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De-mystifying family farming: Features, diversity and trends across the globe



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ABSTRACT

Family farms are defined by two criteria: the importance of family labour and the transfer of ownership, land tenure or management to the next generation. Most farms across the globe are family farms, and they vary in size from < 1 ha to > 10,000 ha. Trends in farm size (small farms getting smaller and large farms getting larger) are not directly related to farm ownership and do not necessarily impact global food security. Rather, both the causes and effects of farm size trends depend on the availability of farm resources and off-farm employment opportunities. Similarly, environmental sustainability, though impacted by agriculture, cannot be linked directly to family ownership or farm size. To address issues related to environment, social conditions and food security, focus should not be on the preservation of family farms but on transformations to strive for environmental, social and economic sustainability of farming in all its shapes and forms.

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1. Introduction

The 'International Year of Family Farming' was declared in 2014 by the United Nations General Assembly. The [FAO \(2014\)](#) stressed the importance of family farming for "its significant role in eradicating hunger and poverty, providing food security and nutrition, improving livelihoods, managing natural resources, protecting the environment, and achieving sustainable development"; a view widely endorsed (e.g. [European Commission, 2014](#); [Foodtank, 2014](#); [IFAD, 2014](#)). Family farms are perceived to be essential to sustain these many functions, yet the very existence of family farms is reputedly under threat (e.g. [Snyder, 2012](#); [van der Ploeg, 2013](#)). The goal of the International Year of Family Farming was, therefore, to "reposition family farming at the centre of agricultural, environmental and social policies in the national agendas" ([FAO, 2014](#)).

The focus on family farms is a reaction to several trends. Economic pressure results in some farms increasing in economic size, while others decrease in economic size or disappear. Small farms can move towards a part-time or "hobby" mode ([Tan et al., 2013](#)), but if off-farm income is lacking the farm family is under threat of impoverishment. This results in a 'disappearing middle', a phenomenon which has been identified in many countries in Europe ([Mandryk et al., 2012](#); [EUROSTAT, 2014](#)), in the USA

([USDA, 2014](#)), see [Fig. 1](#), and also in regions of China ([Tan et al., 2013](#)) and sub-Saharan Africa ([Deininger and Byerlee, 2012](#)). In many developed regions, the total number of farms is decreasing while the age of the farm population increases ([EUROSTAT, 2014](#); [USDA, 2014](#)). Finding successors has become difficult ([Fennell, 1981](#); [Mishra et al., 2004](#); [Wheeler et al., 2012](#); [White, 2012](#)). Farms have become more specialised ([Bernard de Raymond, 2013](#)), mechanised ([Woodhouse, 2010](#)), and intensive ([Rossi and Garner, 2014](#)), while the food supply chain has become more globalised ([McMichael, 2009](#)). Some authors associate these trends with environmental damage ([Rossi and Garner, 2014](#)), lack of cohesion between nature and society ([Slobbe et al., 2011](#)), disappearing rural communities ([van der Ploeg, 2008](#)), landlessness among rural populations ([Woodhouse, 2010](#); [Deininger and Byerlee, 2012](#)) and loss of food sovereignty ([Patel, 2009](#)). Some even link problems of obesity to large, intensive animal farms ([Rossi and Garner, 2014](#)).

Family farms are equated to small farms by various authors (as also found by [Collier and Dercon, 2014](#); see [FAO, 2014](#)). Small farms are perceived to be diversified and to contribute more to environmental sustainability, preservation of traditional values, and economic resilience than large farms ([van der Ploeg, 2013](#); [FAO, 2014](#); [Swaminathan, 2014](#)). Negative perceptions of the loss of control over globalised food supply chains and threats to rural livelihoods in developed countries are directly associated with larger, more specialised and industrialized farms and the proclaimed disappearance of the family farm ([Snyder, 2012](#); [GRACE, 2014](#); [Rossi and Garner, 2014](#)). In developing countries, food security and poverty alleviation are said to depend on productivity

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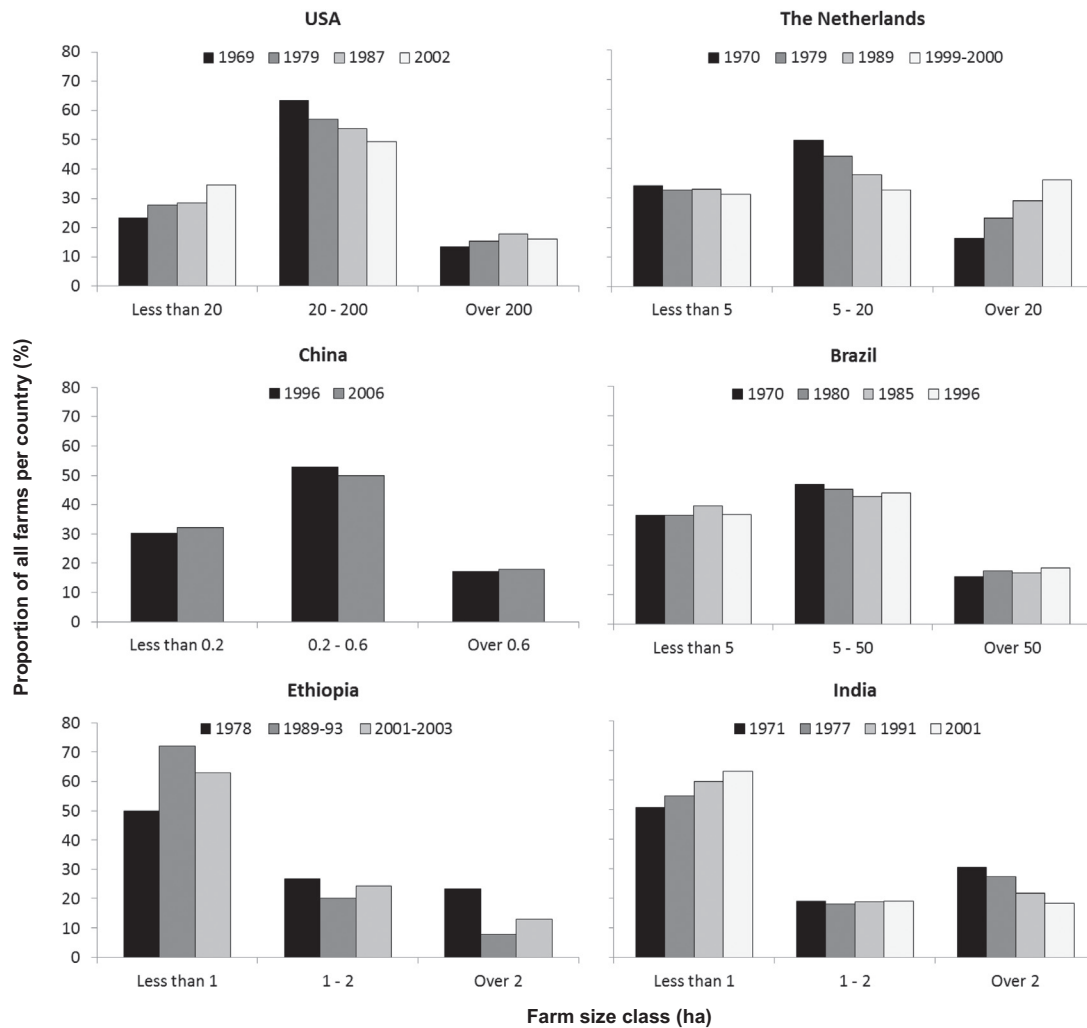


Fig. 1. Changes in farm size distribution in terms of acreage in the USA, The Netherlands, China, Brazil, Ethiopia and India. All farms per country have been grouped into three size classes representing small, medium and large farms, specific to the country represented. The relative distribution of the total number of farms of the country over the three size classes is given as percentages. Years represented differ per country depending on available data. Data for China are from Tan et al. (2013), data for all other countries are from FAO (2015a).

of the diverse crops produced on family farms where the majority of the population resides (FAO, 2014; Swaminathan, 2014).

Hence, the protection of family farming is proposed as the best response to the perceived threats of trends in agriculture in both developed and developing countries. Yet it is unclear what role family farms play in contributing to these trends and on what the attribution of the various positive characteristics to family farms is based. To unravel the above, we identify the criteria used to distinguish family farms, explore the diversity among family farms across the globe and analyse trends in farm size and intensity. Impact on environmental and social conditions and food security are considered and we conclude by reflecting on implications for policies.

2. What is a family farm?

Whilst the term 'family farm' is commonly used both in the scientific and popular literature, there is no common definition to characterise family farms across the globe (Hill, 1993; Eastwood et al., 2010). Definitions often include two criteria: (1) family ownership of the land, or land tenure rights over generations, and (2) the use of family labour (Errington and Gasson, 1994;

Kritzinger and Vorster, 1997). Ownership refers to both decision-making power and physical ownership of the farm assets (e.g. land, housing, machines, livestock) which allow succession: inheritance of the farm by the next generation. Secure land tenure may be regarded as ownership in many Asian and African countries where land remains within the family through traditional governance or long-term tenancy contracts (Lin, 1988; Toulmin and Quan, 2000). Most definitions suggest 'a substantial part' or 'the majority' of farm labour should be provided by the family. Djurfeldt (1996) argues that the use of family labour is a critical advantage of family farms which cannot be neglected in defining them. By contrast, Errington and Gasson (1994) argue that dependence on hired labour on a farm should not be used as a criterion to distinguish family farms as both the demand for labour (seasonality) and the supply of family labour (changes in the family cycle) fluctuate. Both agree on the centrality of family relations and the direct involvement of the farm owner in the daily work, contrary to non-family units where there is a separation between ownership, management and labour (Reinhardt and Barlett, 1989).

Some countries distinguish family farms for legal purposes, such as eligibility for subsidies. The criteria used usually include the characteristics mentioned above. In some cases, a size limit is

imposed. The Brazilian Family Farming Law (Law 11,326, July 24, 2006) states that a family farm ‘Does not have under any tenure regime an area of more than four fiscal modules’ (Berdegué and Fuentealba, 2011, p. 14). The size of the ‘fiscal module’ varies among municipalities, ranging from 0.5 ha in Southern Brazil to 100 ha in the Amazon region (FAO, 2012) and is based largely on the predominant type of farm in the municipality and income earned from the main activities (Presidency of the Republic of Brazil, 1979). As a result, in some regions of Brazil a family farm may be as large as 400 ha. Similarly, a family farm in Argentina may be as large as 5000 ha (Berdegué and Fuentealba, 2011, p. 13). Other legal definitions, such as from the USA (Hoppe et al., 2007), have no size criterion and only exclude farms organised as non-family corporations or cooperatives, and farms with hired managers. Errington and Gasson (1994) suggest that family farms are distinguished by the relationship between the family and the farm, which may influence behaviour irrespective of farm size. Nevertheless, family farms are often perceived as being small and the terms ‘family farmers’ and ‘smallholder farmers’ are used interchangeably by the FAO (FAO, 2014).

Some definitions include farm income as a criterion. A few mention income self-sufficiency (Reinhardt and Barlett, 1989), but most imply that the majority of income should originate from the farm (Errington and Gasson, 1994; Berdegué and Fuentealba, 2011, p. 14). Most farm households gain additional income from off-farm activities, whether in Europe (Davidova, 2014; EUROSTAT, 2014), the USA (USDA, 2014), or Africa (Jayne et al., 2014). As the share of off-farm income and its importance vary strongly both among and within countries, a criterion regarding income cannot be generally applied.

It is commonly acknowledged that family farms are the dominant agricultural holdings across the globe (e.g. Berdegué and Fuentealba, 2011; Collier and Dercon, 2014; European Commission, 2014), but criteria differ among sources and are not always specified. The FAO, for example, states that 98% of farms worldwide are family farms, but without specifying criteria (FAO, 2014). We focus on the two most broadly accepted features of family farming: the use of family labour and successive ownership across generations.

3. Farm diversity

3.1. Resource availability

The main three resources for farming are labour, land and capital. Given the wide diversity of family farms we propose a simple approach to display different types of farms in relation to availability of land and capital. Family labour may be substituted by or supplemented through use of capital through mechanisation, labour-saving agrochemicals and by hiring labour (Kritzinger and Vorster, 1997). The availability of capital and land influences farm (economic) size and intensity (Fig. 2).

Farmers require a certain economic farm size to ensure adequate family income. Where GDP/capita is relatively high, as is the case in developed regions, more income and hence a larger economic size is required (upper half, Fig. 2, see also Fig. 3). This can be achieved by either expansion (increasing area of production) or intensification (increasing production per area unit). Where land is available, large farms will prevail and are likely to continue to increase in size (upper right, Fig. 2). Large farm sizes compensate for inherently poor yields, for instance due to poor agro-ecological conditions (e.g. poor soils, low rainfall) and small profit margins as is the case for cereal farms in Australia (Fig. 3; AWB, 2006; ABARES, 2012; Land Commodities, 2014). However, where land is scarce, for instance close to urban centres, small but

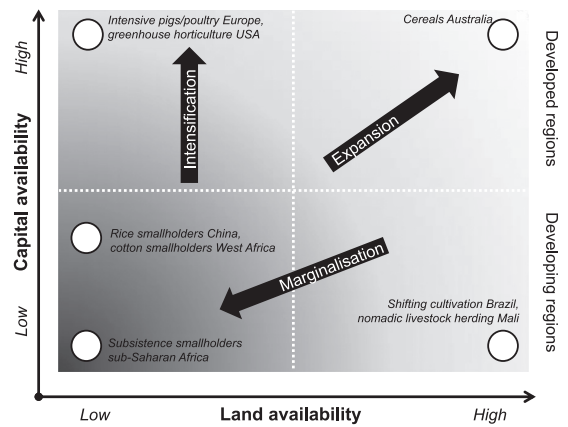


Fig. 2. Farm diversity in relation to availability of capital and land. Options to increase farm economic size include intensification and expansion. In case of decreasing availability of land and/or capital, marginalisation occurs. As capital is generally available in developed and lacking in developing regions (Hazell et al., 2010), these are depicted in the upper and lower parts of the figure.

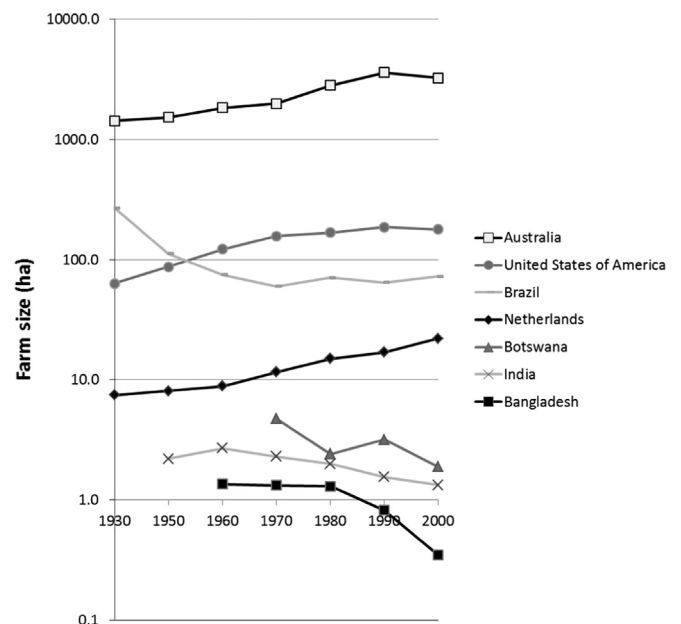


Fig. 3. Farm size trends across the globe. The countries selected represent some prominent trends in different regions of the world. For many countries, insufficient data was available, which further influenced the selection of countries represented in this figure. Based on data from FAO (2015b).

input-intensive farms such as greenhouse horticulture and intensive pig and poultry systems dominate (upper left, Fig. 2; Hill, 1993).

In developing regions (lower half, Fig. 2), farmers often have limited access to inputs other than labour and land. Where land is amply available, farms tend to be large and extensive (lower right, Fig. 2). In shifting cultivation systems fields are left fallow for more than ten years to restore soil fertility after a few years of cultivation (Giller and Palm, 2004), and such systems support only low population densities. Intensification is needed as population pressure increases. This is possible when soil fertility management through legume crops, manure or fertiliser can replace the fallow. When inputs are not available, continuous cropping leads to soil depletion, falling yields, and thus lower income and marginalisation (lower left, Fig. 2; Vanlauwe et al., 2014).

Similarly, for nomadic livestock herders, land and labour are available, but without capital they cannot increase their economic size as this would require increasing the size or productivity of the herd. Their options are further limited where land availability declines as a result of population growth (lower left, Fig. 2).

Where land is scarce, farms remain small and continue to decrease in size due to population pressure, as in many countries in sub-Saharan Africa and Asia (lower left, Fig. 2; Figs. 1 and 3; Masters et al., 2013). These farms struggle to increase their economic size or they become unviable. Both expansion and intensification require capital for mechanisation, technologies and inputs. In the case of smallholder farmers in China, intensification is possible through fertiliser subsidies (Reidsma et al., 2012). An alternative for increasing economic size is to produce higher value crops and animal products. In West Africa, institutional support for input supply and marketing increased cotton yields and income for smallholders (Gabre-Madhin and Haggblade, 2004). In Brazil, the Embrapa Baldo Cheio programme, aimed at family farmers, led to a three-fold increase in milk production per farm and farmers' incomes comparable to the urban minimum wage, showing that intensification of family farms is possible and profitable (Novo et al., 2013).

3.2. Differences between family and non-family farms

Few businesses involved in farming are corporately owned. Historically, non-family farms included various forms of collective farms, haciendas, landlord estates, Junker estates, slave plantations and state farms. Often, the land was worked, but not owned by families. In many cases, land has been redistributed as a result of land reforms induced by law, violent force, revolts, political changes and/or economic forces, and is now owned by family farmers (Lipton, 1993; Binswanger et al., 1995). According to the inverse relationship hypothesis, the land productivity of small sized farms is greater than that of large farms (e.g. Tomich, 1995; Woodhouse, 2010; Li et al., 2013; Collier and Dercon, 2014). The greater productivity of small farms is primarily caused by the ample availability of motivated labour per unit of land as is the case for family farms (see also Section 4.2). Large farms are more likely to encounter labour limitations and large costs for labour supervision, as highlighted in the seminal work of Chayanov (Binswanger and Rosenzweig, 1986; Gorton and Davidova, 2004; Hazell, 2005; Woodhouse, 2010). In agriculture, only few crops benefit from economies of scale and are efficient without depending on the hidden subsidy of family labour (Tomich, 1995). Examples include large-scale corporate farms with sugarcane plantations in Brazil and oil palm plantations in South-East Asia, where knowledge intensive cultivation and co-ordinated harvesting and processing result in substantial extra profit (Binswanger and Rosenzweig, 1986; Tomich, 1995; Deininger and Byerlee, 2012). Although large-scale corporate farms continue to exist in former Soviet countries, Koester (2005) attributes their persistence to an inadequately functioning, corrupt market rather than any comparative advantage. Relatively small-sized, non-family farms are found in agricultural sectors where a high degree of industrialisation is possible with a relatively low demand for labour supervision. They exhibit factory-like conditions, as is the case in horticulture, poultry, and pig rearing (Hill, 1993; Gorton and Davidova, 2004; Hazell et al., 2010). Hence, either through high intensity or large acreage, non-family farms are associated with a large economic size. Indeed, Hill (1993) showed that across the EU, non-family farms are three-fold larger in economic size on average. Hence, most non-family farms fall into the upper half of Fig. 2, while family farms occur throughout the figure.

4. Family farms and land, labour and capital

The above discussion reveals no direct link between family farms and farm characteristics such as size and intensity. Rather, these characteristics are determined by availability of land, labour and/or capital (Hayami and Ruttan, 1971). We now explore the influence of the distinguishing features of family farms: successive ownership and use of family labour.

4.1. The impact of successive ownership on the physical and economic size of farms

Few farmers in developed regions are assured of a successor (Fennell, 1981; Mishra et al., 2004; Wheeler et al., 2012). First, the number of potential successors is limited because families are small (e.g. EUROSTAT, 2014). Second, the opportunity cost of inheriting the parents' farm may be prohibitive compared with the potential profit, particularly for small farms (Fennell, 1981; Mishra et al., 2004; Wheeler et al., 2012). Generally, income in agriculture is less than in other sectors. In the EU for instance, average agricultural income was only 58% of the average wage in 2008 and in the Netherlands, 40% of farming families derive less than the legal minimum income from farming (van der Ploeg, 2008, p. 263; European Commission, 2010, p. 48). Moreover, farming involves hard physical work and little spare time. As a result, the farming lifestyle, though attractive to some (e.g. van der Ploeg, 2013), deters others (e.g. Wheeler et al., 2012).

The presence of a successor in the family influences the current farmer's investment strategies. Farmers without a successor often retire on their farm, gradually disinvesting and reducing the size of their enterprise. Farmers with a successor are more likely to invest in their farm, increasing their economic size, often through taking over land from their disinvesting neighbours (Potter and Lobley, 1996; Wheeler et al., 2012; Inwood et al., 2013). Hence, in many developed countries, succession dynamics contribute to the disappearing middle phenomenon as some medium-sized farms decrease in economic size while others increase (the Netherlands and the USA in Fig. 1).

Similarly, a future in agriculture is unattractive for many people in developing regions due to the limited income and few opportunities for improvement (White, 2012). However, in rural areas, few employment options outside agriculture exist while migration to urban centres is costly and opportunities for employment are limited (Losch and Fréguin-Gresh, 2013). With few alternatives outside farming, many potential successors are available. Where population pressure is high, there is little farm land for multiple successors (Keating et al., 2013). As a result, farm size decreases and the number of farms increases (Figs. 1–3; Hazell et al., 2010). The situation is especially critical in densely-populated countries such as Rwanda, where average farm size is as small as 0.1 ha per adult equivalent while the majority of households depend on farming (Ansoms and McKay, 2010; Bucagu et al., 2014). In other areas, where farm sizes are larger, the situation may be equally critical if yields are poor or profit margins are small.

4.2. The role of family labour

There are several reasons for the high proportion of family labour versus hired labour on farms. Labour supervision and offsite management is difficult for many farm operations (Masters et al., 2013). Many tasks are done most effectively and for the least cost by family members, who are motivated, knowledgeable of the local conditions, can quickly respond to site-specific variables, are flexible and willing to work long hours when necessary (Errington and Gasson, 1994; Hazell et al., 2010; Masters et al., 2013). Family labour is cheap, and if priced as wage labour, many family farms

would not be economically viable (van der Ploeg, 2008, p. 49; Li et al., 2013). Family labour increases the farms' economic flexibility and resilience.

As with succession, labour availability depends on family size and willingness of the family members to work on the farm. In areas where land and capital are scarce relative to labour, as in many developing regions, small, labour abundant family farms predominate (lower left, Fig. 2). On such small farms, both the proportion of land under production and the production per unit area may be greater than on large farms with limited amounts of hired labour facing troubles of labour supervision (Gorton and Davidova, 2004; Hazell, 2005; Woodhouse, 2010). However, workers may have limited effective working hours when employed full time, and hours of labour availability above a certain threshold do not increase the farm output (Errington and Gasson, 1994). This can be seen as 'hidden unemployment'. Such farms may not be economically or socially viable as they cannot provide sufficient income to sustain the workers (Hazell, 2005). Strategies to address this include engaging in agricultural activities which generate a greater output through extra labour input, such as on-farm processing of the products, or alternative off-farm employment.

Where rapid urbanization creates abundant off-farm employment, a crisis of low labour availability may be created as the opportunity cost of labour increases and family members leave the farm to work in urban centres. This situation is exemplified at the East coast of China (Li et al., 2013; Tan et al., 2013). Farm expansion occurs as land rights of farmers who have left are transferred to the remaining farmers (Masters et al., 2013; Tan et al., 2013). Hence, farms tend to increase their labour use efficiency through mechanisation as possible due to both the nature of the work and availability of capital (partly through subsidies) (Reidsma et al., 2012; Li et al., 2013; Tan et al., 2013). However, when labour shortage cannot be covered and farm output is insufficient, this can lead to 'hidden slavery' if the work load per worker is above normal working hours without proportional remuneration.

Both the problems of hidden unemployment and hidden slavery are partly caused by the dependence of family farms on family labour. However, dependence on family labour also enables family farms to overcome these problems due to the flexibility and motivation of family labourers (Errington and Gasson, 1994; Djurfeldt, 1996).

5. Family farms and the environment, social conditions and food security

Although we propose other characteristics which distinguish family farms from non-family farms, the association of non-family farms with large scale, high intensity farming (Section 3.2) gives rise to negative perceptions. Here, we explore the relationships between family farms, their environmental and social impacts and food security.

5.1. Environmental impacts

Many environmental impacts of farming depend on the intensity and efficiency of resource use. Extensive farms usually cause less environmental pollution on a hectare basis as they make little use of agrochemical inputs. Nevertheless, the efficiency with which they use natural resources such as land is low and poor agricultural management can lead to depletion of soil fertility, soil erosion and agricultural land expansion (Rigby and Cáceres, 2001; Baudron and Giller, 2014). As intensive systems use larger amounts of agrochemical inputs, they are often perceived to be less environmentally friendly than many other types of farming (Rossi and Garner, 2014). However, if inputs are used efficiently,

the net environmental impacts of intensive farming systems may be less than those of extensive farming systems (Baudron and Giller, 2014; van Asselt et al., 2014). Environmental impacts are related to production methods, intensity and efficiency of resource use, but not to farm size, the use of family labour, or ownership. For instance, fertiliser use increased more than five-fold in 30 years on many small family farms in China while yields only increased by 65% in the same period, implying poor nutrient use efficiency (Shen et al., 2013).

The characteristics of family farms have no direct influence on the environmental impact of farming. Some argue that family farmers have a longer time horizon due to the expected transfer to the next generation which encourages them to opt for more sustainable management options (Errington and Gasson, 1994; Inwood et al., 2013). Nevertheless, there is a paucity of data to support this assumption. In the Netherlands for instance, the implementation of environmental-friendly practices is mainly induced by legislation rather than voluntary initiatives (Mandryk et al., 2014).

5.2. Social values

In a family farm, the family and the business enterprise are merged (Djurfeldt, 1996). As families are considered to be more involved in social communities than are business enterprises, family farms are considered to contribute more to social cohesion of their community. The family farm provides for more than simply economic goals, such as self-fulfilment, consideration of the next generation, maintenance of the farming community and agricultural landscape, and care for the environment (Inwood et al., 2013; van der Ploeg, 2013). Farming is a way of life (Inwood et al., 2013; van der Ploeg, 2013) and an identity to be continued (Saraceno, 1994). Van der Ploeg (2013) argues that family farmers have a strong emotional bond specifically with their own farm and with farming in general. This bond may be strengthened over multiple generations. American farmers close to urban centres have refused to sell their land despite high prices offered and even bought adjacent land that was vulnerable to non-farm real estate development (Inwood et al., 2013). Nevertheless, as discussed in Section 4, the high opportunity cost may discourage the younger generation from continuing the family farm. Whether this leads to abandonment of the family farm depends on off-farm employment opportunities.

Preservation of rural communities is threatened by depopulation of rural areas as urbanisation continues to gather pace throughout the world. In rural areas, local farmers are important consumers of the services and products of rural towns and contribute to the population density needed to sustain key rural services and institutions (Hazell, 2005; van der Ploeg, 2013). Hence, the continuation of many small farms is encouraged to prevent depopulation of rural areas (Davidova, 2014). However, family farms are not necessarily small and numerous and may not provide these assumed benefits. Instead of striving to prolong the existence of unviable family farms, depopulation of rural areas could be prevented by creating other viable rural employment opportunities.

5.3. Food security

As family farmers constitute the largest part of the global farm population, logically they produce most of the food. However, the way in which food security is achieved differs enormously among farms, regions and countries.

In developing countries, family farms are important to achieve household food security for large parts of the population (Hazell et al., 2010; Losch and Fréguin-Gresh, 2013). This is especially the

case where imported foods are associated with high transport and marketing costs (Hazell, 2005; Collier and Dercon, 2014). Nevertheless, a large proportion of small farmers are net food purchasers, depending on off-farm income for their food security (Jayne et al., 2010; Bucagu et al., 2014). A lack of alternatives forces families into farming for subsistence (lower half, Fig. 2; Hazell, 2005; Hazell et al., 2010; Losch and Fréguin-Gresh, 2013; Collier and Dercon, 2014). These economically small farms are less able to cope with the economic risks of fluctuating yields and prices compared with large farms which can more easily obtain credit, inputs and market access (Toulmin and Guèye, 2005; Hazell et al., 2010; Collier and Dercon, 2014). On the other hand, resilience of family farms is increased by the flexibility of deploying family labour and family capital (Errington and Gasson, 1994; Djurfeldt, 1996). On-farm diversification further increases resilience through risk spreading (Rusinamhodzi et al., 2012), and may contribute to nutrition security through dietary diversification (Swaminathan, 2014). The latter, however, will not be the case if higher value, non-staple foods are sold rather than consumed.

The vast majority of rice production occurs in Asia, where small farms dominate (Masters et al., 2013; FAOSTAT, 2014). By contrast, a large proportion of the bulk food commodities such as maize and soybeans traded across the world originates from very large farms, notably from North and South America (FAOSTAT, 2014). In the USA, for instance, in 2012 6% of farms accounted for 75% of the total sales of agricultural produce although much of this is used for biofuel and feed, not food (USDA/NASS, 2014). Such farms could play a central role in creating global food reserves, in global food security at a larger scale, and in supplying the ever-growing urban population with cheap food.

6. Strategies to support family farmers

In many developed countries, average farm size in terms of acreage is increasing (Fig. 3). There are regions where the number of small farms increases, for instance with farms producing high value horticultural products in the vicinity of urban centres, but in most rural areas, the number of farms is declining (Inwood et al., 2013; Tomanio et al., 2014). The remaining small and medium farms may not be essential for food production or environmental sustainability, although they are important for the rural population and their communities (Saraceno, 1994). If rural culture is to be preserved in the long term in both developed and developing countries, this will require policies to support the rural population. The most obvious pathway is to reinforce or support options to make small and medium farms more economically viable. Alternative on-farm activities such as recreational services or off-farm income may be important to sustain the family farm. Especially when resources or external conditions hamper expansion, diversification may secure farm family income (Toulmin and Guèye, 2005; Inwood et al., 2013; Davidova, 2014). In France, an increasing number of farmers is opting for partnerships (Bernard de Raymond, 2013). Often, land remains in the possession of the family, but management decisions such as crop rotation, cultivation and harvesting are taken together and labour is shared. This generates the benefits typical for larger scale farms, such as specialisation and mechanisation, which increases the viability of the farms (Gorton and Davidova, 2004). In Italy, small farms have persisted largely as a result of division of labour and the possibility to hire and exchange services and machinery (Saraceno, 1994). Here off-farm income played an important role, which was available because of a diversified regional labour market. Furthermore, on-farm diversification into high value activities can increase viability of the farm for instance through offering recreational activities or production and sales of local niche products

(Bernard de Raymond, 2013; Inwood et al., 2013). These opportunities need to be acknowledged by policymakers. Moreover, for any policy to be successful, engagement is needed with the potential next generation of farmers (Chiswell, 2014). For instance, in order to facilitate children to take over their parent's farm without immediately incurring debts, inheritance taxes could be reduced (van der Veen et al., 2002). Given the diversity of family farms and farmers "no single policy measure, even a well-targeted one, is likely to be wholly appropriate for all types of farms and all development paths: this is not a one-size-fits-all situation" (Davidova, 2014).

Many small farms in developing countries may consolidate, while owners of remaining small farms will find niches in high value markets or become part-time farmers as seen in developed countries (Hazell et al., 2010; Masters et al., 2013). In developed countries, the transition from the agricultural economy to the service/knowledge economy through labour-intensive industrialisation started generations ago, while developing countries may face different stages of a similar transition (e.g. Brazil in Figs. 1 and 3). This irreversible transition does not always occur smoothly (Hazell, 2005). If farm consolidation and urbanization lag behind economic growth, too many small farms with low incomes will remain, and farming families need to be supported and protected to survive. If the transition is forced too soon, rural employment is lost while there are insufficient urban jobs, leading to high rural and urban poverty as found in many Latin American countries (Hazell, 2005). Hence, the best way to support farm families may be to invest in job creation for those who exit agriculture, and in improvements in the agricultural sector to increase productivity on remaining farms (Losch and Fréguin-Gresh, 2013; Collier and Dercon, 2014). Examples of policy targets to support off-farm diversification and migration include education, infrastructure, and access to information (Hazell, 2005). Policy targets to sustain current family farms may include market organisation, research and extension tailored to the needs of the farms, access to inputs, credit and insurance, and access to secure tenure of land (Hazell, 2005; Losch and Fréguin-Gresh, 2013).

7. Conclusions

Family farms are changing and adapting, but not disappearing (Errington and Gasson, 1994; Bernard de Raymond, 2013), despite predictions of their demise (Reinhardt and Barlett, 1989). Development pathways and trends in agriculture differ from region to region depending on varying agro-ecological and socio-economic contexts. Concerns have been raised regarding the impact of current trends on food security, environmental sustainability and rural livelihoods. We conclude that distinguishing between family farms and non-family farms does not help in explaining trends in (economic) farm size. Also, farm size and intensity do not necessarily impact global food security. Although agriculture has an impact on the environment, environmental sustainability cannot be directly linked to family farming, nor to farm size or intensity. More quantitative analyses are needed, but it is clear that to achieve sustainability in agriculture, all types of farms have to be considered based on their merits.

In developed countries, rural culture and livelihoods are threatened as a result of increasing size of farms, including family farms, and rural depopulation. In developing countries, small farms persist where there are few off-farm employment opportunities, forcing people to stay in agriculture while rural poverty increases. In both cases, policies could help the small farms which are under threat of becoming economically unviable to adapt, for instance through cooperation or diversification within or outside agriculture. Supporting unviable farms may encourage too many

people to remain in agriculture (Hazell et al., 2010), stressing the importance of policies to support viable exit strategies. In conclusion, it is doubtful whether a specific focus on family farming is either necessary or helpful to address the FAO's objectives as outlined in the introduction. For the majority of family farms their survival will depend on transformation rather than preservation. Policies need to address the long-term economic viability of farming in all its shapes and forms.

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