



ROLE OF DOMESTIC ANIMALS IN PEASANT HOUSEHOLDS FROM THE ANDEAN AREA OF TOLIMA, COLOMBIA

[EL PAPEL DE LOS ANIMALES DOMÉSTICOS EN EL HOGAR CAMPELINO DE LA REGIÓN ANDINA DE TOLIMA, COLOMBIA]

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SUMMARY

It is considered that cattle production systems cause a high environmental impact on strategic ecosystems like the deforestation on tropical forest. However, rationally oriented livestock systems can play a positive role in rural livelihoods. In this study, surveys and interviews were carried out in 49 coffee growers from Andean region of Colombia, where domestic animals had been reported to have different roles in the households such as source of protein food, nutrient recycling, a way to increase income and a source of commercial products. The farmers were classified in three clusters such as T3, T2 and T1, according to socioeconomic and technological indicators extracted from the survey. Different features of farming system were identified in each cluster, among them T1 has the largest farm area (average 32.2 ± 20.2 ha). The clusters T1, T2 and T3 have an average of 17.6 ± 8.6 , 8 ± 4.8 and 4 ± 2.5 cows per farm respectively. In addition, coffee growers have other livestock species like chickens, hens and pigs, that are oriented mainly to own consumption. In conclusion, livestock systems, particularly small scale cattle production contribute to the livelihoods and wellbeing of coffee growers in the Andean area of Colombia.

Key words: qualitative approach; peasant; livelihoods; small livestock.

RESUMEN

Se ha considerado que los sistemas de producción ganaderos tienen un alto impacto sobre ecosistemas estratégicos como deforestación en los bosques tropicales. Sin embargo, racionalmente orientados los sistemas pecuarios pueden jugar un papel positivo en los medios de vida rurales. En este estudio cuestionarios estructurados y entrevistas fueron aplicadas a 49 productores de café de la región andina colombiana en donde los animales domésticos juegan diferentes roles en el hogar, como ser fuente de proteína, reciclaje de nutrientes, una forma de incrementar los ingresos y fuente de productos comerciales. Los productores fueron clasificados en tres grupos denominados T1, T2 y T3, de acuerdo a indicadores socioeconómicos y tecnológicos seleccionados de la encuesta. Diferentes características de los sistemas de producción fueron identificados en cada grupo, entre ellos que T1 tiene el área más grande (promedio 32.2 ± 20.2 ha). Los conglomerados T1, T2 y T3 tienen un promedio de 17.6 ± 8.6 , 8 ± 4.8 y 4 ± 2.5 vacas por finca, respectivamente. Además, estos productores tienen otras especies animales como pollos, gallinas y cerdos, que están orientados principalmente al autoconsumo. En conclusión, los sistemas pecuarios, particularmente, la producción de Ganado en pequeña escala contribuye a los medios de vida y el bienestar de las familias cafeteras en la zona andina de Colombia.

Palabras clave: investigación cualitativa; campesinos; medios de vida; pequeña ganadería.

INTRODUCTION

Livestock breeding provides the population with various foods (milk, meat, lard, eggs, and so forth), and light industry with raw materials (such as cheese, wool, and hides). On the other hand, it also provides the tractive force of horses, oxen, asses, mules and

buffalos. Other by-products of livestock breeding are organic fertilizer (manure).

In the Colombian coffee area, livestock production systems have been associated with high environmental impact on ecosystems. For example, deforestation processes on the Andean forest of Colombia to establish pastures as the source of cattle food or to

establish coffee plantations (Etter and Wyngaarden 2000).

This change in land-use started in the early XX century, but it was more important along middle century devote a governmental coffee policy. That trend decreed in the eighty decade, when the international coffee quota agreement was finished. After that, the coffee cultivated area started a drop down and also the coffee lands start to be substituted by pastures for cattle breeding. However, natural regeneration processes of forest were evident too, specially, where the coffee growing areas were abandoned (Rodriguez, 2011).

Today Andean region from Colombia is characterized by smallholders, some of them, peasants. They are manager of small farming diversified systems, especially in the Tolima area where the main economic activity is the growth of coffee, and where the domestic animal breeding became an increasing economic activity. However, from an environmental point of view, landscape dominated by slopes is not an appropriate area for cattle breeding, and from a social point of view, rationally managed livestock systems could play a positive role in rural livelihoods. The positive role appears since they constitute a source of protein food with reduced costs, nutrient recycling, increase savings, availability of tractive force for transportation and cultivation and finally, a diversified source of commercial products (Mora and Holguin 2011).

The focus of this study correspond to systems analysis in different types of peasant farms from Andean area of northern of Tolima. We guess, this focus can contribute to improving the efficiency of the two basic remits of the agricultural extensions': carrying out diagnoses of farm functioning and advising farmers in techno-economic matters (Landais, 1998). The objective of this study was to evaluate the role of small scale livestock production systems as a source of additional income in rural farmers. The research included the identification and partial characterization of the small scale livestock production systems belonging to the coffee growers in the Andean area of Colombia, South America.

MATERIALS AND METHODS

The study contained two parts; the first includes the description of the region studied. The socioeconomic aspects and the biophysics events that could be related to modifications of landscape, mainly the process of land use change toward an agricultural and livestock industry, dominated by coffee plantations were obtained from a database constructed in a previous study (Calderon and Gomez, 2007). After that, a simple random sample of 49 farmers was selected. The

study was carried out in households of coffee growing areas from four municipalities (Icononzo, Villarica, Fresno and Líbano) located in the Andean area of Tolima (Colombia). The main economic activity of this area is the growth of coffee, however, the livestock activities are increasing in the household's activities portfolio. The area is located at 1000 – 2000 m.a.s.l. average temperature is 19 °C and precipitation fluctuates from 1000 – 3000 mm per year. It is a tropical rainy forest area.

In the second part of the study used surveys and interviews to identify and analyze some of the socioeconomic characteristics of the families, thus a data base was done. A clustering of farms was performed using the technique of cluster analysis (CA) by the Ward method. This procedure allows a typology according to their similar characteristics to the variables analyzed. Ward's method forms groups where variability within groups is high and is the highest among groups. To further establish the differences between groups of farms were performed Canonical Discriminant Analysis using the Infostat software (Di Rienzo *et al.* 2008). Finally, a qualitative discussion of the role of domestic animals within the context of livelihoods of rural families was done.

RESULTS

After of clustering, the canonical discriminant analysis of multivariate statistics confirm three types of farms: large farms (T1), with an estimated area of 32.2 ± 20.2 ha ($n = 20$); medium farms (T2) with an estimated area of 20.5 ± 12.9 ha ($n = 6$) and small farms (T3) with an estimated area of 8.9 ± 6.6 ha ($n = 23$) (figure 1).

Farm typologies, therefore, clearly cannot meet on their own all expectations. However, the typology aims to serve as a systems model, based on a global and consistent vision of on-going development processes (landais, 1998). It offers an appropriate framework to explore the place of animal subsystem in the more general system (the farm) and predict its interactions with others subsystems.

Land use in the typology of farms

A farming system is defined as a population of individual farm systems that have broadly similar resource basis, household livelihoods and constraints and for which similar development strategies and interventions would be appropriate (Subba, 2012). In a farming system, the farm family is also intimately linked. Farming system is holistic in its scope, therefore it is the focus used in this research. Figure 2 show the proportion of land uses reported on households from study area.

T1 cluster grouped the larger farms, where the pastures have become the main land use, especially in the last decade, however conservative lands constitutes an important proportion of farms too, probably because in these lands crop areas were abandoned.

On the contrary, the coffee plantations constitute the main land use in the medium-size farms. There is a balance among different land uses of small farms, which could indicate a strategy to diversification of the livelihoods. There is a variety of agricultural sub-systems within the small farming system due to the different family's decisions.

In the figure 3, you can see the interactions among different agricultural and livestock components. Coffee production system is the main component of the small farming systems, which is generally associated with *musa* species (banana and platan) working as shade. Interacting with the coffee system we found the livestock component, specially, backyard-birds, like pigs, chickens and laying hens. These are oriented to own family consumption, particularly it constitutes a ceremonial found as reported previously (Wolf, 1966; Meillasoux.1973); generally, these animal species are a gastronomic attraction, used to offer guests special family events like baptisms, first communions and marriages. Also, in collective actions as so-called "mingas" these dishes are offered in culinary preparations typical of Tolima as the "sancocho" or "lechona tolimense". In occasions, the minor species

are interchanged with their neighbors as an expression of social capital (Mora-Delgado, 2011). Others families manage cattle production systems at small scale, especially dual purpose, to obtain milk for selling and own family consumption. They sell the male calves and fatted cattle too.

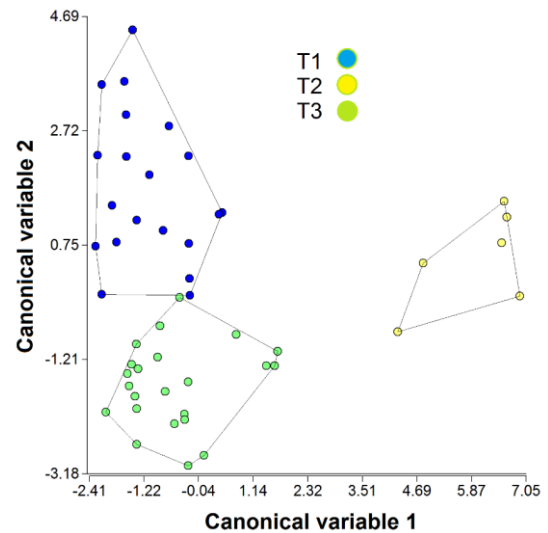


Figure 1. Canonical discriminant analysis of peasant farms in northern and central eastern Tolima.

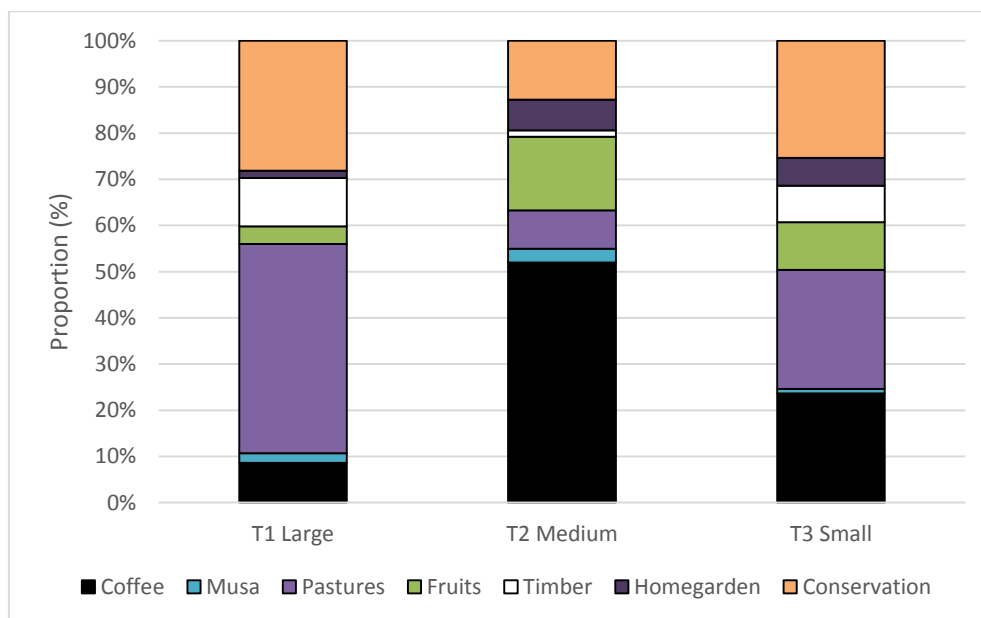


Figure 2. Average of land use proportion (%) of land use in typology of households from Andean area of Tolima, Colombia.

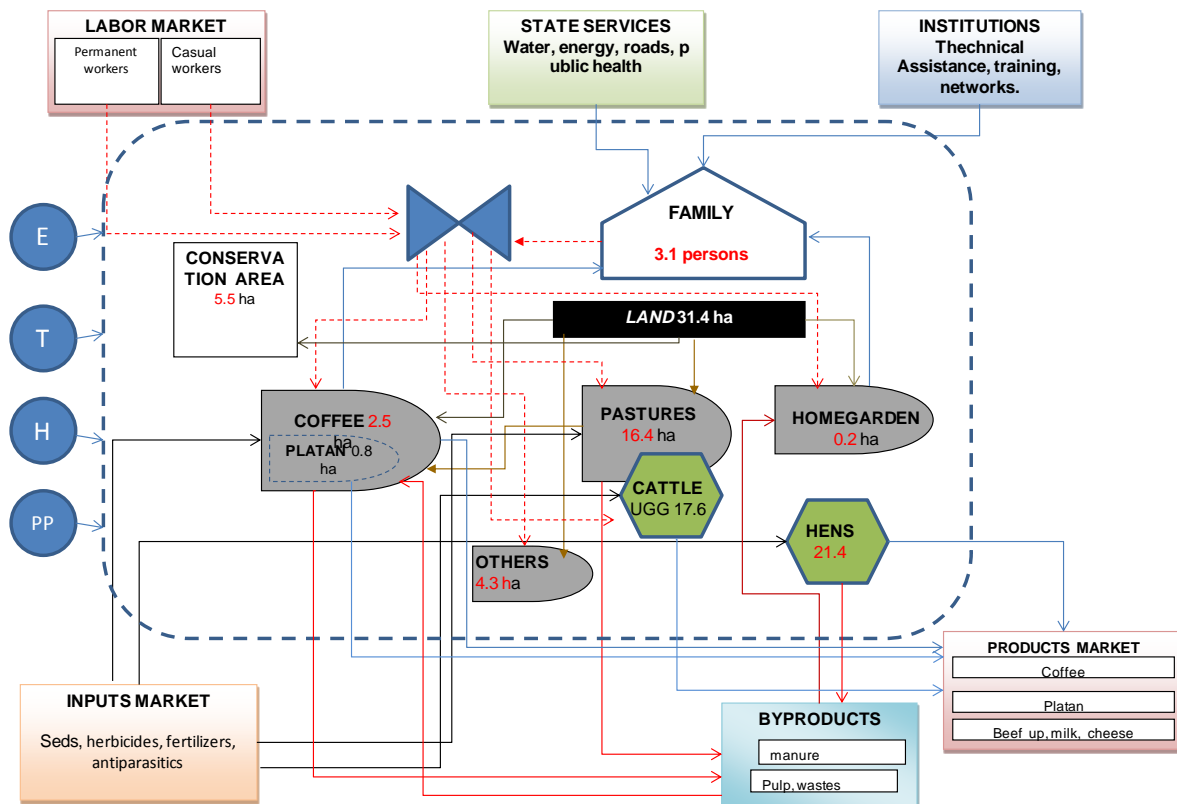


Figure 3. A model analogous to the small farming systems from the coffee area of Tolima, Colombia.

Human capital

Families in our sample were constituted by 3 or 5 persons average. The average peasant household members in Colombia is 5, smaller families are made up of three people and the most numerous by 15. However, today 78% of households generally are made up of 5 members or less. The majority (85%) of families are two-parent nucleated (Alvarez and Restrepo, 2003).

While in the rural economy, the family labor plays a major role in the production system, area study found that hired labor is critical, especially in times of harvest or other intensive agricultural labor practices; this is explained in the size of families and many of them in the hands of the members of working age have emigrated.

The households were similar in terms of education levels, predominating people with elementary or incomplete secondary studies, although, in both medium and large farms holders 23 -28% achieved university studies.

It was noted that 4% of the small farms households lacked formal education compared to medium (3,6%) and larger farm (3,2%) households. Most of the people in large and medium farms (53% and 52%, respectively) households were adults with ages up to 40 year-old, suggesting a tendency of increased migration of young people, perhaps looking for better job opportunities in big cities. In larger and small farm holders, the majority (58%) are males. These results confirm previous findings reported by Mora-Delgado (2011), where the households were similar in terms of education levels, predominating people with elementary or incomplete secondary studies and a minor proportion of households that had attained university studies and finally a lack of formal education mainly in small farms.

Table 1 confirms the importance of cattle breeding activities in the T1 cluster and the minor species as a livestock component oriented to own family consumption. The small amount of animals in each farms appear to not represent a commercial activity.

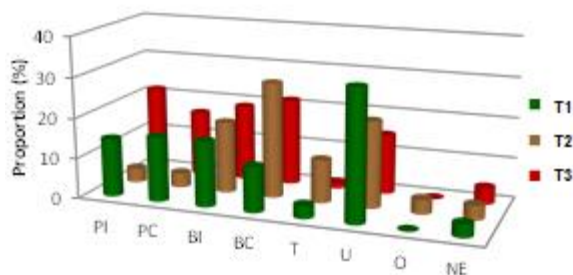


Figure 4. Education levels of households from Andean area of Tolima, Colombia.
 PI uncompleted primary; PC completed primary; BI uncompleted secondary; BC complete secondary; T technical studies; U university studies; NE No study.

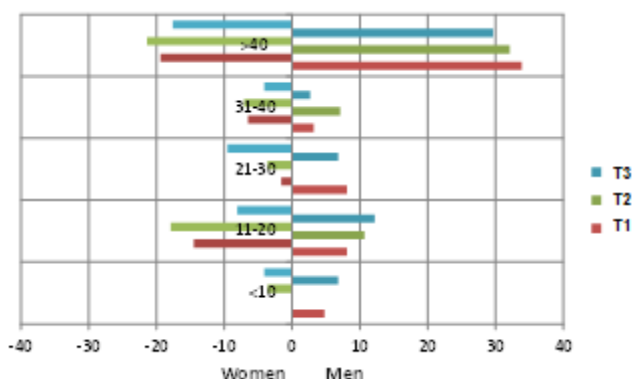


Figure 5. Age distribution of family members from Andean area of Tolima, Colombia.
 T1, Large farm, T2, medium farm, T3, small farm

Table 1. Animal subsystem in different type of farms from the Andean area of Tolima, Colombia

DESCRIPTOR	T 1	T 2	T 3
Pastures area (ha)	16,4±13,5	3,8±2,6	3,2±2,1
Cows (UA)	17,6±8,6	4,8±4,8	4±2,5
Pigs (#)	3,0±2,6	9,0±11,3	2±1,7
Backyard chicken (#)	14,4±20	12,5±12,7	5,5±6,5

T1, Large farm, T2, medium farm, T3, small farm

On the other hand, animals have been used for transportation and work force. In the coffee area of Colombia it is tradition to use the “recua”, which is a group of animals handled by a peasant named “arriero”. In the middle of the last century, it was a very common transportation system for agricultural products, specially using mules, oxen or horses.

In addition, animals constitute a source of manure used as fertilizer in gardens. In particular the chicken manure is used to fertilize coffee plantations (Piñeros *et al.* 2011). The chicken manure is an organic resource that constitute a form of nutrients cycling. Few small farm holders prepare compost as organic fertilizer for the coffee plantations.

We found a differential distribution of herds that depend of farm’s productive trends. The clusters T1 and T3 show an important proportion of male animals, among them bulls, calves and steers that are probably in the fattening process, and suggests a tendency towards dual-purpose animal production. Cows constituted 50% of the herd in cluster T3, indicating a distribution oriented to dairy farm production. High proportion of calves and heifers in cluster T2 suggests a tendency toward dairy farm production.

Indeed, the coffee constitutes the main income source, but the livestock activities are increasing and they start to participate in the economical portfolio of the households. The highest incomes per farm were achieved in the medium farms, indicating that those farms are perhaps the more efficient. It is also evident the differences in the proportion of incomes generated by the agricultural and livestock sources.

Table 2. Proportion of incomes from different agricultural sources form the Andean area of Tolima, Colombia

	Total income US\$/ha	Coffee (%)	Milk (%)	Calves (%)	Backyard chickens (%)
T1	233.7	43,9	44,7	9,3	2,1
T2	3184.1	94,6	1,3	0,5	3,6
T3	601.0	62,3	27,0	2,2	8,4

T1, Large farm, T2, medium farm, T3, small farm

The highest incomes per farm were achieved in the medium farms, indicating that those farms are perhaps the more efficient, however, there may be others reason too, for example, the higher incomes, provided by coffee trade, which result in a high income per ha. The coffee production represents the main source of family incomes, while the livestock production represents a strategy to improve livelihoods. Incomes from livestock activities are important in T1 and less in T3. As the most important problems that were recognized in the households interviewed in this study, are those related with the constantly increasing high prices of consumables and supplies, in addition to coffee production's dependency as their main income source (Table 2).

CONCLUSIONS

Animal subsystems are very important asset as a way to improve social wellbeing of both rural households and communities. In the majority of interviewed households, livestock component was constituted by minor species like chickens, hens and pigs, oriented mainly to own family consumption. It is important to study the environmental impacts of cattle production systems and also, it is necessary identify new eco-friendly strategies to improve the cattle breeding. Finally, livestock systems have contributed to improve livelihoods and wellbeing of peasant in the households of Andean rural area of Colombia.

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REFERENCES

- Álvarez, M, and Restrepo, L. F. (2003). La variedad de alimentos disponibles en el hogar metodología para identificar vulnerabilidad a la inseguridad alimentaria y nutricional en hogares campesinos. *Respyn*, 4 (4) octubre-diciembre, 25-40.
- Calderón, J.C., y Gómez, S.M. (2007). Evaluación bioeconómica de modelos pecuarios y planteamiento de diseños alternativos mejorados en fincas de los municipios de Anzoátegui, Villahermosa, Fresno y Líbano (Tolima). Trabajo de Grado para optar al título de M.V.Z., Universidad del Tolima. 151p.
- Di Rienzo, J.A. Casanoves, F. Balzarini, M.G. Gonzalez, L. Tablada, M. Robledo, C.W. 2008. InfoStat, versión 2008, Grupo InfoStat, FCA, Universidad Nacional de Córdoba, Argentina
- Etter, A. and Wyngaarden, V. 2000. Patterns of Landscape Transformation in Colombia, with Emphasis in the Andean Region. *Ambio* 29(7):412-439.
- Landais, E. 1998. Modelling Farm Diversity New Approaches to Typology Building in France. *Agricultural Systems*, Vol. 58, No. 4, pp. 505-527.
- Mora-Delgado, J. 2011. Social Capital and Reciprocity Relations In Small Households From Rural Andean Area Of Colombia (South America). "XXIV European Congress for Rural Sociology". 22-25 August 2011, Chania, Crete, Greece
- Mora-Delgado, J. and Holguín, V. (Eds.) 2011. Medios de vida y materiales orgánicos en fincas campesinas (Métodos de análisis en fincas de la ecorregión cafetera). Universidad del Tolima- Red Alma Mater. Ibagué.
- Meillassoux, C. 1973. *Mujeres, graneros y capitales*. Madrid, s. XXI.
- Rodríguez, P; Mora, J. 2011. De paisajes naturales a sistemas agroforestales diversificados: una investigación cartográfica en el municipio del Líbano, Tolima, Colombia. Ponencia. III seminario Internacional de Agroforestería. Ibagué.
- Piñeros, R; Mora, J; Aya, S. 2011. Como estimar el flujo potencial de masas orgánicas en fincas campesinas de la eco-región cafetera. En: Mora-Delgado, J and Holguin, V (Eds.) Medios de vida y materiales orgánicos en fincas campesinas (Métodos de análisis en fincas de la ecorregión cafetera). Universidad del Tolima- Red Alma Mater. Ibagué.
- Subba G. 2012. Alternate Land Use Based Farming systems in Rainfed Agriculture. Central Research Institute for Dryland Agriculture, Hyderabad. Consulted on line (15-05-2013). <http://www.crida.in/DRM1-Winter%20School/GSR.pdf>
- Wolf, E. 1966. *Peasants. Foundations of Modern Anthropology Series*. EnglewoodCliffs: Prentice-Hall.

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