4	3.8

Source: DNE 2011

Regarding the distribution of livestock species per district, in overall terms the districts of Baucau, Viqueque and Bobonaro are the ones that show higher proportion of livestock heads. For chicken, the order is Baucau, Viqueque and Bobonaro, for pigs Bobonaro, Baucau and Viqueque, for goats Baucau, Bobonaro and Liquiça, for cattle Bobonaro, Viqueque and Covalima, for horses Baucau, Viqueque and Ainaro, for buffalos Viqueque, Baucau and Lautem and for sheep Baucau with more 55% of total heads.

TABLE 4
Livestock distribution per district (%)

	Chicken	Pig	Goat	Cattle/Cow	Horse	Buffalos	Sheep
Ainaro	4.6	5.0	4.1	4.0	11.0	5.1	2.6
Aileu	3.4	3.8	3.9	2.9	4.3	1.8	2.0
Baucau	12.0	10.7	17.0	3.8	20.8	15.1	55.2
Bobonaro	10.9	12.3	11.8	18.1	5.8	7.8	4.9
Covalima	6.8	9.6	4.6	13.8	2.8	2.6	1.7
Dili	9.9	8.6	9.5	2.2	2.5	1.5	4.3
Ermera	9.3	8.3	6.1	7.0	6.1	3.9	2.9
Liquiça	6.8	6.8	10.8	5.0	2.6	2.4	1.8
Lautem	9.6	7.5	5.6	10.4	10.5	15.9	5.9
Manufahi	5.2	5.0	3.3	4.7	7.3	6.1	0.9
Manatuto	3.5	4.3	5.6	3.8	5.4	8.9	9.7
Oecussi	6.6	7.6	8.8	10.2	2.4	1.9	2.5
Viqueque	11.6	10.5	8.9	14.0	18.7	26.9	5.7
Timor-Leste	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: DNE 2011

Crossing livestock heads with households involved in production, Table 5 shows animal densities per household and district. Regarding chickens, heads per households are higher in Lautem and Viqueque, for pigs in Viqueque and Lautem, for goats in Viqueque, Díli and Lautem, for cattle Viqueque and Lautem, for horses in Díli, Viqueque and Lautem, for buffalos Viqueque Manatuto and Lautem and for sheep Oecussi and Manatuto. In overall terms, animal producers of Viqueque and Lautem are the ones with higher animal herds.

TABLE 5
Number of livestock units per household and per district

	Chicken	Pig	Goat	Cattle/Cow	Horse	Buffalos	Sheep
Ainaro	4.6	2.3	2.7	3.8	1.8	3.3	4.4
Aileu	4.5	2.2	2.1	2.2	1.5	2.2	3.6
Baucau	5.1	2.2	4.0	4.1	2.3	5.1	6.1
Bobonaro	5.9	3.1	3.3	4.0	1.7	4.1	6.4
Covalima	5.9	3.6	3.7	4.1	1.6	3.8	7.1
Dili	5.8	2.3	4.0	4.6	4.6	4.2	5.8
Ermera	4.7	2.1	2.4	2.4	1.6	2.7	3.2
Liquiça	5.5	2.6	3.2	2.4	1.6	4.1	6.0

Lautem	7.9	3.1	4.3	5.9	2.7	6.0	6.8
Manufahi	6.1	2.9	3.0	3.7	1.8	4.3	3.3
Manatuto	4.9	2.8	3.8	3.9	1.8	6.4	9.5
Oecussi	4.5	2.5	2.7	2.7	2.0	3.5	11.7
Viqueque	7.6	3.5	4.1	6.6	2.8	7.7	5.1
Timor-Leste	5.6	2.7	3.3	3.8	2.1	5.0	6.0

Source: DNE 2011

Livestock feeding is done using native pastures, crop and fallow land, agricultural byproducts and waste materials around houses and villages. No grazing management rules of natural pastures leads many times to overgrazing and unsustainable animal production due to loss of the cover vegetation and enhance soil erosion. Native pastures available occupy an area of around 200,000 ha, about 10% of the country area (Cruz, 2003). The average number of cows and buffalos per ha of native pasture is around 0,8 heads, higher than 3 for the districts of Aileu, Dili, Bobonaro, Baucau and Ermera and less than 1 for Manufahi, Lautem, Covalima, Manatuto and Viqueque.

In overall terms, animal production is performed without any special concerns regarding feeding, reproduction or even health management. Animals are kept all together around the year, eating what is available, reproducing around all the seasons and fighting diseases based only in their natural resistance.

Pigs and goats are mostly free ranging some being housed near human houses and sometimes feeding with domestic feed debris. Chicken are almost raised as scavenging birds. Some times are housed at night and feed with domestic feed debris.

Buffalos, cattle and sheep are raised free in native pastures. Changes in feed quality are seasonal and associated with changes in rainfall, which results sometimes in inadequate feed supply. Problems of inadequate feeding are more frequently associated with inadequate quality, namely low protein content, than with complete absence of aliment and sometimes are due to poor feed resources utilization (Smith, 1992). The low quality of native grasses namely in the dry season, in which protein contents can follow bellow 4%, and the inability of the traditional grazing management methods to improve pasture utilization and enrichment are good examples of cattle and buffalo production constrains (Timor Agri, 2004).

In many situations, livestock underfeeding is observed but no feed supplements are supplied. Actually, in some areas, cattle and buffalos are supplemented with leguminous trees namely *Gliricidia sepium* and *Leucaena leucocephala*. However, and as referred in the past, at the present time frequently the nutrition of livestock species and working horses is often neglected and many still suffer from hunger (Cruz, 2003).

Despite the lack of reliable information on reproductive data, there is consensus that livestock fertility rate is low. The absence of a defined reproductive season and the associated nutritional constrains described above, as well as the possible existence of diseases affecting fertility can be responsible for this situation. The low fertility will affect animal selection and genetic progress. Moreover, the use of male animals in some rituals may have important consequences on fertility, mainly if the younger and better animals are the selected ones, staying in the farms only the older males to be used in reproduction.

Local livestock species, such as chicken and pigs, are more valuable than the imported ones. Regarding the gender divisions, usually women take care of small animals that live around the house, chicken and pigs, and men of the others, goats, buffalos, horses and cattle (Miranda, 2011).

Regardless the importance of livestock species in Timor-Leste, few studies have been performed in animal health distribution and no diseases are reported in OIE database (OIE, 2012).

In the past surra (*Trypanosoma evansi*) and hemorrhagic septicemia (*Pasteurella multocida*) have been described as causing and elevate mortality in Timor-Leste specially in buffalos and horses (Valdez, 1927; Valdez 1929; Silva, 1954). Moreover, Silva (1960) performed a parasitic prospection in Timor-Leste in which he describes the internal and external parasitic fauna existent in the island, including

Trypanosoma evansi, *Fasciola hepatica*, *Ascaris lumbricoide*, *Taenia solium* and *Coccidea sp.* as well as a variety of ticks namely, *Amblyoma cyprium cyprium*, *Boophilus microplus*, *Haemaphysalis papuana*, *Rhipicephalus haemaphysaloides*, *Rhipicephalus sanguineus*, which are well known vectors of important animal diseases.

Nowadays, Timor-Leste official veterinary services developed and applied veterinary programs concerning the control of some animal diseases namely Newcastle disease in chicken and hemorrhagic septicemia in cattle. Moreover two surveys were conducted by the Timor-Leste official veterinary services in cooperation with the Australian quarantine and inspection services to test the presence of highly pathogenic avian influenza, with all the results being negative (OIE, 2004).

Concerning the zoonotic diseases, the risk is highly improved in Timor-Leste due to the absence of routine animal health controls, that could identify important zoonosis namely brucellosis and tuberculosis. Moreover some livestock animals, namely pigs, are important reservoirs of emergent diseases in humans, namely Japanese encephalitis, which have been recently identified in Timor-Leste (WHO, 2012). Pigs are mostly free ranging some being housed near human houses and the risk for encephalitis is extremely improved in the rural areas where rice fields and pigs coexist.

3. The functions of livestock production and livestock species in Timor-Leste

The descriptions made by the Portuguese during the XXth century about Timor-Leste livestock species talk about buffalos, cattle, horses and pigs as a symbol of wealth, being the greatness of a king, chief or a simple man of the people, assessed by the number of animals or herds owned.

Although there were significant livestock numbers and the fact that animals are an important source of proteins, the Timor-Leste population rarely consumed their animals at home, except during funerals or feasts and to the dowry to the bride family. Animals were a way of capital accumulation and savings, which could be employed at the time of household necessities.

The Timor-Leste population did not explore livestock in economic and profitability terms. The animals are mainly used to sell or exchange for other products and to perform ceremonies and rituals. Livestock was seen as immobilized resource or wealth with low economic profitability (Valdez, 1929; Artur, 1926; Costa, 1950; Silva, 1954; Friedeberg, 1974; MED 2008).

Domestic consumption

Livestock species are a source of protein for Timor-Leste population but the consumption of meat is not done in a daily basis, instead it happens in the absence of vegetables, in the presence of guests and at the time when ceremonies are made, being chicken and pork the preferred ones. Meat dog is also consumed either at home or in the traditional restaurants, though in Viqueque only by men given that for women is considered sacred (Miranda, 2011).

Despite the old descriptions that referred that pure milk and milk mixed with rice or crushed corn was consumed as a delicious manjar and that the milk left was sold (Martinho, 1936), at present, milk from local production is not drunk, while eggs consumption is restricted, given that in the free ranging system it is difficult to collect the eggs.

The results obtained in three sucos of Bobonaro district show that the majority of the population eat meat only once a week (53.9%) and 31.4% twice a week (Table 6). Tapo-Memo population has higher consumption of meat than the other two sucos because this is a more urban suco. These overall results are better than the ones obtained by Deus (2011) for Letefoho sub-district, in Ermera district, in which the majority of the population eat meat once a month (47.7%) and 29.1% twice a week. These modest results confirm some of the descriptions made during Portuguese colonial period that reported to be rare the Timor-Leste population eat their own domestic animals.

TABLE 6
Number of times that households eat meat per week

Number	Tapo-Tas		Tapo-Memo		Aidabaleten		Total	
	N°	%	N°	%	N°	%	N°	%
0	0	0.0	0	0.0	7	20.0	7	6.9
1	26	74.3	8	25.0	21	60.0	55	53.9
2	6	17.1	21	65.6	5	14.3	32	31.4
3	3	8.6	2	6.3	2	5.7	7	6.9
4	0	0.0	1	3.1	0	0.0	1	1.0
Total	35	100.0	32	100.0	35	100.0	102	100.0

Regarding the livestock species used for self-consumption (Table 7), chickens, pigs, cattle and goats are the species more consumed. Regarding the households involved in livestock rearing in the survey, 66.3% eat chickens, 46.7% goats and 31.3% pigs. Sheep, buffalos and cattle are the species less utilized for self-consumption.

TABLE 7
Number and percentage of households that rear livestock and use for self-consumption

	Tapo-Tas		Tapo-Memo		Aidabaleten		Total	
	N°	%	N°	N°	N°	%	N°	%
Chickens	9	39.1	25	89.3	19	65.5	53	66.3
Pigs	1	3.4	15	55.6	10	37.0	26	31.3
Goats	1	33.3	12	63.2	8	34.8	21	46.7
Cattle	2	9.5	5	25.0	5	18.5	12	17.6
Buffalos	1	25.0	1	50.0	1	11.1	3	20.0
Sheep	0	0.0	0	0.0	1	12.5	2	22.2

Monetary income

Livestock is an important source of monetary income for Timor-Leste rural population. In our study (Table 8), the majority of the households ranked livestock as their most important second and third source of income, with 40.2% and 23.5% of households, respectively, while ranked fourth as first source of income with 18.6% of households. Regarding the 1th source of income, Tapo-Tas ranked livestock immediately after the first rank, wage work. In the other two sucos, livestock was ranked in first place as second source of income. The livestock species that contribute to livestock monetary income stated in descending order by households are pigs, chickens, cattle and goats, being buffalos residual. Regarding the households that are now involved in livestock rearing, 77.8% sell sheep, 66.7% goats, 60.0% chickens, 51.8% pigs, 58.8% cattle and 46.7% buffalos, as can be seen in Table 9.

TABLE 8
Livestock ranking by households as a source of income

	Tapo-Tas			Tapo-Memo			Aidabaleten			Total		
	N°	%	Rank	N°	%	Rank	N°	%	Rank	N°	%	Rank
1 th source of income	13	37.1	2 ^a	1	3.1	3 ^a	5	14.3	2 ^a	19	18.6	4 ^a
2 th source of income	9	28.1	2 ^a	16	50.0	1 ^a	16	45.7	1 ^a	41	40.2	1 ^a
3 th source of income	9	25.7	1 ^a	8	25.0	1 ^a	7	20.0	3 ^a	24	23.5	1 ^a

TABLE 9
Number and percentage of households that rear livestock and sell

Livestock species	Tapo-Tas		Tapo-Memo		Aidabaleten		Total	
	N°	%	N°	%	N°	%	N°	%
Chickens	10	43.5	22	78.6	16	55.2	48	60.0
Pigs	10	34.5	21	77.8	12	44.4	43	51.8
Goats	3	100.0	12	63.2	15	65.2	30	66.7
Cattle	14	66.7	7	35.0	19	70.4	40	58.8
Buffalos	1	25.0	0	0.0	6	66.7	7	46.7
Sheep	1	100.0	0	0.0	6	75.0	7	77.8

Cash income received from livestock selling and from other economic activities is used to pay the school of children, to buy clothes, tools and food and for 36.3% of the households to buy animals to rear (Table 10).

TABLE 10
Cash income spending (number and % of households)

	Tapo-Tas		Tapo-Memo		Aidabaleten		Total	
	N°	%	N°	%	N°	%	N°	%
School of children	32	91.4	27	84.4	26	74.3	85	83.3
Clothes	27	77.1	30	93.8	27	77.1	84	82.4
Tools	30	85.7	30	93.8	21	60.0	81	79.4
Food	21	60.0	19	59.4	14	40.0	54	52.9
Livestock	7	20.0	10	31.3	20	57.1	37	36.3
Other inputs	12	34.3	10	31.3	14	40.0	36	35.3
Machinery	1	2.9	4	12.5	21	60.0	26	25.5
Savings	7	20.0	3	9.4	14	40.0	24	23.5

Animal draught power and fertilizer

The technologies used by subsistence agriculture are traditional ones with low modern input use. The most important vegetal activities in terms of household in crop production are maize, cassava, temporary fruits, permanent fruits, vegetables, coconuts, coffee and rice. The use of draught animal power for land preparation is mainly confined to rice while the use of animal manure to fertilize the soil is widely used in the different crops.

Buffalos and horses are used in the preparation of the soil in rice fields. In the Baucau district, Silva (2011) found that around 52.1% of farmers use buffalos and 24% use horses in rice field preparation. In the suco of Tapo-tas, the households only use tools for land preparation, in Tapo-Memo, where the rice is an important culture, around 40.6% of households use animal draught power and in Aidabaleten 22.9% (Table 11). In these two sucos, the majority of the animals are owned by the households.

TABLE 11
Number and percentage of households using animal draught power

	Tapo-Tas		Tapo-Memo		Aidabaleten		Total	
	N°	%	N°	%	N°	%	N°	%
Animal draught	0	0.0	13	40.6	8	22.9	21	20.6
Owned	0	0.0	11	84.6	8	100.0	19	90.5
Rented	0	0.0	2	15.4	0	0.0	2	9.5

During the Portuguese colonization and Indonesian occupation, several attempts were made for the introduction and reinforce of animal draught power, not only for rice but also for the other agricultural activities such as maize. For example, with the supervision of Portuguese administration, fields experiments were made to use ploughs adapted to the thin and unfertile mountainous soils (Silva, 1910; Martinho, 1936; Thomaz, 1974). During the Indonesian occupation attempts were made, principally through transmigrants, to increase the use of draft animals, while after 1999 several programs and projects provided training and support in the use of drafts animals and on making ploughs (OXFAM, 2004). But all the programs were not successful. It is worth noting that ploughs are not used in Timor-Leste by the rural population since the country is outside the diffusion area of the Chinese plough, that reached Philippines and North Borneo, and also from the Indian plough, that affected Java and Bali (Thomaz, 1973).

Mean of transportation

The Timorese horse is one of the greatest richness of Timor-Leste people. From Arab origin, with elegant shape, is small and nervous, tough and of a great resistance. Having hard shell and not using horseshoe, climbs like a goat the highest mountains and the steepest barriers and goes down without

hesitation the most rugged slopes, walks the difficult and dangerous paths of rural Timor-Leste. His natural aptitude is for saddle and race, although can be used for draught (Valdez, 1926; Silva, 1954).

In the past, horses were used not only as transportation and draught animal power, but also in the wars between the different kingdoms and between them and the Portuguese colonial power. Horses were also used in the hunt of deer. Until the XIXth century, Timor-Leste horses were well known in the South East Asia for their excellent qualities and were exported for Philippines and Dutch territories (Martinho, 1936).

Nowadays, it is still a valuable element for the people of mountainous and remote regions with access and isolation difficulties, facilitating their access to rural and urban areas and markets and to main roads. Horses transport the owner, either farmers or sellers, and their agricultural products and inputs (Sá, 1963; Miranda, 2011).

Social roles

There has been an increased interest in the role and impact of livestock in the livelihoods of the poor in the last decade and livestock are starting to be viewed as a form social capital, like other forms of capital (natural, financial and so on). According to the FAO (ILRI 1995), paying bride wealth with animals or providing animals for communal feasts or sacrifices could be considered as social functions of the livestock activity.

The social functions corresponds to the symbolic values associated to each species and the use of animals for the fulfillment of a set of rituals and social obligations (funerals, ritual slaughter, bride wealth) of families and communities, either formal and informal, and in this way animals are a mean to strengthen social networks. Livestock play a social role also by giving social status to livestock owners and also economic status, facilitating the access of the households to, both informal and formals, financial services, i.e. animals can be used as collateral. They are also considered a common mean of demonstrating wealth.

To fully understand the social role of livestock, it is also important to consider the role that gender plays in livestock production. To treat the pigs and chickens is considered a women's work, on the opposite the guard of buffaloes and cows, which are male property, is considered a man's job. The same division apply to its commercialization (Miranda, 2011) women are in charge of small animals and the men of big ones. In rituals there are animal that have a feminine symbolic value and others with masculine symbolic value. Pigs are considered feminine goods, buffalos and cows are masculine goods.

Animal have also for Timor-Leste people a leisure value once they are used for racing and fighting games.

Horse racing

During Portuguese colonial period horse racing became also very pleasing to the Timorese people. The descriptions made say that bets were made, in which participated local and European people, involving sometimes appreciable amounts, horses and riders entered the racetrack under standing ovations and assistants accompanied the running of the race with great enthusiasm, especially the punters or bettors (Figueiredo, 2004). Nowadays, horse racing is gaining again its importance with the construction of the hippodrome in Batugadé close to West Timor. The last racings were integrated in the commemorations of the 10th anniversary of the independence of the country and count with Australia, Indonesia and Timor-Leste participation. The horse racing is seen as important to tourism and economic development. (http://www.youtube.com/watch?v=yBtVdJG7_1w&feature=plcp).

Cock fighting

Cock fighting is one of the older traditions of Timor-Leste and one of the games preferred by Timor-Leste people from all regions. It is a popular masculine pastime where women are not allowed to participate (Hicks, 2001). Cocks are admired in Timor because of their courage and perseverance and the courage of a man is sometimes compared with that of a cock, while a coward is called a hen. The

cock fighting is inseparable from his owner and it is common to see men carrying cocks under their arms as precious possessions.

Cockfights are held on any social occasion when men get together, from the spontaneous to more formal occasions and are part of many weekly markets. In the past, the animals represented always two factions or two villages and not only fight for their owners, but also for the two villages or kingdoms. There were two fights, between the two cocks and between the bets made by people belonging to the two factions.

It is a gambling game and a very important leisure activity in Timor-Leste. It is a fight to first blood, it makes it very quick, 10-20 seconds from the wind up to first blood, and there is always someone on site, to stitch up the loser and he can go home to the cooking pot or to stud. East Timorese say gambling is in their blood after centuries of cock-fighting and many times lose all their belongings in an afternoon of betting in cock fighting (Fontoura, 1940; Braga, 1935; Sá, 1963).

The Portuguese colonial government tried but was not able to end this practice and instead implemented a tax to its realization, thus becoming a source of income to the state also. Beside the fact that many *tais* designs include the cock, its representation in the coins (10 cêntimos) is a tribute to the culture and to the courage of Timorese's people to fight over time to achieve their independence. The portuguese poet Ruy Cinatti, also in a tribute to Timor-Leste culture make the following poem about cock fighting.

A Luta de Galos

(desporto número um dos Timorenses)

Galo doido, meu brinquedo,
Aninhado nos meus braços.
Sinto o meu coração preso
Só de pensar no combate.

Pintei-lhe de verde as penas
Só a pensar no combate.

(in "Um Cancioneiro Para Timor" – Ruy Cinatti
– 1996)

Source: Cinatti, 1996

The cock fighting

(Timorese number one sport)

Cock crazy, my toy,
Tucked away in my arms.
I feel my heart stuck
Just thinking about the fight.

I painted its feathers of green
Just thinking about the fight

Handicrafts

The Timor-Leste people, with his patience and perseverance, manufactures small articles from the black and white horns of the buffalos, such as dolls, utensils of ménage and adornments, which are a demonstration of his skills and artistic sense (Fontoura, 1940; Braga, 1935). Nowadays there are some handcraft made with animal raw materials such as skins and horns, used to build drums and other artifacts.

Animals as symbol of wealth

The cattle, and special buffalos, are owned as an index of wealth, outward sign of wealth, often created by mere ostentation, without the intention to extract from it any net income.

Cattle ownership largely determines social status in village communities. Owners of large numbers of cattle are important people in society and are always involved in important village events. The Timorese evaluates the wealth of a chief, boss, or a simple man by jewelry, clothes and animals they have, and the buffalo always enter in this calculation with a significant weight (Cruz, 2003).

Buffalos

According to Cinatti (1987) in Timorese society, the buffalo is one of the most useful/helpful animals. The buffalo is a "multi-task" animal: it works, give prestige and it is used in ceremonies.

As a working animal it is indispensable to prepare the lowland rice fields; it gives prestige as buffalos are used as a measure of wealth and as simple method of save accumulation.

During the last century several authors mention the Buffalo as the sacrificial animal per excellence in agricultural, weddings and burial rituals (Valdez, 1927; Martinho, 1936; Thomaz, 1974; Sá 1963). Martinho (1936) refers that “estilos” of "Ocoí-Mate" cause the dead of some thousands of animals, buffaloes, pigs and goats around the year. Even nowadays buffalos are part of the “barlaque” and are indispensable in “estilos” of Ocoí-Mate. The *estilo* of "Ocoí-Mate" is a memorial service for departed souls. Animistic and superstitions says that the soul of the deceased does not feel quiet if relatives, in funeral ceremonies, not sacrifice a few buffalos.

The buffalo meat is of inferior quality but in Timor people makes extensive use of it. Their meat is appreciated in most of the territory. In fact, in terms of meat quality, the buffalo is lower than those of cattle, but in the traditional system, presents an opposite meaning, ie, taking as an example, the dowry and the funerals, the buffalo has more symbolic importance than that cattle. Another dimension considered important to treat this animal is the size and length of horns. The largest value resides in the length of the horns and not on the size and volume of the body.

Livestock

For all that reason farmers are reluctant to slaughter animals, namely cattle and buffalos, for their own consumption, except during funerals, festivals or wedding celebrations. Occasionally, a farmer will slaughter an animal but will negotiate with relatives, friends and neighbors beforehand to ensure that the excess can be sold.

Cattle are more valuable than goats, sheep and pigs from a social point of view but they are not as easy to sell. Goats, sheep and pigs can be sold easily whenever farmers face economic difficulties. Ruminants are important for meeting the needs of major local markets throughout the territory (Cruz, 2003).

Ceremonies and Rituals

One of the social functions is the use of animals for the fulfillment of a set of rituals and social obligations (funerals, ritual slaughter, bridewealth) of families and communities, either formal and informal.

For the three sucos studied, the animals that are more relevant for traditional ceremonies and festivities “estilos” are pigs and cattle followed by chicken and goats. Cattle are more important for Tapo-Tas and Aidabaleten, while pigs and chicken are for Tapo-Memo (Table 12). Regarding the households that are involved in livestock rearing, 51.5% use cattle, 47.0% pigs, 46.7% goats and 30.0% chickens. The animals used are cooked, often in a special way, and shared by participants.

TABLE 12
Nº of households which use livestock animals for ceremonies and festivities

Activities	Tapo-Tas		Tapo-Memo		Aidabaleten		Total	
	Nº	%	Nº	%	Nº	%	Nº	%
Chickens	4	17.4	18	64.3	2	6.9	24	30,0
Pigs	9	31.0	20	74.1	10	37.0	39	47,0
Goats	1	33.3	12	63.2	8	34.8	21	46,7
Cattle	10	47.6	11	55.0	14	51.9	35	51,5
Buffalos	0	0.0	0	0.0	1	11.1	1	6,7
Sheep	0	0.0	0	0.0	1	12.5	1	11,1

Among the several ceremonies performed around the year it is worth to highlighting the “*Finados*” which is celebrated by 99% of respondents followed by the day of All Saints (Table 13).

TABLE 13
Rituals performed every year

	Tapo-Tas		Tapo-Memo		Aidabaleten		Total	
	N°	%	N°	%	N°	%	N°	%
Build and inaugurate sacred house	10	28.6	5	15.6	8	22.9	23	22.5
Remove mourning (desluto)	9	25.7	9	28.1	7	20.0	25	24.5
All Sould's day (finados)	35	100.0	32	100.0	34	97.1	101	99.0
All Saints day	24	68.6	30	93.8	25	71.4	79	77.5
Funerals	12	34.3	6	18.8	8	22.9	26	25.5
Weddings	6	17.1	5	15.6	4	11.4	15	14.7
Call the rain	21	60.0	12	37.5	6	17.1	39	38.2
Burning grass	4	11.4	9	28.1	3	8.6	16	15.7

Almost all families celebrate some kind of worships before or/and after harvest the main agricultural production and they do that mainly as a household or family ceremony and more than of half of them as a more large communal ceremony (Table 14).

TABLE 14
Type of worship made

	Tapo-Tas		Tapo-Memo		Aidabaleten		Total	
	N°	%	N°	%	N°	%	N°	%
Worships before and after harvest	34	97.1	30	93.8	35	100.0	99	97.1
Individual worship	32	94.1	30	93.8	34	97.1	96	95.0
Family worship	25	73.5	19	59.4	33	94.3	77	76.2
Community worship	23	67.6	16	50.0	18	51.4	57	56.4

Beside the main vegetable production, cattle and buffalos are also subject to worship and these occur mainly in Tapo-Tas which is in the mountain and the most rural of them (Table 15).

TABLE 15
Main agricultural activities subject to worship

	Tapo-Tas		Tapo-Memo		Aidabaleten		Total	
	N°	%	N°	%	N°	%	N°	%
Maize	34	100.0	31	96.9	30	85.7	95	94.1
Rice	8	23.5	32	100.0	33	94.3	73	72.3
Coffee	22	64.7	2	6.3	1	2.9	25	24.8
Cattle	18	52.9	2	6.3	4	11.4	24	23.8
Buffalos	9	26.5	1	3.1	3	8.6	13	12.9
Fishing	3	8.8	2	6.3	21	60.0	26	25.7

In all districts the communities still perform a set of rituals with a “propitiatory” nature (before sowing, after harvest, in the case of pests, to ask for rain or to ask to stop the rain ...) and even technological innovations from outside the community have to be integrated into the local culture, such as the ritual of Fasi karau ain (washing the feet of the buffalo) that in the district Viqueque continues to be done, not only to animals but also to tractors (Miranda, 2011).

Beyond the prayers, songs, dances and other gifts as gold, money and areca, the people proceed to the sacrifice of animals to offer to the spirits or to see in his bowels how the harvest will be.

This practice highlights the importance of the investment that is made in agriculture, despite the low number of animals that each family has, they do not fail to meet their ritual obligations, providing animals for communal feasts or sacrifices, in order to try to ensure a good harvest. As gift/scarified in ceremonies, the animals most used are chicken and pigs (Table 16). The buffalos are used only by about 3% of the households.

TABLE 16
Gifts offered in the worships

	Tapo-Tas		Tapo-Memo		Aidabaleten		Total	
	N°	%	N°	%	N°	%	N°	%
Cock and hen	31	88.6	31	96.9	32	91.4	94	92.2
Pigs	23	65.7	27	84.4	28	80.0	78	76.5
Goats	8	22.9	3	9.4	17	48.6	28	27.5
Eggs	13	37.1	6	18.8	24	68.6	43	42.2
Cattle	4	11.4	1	3.1	4	11.4	9	8.8
Buffalos	2	5.7	1	3.1	0	0.0	3	2.9
Palm wine (tua mutin or tua sabu)	9	25.7	5	15.6	3	8.6	17	16.7
Areca e bétele	27	77.1	29	90.6	21	60.0	77	75.5
Money	16	45.7	10	31.3	19	54.3	45	44.1
Gold	5	14.3	4	12.5	2	5.7	11	10.8

If we compare these findings with the past documents seems that buffalos are losing importance but according our informants the decreased in using Buffalos in ceremonies is not because they are not important and desirable but due to the fact that they are very expensive and only affordable on very rare occasions and for very few families. This idea confirmed the description made by Claudine Friedberg, she mentioned that “During my presence, these rituals were no longer performed, undoubtedly because one no longer could afford them” referring the ‘cooling’ ritual in which a piglet and a goat were traditional slaughtered (Friedberg, 1989).

4. Conclusions

In sum we can identify in the literature written about Timor-Leste and in our research different functions of livestock.

Nowadays, livestock is seldom used on agricultural works, such as land preparation, but the manure is often used as organic fertilizer. As a mean of transportation, cattle and horses are used but much less than were in the past. However, when families do not have another mean of transport, use the animals mainly for cargo.

Regarding consumption, livestock species are a source of protein for Timorese even though the consumption of meat is not done in a daily basis. The livestock species used for self-consumption are mainly chickens, pigs and goats, that is small animals. At present, milk from local production is not drunk, although in past times buffalo milk was consumed but this use was lost with the war. The Timor-Leste people use articles from the black and white horns of the buffalos to manufacture articles such as dolls, utensils of ménage and adornments.

Concerning domestic finances, animals are very important as a mean of asset savings that can be converted into cash when family needs. In many rural regions livestock stocks are a source of asset accumulation. This source can be mobilized to satisfy some unexpected expenditures such as children school fees, bridewealth, illness, etc. Cattle are owned as an index of wealth, outward sign of wealth, often created by mere ostentation, without the intention to extract from it any net income. This ownership largely determines social status in village communities.

One of the social functions is the use of animals for the fulfillment of a set of rituals and social obligations (funerals, ritual slaughter, bridewealth) of families and communities, either formal and informal. The most relevant animals for traditional ceremonies and festivities “estilos” are pigs and cattle followed by chicken and goats.

From our observations and talks with local people it is worthwhile to mention the importance given by households to the social functions. However these functions are often ignored when estimating the total contribution of livestock, since they are difficult to evaluate, more studies need to be done in order to better understand and assess the role of livestock in the wellbeing and in development of rural communities in Timor-Leste.

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