

Socio-economic perspectives of family farming in South America: cases of Bolivia, Colombia and Peru

Perspectivas socioeconómicas de la agricultura familiar en Sudamérica: casos de Bolivia, Colombia y Perú

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ABSTRACT

Family farming is very important because it is, among other types, the principal source of food and employment, especially in developing countries. Given the constant changes in the agrarian structure and environment, what are the prospects of family farming under current conditions in South America? To answer this question, we have chosen three countries from this continent: Bolivia, Colombia, and Peru. Based on a literature review of case studies in each country, a comparative analysis of the following topics was carried out: purpose of family farming, production unit, and agricultural production, integration with the market, income, and food security. Many similarities were found in the studied countries, which allow for some generalizations in certain aspects related to the studied cases. Family farming is largely moving to the rhythm of the markets. Its transition from a condition of subsistence to commercial status depends mainly on the availability of sufficient resources for production: mainly land, labor, and financial capital. The scarcity of these resources is forcing farming families to seek other sources of income or to migrate. The monetization of farming is increasing.

Key words: agricultural production, market integration, income, food security.

RESUMEN

La agricultura familiar es muy importante porque es, entre otros tipos, la principal proveedora de alimentos y generadora de empleo, especialmente en los países en desarrollo. Dados los constantes cambios en la estructura agraria y su entorno, ¿cuáles son las perspectivas de la agricultura familiar en las condiciones actuales en Sudamérica? Para responder a esta pregunta hemos escogido tres países del continente: Bolivia, Colombia y Perú. Con base en la revisión de literatura de estudios de caso en cada país, se hizo un análisis comparativo en torno a los siguientes temas: El propósito de la agricultura familiar, la unidad de producción, y la producción agrícola, la integración con el mercado, los ingresos y la seguridad alimentaria. Se han encontrado muchas similitudes en los países estudiados, los cuales permiten hacer algunas generalizaciones en ciertos aspectos relacionados con los casos estudiados. La agricultura familiar se mueve en gran medida al ritmo de los mercados. Su transición de una condición de subsistencia a una situación comercial depende principalmente de la disponibilidad de recursos suficientes para la producción: tierra, trabajo y capital financiero, principalmente. La escasez de estos recursos está llevando a las familias de agricultores a buscar otras fuentes de ingresos o emigrar. La monetización de la agricultura es cada vez mayor.

Palabras clave: producción agraria, integración de mercado, ingresos, seguridad alimentaria.

Introduction

Family farming in Latin America

Around 3 billion people worldwide live in rural areas and 2.5 billion, circa 40% of the global population, depend on agriculture (FAO, 2013). Approximately 70% of the food production worldwide comes from family farms (World Rural Forum, 2014). In Latin America, this contribution ranges from 27 to 67%. In this region, family farms constitute 80% of all farms, cover from 12 to 67% of the agricultural area, and generate between 57 and 77% of agricultural

employment (FAO and IDB, 2007; FAO, 2012). The role of family farming is to eradicate hunger and poverty, ensure food and nutrition, improve livelihoods, manage natural resources, protect the environment, create and strengthen social capital in rural areas, preserve and fortify culture and traditions and achieve sustainable development in agricultural and rural sectors. That is why the United Nations Organization in 2011 declared 2014 as the International Year of Family Farming (FAO, 2012; World Rural Forum, 2014; Flexor and Grisa, 2012).

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Definition

There are many definitions of family farming. They depend on the region of the world and the view of the authors. In a discussion seminar, Garner and de la O Gender (2013) presented an analysis of 36 definitions, 26 of them from developing countries and 13 from developed ones. The most common characteristics found in the definitions were: family as labor, household as management and size of farm, in other words land, production or both. For this paper, the definition of FAO was used (2012), which is based on regional characteristics and proposed for the Latin American and Caribbean area. Its content is used mostly as a guide. It is: *Family farming is the production by producers who, despite their great heterogeneity between countries and within countries, have the following key characteristics: a) Limited access to land and capital resources; b) Predominantly family labor is used with the head of the household participating directly in the production process; therefore, even when there is some division of labor, the head of the household does not just perform management responsibilities but is also a worker in the family unit; c) Agriculture/forestry/aquaculture/fisheries are the main source of income for the family nucleus, which may be complemented with other non-farming activities undertaken inside or outside the family unit (services related to rural tourism, environmental benefits, small-scale production, small agribusinesses, casual jobs, etc.).* It is important to consider that this definition is static and generalized. That is why there are discussions, even now, among experts about different topics, such as land size, production technology and systems, diversity of production, size of patrimony, income sources, access to markets, and other topics. It is also important to note that this definition, although it contains many elements, is not synonymous with the definition of peasant farming. The latter contains sociocultural aspects such as attachment to the land, the relationship and interdependence with their communities, and their farming-based reproduction. These items will also be considered in the analysis.

Types

Family farming is not the same everywhere. After a study in Brazil, Chile, Colombia, Ecuador, Mexico, and Nicaragua carried out in 2007, FAO and BID proposed a categorization for family farming in Latin America: subsistence, transition, and consolidated family farming. Subsistence family farming is the most common type. This is found in fragile zones of tropical and high mountain areas, has limited availability of land and capital as well as reduced access to markets and productive chains, and small production that does not guarantee food security for the farm family. These conditions perpetuate the poverty of the family farms and

risk their continued existence. Meanwhile, consolidated family farming has more land and capital than subsistence farming. This enables more access to markets and agricultural productive chains, generating more earnings for the farm family. These conditions allow agrarian families to overcome poverty and achieve a higher level of conservation of natural resources (Secretaría General de la Comunidad Andina, 2011). In relation to socio-cultural and productive aspects, we can present four types of family farms: rural farms, indigenous-rural farms, afro-rural farms, and small farms. In recent years, afro- and indigenous communities have regained importance in Latin America. According to UNICEF *et al.* (2010), there are, in Latin America, 522 different ethnic communities located in 12 geographical areas from Patagonia to Northern Mexico. They constitute approximately 10% of the entire population, approximately 480 million people. Brazil (241), Colombia (83), Mexico (67), and Peru (43) have the higher numbers of indigenous communities per country, while Bolivia (66%), Guatemala (40%), and Belize (17%) have the higher percentages of population. Mexico, Bolivia, Guatemala, Peru, and Colombia have 87% of the indigenous population in Latin America. Rural, indigenous-rural, and afro-rural farms are characterized mainly by the same social and cultural origin and the interrelation with their community; the small farm does not necessarily follow this trend. Rural inhabitants who belong to an organized community with a common origin or culture, such as indigenous or afro-, have a dependent relationship with their community. Some decisions related to agricultural activities or common resources management have to pass through the community. The community, meanwhile, maintains among its members an interrelation of confidence, reciprocity, and cooperation. For their part, small farms, to improve supplying, production or marketing, can rely on cooperation forming organizations, such as associations or cooperatives (Kervyn, 1987; Breton, 1993, Vegas, 1995; Durston, 2002; Gonzalves, 2007; Kopp, 2011; Forero-Álvarez, 2013).

What is the future of family farming in South America?

The so-called modernization of agriculture in South America, since the middle of the last century, has polarized the production structure; on one extreme are the commercial enterprises, on the other one are the family farms at different stages of development (Chumacero, 2013). Despite its high relevance in food production, especially for local consumers, rural employment generation, land use efficiency, and others, family farming has been less favored by most agricultural policies in the region than industrial and commercial farming (Araujo, 2009; FAO, 2012). Most policy makers have not understood, so far,

the importance, rationality, behavior, work and living conditions of family farmers; they frequently treat them as objects of corporatization or assistencialism (MINAG, 2001). Approximately since the mid 1990s, there has been a political trend in South America, which is revaluing, promoting, and developing family farming. Despite this effort, the agricultural markets have great influence on the development of farms (FAO, 2012; Flexor and Grisa, 2012). However, the flexibility and adaptation capacity of family farming have allowed for survival in adverse and changing conditions, which result in more monetization of production processes, more competition in supply, price drops, and increasing demands for consumers for quality, quantity, diversity, and low prices of products (Breton, 1993; Landini, 2011; Zeballos and Quiroga, 2010).

The question and objective

What are the perspectives of family farms in South America under current conditions? It means: globalization of agricultural markets, new tendencies of consumption, state policies oriented to markets, climate change, etc. This article attempts to answer this question, but not as a generalized prediction for the entire region, but as an information source to support the arguments that favor the development of sustainable family farms. The results also would serve as inputs to enrich the discussion and analysis of family farming theme.

Methodology

This research is mainly based on a comparative analysis of case studies, which were carried out by different authors at different times and countries: Bolivia, Colombia, and Peru. The reviewed case studies were taken according to their availability in the consulted literature. The criterion for choosing the countries was their geographical similarity; all possess an Andean region and a lower region. The agricultural sector of these countries had many similarities until the mid-twentieth century, such as the *hacienda* system, low technological development, and weak foreign trade. Since the second half of the last century, the agricultural development in each country has taken its own course, which has also affected family farming. The studies of each country were taken as an information source; they are the following:

Bolivia: A study of *Fundacion Tierra* titled: ¿Comer de nuestra tierra? Estudios de caso sobre tierra y producción de alimentos en Bolivia (Eating from our land? Case studies on land and food production in Bolivia). For this study, six different cases were taken: 1) Communal indigenous

territories of lowland areas; 2) Rural communities in the industrial-agro territory of Cuatro Cañadas, Santa Cruz; 3) Coca monoculture and gold mining in the Yanacachi (Yungas) Department, La Paz; 4) Smallholdings and traditional agriculture in the Villa Serrano Department, Chuquisaca; 5) Dairy farming in the Tiwanaku Department, La Paz; and 6) Sustainable production of fruit and vegetables in the Comarapa Department, Santa Cruz. The analysis was based on the Livelihoods Approach, that is on natural, human, social, physical and financial capital; the last is an interchangeable capital that allows for acquiring other capitals (Chumacero, 2013).

Colombia: For this country, two studies were taken (thesis): *Análisis de la unidad productiva y del manejo de insumos en el cultivo de papa (Solanum tuberosum L.) en el departamento de Boyacá* (Analysis of production unit and input management in growing potatoes (*Solanum tuberosum* L.) in the department of Boyaca) by Alba (2012), and *Análisis socioeconómico de los sistemas de producción agraria en los resguardos indígenas Tamabioy y San Félix de Sibundoy, Putumayo* (Socio-economic analysis of agricultural production systems on the indigenous reservations of Tamabioy and San Felix in Sibundoy, Putumayo) by Palacios (2012).

Peru: A comparative study titled: *Una mirada de largo plazo a la economía campesina en los Andes* (A long-term look at the rural economy in the Andes), which was developed with information for 1982-1983 and 2009 from two Andean rural communities: Pomacanchi, Acomayo Province, Cuzco Department, and Yanamarca Department, Jauja Province, Junin Department (Escobal and Ponce, 2009).

Additionally, general information was taken from the agricultural sector of each country. Although this information is not the same for the studied countries, it gives an idea of the behavior of the considered variables. After seeing the trend of many variables, mainly time lapses of over ten years were used. For allowing a comparison between the countries, annual changes in percentage were used. Moreover, family farming has many characteristics; of which the following were taken for the analysis: purpose, number, size, production characteristics, market integration, income, and food security of family farms.

Some characteristics of the agricultural sector from developed countries were taken as an initial comparison point for the analysis, namely Germany and the USA. These countries had, at some point in the past, an agricultural sector in somewhat similar conditions as the current ones in Latin America.

Results and discussion

Changing agricultural structure in developed countries: the case of Germany and USA

The structural change in German agricultural sector in the last 50 years (Tab. 1) was characterized by reducing farm quantity, increasing the average farm area, having intensive technological improvement of production processes, increasing production as well as the productivity of crops and animals, and reducing the number of workers per farm and specializing and diversifying production. The profit per farm has increased, but not so much as the increasing of invested capital (Planer, 2012). The agricultural structure in the USA has also been changing in the same way. The number of farms between 1930 and 2005 has been reduced by 67%, from 6,295,103 to 2,100,990 farms in 75 years and the average farm area has increased from 64 to 180 ha in the same period (Brameier, and Kreuz, 2008). Despite 91% of farms in the USA being small, they contribute only 23% of the entire production. Just 40% of all small farms are commercial, with a gross cash income between 10,000 and 249,999 US dollars; the others are noncommercial with a gross cash income of less than 10,000 US dollars (Hoppe et al., 2010).

Purpose of family farming: mostly subsistence but with tendency to changes

The main objective of the family farm is still family production, or subsistence. An inclination to accumulate capital and grow the farm occurs in just a few cases. In Bolivia, Chumacero (2013) found that there is an increasing monetization of production, but the monetary income is mostly

oriented toward covering family expenses. In Colombian indigenous communities, Palacios (2012) determined a transition of agricultural production systems, from subsistence to commercial. However, the acquired revenues with this technical-economical “improvement” are also basically used to support family expenses. Escobal and Ponce (2009), in Peru, confirmed this condition, the rural rationality (mostly subsistence) has remained little changed during the last 30 years. But, according to FAO and IDB (2007), this country will see a reduction of subsistence family farming (Tab. 2). García (2010) explained this as a process of pulling. The commercial and half-commercial agricultural enterprises pull family farms to the market, consolidating them into agribusiness. This phenomenon was favored by good political and market conditions of the country.

In Bolivia and Colombia, this transition from subsistence to consolidated family farming has not prospered as in Peru (Tab. 2). Fajardo (2002) explained this based on decreasing land by small producers, from 1.11 ha in 1984 to 0.99 ha in 1996. A reduction of land reduces production and, in consequence, financial capital for reinvestment in agribusiness.

Number, size and formality of farms: in opposite development

In developed countries, such as Germany and the USA, the trend is: fewer but larger farms (Tab. 1). This trend also occurs in Colombia, where, in the Andean area, the number of farms is increasing but their area is reducing; but in the lowland, the phenomenon is the opposite: there is land concentration, which is currently a dominant trend of

TABLE 1. Structural changes in the German agricultural sector from 1960 to 2010.

Factor	Years		Percentage of change
	1960	2010	
Number of farms	1,500,736	299,134	- 80
Total agricultural area (1,000 ha)	14,254	16,704	17
Agricultural area per farm (ha)	10.9	56.0	414
Workers per farm (family + foreign)	3.5	3.7	6
Workers per 100 ha	18.4	3.1	- 83
Milk cow per farm	4.5	46.4	931
Feeding hogs per farm	8.4	176.2	1,998
Laying hens per farm	10.8	626.8	5,704
Milk production per cow (kg/year)	3,368	7,080	110
Weight gain (g d ⁻¹)	542	761	40
Piglets per sow (per year)	19	26	37
Eggs per laying hen (per year)	140	294	110
Assets/enterprise balance sheet (€)	31,185	785,931	2,420
Profit /enterprise (€)	11,547	54,375	371

Source: Planer (2012).

TABLE 2. Percent distribution of subsistence, transition and consolidated family farming in the countries of the Andean Community.

Countries	Subsistence family farming	Transition family farming	Consolidated family farming
Bolivia	67.2	22.8	10.0
Colombia	79.4	12.9	7.7
Peru	45.5	35.4	19.1

Sources: FAO and IDB (2007); Secretaría General de la Comunidad Andina (2011).

TABLE 3. Trends of rural populations and farms in Bolivia, Colombia and Peru.

Factor	Bolivia			Colombia			Peru		
	Information of comparison years		Annual increase (%)	Information of comparison years		Annual increase (%)	Information of comparison years		Annual increase (%)
Rural population	1,995,597 (1950) ¹	3,504,047 (2010) ²	1.26	10,304,543 (1985) ⁵	11,121,571 (2010) ⁵	0.32	5,533,466 (1970) ⁸	7,990,227 (2010) ⁸	1.11
Percentage share of rural population	74% (1950)	34% (2010)	- 0.91	33% (1985)	24% (2010)	- 1.09	42% (1970) ⁸	27% (2010) ⁸	- 0.91
Number of UPAs*	86,377 (1950) ³	752,606 (2006) ⁴	13.77	1,904,746 (1984) ⁶	1,612,225 (2009) ⁷	- 0.61	879,432 (1961) ⁹	2,260,973 (2012) ⁹	3.08
Total area (ha)	654,258 (1950) ³	2,625,935 (2006) ⁴	5.38	35,490,910 (1984) ⁶	50,941,744 (2009) ⁷	1.74	17,722,000 (1961) ⁹	38,742,500 (2012) ⁹	2.33
Average area per UPA (ha)	7.57 (1950)	3.49 (2006)	- 0.96	18.63 (1984)	31.60 (2009)	2.78	20.15	17.14	- 0.29

* UPA = *Unidad de Producción Agropecuaria* (Farming Unit).

Sources:

¹ INE (2013a).

² INE (2013b).

³ Fundación Tierra (2009). Only agricultural production is referenced, livestock production is not included.

⁴ Zeballos and Quiroga (2010). Only agricultural production is referenced, livestock production is not included. Rural agriculture is distributed in the lowlands (Santa Cruz, Beni and Pando) with 30,811 UPAs (27% of total) occupying 71,265 ha (4% of total), in valleys (Cochabamba, Sucre and Tarija) with 213,530 UPAs (95% of total) occupying 276,994 ha (64% of total), and in the highlands (La Paz, Oruro and Potosi) with 401,311 UPAs (97% of total) occupying 374,471 (91% of total).

⁵ DANE (2013). These data belong only to agricultural production.

⁶ Fajardo (2002). Includes agricultural and livestock production.

⁷ MADR and CCI (2010). The area includes agricultural, livestock, forestry and other land uses.

⁸ INEI (2001). The data for 2010 are projected.

⁹ INEI and MAR (2013).

land distribution (Hurtado, 2010; Palacios, 2012). In Bolivia and Peru, the trend is the opposite of Colombia; there is an increasing number of farms and reducing area (Tab. 3). In all these countries, the largest population of small farmers is located in the Andean area, where agriculture is older and farms are smaller and poorer than in other regions. The increasing population, the limited availability of land, and the land distribution by inheritance have especially contributed to this situation. Approximately 40% of agricultural farms in Bolivia, 40% in Colombia and 80% in Peru are informal, meaning without property rights (titles); most of them are located in the Andes region (INRA, 2010; Bolpress, 2013; MINAG, 2013a). This condition restricts the purchase or sale of land and obtaining credit to invest in agricultural activities. In the low lands (Amazons, plains and coast), where the population density is less, most of the commercial farms and ranches can be found, which mostly have a

property title and, therefore, more possibilities to obtain agricultural credit (Zeballos and Quiroga, 2010; DANE, 2012; INEI and MAR, 2013; Tapia and Syndicus, 2012).

The data in Tabs. 3 and 4 present certain restrictions for the analysis. For example, the information is for the entire sector not only for the family farming subsector; the time range is not uniform for the studied countries and the promotion policies for agriculture have been different in each case. Hence, the interpretation must be made carefully.

Agricultural production: oriented to specialization and to local and national markets

The area of agricultural production is still increasing. The state is still delivering land; more in Bolivia and Colombia than in Peru (Tobasura, 2009). Of the total area that plant production occupies only 5-15%. More than 75% of land

is destined for extensive cattle ranching. One thinks and hopes that this relationship may change in the future, favoring plant production. The entire production has increased; the permanent, industrial and exportation crops have increased more than the transitory, non-industrial, and locally-consumed crops. The animal husbandry has had a considerable increase in the three countries, 1 to 10% per year. Cattle, pork, and poultry are the most important, notably cattle in Colombia and chickens in Peru. Also, yields have increased due to technological development and increasing demand (Miranda *et al.*, 2009; Hurtado, 2010; MADR and DANE, 2010; Tab. 4). The small farms have concentrated more in producing vegetables, fruits, and grains for local and national consumption and animal husbandry has increased with commercial purposes (Garay *et al.*, 2010). In Bolivia, it has been found that four of the six studied cases have specialized in one product: coca in Yanacachi, soy beans in Cuatro Cañadas, milk in Tiwanaku, and nut harvesting in the Indian Territory Chácobo-Pacahuara (Chumacero, 2013). On the indigenous reservations Tamabioy and San Felix (Colombia),

this trend was also observed with the products: corn, beans, and milk (Palacios, 2012). This specialization is more noticeable when considering Colombian producers of onion, coffee, potato, cocoa, and others, who, between 2012 and 2013, conducted strikes and marches protesting for economic losses due to low prices and high production costs (Arango, 2013). Given the small size of land, the growing need for money, and the decreasing and aging of land populations, small producers have begun to concentrate on one or a few products, carrying out a more intensive and efficient use of soil, agrochemicals and labor to achieve higher yields with lower costs. In this sense, the relationship with the market is growing. Also, there has been an increase of small farmer organizations (Forero, 2003; Escobal and Ponce, 2009; Alba, 2012; Tapia and Syndicus, 2012).

It is noteworthy that agricultural growth is a reflection of the growth of family farms but also of the great contribution and staking of the growth of industrial and commercial agriculture.

TABLE 4. Trends of agricultural production in Bolivia, Colombia and Peru.

Factor	Bolivia			Colombia			Peru		
	Comparison among years		Annual increase (%)	Comparison among years		Annual increase (%)	Comparison among years		Annual increase (%)
Agricultural area (ha)	32,749,850 (1950) ⁹	57,305,323 (1993) ¹⁰	1.74	41,162,633 (2000) ³	42,503,277 (2010) ³	0.33	17,722,000 (1961) ⁶	38,742,500 (2012) ⁷	2.33
Crop area (ha)	557,706 (1950) ¹	2,593,219 (2008) ²	6.29	3,759,174 (1999) ³	3,876,899 (2010) ³	0.28	3,897,372 (1961) ⁶	7,125,007 (2012) ⁷	1.62
Crop production (t)	1,178,095 (1950) ¹	14,045,357 (2008) ²	18.83	21,721,967 (1999) ³	24,203,997 (2010) ³	1.04	10,625,835 (1961) ⁸	36,544,001 (2012) ⁸	4.78
Yield (t ha ⁻¹)	2.11 (1950) ¹	5.42 (2008) ²	2.70	5.78 (1999) ³	6.24 (2010) ³	0.72	2.73	5.13	1.72
Cattle	2,226,629 (1950) ¹	7,786,802 (2008) ²	4.31	24,789,875 (2001) ⁴	27,359,290 (2009) ⁵	1.30	3,116,100 (1961) ⁶	5,156,000 (2012) ⁷	1.28
Pork	508,782 (1950) ¹	2,501,931 (2008) ²	6.75	1,935,287 (2001) ⁴	1,634,640 (2009) ⁵	- 1.94	1,074,500 (1961) ⁶	2,224,300 (2012) ⁷	2.10
Poultry	1,760,229 (1950) ¹	6,097,791 (2008) ²	4.25	33,553,506 (2001) ⁴	25,926,019 (2009) ⁵	- 2.84	18,883,980 (1961) ⁶	121,394,062 (2012) ⁷	10.64
Others*	9,381,067 (1950) ¹	13,314,469 (2008) ²	0.72	5,204,645 (2001) ⁴	5,664,558 (2009) ⁵	1.10	26,145,500 (1961) ⁶	9,560,055 (2012) ⁷	- 1.24

* In Bolivia, sheep, goats, llamas and alpacas are included. In Colombia, horses, mules, donkeys, sheep and goats are included. In Peru, sheep and alpacas are included.

Sources:

¹ Fundación Tierra (2009).

² INEI and MAR (Encuesta Nacional Agropecuaria 2008), 2013.

³ MADR (2011).

⁴ MADR and DANE (2002).

⁵ MADR and CCI (2010).

⁶ and ⁷ INEI and MAR (2013).

⁸ MINAG (2013b).

⁹ Fundación Tierra (2009).

¹⁰ INRA (2010). This area is divided into crop, livestock, crop and livestock, and other land uses.

Integration with the market: increasing

Family farmers are integrated with the market through the purchase of inputs and consumer goods and the sale of goods (products) and services (labor). In Bolivia, the production of coca in the Yungas, milk on the high plateau, vegetables and fruits in the valleys, soy beans in Santa Cruz and nut harvesting (for export) in the indigenous communities of the Amazon show a high degree of market integration, which is largely run by the urban consumer (Chumacero, 2013). According to ZONISIG (2001), in Southern Bolivia (departments of Potosi, Tarija and Chuquisaca), between 41 and 68% of products and labor are marketed; this occurs despite the traditional practicing of bartering. The Yanamarca (Peru) producers, who have more than 1 ha land to produce potatoes, market more than 60% of their production with a tendency to increase; likewise, they buy more than 90% of fertilizers and pesticides and pay for approx. 50% of the of non-family labor. By contrast, Pomacanchi (Peru) growers, who have less than one hectare to produce potatoes, market less than 10% of their production with a tendency to keep it. They also purchase fertilizers and pesticides and hire non-familiar labor, but to a lesser degree than in Yanamarca. In both cases, the size of the land for producing potato is decreasing (Escobal and Ponce, 2009). In 2010, little more than 60% of the potato farmers of Boyaca (Colombia) had less than 1 ha crop area and over 78% less than 3 ha. The national potato census of 2002 (MARD - DNP- DANE, 2003) found that between 80 and 85% of potato produced in Boyaca was going to the market. There, the farmers buy agrochemicals, pay non-familiar labor and use credit to cultivate potatoes (Alba, 2012). On indigenous reservations in Putumayo (Colombia), it has been seen that, parallel to the transition from subsistence to commercial agriculture, there is a growing integration to markets: home garden 41-50% (< 1 ha), transition 44-58% (< 3 ha), monoculture 52-59% (< 1 ha), and dairy 99% (< 5 ha). Sale of skilled and unskilled labor as well as handicrafts and agro-industrial products also integrate producers to the market (Palacios, 2012). Family farming is also integrated to export markets through export products such as coffee, bananas, brown sugar, dairy products, tobacco, tropical fruits and others (Forero, 2003). However, an increasing integration with the market also means more dependence of producers on market prices, more business risk, more intensive use of natural resources and their consequent deterioration. The integration of agriculture with the market is determined by family farming, but also by commercial agribusinesses. Family farming had been adapting to this trend to survive.

Income: there is a diversification of income sources and the non-farm income is increasing perceptually

In 18 rural communities in Southern Bolivia (Potosi, Sucre and Tarija), it was determined in 2001 that agricultural production generated 50 to 71% of the farmers' income, livestock production reached 40%, and employment outside the farm reached 40%; the latter being an increasing income source. It was also found that, for 20% of the surveyed households, remittances were the main sources of income and, for 10%, handicrafts were (ZONISIG, 2001). In another case study, the indigenous communities of the Amazon and Chaco derive their income from chestnut harvest, agricultural production and employment in oil companies. Rural communities in the agro-industrial zone of Cuatro Cañadas, Santa Cruz, derive their income from soybean production, cattle fattening and the sale of labor in the city. In Yanacachi, La Paz, they generate their income through the cultivation of coca and, as a second source, mining. In Villa Serrano, Chuquisaca, the income source is non-farm employment and agriculture. In Tiwanaku, La Paz, the main income sources are the production of milk, vegetables, and dairy products. In Comarapa, Santa Cruz, the main sources of income are agriculture and horticulture. In order to become the main source of income from agricultural activities, rural inhabitants must have fertile land, water, financial capital, and access to the market (Fundación Tierra, 2013). In Yanamarca, Peru, agricultural production generates 44% of rural income, livestock 18%, agricultural employment 11%, transfers, remittances and grants 11%, non-farm employment 9% and other activities 7%. In Pomacanchi, agricultural production makes up 21% of rural family income, livestock 28%, other activities 14%, non-farm employment 9%, agricultural employment 10%, and remittance and transfers 19% (Escobal and Ponce, 2009). On the indigenous reserves of Putumayo (Colombia), Palacios (2012) found that the sources of income are 49-50% farming, 39-42% non-farm employment, 6% handicrafts, 2-3% agribusiness and 0-4% other. Moreover, Forero (2003) has found, contrary to data from DANE, that, in most cases, the daily income of farmers and farm laborers exceed the minimum wage, but just over 80% of cases exceed the minimum annual salary and just little more than 50% generate the required three minimum salaries to cover the basic needs of a family. The increasing of non-farm economic activities has the following causes: a decrease of land (smallholding) per family farm, a surplus of manpower, reduced accumulation of financial capital inside the farm, and losses in agribusiness.

Food security: the patterns of production and consumption are changing accordingly to market development

In the rural areas of Bolivia, farmers produce less and less food for their own consumption; they acquire (buy) it outside their farms. Production factors such as labor, land and financial capital are used to produce what the market demands; for example, soy beans in Cuatro Cañadas, coca in Yanacachi, milk in Tiwanaku, vegetables and fruit in Comarapa and chestnut in indigenous territory in the Amazonas. The revenue from the sale of agricultural products is used to buy food in the market. Food security depends on generated income in the rural family. Consumption habits are also changing among the farmers. Now, they consume more processed foods than before, such as flour, noodles, oils, refined sugar, fats, dairy products, canned foods, candy, and soda (Fundación Tierra, 2013). In Peru, the two studied cases did not elucidate if farmers produce or not their own food; however, the proportion of their own consumption of produced potatoes gives us an idea. In Yanamarca, this proportion dropped from 21.2 in 1983 to 14.2% in 2009 and, in Pomacanchi, it rose from 63.3 to 66.7% (Escobal and Ponce, 2009). Also, in these cases, the food security depends on the income of the farm family and food offer in local markets. In Colombia, Palacios (2012) made a quantification of animals and plants that are produced on indigenous farms: energy and protein foods, fruits, vegetables, and medicinal plants. Traditional systems have between 34 and 40 species per farm system, in transition between 7 and 26, and specialized systems have between 1 and 15. The great diversity of food benefits the community through bartering and sharing among families and friends and contributes to food security. According to Garay *et al.* (2010), in Colombia, the production of rural households contributes over 50% to the domestic food market. The study carried out by the Research Group for Management and Rural Development (GIGDR) of the National University of Colombia in the provinces of Cundinamarca and Boyaca and the rural areas of Bogota, Meta and Tolima (Colombia) determined that 60% of fresh food in cities comes from small producers. Also, it was found that farming families spend 39% of their income on food and less than 20% of their agricultural production is destined for their own consumption (Unimedios, 2013).

Conclusions

Family farming in South America is being pushed and pulled more and more to the market and its rules. Some of

them will adapt and grow; others will perish along the way. These perspectives are explained in the following conclusions. In the agrarian structure of developed countries, the participation of smallholders in food production is reduced as compared to the one in developing countries. In the studied countries, family farms are still oriented to subsistence, but there is a gradual trend toward commercial forms, especially in Colombia and Peru. The production units tend to be reduced in number and increased in size in Colombia, but in Bolivia and Peru they are still developing in the opposite direction. In production, the trend is towards specialization, producing what the market demands, intensifying the use of land, agrichemicals, labor and natural resources, and, in some cases, damaging the environment. The integration of smallholders into the market is growing; more and more buy agricultural inputs and sell a greater proportion of their production and services. Agriculture is ceasing to be the only source of income. When production units are smaller and the financial capital less, the sources of income are more diversified. Food security is increasingly dependent on the income of the farm family and food supply in local markets.

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