



Typology and Indicators to Characterize Agricultural Holdings for Improved Policy Formulation

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Chapter 1 : Introduction

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The purpose of the present report entitled: “Typology and Indicators to Characterize Agricultural Holdings for Improved Policy Formulation” is to present an overview of the potential policy advantages of establishing an international typology of agricultural holdings while also examining the WAW Methodological Framework proposal of implementing an international typology of agricultural holdings that largely relies on family/hired labour usage as the key discriminant parameter.

While labour may without doubt be considered a relevant factor to discriminate holdings, further research is undertaken to evaluate whether additional criteria may or may not be needed to develop a ‘robust’ international typology of agricultural holdings taking into consideration the associated practical limitations to building such a typology. This is done based on the experiences and data availability of WAW pre-selected observatories and comparability between country results.

The objective of this report is therefore to strengthen WAW’s goal of establishing an international typology and set of indicators by assessing the extent to which the sustainable livelihoods and capital asset frameworks accompanied by territorial analyses can be effectively used. The report also presents an overview of agricultural transformations in the light of current global challenges such as food & energy security, climate change, poverty and inequality.

1.1 The WAW Methodological Framework & the WAW Typology of Agricultural Holdings

In June 2012, the World Agriculture Watch Secretariat produced its Methodological Framework for “*continuous monitoring of the changing diversity of agricultural holdings to allow more effective participation of disadvantaged stakeholders in influencing policy formulation and planning affecting their livelihoods*”. In contrast to initiatives which focus exclusively on the collection of quantitative ‘statistical’ information, the WAW Methodological Framework envisages a mix of quantitative data collected through conventional statistical surveys but also qualitative data based on the engagement

and empowerment of local stakeholders, taking into consideration their specific needs for supporting various policies and planning processes (WAW, 2012).

WAW's emphasis on monitoring changes at 'agricultural holding' while also considering the territorial perspective is a distinctive feature aimed at enhancing coherency between local and national levels. This partly explains the focus of establishing and promoting observatories in different parts of the world. In the WAW Methodological Framework the typology of agricultural holdings is considered one relevant step but more importantly it is regarded a tool to achieve a much wider aim which is summarized in the Vision, Mission & Implementation Steps of the WAW initiative (See Box 1.1).

Box 1.1: WAW Vision, Mission & Implementation Steps

Vision: Empowerment of marginalized stakeholders to participate effectively in policy, planning and governance processes which affect or are affected by agricultural transformations, and which have important consequences for socio-economic development and environmental sustainability.

Mission: Cognizant of the wide and continuously changing diversity of agricultural holdings, and of consequences on the wellbeing of rural populations, WAW strives to better inform current policy, planning and governance processes (notably those affecting food and nutrition security, socio-economic development and environmental sustainability) by contributing to the development of the capacities of stakeholders, particularly the most marginalized groups, to monitor and effectively take into consideration during decision making, objective evidence on the current and forecasted impacts of agricultural transformations.

WAW Implementation Steps:

Step 1

Analyse priority national issues and trends and select sub-national territorial units for detailed WAW assessment and diagnostic

Step 2

Detailed 'territorial' assessment – including typology of agricultural holdings

Step 3

Information base and decision support system

Step 4

Policy and planning processes

Source: WAW (2012)

Under the WAW Methodological Framework, it is envisaged that the typology is firmly anchored on the FAO definition of agricultural holdings (Box 1.2). Similarly, although highlighting that holding size, tenure, agricultural practices, reliance on non-farm activities, source of financing and degree of market integration are all relevant criteria to identify different types of agricultural holdings, the use of family/hired labour as a key distinguishing parameter is strongly advocated as the primary distinguishing dimension to characterize agricultural holdings:

- (a) Holdings with essentially family labour
- (b) Holdings with family and permanent hired labour

(c) Holdings with exclusively hired labour

The Sustainable Livelihood and Capital Asset Frameworks are considered relevant for the identification of core (and supplementary) indicators that can be used in the further characterization of agricultural holdings but also in understanding the nature of transformations.

Box 1.2: Agricultural Holding

“An agricultural holding is an economic unit of agricultural production under single management comprising all livestock kept and all land used wholly or partly for agricultural production purposes, without regard to title, legal form, or size. Single management may be exercised by an individual or household, jointly by two or more individuals or households, by a clan or tribe, or by a juridical person such as a corporation, cooperative or government agency. The holding's land may consist of one or more parcels, located in one or more separate areas or in one or more territorial or administrative divisions, providing the parcels share the same production means, such as labour, farm buildings, machinery or draught animals.” “There are two types of agricultural holdings: (i) holdings in the household sector - that is, those operated by household members; and (ii) holdings in the non-household sector, such as corporations and government institutions. In most countries, the majority of agricultural production is in the household sector. The concept of “agricultural holding” is therefore closely related to the concept of “household”.

(Extracts from FAO, 2005 and 2007)

The distinction based on *family vs hired labour usage* is largely rooted on the fact that at a global scale, agriculture is one of the few industries overwhelmingly based on a family firm model; that is, farms that are owner operated and rely largely on family labor (Lipton 2009; CIRAD, 2013; Calus and Van Huylenbroeck, 2010). As Brookfield (2008) argues the “agrarian question” has been mainly about the disappearance and replacement of family farms by capitalist farms, or subsumption by agribusiness, but these have competed successfully with capitalist farms for a long period. In this sense, the WAW Methodological Framework focus on family/hired labour usage as key dimension to propose a typology of agricultural holdings is justified as a basis to explore how family farming evolves and interacts with other forms of farming such as the corporate or entrepreneurial farming (CIRAD, 2013).

1.2 Report Objectives & Structure

The present report pursues the following objectives (and tasks):

- To review the WAW Methodological Framework proposal to use family/hired labour as the key discriminant variable in order to set up an international typology that allows monitoring of agricultural transformations. For this purpose, literature and expert consultations on existing typologies and typology methodology are considered in order to i) assess the practical and theoretical advantages and limitations of recommending additional criteria to building international types of agricultural holdings and ii) illustrate the potential policy relevance of an international typology. Similarly, an overview of the ongoing agricultural

transformations is presented in order to reflect on their nature and the level at which these may be taking place

- To highlight the challenges associated to building an international typology based on the experience of pre-selected observatories (Madagascar, Vietnam, Nicaragua, France).
- To offer insights on how to overcome technical and institutional challenges associated to the establishment of the WAW International Typology (and indicators) of agricultural holdings

The present report is thus structured as follows:

Chapter 1: Besides introducing the context in which this research takes place and describing the aim of the report, this chapter discusses the theoretical relevance, preliminary implementation challenges and the potential policy significance that an international typology of agricultural holdings may entail for governments and the international community. Likewise, a synopsis of agricultural transformations at holding, household and sector level is produced.

Chapter 2: A literature review is conducted in order to review existing agricultural typologies for each major geographical area. The review covers typologies developed at governmental level as well as in academic spheres. The aim is to analyze what types of dimensions have been used to characterize agricultural holdings, what indicators have been utilized and what are the limitations and advantages of context-specific classifications. First, the regions with relatively higher data availability are considered, i.e. USA, Europe, etc., followed by assessment in middle to low-income areas (Latin America, Africa, South East Asia). The revision of the literature on typologies attempts to examine the use of "labor" as a key variable to distinguish types as well as the extent to which current typologies capture agricultural transitions (from one type to another) and transformations at sector level. The existence of datasets which cover related socio-economic aspects, the incorporation of agro-ecological zones or territorial constraints to design typologies, or the extent to which typologies are focused on specific sub-sectors (cropping, livestock, forestry) are also reviewed. Likewise, the different typologies are assessed in terms of their suitability to guide policy makers regarding gender equality, food security, poverty-reduction, and environment-related policies.

Chapter 3: The WAW Methodological Framework proposal of building an international typology largely guided by the family/hired labour usage dimension is reviewed not only in the light of previous literature findings but in the context of two participatory scientific and policy events: the WAW Dgroup Discussion (April & May 2013) and the WAW Working Meeting in Rome (May 27, 2013). Chapter 3 summarizes an alternative analytical approach to develop an international typology of agricultural holdings based on the combination of top-down and bottom-up perspectives. A list of specific dimensions (related to internal holding attributes) is proposed to conduct the identification of agricultural types. From this list three distinguishing criteria are selected following the participatory feedback from technical and policy experts (top-down approach). These three criteria include: i) the original WAW Methodological Framework proposal of family/hired labour usage (operational attribute), ii) nature of holding management and decision making process (social attribute) and iii) overview of self-consumption vs market involvement of the holding (production

purpose attribute). The sustainable livelihood and capital asset frameworks are expected to serve as guiding tools to secure supplementary indicators to address issues related to gender, environmental practices or the diversification strategies of rural livelihoods outside agriculture (non-farm activities, migration, etc.) (i.e. bottom up approach). In other words, it is proposed in this report that the development of the WAW international typology and indicators is undertaken through the combination of top down and bottom up perspectives. The top down perspective focuses on key discriminating criteria in order to identify different international (comparable) types that can be inclusive and robust while the bottom up approach is guided at all times by the real and future availability of asset and livelihood information and statistics that also incorporate context specific traits and conditions.

Chapter 4: In order to test the implementation of the proposed analytical approach for typology building, data and experiences from WAW pre-selected Observatories are considered. This chapter includes a methodological proposal for data handling and processing in order to produce indicators that are in line with the three top-down criteria of the proposed international typology. Similarly, an overview of national typology building in each of the pre-selected countries is presented and contrasted to their own efforts of identifying (or adjusting) the necessary indicators that fit the three discriminant criteria. Results from this exercise reflect the practical challenges to developing an international typology that can categorize agricultural holdings from different countries under a common framework. The chapter concludes with recommendations to overcome specific practical and theoretical limitations to typology implementation that are relevant not only to the top-down & bottom-up approach to typology building but also the initial WAW Methodological Framework proposal for an international typology. Experience gained during an initial phase of field testing of the proposed typology building approach in the pre-selected WAW observatories is used to recommend one or more options for wide operational adoption.

Chapter 5: Conclusions include a brief summary of report findings as well as considerations for future work.

Although the objective of continuous monitoring (as opposed to a one-time assessment) is the ultimate objective of WAW Methodological Framework, the present research is strictly concerned with the challenges associated to the development of the WAW international typology; *i.e. the identification of types that provides the starting point for undertaking comparative analysis*. The possibility of extending the analysis into a dynamic assessment which allows for accurate tracking of transformations will in the end depend on securing past data and/or preferably long term data collection mechanisms on key indicators (i.e. those suitable to capture relevant agricultural changes). Another expected outcome of this research is to shed light on the potential benefits of incurring on the efforts to collect additional information at holding level, including market linkages and production but mainly data related to environmental and social issues that are less available at agricultural holding level. The availability of socio-economic and environmental indicators is expected to improve the usability of the typology in order to further understand why transformations are taking place and to support more informed policy making.

In the next two sub-sections of this introductory chapter, the relevance of an international typology is reviewed followed by an overview of current agricultural transformations.

1.3 Relevance of an International Typology of Agricultural Holdings

Several studies (Pretty et al 2010, FAO 2009a, 2009b, Godfrey et al 2010) have highlighted that in order to meet the food requirements of nine billion population in year 2050, an expansion of food production of 70 per cent is needed (with a base reference year of 2006)¹. Other authors, such as Tilman et al (2011) have forecasted that a much higher increase in global crop supply will be required (i.e. 100 to 110 percent increase from 2005 to 2050). Although the extensively quoted 70 percent figure has been criticized for excluding fruit and vegetable production from calculations and not incorporating the impact of efforts related to food waste reduction (Tomilison, 2011;), it is undeniable that increasing agricultural output and yields is a real concern, particularly in emerging and low income economies where most of the demographic growth is expected (Saravia-Matus, et al 2012). At the same time, it should be highlighted that production is just one part of the food security issue, as also aspects related to access and availability should also be factored in.

Likewise, it must be stressed that food insecurity is a current pressing matter and not only a medium to long term challenge, since nowadays 870 million people are categorized as food insecure (WFP, 2013). The majority of them are located in rural areas of low or middle income countries and dependent on farming (IFAD, 2011). Sen (1998) and others (Tomlinson 2011, Smith et al, 2000) argue that the dynamics of income earning and of purchasing power may indeed be the most important component of food insecurity and starvation. In this respect, the emphasis is placed on food access (or the capacity of households to fulfil their minimum dietary needs) as the main limiting factor of food security (Saravia-Matus et al, 2012). In other words, not only production increase but aspects related to inequality and poverty are intrinsic to the food security question. Similar concerns are expressed regarding access to natural resources and the increased competition to secure land and water utilization. According to Alden Wily (2012) of the 70 conflicts raging across the world in 2008, 60 were in agrarian economies, where traditional land rights are not recognized, poverty persists and local institutions are weak.

FAO estimations (2010) indicate that around USD 83 billion annually would be required to assist low and middle income economies in feeding their growing populations towards 2050. Even though it has been recognized that farming in low-income countries has on average the largest room for technical improvement at global level (World Bank, 2010) (especially in African countries which are said to currently achieve less than 30 percent of their potential yield (Deininger, 2011)) there are technical and institutional barriers that prevent farmers from adopting new technologies or innovation systems, as well as difficulties to establish well-functioning markets.

In other words, food and energy security, climate change, competition for natural resources, rural migration, productivity increase, poverty and inequality are among the current global challenges that are directly or indirectly connected to the rural economy and agricultural activities in particular. As de Janvry (2009) highlights in recent years, a number of economic, social and environmental crises have attracted renewed attention to agriculture as both a contributor to these problems and a

¹ Other studies which have addressed this issue are: The Government Office for Science (2011) Foresight. The future of Food and Farming. Final Project Report. London, Paillard, S., S. Treyer, et al., Eds. (2011). Agrimonde - Scenarios and Challenges for Feeding the World in 2050. Versailles, Editions Quae; IFPRI's food security portal: <http://www.ifpri.org/blog/food-security-portal>

potential instrument for solutions². One key question that arises from this scenario is whether agricultural sustainability (considering environmental, social and economic perspectives) as well as efficiency (in fulfilling the increasing demand for food, feed, fuel and fiber of a rapidly expanding global population) can be pursued and achieved while also reducing food insecurity and poverty for the most vulnerable segments (a majority of which is located in rural areas and highly dependent on agriculture for survival (IFAD, 2011)).

There is a great diversity of agricultural holdings which responds not only to local differences in terms of agro-ecology, market conditions, legal frameworks or social/institutional arrangements but also to the way agricultural holdings manage land, inputs (fertilizers, machinery, technology, etc.), or reliance on family labor and off-farm income. Consequently, analyses to measure efficiency or sustainability in agricultural sectors and between holdings are usually based on selected case studies and generalizations cannot be easily made. A review of the academic and the policy literature reveals numerous assessments that are extremely varied in terms of focus and method. These analyses are in fact usually dedicated to particular groups of farms in specific geographical areas and results are seldom directly comparable across regions. For instance, Deininger and Byerlee (2011) have focused on the potential of large farm structures to constitute a more efficient form of production predominantly in areas which report a low population density (i.e. Russia, Ukraine). Other authors have analyzed the environmental and socio-economic potential of smaller family-based mixed-crop holdings, especially in low income, labor-abundant rural societies (Scoones, 2010a 2010b; Saturnino, 2012).

An added difficulty in drawing conclusions from the existing myriad of agricultural assessments or establishing linkages from different studies is related to the great variety of criteria used to define farm types, particularly when based on specific agro-ecological settings or size of agricultural holdings. The implementation of agro-ecological dimensions to distinguish farms implies that these may only be replicated in similar agro-ecological zones. Size of agricultural holdings, can seem at first glance as an objective benchmark, but this is a mistaken appreciation. Size is a rather elusive indicator in an international typology because a 'small' farm in Brazilian or North American context differs in many respects from a 'small' farm in a West African context (WAW, 2012). Similarly, size of agricultural holdings can also be influenced by crop produced and cultivation practices. The latter implies that size is one of the most relative and subjective criteria frequently found in contextualized typologies.

Other difficulties to undertake comparative agricultural analyses relate to concepts such as "peasant", "commercial", "entrepreneurial" or "patronal" farming since these usually have context specific meanings and/or legal implications in different countries. At the same time, it is important to consider that agricultural typologies may use different defining criteria that may not always be relevant under all contexts. Under some circumstances, farm net income level or access to specific technology can be used as key parameters to establish types. Such indicators may not be easily captured in cases when farmers use non-monetary exchanges to access inputs. In fact, according to a recent study by EAFF, ROPPA and PROPAC (2013) "There is information about the commercial commodity and export markets and large scale traders, but not about the forms of market and

² de Janvry (2009) states that the role of agriculture as an instrument for industrialization had been rigorously conceptualized in the 1960's and 1970's under the classical paradigm of development economics. After many implementation failures under import substitution industrialization policies and protracted neglect of agriculture under the policies of the Washington Consensus that followed the debt rises, agricultural gradually returned in the development agenda, especially with the food crisis.

structures of exchange and trade, which are the most important for family farmers and small-scale producers and processors who provide food for most people in the region. This production, processing and trade could be termed 'informal' or 'invisible'.

It is also the case that in low income countries, literacy, basic skills or training can be used to categorize farmers while in high income countries, the typology of agricultural holdings can be driven by other factors such as level of mechanization or annual sales. Similarly, on or off farm diversification indices may be irrelevant if taken out of context. Another issue to consider is that typologies are commonly built to answer specific questions, thus preventing that they may be readily applicable or reproduced in other socio-economic and environmental scenarios.

The general problem from an analytical viewpoint is that there is a vacuum of theoretical and empirical studies which examine the diversity of agricultural holdings in a continuum, providing at the same time internationally comparable working concepts and indicators that are meaningful under different socio-economic and agricultural settings. Essentially, there is no framework to neither analyze agricultural holdings in the same level (or set of dimensions), nor monitor their structural transformations at local and global level. Overall, the lack of such mechanism is an enormous handicap in terms of providing national policy makers a comparative or relative vision of local and national agricultural contexts while also serving as evidence-based resources to inform policy dialogue at an international scale.

An international typology of agricultural holdings could shed light on debates around sustainable agricultural production and socio-economic (inclusive) rural development that are (given current limitations on comparable data and analyses) often guided by ideological rather than comparable evidence-based inputs, particularly when analyzing the contribution of different types of agricultural holdings (i.e. family farming versus corporate farming). In this sense, one advantage of an international typology is that by focusing on the common global challenges of agricultural sectors, it could propose analogous indicators and types of agricultural holdings. In other words, an international typology of agricultural holdings could serve to monitor transformations while also providing scientific proof to support the elaboration of institutional and technological-oriented agricultural policies that contribute to enhance food and energy security, climate change mitigation, poverty reduction and increased productivity in a sustainable and socially responsible manner.

A fundamental conundrum is thus to provide a relevant robust typology of agricultural holdings which contributes to analyzing several dimensions (not only productive aspects but also social and environmental challenges) in order to assess the impact on and from different types of agricultural practices and organizational strategies. In other words, policy formulation would benefit from relying on evidence that illustrates agricultural holdings capacity to increase output and yields in an environmentally sustainable manner while considering socially inclusive and economically viable paths (i.e. maximizing efforts to reduce rural poverty and hunger). An international typology of agricultural holdings could also serve as a tool to support policy planning to develop differentiated programs to promote several aims: food security, value added process, value chains integration (vertical and horizontal). It could allow governments to define strategic results having a clearer targeting strategy.

An international typology of agricultural holdings could in principle shed light on current agricultural practices and the relative pressure these exercise on natural habitat or with respect to biodiversity conservation. Similarly, if social dimensions are included, the potential of gender equality policies in agriculture and poverty alleviation policies can be further examined and enhanced. Clearly,

this implies that information concerning social, economic and environmental aspects is collected at agricultural holding level in a systematic (an internationally comparable) way. Data availability is thus one of the first obstacles to developing an international typology of agricultural holdings and which requires uniform or standardized international data collection and processing mechanisms.

Currently FAO offers a global and coherent framework to capture through census many parameters of relevance for agricultural analyses. The programme for the WCA serves to promote availability of internationally comparable data on structure of agriculture while also providing guidance to countries in collecting data following standard concepts, definitions and classifications (FAO, 2010). However, despite the attempts to create a harmonized data system, countries face their own constraints and priorities when it comes to data collection and processing. In fact, census design and the data resulting from the censuses vary significantly across countries. Very often standard concepts underlying the census data are adjusted to suit national requirements. Specific efforts are made by the FAO Statistics Division to standardize the data so as to make them suitable for international comparisons, to the extent possible (FAO, 2010).

The WAW Methodological Framework is concerned with the inclusion of holding and territory³ level indicators that are aligned to the sustainable livelihood and capital asset frameworks. The latter involves data outside the scope of strictly agricultural issues. There are currently a series of different efforts in the form of topic-specific surveys (education, health, agricultural, etc.) that independently capture a variety of valuable information which is not yet well integrated into the characterization of agricultural holdings. There is thus a potential to unify these datasets and organize future collection which is in line to policy making needs in the agricultural sector for the short, medium and long term. However, if one considers that under the FAO WCA system, key agricultural variables are still difficult to bring to comparable standards, the challenges associated to a larger set of indicators must not be understated.

Another issue to consider is that the WAW Methodological Framework is mainly concerned with monitoring agricultural transformations. Clearly, the challenge of incorporating a dynamic outlook to understand and forecast the consequences of on-going transformations will depend largely on the ability to both identify⁴ suitable indicators and collect related information in a systematic manner. At present, there is insufficient panel data at agricultural holding level which reveals the situation and evolution of capital assets or livelihood strategies, yet initiatives such as the World Bank's Living Standards Measurement Surveys (LSMS) and FAO's Rural Income Generating Activities project (RIGA) indicate that data may become available as international organizations and governments realize the potential value of understanding the characterization of agricultural sectors from an international perspective in order to develop effective policies that respond to emerging challenges. It should be highlighted that in the case of LSMS, the entire population of farms is not targeted since a particular focus is given to farm-households.

³ Based on experience gained during FAO's global assessment of land degradation in drylands (LADA, 2012), WAW will test the concept of major land use systems within a given administrative unit (e.g. district, region) as a basis for defining 'territories' for monitoring purposes. The administrative unit should be relevant from a either policy formulation or decentralized planning perspective. Depending on local variability, one or more land use systems may occur in an administrative unit. Hence, there is a need for 'territories' to be delimited flexibly by local stakeholders, taking into consideration the monitoring effort which would eventually be required.

⁴ Identification of the adequate indicators to monitor transformations is a tricky task in itself, particularly in the case of attempting forecasts because it is not certain which type of variable may best capture the concerned phenomena.

But an overview of agricultural transformations illustrates that efforts related to not only harmonized data collection and processing but also availability of continuous data flows for a variety of indicators are necessary to understand and potentially forecast structural changes in the agricultural sector that have an impact on key global and local challenges such as food and energy security, climate change or poverty reduction.

1.4 Overview of Agricultural Transformations

Individual management of holdings affects and is at the same time influenced by social, economic and environmental conditions at local, national and even global scales. Thus, to better understand transformations, there is need for observations and analyses not only at holding level but at a broader 'territorial' level. Agricultural transformations can thus be examined at holding/household, agricultural sector or multi-sector perspectives. The holding level refers to transformations involving fundamental or structural changes in the organization of farming activities. In the case where production and consumption decisions are integrated such as in the case of the so called farm-household, transformations at the household level deserve attention as they affect the agricultural holding performance. Similarly, transformations at territorial level whether only focused on sector-specific aspects or other activities of the rural economy or rural-urban relations deserve separate attention. Although these manifestations may be distinguished at different levels of observations, they are complex phenomena which are driven by a series of common and inter-related factors. At the same time, it is possible to highlight a series of current agricultural transformations that are pivotal in the debates around food security, climate change or poverty eradication which relate to land concentration, feminization of agriculture, "atomization" of farms, changing paradigms in the agro-processing industry and the pressures or opportunities emerging from agro-energy sector.

For instance, at the agricultural sector level, many authors have documented the decline of the share of agricultural GDP and employment, largely in high income countries (George et al, 2012; Timmer 2009) while simultaneously recognizing that the sector has continued to grow in absolute terms (particularly with respect to the food system taken as a whole) (George et al, 2012). Ellis (2000), documents the main development economic theories to explain these transformations. One of them is related to the hypothesis that rising agricultural productivity stimulates demand for non-farm input services as well as creating an internal consumer market for industrial output, thus allowing for a transition from one sector to another. The political economy of agrarian change relates to the disintegration of peasant communities and the emergence of two distinct social classes of landless wage labor and labor hiring capitalist farmers, as forces of competition, uneven technical change and privatization of land lead to increasing differentiation between families in rural society (related to Lenin's vision). However, Kautsky (1900) argued that the peasant did not disappear as rapidly as expected, in turn, their position was maintained if not increased during his time period. In other words, Kautsky recognized the incorporation of peasant family farms within the capitalist mode of production, providing for their continuity under capital that dominates them and exploits them without dissolving them absolutely. Lastly, Ellis (2000) considers Boserup's (1965) basic proposition that more intensive farming technologies tend to occur with rising population density.

According to George et al (2012) the classic view of structural changes in terms of the reduction of the share of agriculture in the main macroeconomic aggregates was brought about by varied

phenomena such as the Industrial Revolution, urbanization and large-scale migration by European populations in the 19th and early 20th centuries that ultimately contributed to a strategy of replacing labour with capital and with massive recourse to chemical inputs. The authors (*ibid*) argue that the highly uneven distribution of these developed environments generated huge productivity gaps between agricultural systems at worldwide level, which were slightly offset by the development of the “green revolution”.

Another issue to consider regarding transformations affecting agricultural sectors as a whole is related to the trend towards reduced agricultural investment and extension services. Official Development Assistance for the agricultural sector has lost share of overall aid over time from around 15% in 1970's to 5% in 2007 (GTZ, 2009). According to FAO (2012) this decline in agricultural investment has contributed to reduce the positive evolution of yields and performance in marginalized areas where governments' public agricultural spending is also limited. As it will be argued below, these policy changes affect the decisions at both agricultural holding and household level, particularly in the low income countries.

Another aspect to consider is that of an emerging food market paradigm that has gained strength in recent decades (CEPAL, 2013). The latter includes vertical integration, contract farming arrangements, output quality controls and the positioning of major global players in the food manufacturing business. Under this paradigm there has been a change in the way output markets operate since large international food distribution operators (related to the so called ‘supermarket revolution’⁵) impose stricter standards, contractual arrangements and conditions to set up vertical integration mechanisms. The latter reduces to some extent the possibility of market integration for agricultural holdings that lack the necessary assets and institutional network to fulfill such stipulations. This is also connected to the expansion of global trade of agricultural products that influence the competitiveness of agricultural holdings and promotes production patterns towards limited set of crop portfolios that fit with the emerging agri-business models (CEPAL, 2013). These have implied changes to the way agricultural producers access markets, manage resources and integrate inputs or technology. Concerning this last aspect, recent developments in genetically modified crops (promoted by large multinationals instead of public agencies) focus on relatively few (tempered weather-based) crops excluding crops in tropical, arid, marginal or stress-prone environments (Pingali, 2007); i.e. areas where the poorest and smallest farmers are located. At the same time, the positive effects of the Green Revolution are reported to be declining (Estudillo and Otsuka, 2004 ; Pingali, 2007; Pingali and Traxler, 2002).

Another recent phenomenon is that of large-scale land transactions. The latter implies that new players are transforming the structure of agricultural sectors, sometimes even displacing other types of agricultural holdings (mainly the poorest and smallest land holders with insecure rights of tenure or in communal land catalogued as state land) (Hallam, 2011, EC-JRC, 2013). This tendency (partly driven by scarcity of land and water resources, financial speculation or new demand of biofuels)

⁵ According to Poulton et al, (2009) the literature on global supermarket expansion demonstrates common features of supermarket growth across countries and regions. The authors highlight that where demand conditions are favorable (due to income growth and urbanization) and restrictions on foreign direct investment have been lifted, supermarkets have rapidly expanded to command major shares of urban food retail market. In this respect, Reardon and Berdegue (2002) have argued that in the case of Latin America (with a highly dualistic agricultural sector), supermarket expansion has happened very quickly and small farms have struggled to maintain their position with the supply chain. Only where a majority of small holders are found and a source of local products is required, the supermarkets have had to provide support packages to build the capacity of undercapitalized farms (Dries et al, 2004).

entails a further consolidation of previous dualistic structures (Lewis, 1954) and historical paths (e.g. multi-national firms in Latin America, Asia and Africa; planned agriculture in former Soviet Union; Estate farms in East and southern Africa or "pools de siembra" in the Southern Cone). The latter is also enhanced by national policies on land consolidation aimed at achieving greater production efficiencies, notably in regions where land fragmentation occurs due to traditional land inheritance practices (e.g. in parts of Eastern Europe, Asia, Africa). According to Land Matrix data (2013) about 40 million hectares have been negotiated under different large-scale land deals between 2006 and 2009. The annual average number of hectares negotiated during these years (10-12 million hectares) is almost three times higher than the annual average in the early 2000's. It is thus not surprising that the increase of large-scale land transactions worldwide has been registered and denominated in various fashions: "outsourcing's third wave", "global race for farmland", "commercial agriculture", "land grab", "land rush" (The Economist, The Guardian, BBC News, UNEP-Global Environmental Alert Service), "agro-imperialism" or "neo-colonialism" (Via Campesina). Most of these land deals have the objective of securing food supply for specific populations (thus avoiding international market mechanisms and their price volatility) or important distribution channels (such as those belonging to large agro-commodity & agro-chemical transnational corporations directly involved in farming) (CEPAL, 2013). Another driver behind large-scale land transactions is connected to the increasing biofuel production capacity mainly triggered by the mandate of many governments to favor "clean energy sources". According to World Bank data, between 2004 and 2008 the total area under biofuel crops doubled to 36 million hectares. The increase in demand for biofuels has potentially exerted pressures both on world prices for agricultural commodities and on land use, i.e. how much planting area could be diverted from producing other crops to those used as feedstock for the production of biofuels (FAO, 2009a). Investors from the financial sector have also participated in land acquisition or leasing projects since the expected demand for food and fuel will increase the strategic value of natural resources such as land or water (Saravia-Matus et al, 2013). With the entrance of such new players (into what were already highly dualistic sectors) the access to natural resources (such as land, water and forests) for the 2.5 billion people who depend on farming for self-consumption (FAO, 2012) is threatened, mostly when "mega-farms" are established in community areas or state land. These transformations, although guided by a variety of drivers are ultimately shaped by the institutional and other territory-specific traits in which they take place⁶. In any case it should be highlighted that behind these large scale land transactions both foreign and domestic players are involved (Saravia-Matus, et al, 2013).

The consolidation of the so-called large-scale agricultural holdings highlights the different evolution and context in which small or medium scale holdings may operate. According to Cochet and Merlet (2011) the emergence of large-scale farms relates to a growing gap between return on

⁶ Cotula (2012), Borras et al (2012) and Visser et al (2012) have documented the nature of large-scale land deals in Africa, Latin America and the Black Sea Region respectively. It is in African countries that most of the abuses related to displacement and reduced access to natural resources in communal areas, have been registered. It is also in Africa that the largest deals have been documented, with the Chinese corporations at the top, securing their investments in palm oil production for biofuel on 2.8 million hectares in Congo (Land Matrix, 2013). Large-scale transactions in Russia or Ukraine have taken place through a dynamic process of share acquisition of agro-holding structures, leading to even higher levels of land concentration. By mid-2008 about 11.5 million hectares were under the control of 196 agro-holdings, 32 of them with landholdings of over 100,000 ha (Visser et al, 2012). In Latin America, the different regulations against foreigners holding land have led to an enlarged number of local and regional partnerships to establish large-scale land transactions in a region where latifundia holdings were already widespread (Saravia-Matus et al 2013). According to Borras et al (2012) the so-called "translatina" companies are the main investors in the region. The latter suggests that south-south and not only north-south large-scale land deals are taking place.

capital and remuneration for labour, with the previous increasing at detriment of the latter. Labour compensation is limited in this type of holding since investors manage to secure very cheap access to land. Consequently, value added is highly concentrated on the return on capital, disregarding both fair compensation for labour and the land use. This situation is particularly acute in the case of large-scale farms which are non-labour intensive. A series of academic studies also reflect that a substantial percentage of the agricultural population is currently reporting declining average farm size (or an increase in the proportion of farmland cultivated in small holdings) (Lipton, 2006; Scoones, 2010a, 2010b). The latter is also accompanied by deteriorated agricultural infrastructure and extension services and very often a high degree of food insecurity. Similarly, a diversification of rural income sources to include off-farm income generating activities as well as other strategies including migration to urban areas have been recorded (Scoones, 2010a, b).

Transformations at the agricultural holding level include changes in terms of both input or output decisions. From the input side, land may become concentrated or fragmented, family labor may be substituted or increased, new equipment, machinery, high yielding variety (HYV) seeds, biotechnology products, etc. may be incorporated or absent. From the output perspective, the agricultural holding may become more or less specialized in a given agricultural activity or specific crop. Agricultural holdings' decisions between specialization and diversification are usually connected to capital asset portfolio and risk preferences (World Bank, 2007). Specialization (under contractual arrangements) is usually aimed at achieving economies of scale as part of conventional modernization and it implies higher integration to local, national or international markets. Diversification towards off-farm income sources is another widespread phenomenon. For the case of the poorest and smallest family farms, this transformation of the livelihood portfolio towards diversified crop portfolios (or integrated livestock systems) may be related to self-consumption purposes (depending on agro-ecological conditions). According to Freguin-Gresh et al (2012) there is a strong relationship between income and the diversification/specialization of rural households in terms of economic activities. After analyzing rural household surveys in the agricultural-based regions of Meso America and Africa, it was observed that poorer households diversify to mitigate risks while households that are better off can make larger investments and begin to specialize to take advantage of newly acquired assets.

There is also a segment of farms that are becoming more "atomized" and are usually considered as little responsive to price signals. Lastly, there are empirical studies indicating that female-headed agricultural holdings are mainly belonging to this segment, particularly in low income areas (FAO 2011, the SOFA; Daley and Mi-young Park, 2012, World Bank, 2007)

At the agricultural household level, transformations may be related to changes in terms of who is the holder (concerning gender or age), the extent of the household reliance on agriculture for subsistence, and their engagement in non-farm activities. At this level it is possible to capture the level of food insecurity, resilience and poverty. The latter is also connected to transformations regarding demographic evolution, as the population decides to migrate or introduce changes into their life and work styles. In other words, it is possible to refer to a growing preference for a 'modern' urban (as opposed to farming) lifestyle in high and middle income countries, resulting in the need for hired labour (e.g. France, Spain) or a turn towards mechanization (i.e. Chile). In other cases, such as in China, government policies also affect directly the rural and urban demographic transitions. In the case of low income countries, migration to urban centers as a result of poverty and limited income generation opportunities in rural areas (on and/or off farm) represents an increasing trend. In low income areas, increasing reliance on remittances and expanding number of female-headed

households, female managers and female operators of farms are also present. The latter is usually termed as “feminization” of agriculture.

These agricultural transformations raise important questions on social, economic and environmental sustainability of the different agricultural holdings which have repercussions for the rest of the economy and society not only at local or national levels but also at global scale. From an environmental outlook, evidence is widespread on the risks associated to extensive mono-cultivation, loss of biodiversity or abusive use of natural resources which tend to occur in highly mechanized mono-cultivated areas (UNEP GEAS, 2011). The increasing competition for resources such as land and water which is resulting from the current wave of farmland acquisition and leasing is leaving small-scale family farms not only in a less competitive position but also in an even more vulnerable situation regarding food security (Saravia-Matus et al, 2013). In many unfortunate circumstances the competition for scarce resources has fueled conflict and civil unrest (Alden, 2009).

The overview of agricultural transformations leaves us with a sense of their diversity and the challenges associated to tracking and monitoring such transformations. The latter has been rather elusive, partly because they take place in varied institutional and socio political contexts. Yet evaluation and monitoring in the agricultural sector are essential tasks to guide policy formulation.

A deeper analysis of agricultural transformations could address a series of questions;

- How are current agricultural transformations shaping who produces, what is produced, for what purpose and with which resources?
- What are the consequences of these transformations in economic, social and environmental terms at national and global level?
- Is it possible for different types of agricultural holdings to co-exist? How?

Nowadays, there is no common terminology to identify different agricultural holdings (as family, peasant, industrial or corporate farming can have different meanings depending on the source and context). Also it is difficult to establish accurate comparisons between indicators and available data in order to establish more definite terminology. Therefore, without accurate identification of agricultural holdings, it is not possible to describe their transitions least establish comparisons at local, national or global level.

A key challenge is to learn which types or combination of types of agricultural holdings are most suitable within their given agro-ecological settings and based on technical traits (i.e. size, production mix, input mix, food chain coordination, etc.) to produce efficiently (in socio-economic and environmental terms). To face this challenge, it is necessary to first conceive a working typology and a set of indicators in order to capture the characteristics of existing (and emerging or disappearing) agricultural holdings and establish effective comparisons and analyses that feed into the on-going debates around environmental sustainability and socio-economic development. The World Agriculture Watch is deeply concerned with the development of such an internationally comparable agricultural characterization of holdings and monitoring their transformations. The aim is that by starting at the holding level, the analysis of overall sector transformations can be better understood and possibly forecasted. The latter could be useful to support evidence-based policies to deal with food and energy security, sustainable use of natural resources as well as socio-economic viability in rural and urban areas at the global level.

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Chapter 2: Overview of typologies of agricultural holdings in different geographical areas and focus

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In this chapter a revision of relevant policy and academic literature concerning agricultural characterizations in different geographical areas is achieved. During this process, indicators which may capture not only the socio-economic and environmental traits of holdings but their transformations are surveyed. However, the main purpose of this task is to obtain a wide sense of what criteria or distinguishing factors have been employed (besides labor) in order to set up different types of agricultural holdings. Particular attention is also given to the practical implementation of typologies (i.e. data availability and general policy purpose). The findings are put in perspective with the original WAW framework, analyzing notably how labor, as a distinguishing dimension, has been used, whether it may be sufficient, as well as whether other criteria emerge as potentially relevant across agro-economic settings so to establish international types of agricultural holdings.

This chapter constitutes a synthesis of the findings resulting from the literature review undertaken by the consultancy team. More precise information, details on indicators and exhaustive references are given in an extended version proceeding from this literature review (Refer to the Annex Report “*Overview of typologies of agricultural holdings in different geographical areas and focus*”).

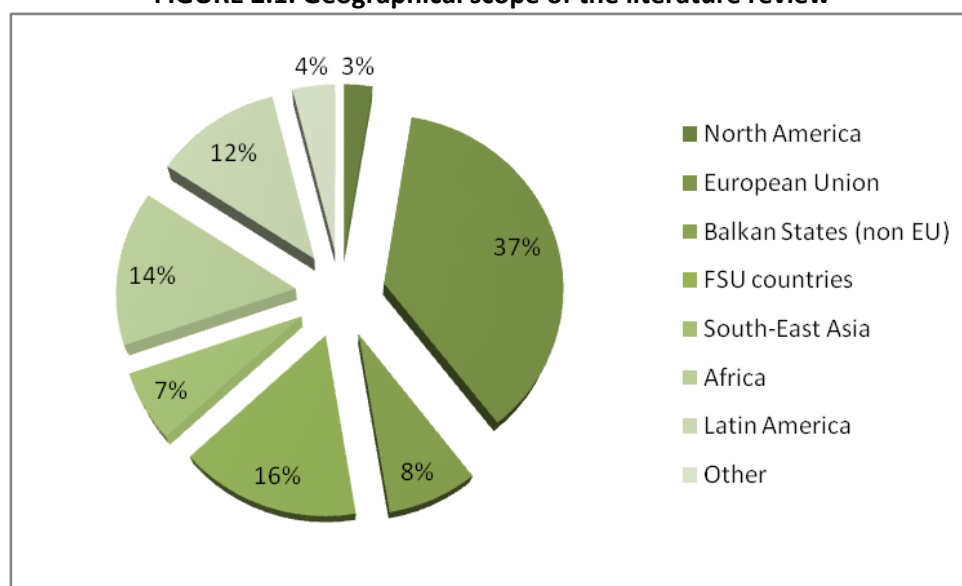
2.1. Scope of literature review: Typologies of agricultural holdings in policy & academic spheres across the 5 continents

Literature on agricultural holding typologies is considerably large and diverse. Such typologies have been elaborated for multiple purposes: to feed economic, sociological, environmental, technical, historical analysis (among other scientific fields) in research projects at many different

geographical scales; to document the diversity of agricultural systems and their relations with the socio-economic and ecological environment and to support the design of national, regional or international policies; and more operationally to define beneficiaries of a given targeted policy / public or private aid programme.

Typologies also differ by their focus (small-holdings, commercial holdings, peri-urban holdings, etc.), their methodology, their data-sources... Indeed, two main types of actors are documenting agricultural holdings diversity. Socio-economic and agriculture scientists try to depict technical-economic characteristics of specific agricultural holdings, their income level and composition, and to document interests and balances of power at stakes, as well as their integration with their local, national and global environment. On the other side, policy makers have more pragmatic objectives and they have been looking for a better design and targeting approach of public programs to improve their efficiency and effectiveness. Consequently, we have focused our literature review on both academic scientific articles and “grey literature” (policy briefs, official public programs specifications, institutional information papers, documents from national statistic institutes, etc.). In total, 187 sources have been revised, covering 73 different countries (See Figure 2.1).

FIGURE 2.1. Geographical scope of the literature review



Analysing the literature from the United States and Canada, we clearly underline the omnipresence of official farm typologies that are at the basis of both agricultural policy building and scientific research analyses. Indeed, researchers from these two countries base their investigations predominantly on official farm typologies at national level. In general outlines, these typologies have a lot in common, being based on similar criteria (mainly indicators of business size, see section 2.5). As referenced in Johnson (2002): “Classification systems for U.S. farms are not new. National data collections and the literature in agricultural economics and rural sociology have included efforts to categorize farms for over a century”. This resulted on two official farm typologies for the U.S. Agricultural Sector: one derived from the U.S. Census of Agriculture and another from the Agricultural Resource Management Study (ARMS) annual surveys. In Canada, typologies of agricultural holdings rely on the Farm Financial Surveys (FFS). In Canada, the official typology of agricultural holdings proceeds from Agriculture and Agri-Food Canada (AAFC).

In the European Union, the necessity of a common farm typology dividing farms into uniform groups according to their production structure, has gained importance with the development of the

Common Agricultural Policy (CAP). In this context, the first classification system was established in 1978 (EEC, 1978) and revised in 1985 (EEC, 1985). It was designed as an instrument at the EU level to carry out: a) analysis of the equity of the farms based on the economic criteria; b) comparisons of the situation of farms and between the various classes in the typology, between the member states or regions of the Member States, and between different periods. It is also an instrument to run policy simulations (EC, 2000). The EU case gives a good illustration of the risks of obsolescence of a given typology over time and its necessary adaptation to fit with changing purposes in a changing environment⁷. Indeed, due to the decoupling of direct CAP payments, it was not possible to maintain the 1985 typology based on Standard Gross Margin (SGM), because without subsidies SGM could be negative and therefore cannot be used as classification criteria (European Commission, 2009). In such circumstances, a new European typology has been established, based on Standard Outputs (SO) (see section 2.5).

The overview of farm typologies in Balkan countries (non-EU) reveals that official typology is the only existing form of typology in these countries. They are similarly based across countries on only easy-to-collect criteria of land size and/or legal status. Besides, the region suffers from an evident disinterest of agricultural academic spheres. Even stakeholders from agricultural development projects that could have filled this gap like in Sub-Saharan African countries seem to be absent from typology building activities in this region. After the end of the communist era large transformations were expected, induced by the distribution/selling of the former large state owned agricultural holdings. Nevertheless, due to the lack of observers and/or resources allocated to data collection and agricultural research activities, very little is known regarding the post communism or the globalisation-induced processes at stake. More widely, large-scale land acquisitions are reported in some Former Soviet Union countries but again poor information is available about their real importance relatively to total land or total agricultural production.

The literature review on agricultural holding typologies in Latin American regions covers nine countries. The most accessible information on agricultural typologies is released by the biggest and wealthiest Latin American countries (Chile, Mexico and Argentina). Brazil has undertaken a real effort to define and classify its own agriculture. Indeed, the existence of two distinct agriculture ministries in Brazil, one for agri-business agriculture and another for small-scale and subsistence agriculture, suggests that administrative institutions have clearly identified and classified their beneficiaries (see also the establishment of an official definition of family holdings in the next section). Nicaragua, despite being a small poor country in the region is quite well represented (5 of 26 sources) thanks to the historical academic interest that has focused on agricultural and land issues in this country. In Latin America, the long tradition of farmers' claims induced the foundation of national systems of observation and analysis of the agricultural sector. Currently, the region counts on both official typologies elaborated by public institutions and academic typologies. Contrary to USA, Canada and the EU, official typologies in Latin America are designed to be easy-to-use. Thus, they comprise a very limited number of differentiating factors (one or two) to which corresponds easy-to-document indicators (farm size, location of farming plots in a given zoning, annual sales, number of employees) that do not embed the calculation of proxy variables. They also result on a reduced number of generic types. Non official typologies are also commissioned by political institutions, elaborated on the basis of public datasets (agricultural census, socio-economic surveys, etc.). Their main objective is to cover the continuum of existing holdings and to support established public programs or policies.

⁷ This point is also stressed by Dufumier (2005) in the case of a Malian cotton zone where the prevalent CMDT typology has lost relevancy with the evolution of the farming sector.

They can rely on existing official zoning, or land area unit equivalent or livestock unit equivalent to take into account territorial diversity at the national scale. This panorama is completed by academic typologies based on ad hoc surveys.

In the eleven countries covered in Western, Eastern and Southern Africa, official typologies seem to be rare or almost inexistent, at least in the sample of online documents reviewed. This can be due to the general state withdrawal in agricultural public policies that accompanied the 1980's and 1990's measures of structural adjustment. Typologies are there first and foremost tools for academic and agricultural development actors concerned by the reality of particular and generally poor areas. This implies that most of them are small-holder focused, except in Zambia and South Africa. A second trait of African typologies is that they usually rely on household surveys and rarely on official national datasets. Reasons can be twofold: household surveys allow a variety of questions and focuses (urban agriculture, "emergent farmers", gender or self-sufficiency) that better fit to the concern of academics and agricultural/rural development stakeholders, in the same time official reliable data are lacking in a majority of countries reviewed.

The literature review covers seven countries of South-East Asia, with a significant over-representation of Vietnam (9 of 19 sources). As for the African region, reviewed typologies are mainly used for academic analysis. In particular typologies developed by international research institutes from the CGIAR⁸ are frequent for this region (like IRRI⁹ and ICRISAT)¹⁰. Unlike the African region, these academic-oriented typologies are largely relying on national databases like the Living Standard Measurement Surveys. Another feature of South-East Asian typologies is their strong focus on livestock production and on Integrated Crop Animal Systems (ICAS) in particular.

2.2. Two main typology building approaches pinpointed

Independently of the kind of typology (official/academic/development project) and its specific focus, two main typology building methods are identified:

- **A "deductive " or "qualitative" method** that consists in defining holding types on the basis of expert knowledge and literature review and/or a specific policy objective/focus. In some cases, this method follows a top-down approach with holding types being defined *a priori* with or without *a posteriori* validation from data or field-based feedback. Types may be identified according to field consultation of technical experts, local authorities, stakeholder interviews, etc. The *a priori* qualitative classification can be validated, documented, detailed and/or sub-divided based on quantitative datasets.
- **A "data-based" or statistical method** that consists in applying statistical tests to existing datasets in order to group individuals according to criteria (that can be pre-selected or identified through quantitative methods). The idea is to come to homogeneous groups with little intra-group variability while high inter-group variability is enforced. The main statistical tests quoted in the literature for typology building are the principal and multivariate analyses as well as the cluster analysis.

⁸ CGIAR is Consultative Group on International Agricultural Research.

⁹ IRRI is for International Rice Research Institute.

¹⁰ ICRISAT is for International Crops Research Institute for the Semi-Arid Tropics.

In practice, when typology building relates to a specific policy objective, the deductive analysis lead to a fast determination of relevant types according to a reduced number of characteristics (i.e holdings with total land ownership / holdings with partly land ownership / holdings with no land ownership). But it is also particularly appropriate in situations in which no or only partial datasets are available (as is the case of the elaboration of the international typology). This approach is based on a deep qualitative understanding prevalent differentiation factors and their impacts on holdings' trajectories (transformation processes). It is then knowledge-intensive. When quantification of types is pursued in order to estimate the relative share of each type or to define sub-types based on measurable indicators, strong investment in data collection (whether by institutions or researchers) are required along with strong skills in data management and data analysis. If the aim of the typology is to capture and document agricultural changes (dynamic analysis), the qualitative approach has to be associated with the enumeration of its resulting types and/or with the quantification of its main indicators in order to provide reference points for time-evolution analyses as well as to gain objectivity.

The "data based" approach requires the existence of and access to reliable and comprehensive datasets. At the national level, this means the existence of a strong statistical system for agriculture and the conduction of census and large agricultural surveys (like FADN in Europe or the LSMS in developing countries, assuming these cover all farms and not only a sub-segment of smallholders as in the case of LSMS). In addition to the access of such related datasets, the statistical approach is demanding in the interpretation of ambiguous indicators and regarding effective data cleaning. In addition, strong skills in statistics and statistical software management are required, a particular capacity building challenge in many low income areas.

In the case of the international typology, the qualitative approach appears to be the most suitable given that no appropriate international agricultural database exists and given that the WAW Methodological Framework aims at documenting some pre-defined holdings' features such as labor usage and at ultimately documenting food security status, territorial linkages, environmental impacts, etc... The enumeration/quantification stage should be based on few selected indicators taking into consideration that not all countries have extensive data collection systems, as illustrated in section 2.1.

2.3. Data sources for typology building

All quantified typologies are based on a specific dataset, which data content fits with the typology focus and purpose. Across our literature review, we have recorded four types of datasets used for typology building:

- **Official statistics / registers.** Some official typologies, based on a unique criterion of differentiation, rely on official statistics and registers. The Chilean ministry of the Economy has elaborated for example two very simple national typologies embedding all types of enterprises, including the agricultural ones. One typology is based on the enterprises' annual sales; another is based on the number of employees. These typologies do not incur extra cost to document agricultural related issues (i.e specific survey or agricultural census). Nevertheless, they are too restrictive for the purpose of capturing and analysing structural transformations

- **Agricultural census (AC).** The main advantage of AC is that they are conducted in almost all countries of the world and if efforts for their harmonisation continue in the future, they could be a source of reliable and comparable data across countries. Besides, AC's are exhaustive at the national level or supposed to be exhaustive or representative. Nevertheless, we should acknowledge that currently countries do not always follow up FAO guidelines and censuses are in reality not always comparable (differences in core variables, altered versions of questions or definitions). Their quality is heterogeneous and it is often time consuming to clean the data and use it. The NAICS typology is for example based on the USA agricultural census but its correlative shortcoming is that it can be updated only every decade with the AC update. As agricultural policy decision makers cannot rely themselves on old data for over a decade, an alternative typology has been elaborated from the ARMS annual national survey. The time frame between two ACs is a common limitation in other countries and cannot realistically be reduced given the cost of ACs, yet as illustrated in the case of the US, if frequent surveys are associated to AC's these may serve to monitor changes on selected representative samples in order to inform policy objectives. Finally, micro data is a very sensitive topic and access to AC database is usually highly restricted. However, FAO and other agencies are seeking to improve AC harmonization, quality and data sharing. Hence, ACs could potentially provide relevant and detailed databases for international comparisons.
- **National surveys.** National surveys are used as complementary instruments to update AC datasets in the official typologies of high-income countries (ARMS in USA, FFS in Canada, FADN in the European Union, etc.). They present the advantage to be annually or bi-annually updated and to compile a large variety of data (i.e ARMS provide information at three levels of observation: the farm as a business establishment; the household level; and the individual one, comprising the operator and its spouse (Johnson, 2002)). To balance the cost of the latter, they are conducted only on a sample of holdings that is supposed to be representative of the national holding distribution. Nevertheless, the definition of agricultural holding on which surveys are based is sometimes criticised for excluding the smallest holdings in high income countries, or the informal holdings without land titles or under specific institutional conditions (i.e tenant farmers in India) in some developing countries. For instance, the AAFC Canadian farm typology is based on the Farm Financial Survey (FFS), a biennial survey covering farms with revenues of not less than CDN \$10 000. This definition definitely excludes the eventual Canadian "subsistence" or "leisure" holdings. In the case of the European Union, FADN data exclude "unprofessional farms", leaving a significant part of land uncovered in some areas. According to Rusali (2011) "... the sample of evidence (FADN) shares only a percent in the total EU farms. Under these circumstances, it cannot be said that there is a sound assessment of the situation of agricultural holdings in the EU".
- **LSMS surveys** conducted by the World Bank are another valuable source of household data comparable across a number of low and middle countries, but their frequency is unfortunately much sporadic than the aforementioned ones and they tend to exclude commercial or corporate farms, placing their focus on the small and vulnerable farmers. At the same time, it should be emphasized that LSMS may include other household not directly engaged in farming. Thus, the unit of observation is not the agricultural holding as in it is in the case of AC's but the rural household.

- **Local research or statistic surveys.** A common critic of AC and national surveys related to agriculture is that they provide poor data on the environmental impacts of agricultural holdings. This drawback is overcome in some local surveys conducted for specific research or development projects. More generally, ad hoc surveys are interesting in that they can address a large variety of issues providing an appropriate survey design. On the other hand, they cover only a small sample of agricultural holdings and they are highly context specific. As such, they cannot be used in the elaboration of international/national typologies but they can be used to elaborate more in-depth local typologies in complement to the national ones as in the case of the ROR dataset in Madagascar.
- **Qualitative data from focus groups.** Restricted surveys or focused group discussions allow obtaining a socio-economic description of general functional farm types that can be easily updated at a low cost (refer to the agribenchmark or IFCN methodology). Although not statistically representative this approach offers a systemic and coherent understanding of types. For the same reasons as the ones invoked for the local surveys, this approach can be used to complement national typologies but it is of little help at the international level.

A combination of data sources would clearly improve the quality, quantity and diversity of information to draw an international WAW typology that can be aligned to local-specific traits. In practice, it is not only very complicated to mix different datasets with different sampling designs, beginning with establishing correspondence between data, but also rather expensive. Consequently, it would be suitable to identify data sources which can inform international comparisons from data sources which can serve to further understand the national or specific descriptions of farm types. In principle the international types should be seen as a sort of umbrella under which sub-types can be further identified and analysed.

2.4. Regional factors & characterization of agricultural holdings

The review of literature on agricultural holdings has been performed region by region. The literature review has thus highlighted very strong regional specificities which reflect on the choice of the main differentiating criteria in the building process of agricultural holding typologies.

In high income countries such as the USA, Canada, Australia, where most of the holdings are already integrated to input and output markets and where comprehensive systems of data collection are in place official typologies rely on sophisticated indicators of **sales** and **gross revenue**. In these countries, the identification of monetary thresholds on sales or revenues are used to distinguish between small or large. Due to a recent trend towards the diversification of on- and off-farm household activities, in its 2008 revision of the EU official typology, a new dimension was integrated to measure the other gainful activities. For the part of academics, the focus is placed upon the off-farm diversification as well as lifestyle choices and age of the head holder. This leads to a variety of holding types, namely Retirement holdings, Residential/lifestyle holdings vs Farming occupation (Johnson 2002, Hoppe et al. 2007). Ultimately, this will expand the focus of agricultural databases in such countries.

In the Balkan States, typologies are mainly based on two criteria, very easy to collect : **legal status** and **land size**. This underlines what are the most easily available dimensions in contexts where the agricultural national statistic system is weak and academic literature not so abundant. These two criteria are nonetheless informative on the main features of holding types in this region: a vast

majority of family holding with limited land. For example, in Montenegro, farms are classified by legal status into business entities (0.1% of total) and family agricultural holdings (99.9%) (Zvizdojevic et al., 2010). A similar situation is found in Albania where 99.77% of the total number of agricultural holdings belongs to physical persons (vs corporate entities) according to the preliminary results of the 2012 agricultural census (INSTAT, 2012). In Kosovo, in the early 2000's, 86% of the agricultural land was privately owned and operated by family farms; the remainder was under the ownership of producer cooperatives (1%) or the so-called socially owned enterprises (13%) Sauer et al. (2012). Regarding land size, more than 80 % of the holdings (over 400,000) is smaller than 5 ha in Bosnia-Herzegovina (Bajramovic et al. (2010).

In Latin America, the literature review stresses that **labor force, market integration, reproductive capacity** and importance of **off-farm incomes** are key dimensions to define large continuum of types. Nevertheless, the literature review highlights a particular focus on the vast majority of small-holders operating in the region, sometimes making distinctions between those more or less capitalized or more or less market-integrated through terms such as: "transitional", "*finqueros*" or "capitalized" farmers. Typologies seem very statics, at least in comparison with African typologies which include "emergent farmers" or "expanding commercial farmers". There is also a focus on **size** which appears to be suitable for capturing some structural changes and possibly the emergence of new types such as the "urban small entrepreneurs" and the disappearance of and "land reform beneficiaries" in Nicaragua. Nevertheless, types depicting the biggest and wealthiest farmers do not change over time and the major distinction found among them is based on the **intensive or extensive nature of their system of production**. Emergent collective practices such as planting pools (*pool de siembra*) and agrarian reconfigurations are not documented by this type of literature. The latter reflects the difficulties of capturing short-lived arrangements in which several partners join to plant (usually cereals, particularly soybean) and dissolve their farming arrangement in less than 2 or 5 years.

African typologies point out distinct points of polarization in the differentiation of holdings than in Latin America. Indeed, many examples underlined polarizations between **crop cultivation** and **livestock breeding** leading to a continuum of holding types varying from crop producers to agro-pastoralists and to pastoralists. Polarization between staple or **food crops** and **cash crops** was also underlined in many studies; especially in areas specialized in crops for export (cotton zones, horticulture, etc.). It induced types varying from **subsistence farming** to **market oriented** or cash crop specialization. Both poles of polarization are the result of very strong historical features of the continent: on the one hand, the co-existence of nomadic pastoralist and sedentary crop producer ethnic groups is an historical source of differentiation (and even of division) of agriculture in Africa. On the other hand, the development of crops for export has been pushed during the colonial period inducing new processes of differentiation associated with access to markets, adoption of new equipment, practices and techniques.

In South-East Asian typologies, the more powerful motor of change in the last decades has certainly been the achievement of the green revolution. Indeed, this agricultural revolution has triggered new processes of differentiation regarding many aspects related to agriculture that constitute the main distinguishing factors found in South-East Asian typologies: **agricultural practices, technologies** and **equipment** of course, but also the integration of agricultural holdings to input and output **markets** as well as labor market since the green revolution has been concomitant to a process of urbanization and of diversification of the whole economy.

This diversity of primary dimensions found to differentiate holding types across world regions stresses once again the difficulty to define international types that are broad enough to encompass

all types of agricultural holdings while being flexible enough to admit the large palette of holdings in a sub-classification.

2.5. Main distinguishing criteria found in the literature review

The wide number of typologies reviewed is based on a set of distinguishing criteria that diverge either due to their own purpose or to their specific context. The main distinguishing variables found in the literature illustrate that a given dimension or criteria can be documented with very different indicators according to the dataset the typology relies on, the methodology used or once again its specific context. In this sub-section, the 6 major dimensions are discussed along with their potential adequacy for building an international typology of agricultural holdings, considering their capacity to distinguish relevant types, inform cross-border comparison and extent of data availability, notably along census:

1. Land & Business Size
2. Legal Status
3. Labor Usage
4. Diversification, Specialization & Market Orientation
5. Capital Asset Endowment
6. Gender

1. Land and Business Size Dimensions

○ Land size

As a production factor and an important asset of agricultural holdings, land is frequently used in typology building, whatever the country or the zone considered. Some official typologies even rely on this unique criteria to classify their agricultural holdings, particularly in Balkan States (Albania, Bosnia-Herzegovina, Macedonia and Montenegro) (MAFCP 2012, Bajramovic et al. 2010, SSO 2007, SSO 2012, Markovic and Markovic 2010), but also in other countries such as Chile (INE 2009) and Columbia (SISPA¹¹). Land size is taken into consideration in typologies focusing strictly on the household income structure and official typologies in USA, Canada and Europe, although the latter give preference to business size over land size. Land as an indicator, is also frequently combined with other distinguishing criteria in African, Latin American and Asian typologies or simply used as a descriptive additional indicator.

When used as a distinguishing criteria (i.e in Balkan official typologies, in Sauer et al. (2012) for Kosovo, in Todorovic et al. (2009) for Serbia, in (Echenique and Romero) 2009 for Chile, in Gattini (2011) for Paraguay, etc.), land size is implicitly used as an approximation of the holding economic size. Indeed, land endowment is associated to the holding capacity to generate surplus and accumulate and invest in plots of land. In a dynamic perspective, the land size criterion is appropriate to capture agricultural transformations like land concentration, fragmentation or redistribution trends in a specific territory. These processes are strongly linked to the functioning of land markets,

¹¹ Sistema de Informacion de Precios del Sector Agropecuario: Price information system for the agricultural sector.

the prevalent mechanisms for land transmission/inheritance and more generally they are indicative of attractiveness of agriculture and employment opportunities out of agriculture in a given place.

Moreover, land size is relatively easy to measure and it is commonly declared in countries where private ownership prevails over customary rights. As far as we know, land size is collected in almost all kind of censuses and surveys related with agriculture. The easy availability of such criteria certainly explains its extensive use in typology building and in particular in official typologies of countries counting on a weak national statistic system.

Land size might be the dimension with the widest number of different indicators. Indeed, diverse indicators can be used to qualify land at the holding level: total area, cropland area, grassland area, wooded land area, etc. But some authors prefer to focus on land effective utilization with the standard European indicator of Utilized Agricultural Area (UAA), or its equivalents “operated area”, “cultivated area”, etc. Land utilization is also caught with the share of sown area, the share of set-aside land, the ratio of cultivated land to fallow area or the ratio of land operated per one unit of labor, etc. Effective utilization is particularly used in countries with a strong set-aside policy (particularly in the European Union), or in zones at the agricultural frontier where agricultural systems still rely on long period of fallow (see for example Aubry and Ramaromisy (2003) in Madagascar, or Raj Gurung (2012) in Buthan).

But the main limitation of land size indicators is that they are highly context specific and difficult to compare. For example, in Columbia, a small-scale holding is officially one which comprises less than 10 ha, a medium-scale holding has an area of 10 to 30 ha and a large holding involves more than 30 ha (SISPA typology) while in Zambia (Sitko and Jayne, 2012) it is considered that small-scale holdings rely on less than 10 ha (and their vast majority on less than 2 ha), the “emergent” ones (or medium holdings) have 10 to 100 ha, and the large ones have more than 100 ha (in most of the cases even more than 200 ha). Conversely, in Asia 90% of agricultural holdings have less than 2 ha (FAO 2010). Similarly, it is noteworthy that in the Balkan states, the largest holding type operates land area ranged from over 2.1 Ha in Albania to over 20 Ha in Montenegro (see Table 2.1), in other words, land size orders of magnitude used to define small holdings in other parts of the world.

TABLEA 2.1 THE LARGEST HOLDING CLASS CONSIDERED IN THE TYPOLOGIES OF AGRICULTURAL HOLDINGS BY LAND SIZE IN THE BALKAN STATES

Largest holding class	Balkan states reviewed
More than 2.1 Ha	Albania (MAFCP 2012)
More than 3 Ha	Kosovo (Agricultural Household Survey 2008)
More than 10 Ha	Bosnia-Herzegovina (Bajramovic et al. 2010), Macedonia (SSO 2012), and Serbia (Tordoric et al. 2009)
More than 15 Ha	Macedonia (Martinovska-Stojcevska et al. 2011)
More than 20 Ha	Montenegro (Markovic and Markovic 2010)

Another aspect which blurs comparisons of land size indicators is that in many cases one hectare of private land is not equivalent to one hectare of rented land, not to mention that one hectare of land can have very different values according to its agro-ecological characteristics. To overcome this drawback, some authors use indicators of land tenure (share of rented land in cultivated land, or rented UAA/total UAA) and/or indicators of soil quality (% of sloped lands, % of up-lands, etc.). In Asia, El Sotheary (2005) for Cambodia and Jourdain et al. (2009) for Vietnam suggest to consider the land endowment in a broad definition, taking into account the opportunities offered by different types of lands (% lowlands, % sloping uplands, % flood recession paddy fields, etc.). In Madagascar, Penot 2010 also emphasizes the access to *tanety* lands and [Aubry and Ramaromisy \(2003\)](#) the access to *baiboho* lands. This last approach is in the same line as the introduction of agro-ecological zones¹² among distinguishing factors like in Teufel et al. (2010) for South Asia. Finally, Dufumier (2005) gives a clear illustration of how access to lowlands is a powerful factor of differentiation in a Malian cotton zone, allowing or preventing from investment in high added value crops like horticulture or tree plantation.

In other words, the literature review process has presented typologies highly related to their agro-ecological environment with the access to lowland and uplands playing a great role in the differentiation of cropping systems in Asia (Devendra and Thomas 2002), or access to a particular type of soil (the *tanety*) being crucial in Madagascar (Penot 2010). These type of classifications highlight the uniqueness of territories which nonetheless obscures the possibility of engaging in direct comparisons of agricultural holdings. In this respect, historical settings have also been used to build typologies. In South Africa the post-apartheid implied the integration of racial traits in agricultural typologies (e.g the financially capable, aspirant black commercial farmers of the South African rural development programme (DRDLR 2009)). In other countries, the recent land reforms are also inducing a type of landowners that do not farm their land for a reason or another (legal uncertainties, lack of assets or incentives) (Laurent et al. 1999 for South Africa, Dumazert 2007 in Nicaragua). In Moldova, for example, 11% of agricultural land (Agricultural Census, 2010) is abandoned, although it formally is privatized and has an owner. Without having access to capital assets and no jobs in rural areas, a lot of new landowners or their heirs migrate temporarily to other countries, leaving their lands uncultivated. This type of distinction is too context specific for cross border comparisons.

To make the comparisons possible between different types of land, coefficients have been elaborated at the national level to convert the different types of land into irrigated land equivalent (Echenique and Romero 2009 in Chile) or into hectare of wheat equivalent (European Union). But such coefficients are only utilizable in the zone for which they have been constructed. No equivalent initiative at global level has been recorded in the literature review. The latter is also associated to the challenges of incorporating and collecting environmental indicators in general and in particular to any typology building exercise (Refer to Section 2.6)

The last limitation, but not the least, in using land size as a distinguishing factor in an international typology is due to the difficulties it will bring to set thresholds. First, there is no meaning to set thresholds with land size indicators that are not harmonised and equivalent. Second, land distribution is a result of historical political and demographic processes and it remains highly context specific. In the European Union, Laczka and Szabo (2000) report an interesting example in this sense: "...the threshold level accepted in Netherlands sets the lowest limit of a farm as 3 Economic Size

¹² At global level, differences in the quality of soils and diversity of agro-ecological zones are even greater. A farm size dimension should then be examined carefully

Units (ESU). Such size farms is the equivalent of approximately 3-hectare autumn wheat or respectively 1,6-hectare sugar beet output". This threshold level tends to be too high for other countries, like Romania or Hungary, where the lowest limit of a small farm starts with 1-2 ESU. At a more global level, setting a threshold at (say) two hectares would make little sense in Northern America and Europe (except maybe for urban agriculture) when it would mean to group 90% of Asian holdings in the category of holdings with less than two hectares (FAO 2010). Third, land size thresholds would have to be accompanied with indicators of level of equipment and/or financial assets since it is not similar to farm one hectare of land manually, or with access to herbicides and/or with access to machinery or out-sourced services. Fourth, even when land size is used as an easy-to-document proxy of the holding economic size, its interpretation in terms of household's richness/poverty can be misleading. Indeed, using it as a main criterion of differentiation in a typology for the Red River Delta in Vietnam, Jésus and The Anh (1997) observed that small-holdings were not necessarily the poorest, depending on their off-farm incomes.

In conclusion, despite land size is almost universally documented among countries and agricultural systems of production (note that land size is also used in urban agriculture typologies like in Madagascar (Aubry et al. 2008)), and because of all the limitations mentioned above, and the difficulties to overcome them at the global level, land would not be a suitable distinguishing factor in the WAW international typology. Nevertheless, land size shall be maintained among descriptive indicators, along with other asset indicators, especially to capture trends of land concentration/fragmentation transformations.

○ **Business size**

Business size is an important distinguishing factor in official typologies of industrialized countries. For instance, Gross Sales are used in one of the two US official typologies (from the Economic Research Survey, ERS) as well as in Canada (AAFC Niekamp 2002) and Chile (Ministry of Economy). A similar indicator, the Sales Revenues is utilized in Russia. In the European Union and Azerbaijan official typologies, the Standard Gross Margin (SGM) constituted one of the two distinguishing criteria (EC 2000). It has been replaced in 2008 by the Standard Output (SO) indicator (European Commission 2008). Australia and New-Zeland have also elaborated a similar indicator (the Estimated Value of Agricultural Operations). Russia goes further with the computation of Standardized Revenue.

According to the indicator used, the business size dimension captures different holding realities. "Standard Outputs" (SO) refers to the output value at farm-gate price. It is calculated by multiplying each hectare or head of livestock of the farm by its corresponding SO coefficient. It is then a measure of the holding's production potential. Its variation across time would express intensification/extensification of farming practices. Gross Sales encompasses the effective production of the holding but also its marketing skills. The Standard Gross Margin (SGM) is rather a measure of economic performance of the holding and its evolution across time captures competitiveness trends. For its part, the Standardized Revenue measures the holder's standard of living and is an indicator of the agricultural sector dynamism.

In typologies of agricultural holdings, the business size is sometimes used as the single distinguishing criteria like in the Ministry of Economy's typology in Chile, or like in the first version of the ERS typology (USA). But business size is usually combined with another dimension (occupation of operator in the actual ERS typology, type of farming in the first version of the EU typology), or two

other dimensions (type of farming and other gainful activity in the actual EU typology) or more (AAFC typology in Canada). In countries where sales are annually declared, “Gross Sales” or “Annual Sales” are very easy to document. Conversely, computed indicators like the GSM or SO used by the European Union cannot be found in other countries or will suppose sophisticated calculation of regional coefficients. When business size indicators are arranged by type of activity, a proxy of “type of farming or productive specialization”¹³ may be obtained. These indicators could also be used to calculate farming intensity (total output per ha in monetary value) like in the EU SEAMLESS typology.

Monetary value indicators in general present some major drawbacks. The first is particularly tangible in a context of fluctuating prices. For instance, since the elaboration of the original ERS farm typology, inflation in commodity prices—for farm products as well as for farm inputs like feed, fuels, and fertilizers—has increased sales and expenses for farms even when they have had no change in production, shifting some farms into different typology groups solely because of price increases. To correct for these shifts, Hoppe and MacDonald (2013) propose to adjust sales for price changes. They also introduce a technical change in the measurement of farm business size, shifting from gross farm sales to gross cash farm income (GCFI), a better measure of farm revenue given the prevalence of production contracts in livestock production. Meier (2005) stresses other limits regarding SGM: first they represent regional averages over several years and no distinction between organic and conventional activities is made whereas gross output and direct inputs can be very different for organic and conventional farms. This observation is supported by Ascione et al. (2012) considering that SGM does not consider the variability of sale prices according to the quality level of marketed goods and does not take into account the non-agricultural activities. Lastly, since the decoupling of CAP direct payments in 2005, it was not possible to maintain the typology based on SGM, because without subsidies SGM could be negative and therefore cannot be used as classification criteria (European Commission, 2009).

Apart from these very technical drawbacks, the use of business size as a differentiating criterion raises the question of how to establish international thresholds. A quick cross-country comparison will shed light on the reality of this difficulty: Australian holdings are classified according to their value of agricultural operations from holdings with less than 22.500\$ of agricultural operations to holdings with more than 2'000.000\$ (ABS 2012). In the EU classification (European Commission 2008), the smallest type of holdings gets less than 2.000€ of standard outputs and the largest more than 3'000.000€. The Canadian classification can be relatively termed as intermediate with holdings ranging from less than 10.000\$ to more than 1'000.000\$ of gross sales. Another of the main differences between the typologies developed by USA and Canada is how small farms are defined. US typology sets a maximum of US\$249,999 in sales defining a small farm, while official Canadian typology lowers the cap to CDN \$49,999, but in gross revenue. In addition, comparisons between agricultural operations (Australia), Standard Output (EU) and Gross Sales (USA), are not straightforward. First of all, gross sales in the USA are not used anymore as this measurement has been recently replaced (in 2013) with Gross Cash Income.

The differences between the two indicators are summarized below :

¹³ This is illustrated by Fabiani and Scarano (1995) who split agricultural sector into two major groups: professional units (holdings with SGM sufficient to employ one full time work unit) and pluriactive/accessory units .

What's included?		
Item	Gross farm sales	Gross cash farm income
Revenue to the farm from:		
Crop and livestock sales	Yes	Yes
Government payments	Yes	Yes
Other farm-related income ¹	No	Yes
Value of production accruing to:		
Share landlords	Yes	No
Contractors	Yes	No
Landlord receipt of		
Government payments	Yes	No

¹Receipts from custom work, machine hire, livestock grazing fees, timber sales, outdoor recreation, production contract fees, etc.

European Standard Output (SO) differs from American gross sales and gross cash income, as it focuses basically on production and not on commercialization (i.e. you could produce a lot, but sell nothing). SO is concerned with the monetary value of the agricultural output at farm gate price. Coefficients are used for this purpose. Output from each crop and livestock is multiplied with a coefficient, which is individual to each output produced and differs from country to country. The sum of all SO per hectare of crop and per head of livestock in a farm is a measure of its overall economic size, expressed in euro.

Concerning the Estimated Value of Agricultural Operations (EVAO) in Australia, it is not completely clear from the literature how it is calculated or what it includes. One source mentions that it is a standardized measure of the level of agricultural output (ABARES, 2011), which assumes to be very similar to the European SO, while another source mentions that it is a measure of gross farm income (Australian Government, 2010), which assumes to be closer to American classification.

Considering that it will be hard to document business size dimension in the vast majority of developing countries where national systems of data collection and data analysis do not permit the construction of such kind of indicator business size measures are not recommended for the implementation of an international typology.

2. Legal status of the holding

The legal status of the holding is a widely used dimension in the Balkan States (BHAS 2010 in Bosnia-Herzegovina, SSO 2007 in Macedonia, Zvizdojevic et al. 2010 in Montenegro, Varga and Villanyi 2011 in Kosovo, and SORS 2012 in Serbia). It is worth considering that in a context of poor data availability (particularly regarding labor indicators), the holding status is often an easy way to access variable that can supplement or corroborate the labor usage dimension largely to identify large individual/private holdings from corporate ones. Since this criterion places the focus on differentiating between family-run holdings and non-family or corporate holdings and it is frequently found in agricultural census and surveys it is considered as suitable to reinforce the labor dimension highlighted under the WAW methodological framework.

3. Labor usage

Labor usage is quite widely employed in typology building, with two exceptions: the official typologies of Northern American countries, Europe Union and Balkan States, and in our South-East Asian sample where labor usage was rather indirectly linked to other dimensions like market orientation or self-sufficiency by the authors. In fact, among the typologies reviewed, **the labor usage dimension is generally employed in combination with other variables (such as management and market integration).**

The single typology based exclusively on labor force that we have reviewed is given by the OECD (2008) to distinguish three types of agricultural workers and holdings: the salaried workers, the self-employed holders (with one to four workers) and the employers (with more than five workers) ([OECD 2008](#)). In this case, it presents the advantage to allow the embracement of landless agricultural workers into the typology (compared to other criteria like farm size or legal status of the holding). Labor also constitutes the first stage of classification under the WAW methodological framework (2012). Three types of agricultural labour force are distinguished in WCA 2010: own account workers, contributing family workers and employees (WCA 2010).

Labor usage provides important information on the market, structural or managerial characteristics of agricultural holdings, among which the following can be highlighted:

- The presence of hired labor indicates a capacity to generate cash flows and hence a connection of the holding with output and labor **markets**.
- The presence of external labor (either paid in cash or in kind) is often indicative of absence of **land** constraints with respect to the level of family labor force. Although, especially concerning seasonal – daily external labor, in some cases it is rather due to specific systems of production requiring manual tasks (i.e. the strawberry or the coffee harvest,) or a mostly manual agriculture requiring peaks of labor around specific labor intensive activities (such as manual land preparation, weeding, harvesting..) with difficult access to mechanization, either in terms of availability of services, cost of services (especially sometimes heightened for disperse and atomized plots) or due to agro-ecological settings (slopes etc..). In such case, hired daily workers may be substitutable to payment of mechanized or input services and equally signify limitations of labor-equipment at household level as well as availability of cash to pay such services or labor.
- The involvement of the head holder in farming activities is also sometimes considered as an indicator of **management type**. Indeed, for USA, Blank (2005) considers that ““Real” farmers work on the farm to support the household while “real-estate investment” farmers primarily work off the farm”. This distinction is also found in several Latin American typologies where the owner may or may not be present on-site. Head holder demographic indicators are also used to provide a social perspective on agricultural holdings. For instance, Westbury et al. (2008) took into account the demographic characteristic of the farmer. Farmer age was grouped in four groups: under 35 years old, between 34-45, between 45 and 60, over 60 years old. Farmer education was based on levels of qualification: none, school only; secondary only; university degree. To tackle to social dimension in terms of social integration within the RC, the distance of the holding from the inhabited centre was grouped into 4 categories (under 5 km, between 5 and 10, between 10 and 15, above 15 kilometres).

Labor usage is considered in two ways: focusing on the type and/or quantity of family /hired labor used. Indicators of type of labor firstly distinguish the family labor force from the external or hired one. A second distinction is made on the basis of external labor force employed, distinguishing between permanent from temporary and/or seasonal labor (see Table 2.2).

TABLE 2.2 INDICATORS OF LABOR USAGE IN AGRICULTURAL HOLDINGS

Type of Labor used	Quantity of Labor used
Family Labor	<ul style="list-style-type: none"> - Number of family members involved on farm activities - Number of working days spent by family members - Number of hours worked by family members - Share of family members working on farm - Share of family members in total labor force - Family Labor Units
Including the head holder involvement	<ul style="list-style-type: none"> - Full time equivalent spent on farm by the head holder
External Labor	<ul style="list-style-type: none"> - Number of hired workers
Permanent	<ul style="list-style-type: none"> - Number of working days spent by hired workers
Seasonal	<ul style="list-style-type: none"> - Number of hours worked by hired workers
Temporary	<ul style="list-style-type: none"> - Number of full-time salaried workers - Labor Supply¹ = Total labor – Family Labor
Total labor	<ul style="list-style-type: none"> - Number of operators - Number of full-time equivalent operators
Demographic traits of the holder	<ul style="list-style-type: none"> - Age - Sex - Education

¹Concept proposed by Longhitano et al. (2012) in Europe representing a proxy for the potential and real need for labor additional to the family one.

Type of labor can be documented by binary indicators to distinguish holdings relying only on family labor, from enterprises with non-family/hired labor exclusively, and from an intermediary type employing both family and hired labor, thus identifying types of agricultural holdings which are of interest in the WAW methodological framework.

However, according to data availability, total labor and the different kinds of workers can also be quantified whether in absolute or relative terms. It is noteworthy that the precise quantification of agricultural labor requires a lot of details related to the work schedule of workers since the amount of agricultural work is fluctuating through the cropping year. It additionally requires information on the demographic characteristics of the workers involved in the farming system (age, sex, educational level). Indeed, the workload accomplished by a child is rarely equivalent to the one accomplished by an adult, leading some authors to convert working time into “Labor Adult Equivalent” (based on ILO, FAO or World Bank coefficients). In this respect, it is important to stress that details on each type of labor force contribution, amount of their contribution and demographic characteristics are not systematically present in agricultural census, not to mention permanent labor. Thus, when using quantified indicators of labor force, the thresholds that distinguish types are highly fluctuant from one country/sub-region to another. They are either roughly defined *a priori* (OECD 2008, Chilean

Ministry of the Economy), or more precisely by cluster analysis, or simply by observing *a posteriori* the value of given classes determined by other distinguishing factors. In any case, thresholds are hard to establish at the international level given the high heterogeneity of farming systems. Furthermore, in many cases, the frontier between two different types of holding is blurred preventing the establishment of clear-cut thresholds.

- For instance, the usage of external labor force is not only a characteristic of better-off holders. Small and subsistence family holding can be compelled to resort to additional labor force in specific case like in aged households, in single headed holdings or in women headed holdings in which the domestic work achieved by the head can limit its time to devote to productive work.
- Conversely, the exclusive usage of family labor force is not always a characteristic of less endowed farms. Such a situation can be found among recreational farmers that practice agriculture for their own as a hobby or as a supplement to their main salary/income, see for example the three sub-types of small US family farms that are retirement farms, residential/lifestyle farms and farming-occupation farms (Johnson 2002, Beaulieu and Pietro 2003, Hoppe et al. 2007, Hoppe and MacDonald 2013 and the ERS typology based on ARMS surveys). Such cases are also found in Europe (Castagnini et al. 2002 and Fabiani and Scarano 2005). Moreover, substituting external labor by machinery labor, hired services or agricultural technologies (i.e herbicides) is also a common strategy of farmers relying on enough financial capital or with access to credit. Then, it would be misleading to group in the same category holdings those farms which employ only family labor as their only resource, with holdings far better endowed, and with agricultural holdings that represent only a minor supplement to the household income, not to mention nearly abandoned plot distributed during land reforms found in Former Soviet Union, Latin America (Nicaragua) and Africa (South Africa).

4. Diversification, Specialization & Market Orientation Criteria

○ Diversification: Other gainful activities & Off-Farm

In all countries, a significant part of agricultural holders are considered multi-active agents that may be involved in non- or off-farm activities. However, it is very important to keep in mind that this dimension particularly fits to typologies focusing on the household level rather than the holding level where these different income sources are not always necessarily captured in agricultural datasets. Consequently, it is not easy to document the nature of such “other gainful activities” with datasets focusing on the structural traits of agricultural holdings. For instance, “the other gainful activities”¹⁴ is one of the three distinguishing criteria of the recent EU typology established in 2008 (European Commission 2008 and Kinsella 2009). By introducing this dimension, the European Commission recognized the growing importance of non-agricultural activities in farmers’ income. Nevertheless, due to the nature of the dataset used (the FADN) only on-farm non-agricultural activities could be

¹⁴ Other gainful activities (OGA) of the farm comprise all activities other than farm work, directly related to the farm and having economic impact on the holding. The share of OGA directly related to the farm in the final output of the holding is estimated as the share of OGA directly related to the holding turnover in the total turnover of the holding (European Commission, 2008).

considered. Interestingly, Daskalopoulou and Petrou (2002) expect a negative relation between the farm size and the existence of off-farm gainful activity.

“Off-farm activities” is usually a dimension considered in household typologies to integrate the diversification trend of the rural economy. For instance, for Maltsoglou and Rapsomanikis (2005) diversification of rural economy is such a strong factor of differentiation in Vietnam that it justifies using the share of agricultural income as the first distinguishing dimension ($>$ or $<$ 50%). The off-farm activities dimension attempts to capture two very divergent kinds of agricultural strategies occurring in both “high” and “low- and middle-income” countries: on the one hand off-farm activities undertaken by low asset endowed households are expected to compensate their asset constraints and improve their living; on the other hand, stable and high return off-farm activities are undertaken by better-off farmers. In that sense, Rigg (2005) clearly differentiate post-peasants’ pluri-activity and neo-peasants’ pluriactivity in South-East Asia. The former is attributed to off-farm activities as a complement to subsistence farming, often associated with migration, and the later one to off-farm activities as a lifestyle choice of part-time farmers. This duality is again stressed by Goto (2006) in Indonesia, under the distinction between “small multiple job holders” and “part-time farming households with a steady non-farm income”. Also in the European case, Fabiani and Scarano yet proposed in 1995 a socio-economic stratification of agricultural holdings that even if based on structural data from census was interpreted within the “household-farm” framework. Then, they came to a classification in eight types among which “De-activate accessory farms”, “Pluri-active accessory farms” and “Pluri-active professional farms” were found. Lastly in USA, the “neo-peasant pluri-activity” is also caught in the Single and Double Income Ruralpolitan types as well as in the “Farm operator with spouse working off-farm” type (Blank 2005).

Different indicators are used to document pluri-activity or the “off-farm activity” dimension. In EU, Gaspar et al. (2008) consider pluri-activity only at the head holder level with a binary indicator: Holder’s part-time activity (0= full-time, 1=part-time). The other typologies focus on pluri-activity at the household level with binary indicators (i.e presence of off-farm activity yes/no), in absolute term (i.e hours worked out off-farm) or in relative term (i.e share of family members working off-farm). The contribution of off-farm activities to total income is another way to measure off-farm activities. But, the type of off-farm activity is usually costly to acquire especially in attempts to differentiate precarious and informal employment from stable and high return activities. Lacking quantitative data on earnings from off-farm activities, Ulrich et al. (2012) rely on a classification of off-farm activities that distinguish permanent labor (high return vs low return activities), from casual employment (regular vs occasional employment) and no off-farm activities. It is thus not surprising that the “off-farm activity” dimension is always combined with more structural dimension to define typologies of agricultural holdings, even in the case of typologies focusing on the “system of activities” concept (i.e Aubry et al. 2008 in Madagascar).

The “off-farm activity” is a good complement to understand the role of agricultural activities in a given household, but the current focus of the WAW international typology is on holdings which includes those in corporate or entrepreneurial agriculture. It would be relevant to use this information in the case of further differentiating agricultural household holdings, possibly using off-farm activities as a supplement source of income for low asset-endowed households, or as stable and high return activities for better-off ones (i.e qualifying the type of off-farm activities as in Ulrich et al. (2012)). Still, this dimension would have to be coupled to other traits in order to identify alternative paths of diversification

On a more practical ground, it should be highlighted that data on incomes are rarely detailed in national agricultural censuses and national surveys related with agriculture and thus it could hardly be used to classify holdings at the international level. This dimension could be interesting to define household holding typologies at national/local level¹⁵ where income structure allows the assessment of the relative share of agricultural and non-agricultural income in the total household income, but also the relative share of each farm output in the agricultural income. Thus, the former division (agricultural vs non-agricultural income) is a way to address structural changes related to the diversification of the rural economies as the “Other gainful activities and off-farm activities” dimension do for the European Union case. The latter (share of specific agricultural outputs in total agricultural income) could also be viewed as sort of indicator of the degree of specialisation/diversification and can be used for the “Productive specialisation” or “type of farming” dimension discussed below.

○ **Productive specialization**

Productive specialization is a criteria found among distinguishing factors both in developing and industrialized countries. Its evolution over time is highly informative of the undertaken strategy of agricultural holdings. It can also capture the impact of lifestyle choices as the settlement of former pastoralists (transition from a “pastoralist” type to “agro-pastoralis” or even “crop producer”), or also the abandonment of breeding activities for cropping ones with less time constraints as occurring in some parts of high-income countries.

Indicators of productive specialization can either be declarative (answer to what is your main farming activity?) or quantified. For instance, the EU official typology, based on the holding’s Standard Outputs, have determined rules to allocate holdings into different farm types according to specialization. “Type of farming” is calculated by the relative contribution of the standard output of the different farm activities to the farm’s total standard output. In this respect, the EU typology distinguishes (Kinsella 2009) three levels of specialization/specification: General type of farming, Principle type of farming, and Particular type of farming. “General type of farming” is the most general level of specification and comprises nine categories of which five specialist types. Specialist types are defined when more than two thirds of the Total Standard Output comes from one production source. In Honduras, Jansen et al. (2005) quantify the share of each farming production into the total agricultural income. After a cluster analysis, they differentiate holdings according to farm size, presence of off-farm incomes, and productive specialisation (basic grain, coffee, extensive livestock, diversified, etc.). Lastly, some typologies are based on the degree of specialisation of production systems, intending to capture specialisation in a staple crop vs multi-cropping or

¹⁵ In Honduras, Jansen et al. (2005) base their typology on the household income structure in both perspectives. In the first perspective (agricultural vs non agricultural income), income structure is crucial in the strategy of emergent Zambian farmers in Sitko and Jayne (2012) since the reliance on non-farm income determine the rapidity of their transition. In Chapoto et al. (2012), cash flows determine if Zambian farmers can follow the low-road or the high-road out of poverty. Moreover, income structure is the only dimension considered in Perret et al. (2005) and in Laurent (1999) in South Africa. These two cases illustrate how the income dimension is utile to characterize agricultural households in a broad definition, including landless agricultural workers that are often absents in agricultural typologies. Moreover, income structure is adequate to put in light the diversification process of agricultural holdings, viewed as “a way out of deep poverty” by Perret et al. (2005). In Italy, Ascione et al. (2011) base their typology on the share of , quality brands, Agrotourism and other revenues into the holding gross saleable production to integrate indicators of both holding diversification (agrotourism and other sources of revenues) and of the holding’s strategy of product differentiation (quality brands).

integration of cropping and animal systems (El Sotheary 2005, Parthasaraty Rao and Birtal 2008, Teufel, Markemann et al. 2010).

The main quality of the “productive specialisation” dimension is its capacity to define very generic types that can be found everywhere on earth (subsistence cereal crop holdings in Toulmin and Gueyes (2003) or agro-pastoralists and para-agricultural farmers in Mbétid-Bessane 2002 (quoted by Mbétid-Bessane 2003)). Besides, gardening can be included to fit with urban and peri-urban situations ([Abdulkadir, Dossa et al. 2012](#)). But at the same time, it can induce very specialised and precise types (i.e suckler breeder of milk-fed calves). Similarly, setting thresholds for international comparison would not be straightforward.

○ **Market orientation & Self-sufficiency**

The market orientation dimension is rarely a differentiating factor used in industrialised country's typologies because most farms are well integrated into markets. However, this dimension comes across as a fundamental distinguishing criterion among the majority of typologies in developing countries. This reflects a wide trend of agricultural policy focusing attention on the need for smallholders to become “commercialized” and to facilitate their access to market and integration in value chains (CAADP pillar 2 etc.). At another scale, there is also attention on the need to develop local food markets and minimal national self-sufficiency levels. Therefore, attempting to better document the diverse existing degrees of market orientation and self-sufficiency appears highly pertinent regarding current policy attention and transformation trends.

The integration to output markets aims at capturing three main aspects:

- The holding capacity to generate a surplus for sale and implicitly to cover the household's basic needs (some authors refer to the holding reproducing capacity).
- The monetisation of the agricultural economy and implicitly the holding involvement in new processes of differentiation. Indeed, with access to cash flows, holders can integrate their system of production to input markets (improved seeds, fertilizers, pesticides, etc.) or to invest in new factors of production (i.e land, equipment, farm buildings) or engage in further vertical integration along the market chain.
- Market integration is also frequently associated to technical specialization or access to specific capital assets which go beyond the physical, natural endowments to include human or social capital assets.

Self-sufficiency is a variant of market orientation. It also informs on the holding capacity to produce a sealable surplus, but putting more emphasis on poor households. It is frequently use to infer food security status of an agricultural household holding.

The market orientation may differentiate very broad types of holdings by opposing subsistence versus commercial holdings and specifying an intermediate place given to semi-commercial holdings ([Maltsoglou and Rapsomanikis 2005](#); [Rigg 2005](#); [Goto 2006](#); [Lemke, Mergenthaler et al. 2008](#); [Jourdain, Tai et al. 2009](#); [Teufel, Markemann et al. 2010](#)). The market integration dimension is documented in several ways in the literature review. Table 2.3 summarizes three approaches which are related to specialization/diversification processes as well as food security status. The most direct indicator is obviously the answer to the binary question “what is the destination of your outputs: market or self-consumption”, but more precision is given by the share of agricultural production sold.

In some cases, the answer is obtained through indirect indicators of specialization. For instance, in Sub-Saharan Africa, market orientation is notably estimated by the production orientation or specialization of the holding, opposing food crops to cash crops oriented systems of production and/or crop versus livestock systems of production. Specialization in “ex-colonial” export crops is indeed associated with market integration in the “intensive cotton orientation” type of Mbétid-Bessane (2003) or the “small holders integrating cotton and livestock” and the “large cotton holders” types in Belières et al. (2012). Similarly, specialization in livestock systems is a criterion of market integration in agro-pastoralist zones with types opposing staple crop producers to pastoralists and agro-pastoralists. In Greece, Daskalopoulou and Petrou (2002) drastically group into their Subsistence farms type all farms of less than 1 ha size. In the European Union, Rocchi and Stefani (2005) consider as “self-consumption oriented holdings” those with absent or limited access to products market. Finally, indicators of food security are used to disentangle food insecure holdings among food-secure ones. Notably, in Thailand, Belsky’s typology (1984) is based on the share of self-produced rice among other indicators. This allows more subdivisions than the classical subsistence / (semi-commercial) / commercial classification and then gives more information on the degree of vulnerability of the holding.

TABLE 1.3 INDICATORS FOR THE MARKET INTEGRATION DIMENSION

Direct indicators	Indirect indicators	Food security & Self-sufficiency indicators
<ul style="list-style-type: none"> - % production for the market - output destination (self-consumption / market) - % of food crops sold on the market 	<ul style="list-style-type: none"> - cash crop specialisation - livestock specialisation - regional market access (poor, fair, good, excellent) - local access to market (time to reach a health care centre) 	<ul style="list-style-type: none"> - self-sufficiency (Yes/No) - Household consumption of own grown staple food in number of months - estimated stock of staple crop after harvest and sales - share of self-produced staple crop in the household food basket - % of agricultural income devoted to food expenditure

The market orientation dimension presents several advantages. Firstly, it is particularly appropriate to catch agricultural transitions and it tends to be connected to diversification and specialization efforts. This feature is well illustrated by the DRDLR’s typology (2009) which combines market orientation with off-farm activities to define in-transition types of holdings: commercial-ready subsistence producers and expanding commercial small holders. Secondly, this dimension fits to address concerns linked with poverty reduction policies. Even if market integrated holders (like small coffee producers) can be as poor as non-market integrated holders, this criterion allows to identify a group of poor people: those without access to cash (through farming activities) and consequently without access to basic products and services, even more so when food unsecured households (the poorest of the poor) are pinpointed. More importantly, the latter is done without moving to a typology focused on household level analysis and it does not require additional costly information on non- or off farm income data.

5. Capital asset endowment

The (human, social, physical, financial, natural) capital asset endowment is an approach initially developed to assess the livelihood options offered to developing countries' holdings and applies for typologies performed at the household level. It can be caught thanks to a set of variables (WAW, 2012). In reality, the set of indicators adopted to estimate asset endowment is highly variable from one study to another, each author adapting the choice of its indicators to the local situation and to data availability. According to Tiftonell et al (2005), the asset endowment dimension would gain to be combined with indicators related to the household agricultural strategy to develop interesting typologies. "An initial approach to classify farms based solely on resource endowment led to poor discrimination of resource allocation patterns. Adding information on production goals (e.g. self-subsistence, market orientation), the main types of constraints faced, position in the farm developmental cycle and main source of income improved the discrimination of farm typologies enormously" ([Tiftonell, Vanlauwe et al. 2005](#)).

- **Physical Capital: Level of equipment and access to agricultural technologies and services**

In the last decades, access to agricultural equipment and technologies has been a strong factor of specialization of farming systems, and as such it has constituted an uncontested driver of holding differentiation. Besides constituting an indicator of holding physical assets, the level of equipment dimension is a way to estimate the capital accumulation and the investment capacity of holdings. It additionally informs on their degree of specialization. In the literature review of typologies (particularly in low or middle income areas), level of equipment is always associated with all sort of dimensions (land size, market orientation, production specialization, gender, etc.).

In the typologies we have reviewed, the level of equipment is never quantified in monetary value and it tends to be highly context-specific. More concretely, presence of animal labor versus traction is a frequently found factor of differentiation in agro-pastoralist African zones. Typologies are then based on the access to animal drawn or on the number of units of animal drawn possessed by the holder (CMDT, ([Aubry and Ramaromisy 2003](#); [Dufumier 2005](#); [Diop, Fofana et al. 2008](#); [Reoungal and Djondang 2010](#); [Belières, Passouant et al. 2012](#)). In Asia, the green revolution has induced the diffusion of irrigation systems and of the use of modern agricultural technologies (improved seeds, fertilizers...). They then constitute appropriate indicators of level of equipment (El Sotheary 2005) in Philippines, Jourdain et al. (2009) in Vietnam and Teufel et al. 2010 for the global South Asia). In other contexts, level of equipment is measured in a binary way, being manual or backpack sprayer (Aubry et al. 2008) or by input usage (chemical inputs and improved seeds) (Ranaivoarisoa et al. 2010) or by technology access (traditional vs modern technologies in Raj Gurung 2012). Lapar (2003) and Thanh Duong (2005) discriminate holdings that use crop residues for animal feed from the one that rely on concentrated feed.

Level of equipment is not present among differentiating criteria of industrialised countries' typologies, but it is used as a descriptive indicator (i.e irrigation system of low vs high intensity in Italy (Longhitano 2012), or the share of farm per size class that own a tractor in Greece (Daskalopoulou and Petrou 2002)). Nevertheless, this criterion would be interesting to catch current strategies to lower the cost of access to mechanisation in middle and high income countries, mutualising costs as in planting pools or out-sourcing mechanisation to "tractorists" for example.

In these examples, indicators of level of equipment are very context-specific and as such would not be suitable for the implementation of an international typology. Nevertheless, access to equipment / technologies / services is such a strong factor of holding differentiation and structural change that it could be worth to explore the feasibility to implement general indicators to estimate manual access to equipment (manual/ animal traction / machinery), or of input usage (low / medium / high), or even of level of investment in input per kilo produced (low level / medium level / high level). However, this approach would require extensive data processing and ideally should be undertaken to the development of sub-types. A last distinction is proposed by Blières et al. (2013) concerning the type of market integrated: local market / national or regional market governed by local norms / international niche market / international commodity market.

6. Gender

Gender variables are used in some typologies to point out specific constraints applied to men or women¹⁶. Women-headed holdings and women workers are often undertaking productive and domestic tasks which hamper their total productive capacity, not to mention the specific constraints they face regarding access to land, labor and input markets. It is then undeniable that gender is shaping the way households undertake agricultural activities and for that reason it deserves a careful attention in the selection of distinguishing criteria when designing a typology.

The main limitation to introduce gender among the main distinguishing factor of an international typology is that it would double the number of types, as it is the case in Djonnewa et al. (2000) and in Djondang and Leroy (2001) (both quoted by Mbétid-Bessane 2003). For one author, “complementary variables such as gender or marital status of the household head were not included in the Principal Component Analysis but used as criteria to refine the clusters later on” ([Tittone, Muriuki et al. 2010](#)). Hence, it would rather fit as secondary distinguishing criterion to distinguish local types or sub-types.

Box 2.1 Distinguishing Criteria in Smallholding typologies in low and middle income areas

The literature review of smallholding typologies reiteratively presented at least three distinguishing criteria based on **land, market and output orientation and context-specific equipment**. However, in all cases, the smallholding classification was strongly associated to the **family managed agricultural holding**.

In the case of land size, the thresholds among typologies of smallholders were varied. While in Colombia a smallholding is one with 10 ha, in Western Africa, holdings have on average 2 ha. Concerning market-orientation, in South-East Asia, most typologies oppose subsistence to commercial holdings, small-holdings being implicitly the subsistence one. The same polarisation is found in Sub-Saharan African and Latin American countries. The smallest holdings group comprises types named “small-holdings”, “semi-subsistence”, “subsistence”, “self-consumption oriented”. An intermediate type comprises the “semi-commercial holdings”, or the “emergent farmers”, or the

¹⁶ Balkissou 2000, Djonnewa et al. 2000, Djamen and Ndzana (2000), Djondang and Leroy (2001) all in Mbétid-Bessane 2003, Dumazert 2007, Blières et al. 2012, Jansen et al. 2005, Dorward 2002, Scheinkerman de Obchatko et al. 2007, Echenique and Romero 2009, Ruiz Garcia et al. 2005, Tobar 2011, Perret et al. 2005, Goto 2006, El Sotheary 2005, ThanhDuong et al. 2005, ParthasarathyRao and BIRTHAL 2008, Teufel et al. 2010.

“commercial-ready” and “expanding commercial” holders as well as the “low-input market oriented” holdings. Finally, all these types are opposed to “commercial”, “commercial industrial”, “market oriented with large resource endowment” holdings or even to “State Owned Entreprises and joint stock companies”.

In Sub-Saharan African other criteria of differentiation among smallholders was the access to livestock herd and animal traction and/or the specialisation into cash-crops for exportation. Holdings are then differentiated according if they are operated under manual agriculture / rented animal drawn or partially owned animal drawn / Own animal drawn (Mbétid Bessane et al. 2003, Reoungal and Djondang 2010). Agricultural holdings are also frequently classified as crop producers / agro-pastoralists / para-agricultural farmers (Mbétid Bessane et al. 2003), or subsistence cereal oriented / agro-pastoralists / agro-pastoralist cotton oriented (Sanogo et al. 2010). As mentioned above, these classifications tended to be highly context specific.

2.6. How can the literature review guide the elaboration of the WAW typology?

The literature review presented in this chapter is highly illustrative of the divergences and convergences in terms of **methodologies**, **data-sources used** and **selection of main distinguishing criteria** for typology building across different world regions. Also the results from the literature review shed light on the difficulties associated to integrating into an international typology definition, two key aspects (as identified under the WAW Framework) gender and environmental aspects (Refer to Box 2.2 and Box 2.3 respectively).

Concerning the methodology and data sources, the literature review provides evidence that a deductive or top-down approach would be the most suitable to build an international typology of agricultural holdings, not only because it will allow to be better aligned with policy objectives but also considering that no international dataset is available to engage in a data-based approach. In this respect, WAW observatories can be relied upon to elaborate more complex typologies at local level according to the quality of available data and the statistical skills they dispose in order to generate relevant sub-types that are aligned to WAW international types. It is worthy to highlight that combining datasets – for instance agricultural census and socio-economic surveys – is a complex exercise and that in the studies reviewed, authors preferred to select one single dataset (in general the most comprehensive). Thus, for the consolidation of international types, agricultural census would be the preferred data source while for the identification of local sub-types surveys can be integrated into the data analysis.

The most challenging task is related to the selection of the main dimensions or distinguishing criteria with which to build the international typology. In principle, criteria that can be found in all reviewed typologies (directly or indirectly) could be evaluated as suitable to distinguish broad types at the global level, since it would denote *a priori* data availability at census or survey level. Conversely, divergent dimensions which stress regional/national or territory specificities of agricultural holdings are more suitable to identify sub-types at more local levels. Among this group, traits related to agro-ecological settings, historical processes or institutional changes would be better integrated at a local or national level.

As presented in this chapter there were 6 distinguishing criteria that were frequently found in the literature review of typologies in different world regions :

1. Land & Business Size
2. Legal Status
3. Labor Usage
4. Diversification, Specialization & Market Orientation Dimensions
5. Capital Asset Endowment
6. Gender

Of these, two dimensions were deemed as more relevant to inform the identification of sub-types rather than international types due to reduced cross-country comparability and/or data processing efforts: *land & business size* measures and *capital asset endowment dimensions*. As already argued, the land size¹⁷ and monetary based indicators are highly context specific as well as proxies on equipment usage which vary substantially according to agro-ecological settings and socio-economic inequalities among holdings. These two dimensions are also considered as highly demanding in terms of data collection and processing tasks. Regarding gender, it was assessed that this dimension should be used to capture particular gender inequalities that are relevant to specific scenarios (Refer to Box 2.2).

Of the remaining three main distinguishing criteria, legal status may be considered as a complementary descriptor of the highly relevant family/hired labor usage dimension which has been strongly supported under the WAW Methodological Framework (2012). The joint analysis of these two dimensions allows differentiating between household and non-household agricultural holdings. In fact, another key finding of the literature review, concerning labor usage as a key discriminating criterion is that among typologies, this dimension is generally employed ***in combination*** with other variables (such as management, market integration or related criteria). The latter was primarily justified in reviewed typologies (and is also crucial for an international typology) because if household agricultural holdings are grouped only on the basis of their labour usage, those holdings only employing family labour would include a great variety of family farms that would vary substantially in their different production capacities as well as poverty status (i.e. family farms with both well or poor endowments could end up clustered together).

Lastly, concerning the dimension of diversification, specialization and marketing orientation, the indicators related to the market were considered the least data demanding while being mainly focused on agricultural holding traits rather than household traits. Also the focus on market integration is well aligned to widespread technical assistance programs based on market enhancement as well as economic thought and evidence that links market participation to economic development (Bosker and Garretsen, 2012). The identification of agricultural holdings responsive to market signals can serve to better justify the widespread market-based programs and policies in low and middle income areas; while the identification of holdings in relative isolation can contribute to promote complementary programs that address and support the generation of alternative livelihoods, possibly focusing on both off-farm and non-farm activities. Although indices of specialization and diversification may be more relevant to analyse transformations in the rural economy at large, the required detailed information on specialization and particularly on

¹⁷ The case of "land size" is very contentious since size is highly dependent of the kind of land that holders have access to (refer to the distinction between uplands, lowlands, tanety lands, baiboho lands, etc.) and the type of cropping or agricultural activity.

diversification¹⁸ data would not support international definition of types and thus could better fit as a secondary indicator to build sub-types at local or national levels.

Box: 2.2: Reflection on ENVIRONMENT INDICATORS – Perspectives and Challenges concerning their usage in the WAW International Typology of Agricultural Holdings

Environmental indicators cover many angles. On one hand, indicators may capture the general impact of agriculture on the environment of a specific territory. On the other hand, specific environmental settings may directly influence the choice of agricultural practices or organizational and productive decisions at holding level. In other words, the focus of environmental indicators can vary from territorial to holding level perspective, always assuming a two-way relation.

In the context of the WAW methodological framework, both types of perspectives are relevant. When analysing the impact of agricultural activities on the environment, the emphasis should be placed at the holding level. Indicators monitoring farm input usage of nutrients, pesticides and water can shed light on the degree of adequate management of natural resources. But also, the overall commitment to specific agricultural systems can be of relevance such as introduction of conservation agriculture, holistic grazing management, organic agriculture, precision agriculture or stem of rice intensification (also known as agro ecological intensification systems) (Milder et al, 2012). For the general assessment of environmental outcomes, which is another important aspect of WAW, indicators capturing the overall impact of agriculture on the environment at a territorial level are of particular relevance. The most relevant environmental indicators at territorial level include:

- Soil quality (risk of soil erosion by water or wind)
- Water quality (risk and state indicator)
- Land conservation (water and soil retaining capacity)
- Greenhouse gases (gross agricultural greenhouse gas emissions)
- Biodiversity (eco-system, genetic and wild & non-native species diversity)
- Wildlife habitats (intensively-farmed, semi-natural & uncultivated natural, habitat matrix)
- Landscape (management, cost & benefits, structure: environmental features and land use patterns, man-made objects)

Territorial level indicators serve to document aggregate changes in the usage of both nitrogen and pesticide uses, improvement and deterioration of water quality and level of greenhouse gas emissions. According to OECD 2001 report, between 1980 and 2000's there was a 10 per cent decrease of nitrogen and pesticide use in many European countries and Japan which was correlated to improvements in water quality and lowering of greenhouse gas emissions. The same report indicates that soil erosion declined in Australia, Canada and the United States throughout the same time period. The latter effects were associated to the adoption of farming practices that enhanced environmental performance such as the shift to using nitrogen management plans, integrated pest management and conservation soil tillage. However, as argued below, using only

¹⁸ Concerning "off-farm activities", some authors stressed that it is more relevant to analyze diversification strategies in combination with overall household holding performance in order not to mix holders that are pluri-active by need (to meet the household basic needs) and those who really choose to be pluri-active (most of the time with a high income or permanent off-farm job).

input use variables as key tools to analyse impact on ecosystems implies important constraints.

In turn, the intensification of farm production, specifically livestock farming has resulted in higher levels of nutrient surpluses, ammonia and greenhouse gas emissions with consequent increases in water and air pollution in region of Canada, Europe, New Zealand and the United States (OECD, 2001). The OECD report (2001) also highlighted increasing competition for water. In other words, agricultural practices have the potential to pollute or deteriorate the environment (i.e. through nitrogen or pesticide loadings in water or soil erosion and water resource depletion), but other services can be enhanced such as provision of wildlife habitat, landscape amenities or a sink for greenhouse gases (OECD, 2001). However, it should be highlighted that these indicators are mainly captured in selected high income countries and their equivalent in low income areas is scarce or altogether inexistent.

Environmental data collection becomes even more cumbersome at holding level. Yet among the most commonly found environmental indicators at holding level include the following:

Indicators related to specific farm management practices:

- Presence and quality of environmental whole farm management plans: such as organic farming
- Nutrient management plans
- Soil tests
- Use of non-chemical pest control methods
- Use of integrated pest management
- Soil cover
- Land management practices
- Irrigation technology

Indicators related to the usage of farm inputs and natural resources :

- Nitrogen balance and efficiency
- Pesticide use and risk
- Water use intensity, (technical & economic) efficiency and stress
- Usage of fossil sources of energy

The latter may also be associated to agro-ecological intensification systems as highlighted above and identified by Milder et al (2012) where specific agricultural practices are identified and bundled to enhance ecosystem services, such as:

- Use of ecological approaches in tillage, soil fertility and health and disease, pest and weed control (e.g. trap cropping) – integrated pest management, integrated weed management, management of pollination, crop rotation etc.;
- Use of multi-species and multi-breed herds and flocks;
- Diversity-enhancing crop, field- and grassland management, e.g. late and/or staggered mowing, maintenance of wildflower strips and ecological infrastructures such as stone and wood heaps, trees and hedgerows.

Alternatively, these holding level environmental indicators can be divided into four main groups (OECD, 2001) which can be better connected to equivalent evaluations of territorial level indicators:

- *Nutrient management indicators* which measure the share of cultivated area with adequate nutrient management plans with an associated frequency of soil tests.
- *Pest management indicators* which reflect the share of cultivated agricultural area that is not treated with pesticides or is under integrated pest management.
- *Soil & land management indicators* measure the number of days in a year that the soil is covered with vegetation. The greater the cumulative soil cover, the greater the protection from soil erosion, compaction and run-off and the contribution, in general, to biodiversity.
- *Irrigation & water management indicators* measure the share of irrigation water applied by different irrigation technologies, from the least efficient methods (e.g. flooding) to technologies (e.g. drip-emitters) that use water more efficiently.

Additionally, Bessou and Ronfort (2011) propose in their note M3 for the WAW to consider a two-component indicator on energy use and impact on fossil resources. The two components are: (i) Annual use of total fossil energy (LHV) / national or territorial stocks of fossil energy (LHV), this ratio being expressed in MJ, and (ii) Annual use of renewable energy / national or territorial stocks of fossil energy (LHV¹⁹).

In this respect, the Agro-Environmental impact matrix developed by Girardin et al. (2000) serves as another tool to illustrate how specific agricultural practices around land preparation, irrigation, fertilization, pesticide use, etc. can have an effect on natural resources such as water, air, soil, etc. The figure below represents the relations and intensity between agricultural practices and natural resources for the case of oil palm production.

Agri-Environmental Matrix		LAND PREPARATION & MANAGEMENT						IRRIGATION		FERTILISATION					PESTICIDES		FACTORY				Ecological Indicator
		LAND CLEARING	SOIL PREPARATION (first gestation)	SOIL PREPARATION (replanting)	LAND IMPROVEMENT (terrace,...)	LEGUME COVER CROP	ORGANIC MATTER (biomass, agro)	NURSERY	PLANTATION	NITROGEN	PHOSPHORUS	POTASSIUM	MAGNESIUM	Micro Nutrients (Ca,...)	PESTIDES	HERBICIDES	EFB	EFFLUENT	SMOKE	OIL LOSSES	
WATER	SURFACE	++	++	+	++	++	+	+	++	+	++	+	+	+	+	+		++		++	Surface water quality
	GROUNDWATER	++	+	+	+	+		+	++	++	+	+	+	+	+	+		++			
AIR		+	+	+						++					+	+	++	++	++		Air quality
SOIL	CHEMICAL	++	+	+	+	++	++		+		+	+	+	+	+	+	++	+			Soil chemical fertility
	PHYSICAL	++	++	++	+	++	++		+			+					++	+			Soil physical fertility
	BIOLOGICAL	+	+	+	+	++	++			+	+				+	+	++	+			Soil biological fertility
NON RENEWABLE RESOURCES		+	+	+	+	++	+		++	++	++	++	++				+	+			Soil biological fertility
BIODIVERSITY		+++	+	+	+	+	+			+	+			+	++	++	+	+			Natural resource stock
LANDSCAPE		+++	+	+	+	+	+			+	+	+	+	+							
Agri-Environmental Indicator								iOM			iN	iP	iK	iMg		iPHY					

However, one of the main challenges associated to environmental indicators in general is that they each have to reflect and capture a delicate natural balance when it comes to nutrient or pesticide management or soil and water preservation. For example, a persistent surplus of nitrogen indicates potential environmental pollution, while a persistent deficit indicates potential

¹⁹ LHV is a unit: Low Heating Value

agricultural sustainability problems. Similarly, agricultural pesticides contribute to agricultural productivity but also pose potential risks to human health and the environment, particularly if their quality is not pre-approved or their application is not adequately performed considering the specific territorial or agro-ecological conditions. Consequently, indicators recording overall pesticide usage might not be entirely revealing the potential damage to the environment and so relevant training should also be considered. In other words, individual nutrient or pesticide indicators may reveal only one aspect of environmental effects. For example, the *soil surface nitrogen balance* indicator provides information on the potential loss of nitrogen to the soil, the air and the surface or groundwater. However, nitrogen loss through the volatilisation of ammonia to the atmosphere from livestock housing and stored manure is often excluded from the calculation (OECD, 2001).

Usually, composed environmental indicators are also considered to review the above mentioned problems but they are not free from limitations in their own right. For example, the farm intensity index has been developed at EU level. The intensity of a farm can be defined as the level of inputs used by the farm per unit of factor of production (in general land). Intensification / extensification is therefore the increase/decrease in farm intensity (EUROSTAT, 2013). The inputs taken into consideration are fertilizers, pesticides and purchased feed. However, water could not be included because there was no consistent information available. Clearly, the replication of such an exercise for low income areas would result in much larger data gaps which highly limit the consideration of environmental aspects for identification of types. However, it is proposed that as data collection is improved, it will be possible to establish connections between types and specific management practices or at least to evaluate the environmental status of a given territory and establish a connection to the types of farms operating in the given area.

Box 2.3 Reflection on GENDER –Perspectives and Challenges concerning the integration of gender aspects in the development of the WAW International Typology of Agricultural Holdings

A primary reason to paying a specific attention to gender issues “concerns the different, culturally grounded, roles of men and women in household food and livelihood systems” which imply that men and women have different options and responsibilities in processes of livelihood generation (Niehof 2004). This is particularly true in societies where a set of (reproductive and/or productive) tasks is directly identified as belonging solely to females. This implies specific time allocation constraints (among others) that affect the access of women to a number of assets and services, such as education, support services, off-farm activities, involvement in sectoral association, etc.

As a tool to systematize data, typologies can be of great help to shed light on the specific position of men and women regarding some selected criteria. For instance, it is noteworthy that there is a strong convergence toward the description of an over-representation of women-headed households in the poorest types of agricultural holdings. Notably, Dumazert reports in the Nicaraguan case that the share of women-headed household is over the national average among the “poor descapitalized producers” (26% vs 18%) and among the “minifundists producers”, that is to say, two types evidently poorly endowed in the different capital assets. In Chile, the share of

women holders is also higher among the “most vulnerable small-holdings” (Belières, Passouant et al. 2012). Lastly, in Honduras, “households headed by single women are not the only ones included among the extremely poor, but they do have fewer options, a factor that can generate families of extremely poor people among the children raised in these families” (Jansen, Siegel et al. 2005). The aforementioned examples show that the link between gender and poverty of agricultural household holdings can be highlighted by simply integrating “% of women headed households” or “% of women” among “observational” or “descriptive” indicators.

The literature review also identifies typologies which have integrated gender-related indicators at the first stage, among the differentiating or discriminating factors. In the corresponding cases (four Africa cases in our literature review), the position of women among the less endowed types is made even more explicit. In Malawi, the cluster analysis realized by Dorward (2002) on 6,586 households led to distinguish a “poor male-headed” type as well as a “poor female-headed” type. There, even though male-headed households compose the majority of the poor, “female headed households are more likely to be poor than male headed households” (Dorward 2002). In Cameroun and Chad, Djondang and Leroy (2001) and Djonnewa et al. (2000) (quoted by Mbétid-bessane 2003) both stress constraints on access to means of production by women, distinguishing a “female-headed holding in manual cultivation” type (whereas this distinction is not done among groups with access to animal traction). Finally, Balkissou (2000) (quoted by Mbétid-bessane 2003) interestingly emphasizes the role of women in the diversification of livelihoods. Effectively, among this group, the author identifies a sub-group called “holdings with land and off-farm female incomes”.

Besides underscoring the situation of women among different types, some authors also stress the position of women regarding access to specific assets and their degree of vulnerability:

- Access to income earning activities: along the 1997-2007 period, Chilean agricultural censuses shows that women are more likely to access temporary or seasonal jobs in agriculture than permanent jobs (Scheinkerman de Obschatko, Foti et al. 2007; Echenique and Romero 2009). While in South-Africa, women almost do not secure off-farm jobs at all (Perret, Anseeuw et al. 2005). Moreover, in situation when women are diversifying the household livelihoods, they often face a men-women income gap. This situation is particularly stressed in Honduras by Jansen et al. (2005), in Chile by the OECD (2008) and in Java by Goto (2006). In Honduras, Jansen et al. (2005) also observe that women-headed households tend to rely on basic grains and seem to be less likely to diversify their production portfolio toward more added value crops: “Crop diversification is less common in female headed households than in male headed households. Female headed households do not grow annual crops other than basic grains and very few female headed households grow permanent crops. Some of these differences between male headed households and female headed households can be explained by the many competing demands for female labor” (Jansen, Siegel et al. 2005). Fortunately and contrary to the previous observations, in some situations, women dispose of a beneficial position with respect to income diversification. According to Hertz et al (2009) women in Latin America appear to participate more in non-agricultural activities than their male counterparts and the SOFA (2011) reports that women were more likely to participate in non-traditional agricultural production without necessarily implying that higher revenues were obtained in comparison to men in similar positions. This is the case regarding the commercialisation of farm outputs in Latin America and Africa, (Mbétid-Bessane, Havard et al. 2003; Ruíz

García and Marín López 2005; Tobar 2011), or of animal husbandry and in particular animal care in Asia (El Sotheary 2005; Thanh Duong, Duy Can et al. 2005; Parthasarathy Rao and Birthal 2008; Teufel, Markemann et al. 2010). In the context of the Chad cotton crisis, women tried to diversify income sources by expanding groundnut cropped area, a crop that is traditionally reserved to women.

- Social and human capital: many authors reports that women of agricultural households in general and women holders in particular lag behind men regarding level of education and literacy rates (Dorward 2002; El Sotheary 2005; Belières, Passouant et al. 2012). Consequences are significant since their resulting lack of knowledge represents an additional obstacle towards market participation, access to extension services and technical assistance, the adoption of selected technologies and even to the usage of information technologies (Dumazert 2007; Echenique and Romero 2009; Tobar 2011). They are also seen as less likely to involve themselves in association of producers ((Dumazert 2007; Scheinkerman de Obschatko, Foti et al. 2007)
- Dependency ratio: as men are more likely than women to undertake long distance migration, the remaining women headed households suffer from a deficit of active worker among the household. Consequently, they cannot farm the same area as other households or they sometimes have to pay for external labor force. This increases their vulnerability even though they are supposed to receive remittances in return (Dorward 2002; Jansen, Siegel et al. 2005; Dumazert 2007; Echenique and Romero 2009).

Based on the empirical evidence discussed above, it is relevant to distinguish gender perspectives on a series of indicators that may be used at different stages of typology building where a distinction by sex would inform gender-equity and poverty reduction policies:

Economic indicators:

- o Income
- o Off-farm employment
- o Remittances

Indicators related to asset endowment:

- o Cropped land
- o Level of equipment
- o Access to support services
- o Commercialization of holding outputs
- o Dependency ratio of the household (both for elderly and child dependency)

Social indicators

- o Educational level
- o Membership to an association of producers

Gender issues can be addressed in different ways by the WAW international typology of agricultural holdings and it can shed light on the issue of "feminization of agriculture":

- Integrating a gender dimension among the distinguishing dimensions, that is in the identification of "international types". This option would double the number of

international types.

- Integrating a gender dimension among secondary criteria of differentiation i.e. definition of sub-types at national/local level. This has been identified as the favoured option. The incorporation of gender dimensions in the elaboration of sub-types will be context specific. Gender access to different assets or services may serve to inform local and national policies. This option is in line with the approach adopted by Tittone et al. (2010).
- Integrating a distinction by sex on some selected observational indicators. This option would also be of great interest, considering the list of indicators proposed above as a way to improve data collection processes that are gender sensitive. Nevertheless, distinction by sex is not always available in national statistical datasets (in the case of the Chilean agricultural census, Scheinkerman de Obschatko 2007 observe that women employment is systematically under-estimated). This option would better fit in the development of household level surveys covering a variety of topics, where more flexibility is allowed regarding the number and kind of questions included.

Annexes

2.1 Extended Literature Review Document (word file)

2.2 Overview of key indicators (excel file)

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Chapter 3. Proposal of an International Typology of Agricultural Holdings under the WAW Methodological Framework

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As already argued in the introductory chapter of this report, agricultural sectors are currently at the centre of the debates around food & nutrition and energy security, climate change, competition for natural resources & increasing socio-economic inequality (World Bank, 2007; de Janvry 2009). The development of the WAW international typology of agricultural holdings is expected to provide information to feed such public debates. Thus, the aim of the international typology (as a tool) is not to defend a specific type of agriculture but to offer evidence-based elements to various stakeholders, particularly those concerned with or involved in the situation of the poorest and most vulnerable farmers.

It is important to highlight where the WAW international typology building exercise fits with respect to the WAW general Methodological Framework. The typology building is related to the identification or characterization of agricultural holdings under a common framework, which is the main task of the present research. The objective of using this international typology for the monitoring of agricultural transformations is considered a subsequent relevant task that can be adequately undertaken once a well-functioning typology and data processing systems are established. Similarly, it should be highlighted that not only agricultural data but also environmental, social and economic information are required to monitor current agricultural transformations.

An assessment of the specific WAW Methodological Framework proposal of using permanent hired versus only family labour dimension as the key parameter to identify international types of agricultural holdings is conducted in this chapter. Such assessment is undertaken on the basis of literature review findings and expert consultations and it is argued that the WAW typology (and overall WAW objectives) would benefit from additional criteria in the definition of international types of agricultural holdings.

This chapter is thus structured as follows: Section 3.1 stresses the importance of having well-defined and comparable terminology for the purpose of identifying agricultural holdings from an international perspective, particularly if only a labour dimension is embraced as the main distinguishing criterion. Section 3.2 addresses the task of identifying agricultural holdings based on the WAW Methodological Framework and under an alternative complementary approach proposed by the WAW Consultancy team. Section 3.3 presents an overview of challenges associated to defining types of agricultural holdings using three instead of one discriminating parameters for engaging in international comparisons.

3.1 Diversity of Terminology of Agricultural Holdings

In certain contexts, concepts such as peasant or family farmer are taken as inter-changeable (such as in the case of Brookfield (2008)) but in others (such as in Ellis (1996) for the case of peasants and/or the Brazilian government legal definition of family farmers) these two concepts do not match and cannot be considered as equivalent. In other words, widely used concepts (such as family farming, smallholders or peasant agriculture) are often subject to various interpretations that ultimately hamper policy dialogue²⁰.

Next, literature addressing the variety of (labour-based) concepts used for the characterization of agricultural holdings is presented. These results are later used as supporting evidence that the identification and definition of agricultural holdings for typology building must be rooted in internal rather than context-dependent traits and that identification of international types only based on labour could lead to rough types that would include very heterogeneous observations particularly within the case of "family labour only" holding while at the same time, setting apart holdings that are in essence similar in socio-economic and cultural aspects (for instance, positioning individual household holdings under the WAW MF "type 3" if all labour is hired. This was the particular case under the Malagasy Observatory to be illustrated in Chapter 4). Similarly, it is argued that in order to support the characterization of agricultural holdings that allows for cross border comparisons, the international typology must be designed on a set of basic criteria (and indicators) beyond labor that rely on data that can be widely acquired in different countries.

As mentioned above, there is a vacuum of internationally comparable working concepts and indicators that may be utilized meaningfully under different socio-economic and agricultural settings. In other words, concepts such as "family", "peasant", "smallholder", "commercial", "entrepreneurial", "marginal", "patronal" farming may imply altered meanings and/or legal implications in different countries/regions²¹. In this sub-section, particular emphasis is placed on the

²⁰ Another key drawback well illustrated in the literature review of existing typologies presented in Chapter 2 is related to (land) size and monetary (business) based indicators. The latter are frequently used to build typologies but remain highly context-specific, thus hindering potential international comparisons. The same occurs when typologies are guided by territory-specific agro-ecologies, historical paths or institutional traits (i.e. based on anthropological or social norms). One key lesson from the literature review is that inherent traits of the agricultural holding (not household) should be used to identify types from a cross border perspective.

²¹ Chapter 2 already illustrated the many definitions of "small" holdings in low, middle and high income areas. In low and middle income countries, the different typologies reviewed demonstrate that the small holdings are frequently identified in terms of their little access to land, markets and equipment. And in all cases, the smallholders are run and managed on a family basis. This has raised a controversy about the correspondence between family agriculture and small-scale farming. Indeed, many typologies do not differentiate family agriculture and small-scale farming, using loosely the word *campesino* which could be approximated to the

definitions of **family farmer** and **peasant** given that the WAW Methodological Framework has identified the family/hired labour usage as the key discriminant dimension for international types of agricultural holdings (and not size).

One particular and relevant example in this respect is related to the definition of “**family farming**”. According to ESW Division at FAO, family farming is undertaken by producers who, despite their great heterogeneity among and within countries, have the following key characteristics (FAO, 2012):

- Predominantly family labour is used with the head of the household participating directly in the production process; therefore; even when there is some division of labour, the head of the household does not just perform management responsibilities but is also a worker in the family unit;
- Agriculture/forestry/aquaculture/fisheries is 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.).
- Limited access to land and capital resources;

This ESW FAO definition of family farm would not be in line with Hayami’s (2010) definition of family farms. The author argues that if family farm is defined as the farm production unit operated mainly by the operator’s and his or her family members’ labour (i.e. only using labour dimension), the family farm can be very large in terms of its operational land holding since a farm of several hundred hectares can easily be cultivated by one or two family members with the use of modern labor-saving machinery.

CIRAD (1998) offers a wider definition of what constitutes “family agriculture”: *a form of production characterized by the specific structural link between the economic activities and family structure*. This relationship affects the decision making process at the holding level; i.e. the choice of activities, the organization of family work, the management of factors of production and the transmission of assets. In other words, a family farm may include not only ESW-FAO definition but other agricultural holdings that employ family labour but are also engaged in other off-farm activities as main activity for subsistence (this would be the case of a *minifundio* as characterized in the Nicaraguan context which does not provide sufficient farm output for simple reproduction and family members are engaged in other rural activities as main source of income (NITLAPAN, 2001)).

Similarly, a more recent CIRAD (2013) definition of family farms leaves room to incorporate any holding which hires one to a few *temporary* labourers, a notion which is aligned to Brookfield’s (2008) statement that family farms may also employ contractors to undertake specific tasks such as land preparation and harvesting and they may employ casual labour to do special or skilled jobs.

term peasant in English. By opposition to this amalgam, Dumazert (2007) defines a type called Campesinos finqueros that relies on family labor force but with higher land area and degree of capitalization than other campesinos types. It is also striking that Echenique and Romero (2009) include Empresarios grandes into their review of family agriculture in Chile. In Brazil, Guanziroli and Basco (2010) make a clear distinction between small farms and family farms, arguing that a “farmer can employ workers on a small surface area (e.g., irrigated agriculture) or run a large farm with family members, as is the case with grain and livestock production”. Then, they define a family farm as a farm that uses more family labor than hired labor. Finally, Forero et al. (2013) confirm that small farmers and family farmers can be distinct groups, differentiating familiar small-holders and no-familiar small-holders in Columbia.

Thus, as long as management remains with the family farmer then it will be catalogued as a family agricultural holding.

CIRAD (2013) makes a further distinction between family farming, family business or patronal farming and corporate or entrepreneurial agriculture. While the corporate or entrepreneurial agriculture is entirely disconnected from family based decisions (i.e. management is undertaken by a firm or corporation, all labour is hired and all assets are purchased by a non-family entity); the patronal farming or family business has a medium ground between corporate agriculture and family farming. This type includes any private landowner who has hired permanent labour to run the agricultural holding (i.e. Latin America Latifundia). The owner may or may not be always on-site but he or she is responsible for key investment and production decisions. The family business or patronal farming definition would then fall strictly outside of the ESW-FAO definition.

According to CIRAD (2013) the existence of permanent hired labour would serve as an indicator to catalogue a holding as belonging to patronal farming or family business. This is particularly troublesome for the cases where elder and/or female-headed agricultural household holdings are unable to undertake all necessary agricultural activities using family labour only and thus have to rely on permanent hired labour in order to conduct their main livelihood activity. The ESW FAO definition, on the other hand, would certainly include this holding as a family farmer not a family business.

While the CIRAD definition of family farming fits into what may be considered as a “knowledge-based” concept, the literature review illustrates that other “normative-based” definitions of family farming may be found. One example is that of Brazil where the law n°11.326 (from July 24 2006) legally defines a family farmer or a rural family entrepreneur in reference to its farm size, the usage of family labour and its main source of family income proceeding from on-farm activities. Social claims and political struggles from the historic movement of family farmers in Brazil have guided and triggered this official recognition and definition family holdings. The official definition is used to set the basis for targeted agricultural policies and support programs (See Box 3.1). Similar legal definitions are found at governmental level in other countries.

Box 3.1: Brazilian legal definition of “family farmer” (Law n° 11.326) :

“Is considered as a familiar farmer or familiar entrepreneur anyone that undertake an activity in a rural area and that comply with the following characteristics:

- 1- Do not have any legal title, land area superior to four fiscal modules (familiar agrarian unit defined in every Brazilian locality)
- 2- Use mainly its own familiar labour force on its farm/enterprise
- 3- With a familiar income predominantly originated from economic activities in link with its own farm/enterprise”

Another concept with varied (knowledge, normative and even cultural or historical- based) interpretations is that of peasantry or peasant agriculture (Shanin, 1987). According to Ellis (1996) peasants are considered mainly as farmers who obtain their livelihood predominantly from the land by cultivation of crops and raising livestock (thus, it excludes landless labourers, plantation workers, pastoralists and nomads; although the latter may be on the verge of becoming peasants). Otsuka

(2008) presents a different perspective, since he claims that the main characteristics of peasants have changed over time in the process of economic development: many of them (i.e. peasants) are part-time farmers engaged in both farming and non-farm jobs.

French sociologists refer to peasant to define a status or “a condition assigned at birth” by way of inheritance and to perpetuate the family patrimony. Peasants maintain very strong ties to their village/community, produces for their family and community needs with very few external inputs entering in the productive system. In 1967, Mendras foresaw “the end of the peasants” in France, meaning the end of subsistence farming. Hervieu and Purseigle (2009) confirm this intuition defining the elimination of peasant farming in the 20th century, replaced by family farming (as a professional status that is chosen and attained) and foresee the emergence of a kind of family-based corporate agriculture in the 21th century.

In peasant societies (as envisaged by Ellis, 1996), land is seen as more than just another factor of production because it represents the long term security of the family against hazards and it is part of the social status. Peasants rely main on family labour. This predominance is said to have an effect on the working of labour markets in peasant communities, since various subjective criteria peculiar to individual households are likely to influence both the supply and demand for wage labour in the wider market. They are also characterized by the “subsistence basis of their livelihood” (independently if they directly consume what they produce or farm output is sold to fulfil basic needs). The key issue from Ellis’ perspective is that peasants are only *partially integrated into incomplete markets* (1996, p 4). In other words, they are not fully integrated into markets but cannot escape their forces either. By incomplete markets, Ellis (1996) refers to markets which function sporadically and in a disconnected way across location and time²². Consequently, it is often that peasant societies feature non-market or “reciprocal transactions” between farm households. Exchanges are usually defined according to context-specific norms and may involve unlike goods and services. Ellis’ definition implies that peasant farming takes place in the following conditions (1996, p 12):

- Capital markets are fragmentary or non-existent
- Variable production inputs may be erratically available or unavailable
- Market information is poor, erratic, fragmentary and incomplete
- A freehold market for land does not always exist
- Markets and communications in general are not well integrated

3.2 Identification of Types of Agricultural Holdings: The task

In this section the WAW Methodological Framework proposal for typology building is re-visited and evaluated in terms of data requirements and challenges associated to ensuring international comparability of emerging international types. This discussion is followed by an alternative yet

²² Markets for farm inputs and farm outputs sometimes do not work well due to generalised economic collapse, resulting in erratic availability of imported inputs (fuel, spare parts, fertilizers) and lack of consumer goods in rural areas. Sometimes they do not work well due to poor transport and communications. Poor information often results in fragmentation of markets, so exchanges are not replicated between places and times. (Ellis, 1996 p 11)

complementary approach developed by the WAW consultancy team under a collaborative effort with selected experts and on the basis of literature findings.

3.2.1 Overview of the WAW Methodological Framework Proposal for Typology Building: Advantages, Data Requirements & Challenges

As explained in the introductory chapter, the WAW Methodological Framework proposal regarding typology building is to distinguish agricultural holdings on the basis of family vs. hired labour usage. The focus on labour provides the opportunity of keeping track of holdings where both production and consumption decisions are inter-related and inter-dependent. In low income countries, such type of holding is usually connected to higher degrees of food insecurity, poverty and limited access to mechanized equipment or fertilizers. Another key reason to focus on labour is that agricultural production is considered to have few technical (dis) economies of scale, implying that a range of production forms can coexist (Otsuka, 2008). Larger units are said to have advantages in accessing credit or lumpy inputs but the ability of smaller farms to overcome these through collective action, together with owner-operators' superior incentives for exerting effort imply that, in contrast to other industries, farming is still dominated by family-owned businesses (Deininger and Byerlee, 2011). However, Brookfield (2008) reminds us that family farms come in a wide range of sizes in the developed countries and in a narrower and generally smaller range in the developing countries. Consequently, the focus on family/hired labour usage goes beyond elements of land size; in the sense that it is not possible to assume that a family farm will also be necessarily a "small" farm.

The WAW Methodological Framework has opted for the "**agricultural holding**" as the key unit of observation and the latter is defined following the guidelines of FAO ESS as stated in WCA (2010). This definition allows for implicitly incorporating the notion of household into the description of holdings. Thus, household holdings are closer to the notion of family farms while non-household agricultural holdings correspond to holdings operated by non-family entities (corporations or government institutions). Another advantage of the FAO ESS agricultural holding definition is that it embraces the pluriactive nature of holdings, including non-market dimensions.

As it will be illustrated, both the focus on labour as a discriminating factor and the use of the FAO ESS definition of agricultural holding as key unit of observation are also embraced as relevant aspects in the WAW Consultancy proposals. However, the WAW Methodological Framework also puts forward the bearing of considering (50+) structural indicators (at holding and territorial level) based on the five capital assets and sustainable livelihood frameworks for the further characterisation of agricultural holdings (Table A3.1 & Table A3.2 in Annex 3.1). The WAW Methodological Framework has adapted the sustainable livelihoods and the capital asset frameworks for further characterization of holdings and for capturing their transformations because holders may employ different strategies (as a response to external drivers and internal restrictions) to manage the five key capital assets (natural, physical, financial, human, social) - through appropriate tradeoffs - in order to achieve desirable livelihood outcomes. According to the WAW Methodological Framework, this allows for a comprehensive, cross-sectional approach to identifying core indicators that are determinant in agricultural transformation. It is argued that indicators based on the Sustainable Livelihood and Capital Assets Frameworks offer a better understanding of transformation, driving forces and impacts, as well as a guide for appropriate indicator selection and subsequent data collection (WAW, 2012)²³. The selection of indicators was based on the core modules of the World Programme for the

²³ To achieve this, the WAW Methodological Framework (2012) envisaged the integration of observatory experiences to support the identification of agricultural holdings and the monitoring of their transformations.

Census of Agriculture while additional indicators proposed are usually included in national agricultural or other common surveys.

In the identification of agricultural holdings and territory traits, the WAW methodological framework (2012) also considers aspects related to market integration: *given the importance of markets in livelihood strategies, the inclusion of appropriate indicators for documenting patterns of market participation of different holding types and the constraints that they face (in terms of market and institutional development) would help in explaining both the current structure, as well as transformations which are likely under different scenarios of constraints.* Thus in addition to the 50+ indicators shown in Tables 3.1 and 3.2 in Annex 3.1, 'value chain' indicators are recognized as relevant, but any further reference to the core indicators within census or survey data to capture this particular aspect is absent.

The WAW Methodological framework (2012) also stipulates that outcomes, associated to specific types, should be captured and monitored. The latter mainly refer to environmental impact of agricultural activities, socio-economic performance, food security status including a perspective on gender and poverty. Again, a substantive list of 54 indicators are proposed (WAW, 2012, pp 28-29) and reproduced in Table A3.3 in Annex 3.1

In other words, the WAW methodological framework requires **extensive data availability** in order to identify holdings and measure their related socio-economic and environmental outcomes. The integration of socio-economic & environmental aspects at holding and territorial level requires that agricultural datasets be connected to a variety of theme-oriented data sources. This implies not only extensive investment in information system²⁴ (particularly in low income countries) but also further harmonization among indicators, as many of these may not always be available in every country and for certain cases proxies must be considered. In this respect, the case of environmental indicators is particularly troublesome and explicit considerations must be reviewed for the incorporation of gender perspectives. The constraints surround both environmental indicators and gender related aspects are discussed in Box A3.1 and Box A3.2 of Annex 3.2.

However, the challenges to implementing the WAW Methodological Framework proposal for typology building are not restricted to extensive data availability. The WAW Methodological Framework considers that national and territorial levels require more contextualized typologies that cannot be defined ex ante and from outside. Thus, it is proposed that a substantial number of indicators directly related to the asset and sustainable livelihood frameworks are used to address specific and locally relevant issues. The fact that 100+ indicators (emerging from the capital asset or sustainable livelihood framework) were proposed, requires further screening and prioritization if any of them are to be used in the definition of international types. Since the WAW Methodological Framework does not specify which indicators should be prioritized, an enormous number of context-specific types would potentially emerge. Clearly, even if only a percentage of all listed indicators in Annex 3.1 are taken to define types, the capacity of the typology to become truly a policy tool to effectively support straightforward comparisons from a cross-border perspective would be hampered. The WAW Methodological Framework advocates that the main criterion to distinguish types of agricultural holdings at international level is limited to the family/hired labour usage

²⁴ These information systems are required to cover not only agricultural aspects but also aspects of rural activities as a whole where issues related to environment, demography, health, off-farm income, industrial structure, markets, etc. are picked up.

dimension, ultimately leading to the CIRAD (2013) definitions around family farming, family business and corporate agriculture.

1. Holdings with essentially family labour (and occasional hired temporary labour - "family farming")
2. Holdings with family and permanent hired labour (patronal farming or family business)
3. Holdings with exclusively hired labour (corporate agricultural)

Prevalence of this family vs (permanently) hired labour dimension in the WAW Methodological Framework is related to a valid attempt of capturing transformations which mainly affect the status of family farmers vis a vis other forms of patronal farming or corporate agriculture development from an international perspective. However, in this section it is argued that if only such a labour usage criterion is used to define international types of agricultural holdings, it may lead to placing under the same heading of "family farm" very diverse agricultural holdings in terms of socio-economic and food security status; a condition which would not be consistent with the policy focus on food security or poverty reduction largely depending on the ability of targeting the most vulnerable agricultural household holdings. For instance, international type 1 (as defined above) could include, as highlighted by Hayami (2010) both farmers only using family labour (and occasional hired labour) with extensive land, mechanized equipment and strong market involvement on one hand and on the other hand "peasant" farmers (as defined by Ellis, 1996). In other words, using only family/ permanently hired labour usage to define international types would imply that family farms operating under very different conditions may be grouped together even though their production purpose and vulnerability status can be at opposite ends of the spectrum. In other words, family farmers that are not socially vulnerable but aimed at self-consumption for issues of leisure not survival end up being classified under the same group as family farms in Sub-Saharan Africa who are mostly food insecure and starved. This sort of classification of agricultural holdings would not allow for accurate comparisons across countries. Another important issue to consider is that holdings managed by elderly or females who (for any reason) are not able to work personally on their farm and end up entirely relying on hired labor (both permanent & seasonal) would be erroneously classified as "corporate agriculture" under. In other words, the WAW methodological framework presupposes a silent distinction between household and non-household holdings in order for the allocation of hired vs family labour to effectively categorize holdings under type 1, 2 3 (as defined above).

Thus, it is argued that further criteria must be incorporated into the design of international types of agricultural holdings and a compromise must be found between local specificities and global coverage. However, there are many theoretical and practical challenges associated to this particular requirement. In the first place, an international typology must be exhaustive and mutually exclusive. i.e. robust & broad yet flexible to accommodate for specific situations (i.e. types must be applicable to global and local contexts). At the same time, the number of distinguishing variables in order to identify the types of agricultural holdings must be limited so that data availability is ensured in most countries and policy evaluations from a global perspective can actually take place. These two conditions are critical for the typology to really become a working tool for policy dialogue, international comparisons and ultimately monitoring of transformations.

In this sense, the starting point is the selection of "policy" relevant criteria for identifying agricultural holdings. For this purpose, not only extensive literature review was undertaken (as

illustrated in Chapter 2) but also a comprehensive e-mail discussion with 100+ experts located in 20 different countries (Box 3.2), followed by a working meeting with experts from IFAD, FAO, CIRAD, INRA, among other international consultants and experts conducted in May 27, 2013 in Rome (FAO Headquarters). These activities constitute the essence of the WAW Consultancy Proposal to Typology Building explored in the following sub-section.

Box 3.2: WAW DGROUP Experience: April – May 2013

Around 100+ Experts from over 20 countries were contacted to address three key questions:

- a. Could you suggest relevant literature and / or key experts on typologies and characterization of agricultural holdings for policy monitoring and formulation?
- b. Are you familiar with existing agricultural typologies and associated set of indicators (either typology used at official/government level or from academic sources) that may serve as valuable examples to setting up an international typology of agricultural holdings? What would you say are the key advantages and disadvantages of such typologies? (in terms of coverage, cost-effectiveness in data collection and/or policy analysis)
- c. In your opinion, what are the most suitable indicators that could capture better or more accurately the current transformations and/or aspects related to sustainable development at agricultural holding level? What indicators would be feasible to incorporate in the short and long-term that will help grasp the multidimensionality of agriculture holdings' characteristics?

The results were 50+ recommended literature, links and references on agricultural typologies (containing mixed contributions on typologies between *Agricultural Household Holdings* & *Agricultural Holdings* experiences). The examples covered a widespread set of criteria: market involvement, agro-ecological setting, food security, poverty levels, socio-political institutions (i.e. land status), and agricultural practices, demographics (gender and age)...

However, the WAW Dgroup reached consensus on the premise that "ownership" and "management status" captured through the extent of family vs. hired labor usage and identification of holding decision maker could serve as a first criteria to guide the identification of international types of agricultural holdings. Nonetheless, the inclusion of many other factors were considered necessary to work on the identification of additional types or sub-types and the main challenge was connected to actual data availability and the extent of policy relevance of resulting characterizing dimensions.

This diversity of contributions from the WAW Dgroup exchange also stressed the fact that typologies are all purpose-driven and context specific, ultimately requiring an in depth revision of the key objectives of WAW International Typology. The latter took place in Rome during WAW Meeting "*Towards an international Typology of Agricultural Holdings*" (27th, May 2013)

WAW Dgroup: <http://dgroups.org/fao/waw/>

3.2.2 The WAW Consultancy Approach & Proposal

In order to devise an international typology of agricultural holdings that could be global in coverage yet flexible to accommodate specific country situations, the Consultancy Team envisaged a **top-down & bottom-up** approach to typology building which was presented at the WAW Working Meeting “Towards an international Typology of Agricultural Holdings” on 27th, May 2013, for comments and reactions.

As it has been stated, there is no international “hands-on” framework to analyse agricultural holdings of different areas in comparable terms, nor monitor their structural transformations. If the aim is to define an international typology of agricultural holdings which responds to both global and local expectations, then a middle ground must be found between policy objectives (in order to guide the identification of types) and current data availability at local level (so that sub-types relevant to the specific context can be generated).

The top-down logic or approach proposed by the WAW Consultancy team would thus first require the identification of key characterizing variables (including but not restricted to the WAW Methodological Framework focus on family/hired labour) for establishing a set of basic or generic international types of agricultural holdings that are aligned to policy interests and renders further distinction between what is considered a family farmer (i.e. the qualitative top-down approach described in the literature review of agricultural holding typologies). These “international types” are expected to enable comparisons from one country relying on data that is widely available in most countries. Besides the identification and selection of criteria, it is necessary to reflect the order in which said criteria will be used to filter the data and establish types. Clearly, the selected criteria must also abide to practical limitations such as the real availability of proxy indicators in a majority of countries. This requires that the criteria used for identification remains not only simple but limited in number.

The bottom-up logic relates to the incorporation of local datasets and territory-specific information in order to highlight further differentiation among pre-defined international types²⁵. This may be executed with the aid of statistical / numerical analyses and the cross-checking of local data from different surveys or census, paying special attention to the incorporation of data related to environment and gender as well as feedback from key stakeholders. In other words, the bottom-up approach is close to the WAW Methodological Framework vision of making typologies relevant for local contexts. This distinction is meant to make sure that relevant national or local differences are not obscured by too broad international categories, but it argues that there should be a separation between indicators to identify “international types” and indicators to identify “national or local sub-types”. In this respect, the five capital asset and sustainable livelihood frameworks are regarded as a guiding tool to assess performance and establish a balanced set of indicators that may allow for an adequate identification of sub-types and later capturing more detailed information on holding-level transformations provided data is available to engage in a dynamic analysis. It is expected that with this separation between indicators for identifying international types with respect to indicators for

²⁵ Although the bottom-up logic may be closely related to a data-based approach of typology building it does not entail that a deductive approach can also be implemented in order to incorporate context specific aspects.

identifying national/local sub-types the building or rather implementation of the international typology becomes a more straight forward process.

In the top-down and bottom-up approach, both data quality and availability are considered the main limitations for effective typology building (at both international and national levels). From the literature review, it can be concluded that when dealing with different sources of data, the recommendation would be to select the one providing the best set of indicators for basic analysis and “to cross-check this information with other data where possible” ([Dorward 2002](#)). The first feature expected from a dataset is then to provide as many as indicators of interest as possible. In the case of an international typology, this feature must be shared across countries. In that sense, agricultural censuses, despite any present disadvantages, represent the best option (although further harmonization in data collection and processing must be supported). For the consolidation of sub-types surveys and even local expert knowledge could be considered and incorporated.

As argued above, the WAW methodological framework suggests integrating the capital asset endowment and sustainable livelihood frameworks in the characterisations of agricultural holdings; which implies having access to a wide scope of variable including environmental, social and economic indicators (refer to Tables A3.1 & A3.2 in Annex 3.1). Many of such indicators are generally absent from agricultural censuses but can be integrated in socio-economic surveys. This limitation would not be a systematic problem in the case of the top-down & bottom up perspective to defining international types with census data and national sub-types with local information or surveys. In other words, for the top-down perspective Census data will be prioritized while for the bottom-up approach a wider scope of potential data sources can be considered including the capital asset framework or sustainable livelihood indicators identified under the WAW Methodological Framework.

Although agricultural censuses are considered the most appropriate source for identification of international types, the fact that these are generally updated every ten years and their collection, analysis and publication take considerable time, it is an important limitation for the purpose of tracking on-going transformation in agriculture. Socio-economic surveys present the opposite advantages and limitations. On one hand there is no worldwide set of similar socio-economic surveys but LSMS initiatives can be used as platforms to produce frequent observations in a relatively short timeframe for a particular segment of agricultural holdings (i.e. the farm-household). The second feature expected from a dataset for the international typology is its representativeness. In this regard, agricultural censuses are exhaustive but their questionnaire counts a limited number of questions. Because of this limited set of questions, some holding types cannot be captured through agricultural censuses datasets (e.g planting pools). Comparatively surveys can be more precise since they can address targeted questions but their coverage is limited to a specific sample that is not always representative of the national diversity of holdings or of their numerical distribution.

Data from agricultural census could in principle serve to describe generic holding types and highlight transitions but without putting sufficient emphasis on the drivers of such changes. In comparison, more contextual or targeted questions of socio-economic surveys can allow further assessment of the factors and reasons behind the observed transformation as well as related impacts. As argued by Dorward (2002), a compromise solution could be to base the international typology on Agricultural Census data and to clarify non-census documented issues with socio-economic surveys when they exist (sample representativeness could be corrected according to Agricultural Census data). Another potential middle-ground solution is to establish links between key indicators for the identification of international types that can be present in both census and major

survey questions. In chapter 4, the practical challenges regarding integration of varied data sources to the development of typologies will be discussed in more detail. Figure 3.1 provides an overview of the related advantages and disadvantages of data emerging from Census and Survey.

Figure 3.1: Challenges of integrating different data source to typology building.

Data sources, a difficult choice...		
Needs for the international typology	Agricultural Census	Socio-economic surveys
Worldwide data availability	OK but every 10 years <i>In the future : same definition of variables worldwide?</i>	NO
Representativity: Cost, Detail, Speed...	Exhaustive sample of agricultural holdings <i>But "statistically unknowns": landless, planting pools</i>	Samples can be non-representative of national diversity / distribution of holdings
Assess endowment	Limitations	Adjustable (Income structure, soil quality, etc.)
Territorial / Agro-ecological context	- By main AEZ ? - Sometimes, existing national zoning	More precise zoning (<i>i.e floodable lowlands vs non floodable lowlands, soil quality...</i>)
Outcomes	Description of structure	Understanding of drivers of strategies / transformation

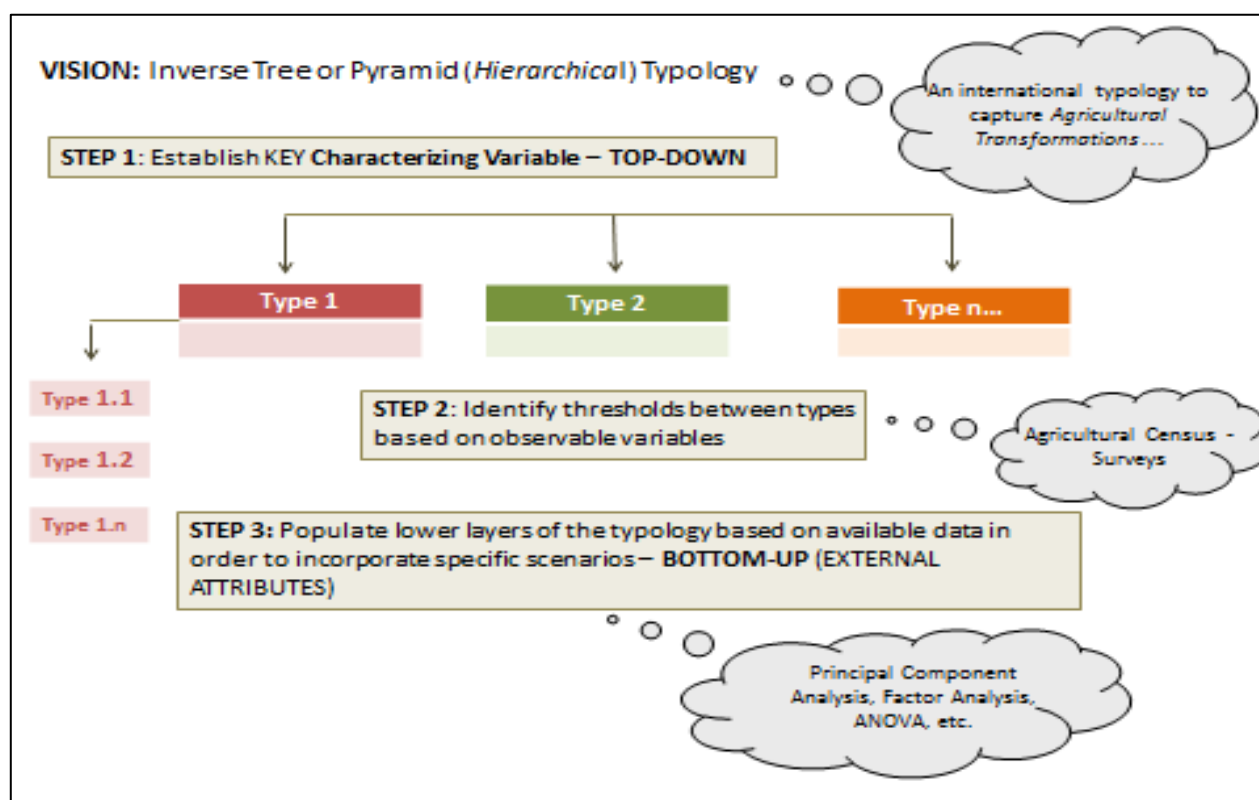
- A compromise solution could be to base the international typology on Agricultural Census data
- And to clarify non-census documented issues with socio-economic surveys when they exist: sample representativeness could be corrected according to Agricultural Census data

Figure 3.2 roughly illustrates the steps associated to the top-down & bottom-up approach proposed by the WAW Consultancy Team. The first step to typology building is directly concerned with the selection of characterizing variables or criteria which allow distinguishing types at an international level (in order to ensure comparability across countries). The second step identifies the thresholds based on expert knowledge (or as designed in Census questionnaires) and observed data that will help group or allocate agricultural holdings. The third step implies the incorporation of additional context-specific indicators that can lead to the formation of sub-types relevant at regional or national level. As in the proposal of the WAW Methodological Framework, the typology is using the FAO ESS definition of agricultural holding to set its unit of observation. More details on the methodological process associated to these steps are explained in Chapter 4.

The relevance of a farm typology will depend on its ability to capture the differentiation of farming systems, showing a maximum amount of heterogeneity between the types, while obtaining maximum homogeneity within particular types of categories (Kobrich et al. 2003). A type is a systematic or taxonomic concept, and its definition is based essentially on similarities between various individuals. As individuals characterized by similar sets of attributes, may occur repeatedly both in time and space, the same types can be identified in various period or territories (Kostrowicki, 1992). Consequently, the identification of types has to be based on internal (inherent or endogenous) attributes that can support comparisons across different agricultural contexts and periods. In other words, the focus for the selection of distinguishing criteria should be placed upon traits that are intrinsic to holding organization rather than on external factors or environment in which the holding operates. In this respect, external (or exogenous) attributes such as those related

to the conditions in which agricultural activity takes place, should not be used as a basis for agricultural typology, even if these aspects serve to explain why in a particular place and time, individual types of agricultural holdings have developed. Those external attributes may involve: agro-ecological settings, policy or institutional settings or market conditions, among others. Their assessment is necessary for both understanding and interpreting the development and spatial distribution of agricultural types. However, according to Kostrowicki (1992) “*the simultaneous use of such exogenous, natural and other conditions alongside endogenous attributes is futile since it presupposes rather than proves their impact on the formation of agricultural types*”. He argues that this can be proved much better by the study of agricultural characteristics and their associations, independently of the conditions of their development, and then by a subsequent analysis of inter-relationships by means of correlation calculus. In fact, this analysis can be extended to include some of the outcomes associated to types which have been recognized under the WAW methodological framework; namely: food and nutrition security status or socio-economic and environmental sustainability of holdings.

Figure 3.2: Building an International Typology of Agricultural Holdings combining top-down & bottom-up approaches.



Internal attributes that may serve as a basis for the identification of types can be group as follows: (Kostrowicki, 1992):

- **Social Attributes** provides answers to who is the holding operator or decision maker (gender, age or legal status)
- **Operational Attributes** explain what the labour and capital inputs are, farming intensification/extensification and how holding or holdings are operated

- **Production Attributes** disclose how much is produced and for what purpose
- **Structural Attributes** answer the question about the proportion of various branches of agricultural production, i.e. about the enterprise combinations in terms of land use, livestock breeding, gross agricultural output and commercial production.

Interestingly, the 6 main distinguishing criteria found in the literature review can be fitted among these four inherent traits of agricultural holdings. With land&business size and physical capital and labour usage indicators belonging to the operational attributes; gender and legal status to the social attribute; diversification, specialization and market orientation dimensions associated to both production and structural attributes.

If the WAW International Typology is developed using the proposed internal attributes as main characterizing criteria, it would be possible to keep track of the following related transitions (from one type to another)²⁶:

1. Transformation in Social Attributes: The management of the agricultural holding changes over time which may imply passing from household to non-household holding management. The latter may be reflected through processes of land concentration or fragmentation as well as evolution in terms of legal status. Similarly, the indicators related to this attribute can shed information on social transformations as holding management or operations shifts in terms of age & gender compositions.
2. Transformation in Operational Attributes: Changes in terms of agricultural intensification or extensification may be captured by focusing on operational attributes. Similarly, the potential of agriculture as a key source of rural employment may be assessed by reviewing varying patterns regarding family vs hired labour usage. Other transformations relate to the rate of adoption of new technologies, establishment of irrigation or new agricultural management practices.
3. Transformation in Production Attributes (or Purpose of Production): Shifts of farm output usage from family consumption needs to market demands are at the heart of production attributes. Depending on data availability, indicators could also capture the end-use of production (food, fodder, fibre, fuel)
4. Transformation in Structural Attributes (or choice of crops /livestock /forestry /aquaculture composition of output) relate to the evolution or transitions from/to diversification from/to specialized agricultural portfolios.

Table 3.4 presents a summary of how each of the internal attributes could be connected to specific indicators arising from the core and supplementary modules of the World Programme of Agricultural Census 2010.

²⁶ For analyzing transformations, external attributes would be required.

Table 3.4: Linking observed variables (and related indices) to internal attributes for type identification

CHARACTERIZING VARIABLE / INTERNAL ATTRIBUTE	CORRESPONDING OBSERVABLE VARIABLE / CORE & SUPPLEMENTARY INDICATORS from WPAC 2010
<ul style="list-style-type: none"> ❖ Social Attributes: Who is the holding operator/manager? ❖ Operational attributes: How is labour organized: Usage of family labor vs. salaried hired labor? Land management & access: owned? Communal? Sharecropped? Rented? Is there equipment? Infrastructure? Credit access? Fertilizers? Pesticides? Mechanizations? 	<ul style="list-style-type: none"> • Identify the nature of the management unit: household (family-private / single or multiple) vs. non-household (cooperative, business, public agency?) • Time Worked: % of Family labour involved in farming activities with respect to hired labour (social aspect). (Note that in the WAW Methodological Framework the reference would be in terms of permanent hired labour.) Indicators for capital asset management as captured through agricultural census questionnaires (technology availability questions, use of tools, equipment, machinery, irrigation etc.) These can be used as proxies for intensification or extensification practices.
<ul style="list-style-type: none"> ❖ Production Attributes: Purpose of production: Self-Consumption Vs Market (End use?) ❖ Structural Attributes: Characteristics of agricultural holding activities: cropping, livestock, forestry, aquaculture (integrated systems – extent of specialization / diversification) 	<ul style="list-style-type: none"> • Importance - Ratio: output sold to markets with respect to output for self-consumption (below 1: self-consumption, above 1 market orientation. Type of market involvement: (no sales, from spot market transaction to contractual arrangements or vertical integration in local or external markets) • Agricultural Activities & Portfolio (Crop diversification index, area under permanent vs temporary crops, Dominant Activity (Aquaculture, Forestry, Fishery, Agriculture (permanent, temporary, livestock, integrated).

However, the number of potential types emerging from the combination of the four identified internal attributes (which includes the family vs hired labour usage criterion highlighted under the WAW methodological framework) can be substantially large, making typology building and cross country comparison of types both taxing in data requirements and leading to highly context-specific types.

In other words, further analysis is required to identify which criteria (in fact, a minimum set of criteria) are necessary to distinguish types at international level. This was the purpose of WAW Meeting “Towards an international Typology of Agricultural Holdings” held on 27 May, 2013 in Rome.

In order to effectively undertake the top-down logic for the identification of international types of agricultural holdings, a participatory working meeting to revise the WAW Consultancy top-down &

bottom-up approach and the WAW policy objectives was undertaken during in Rome on 27th May 2013 at FAO Headquarter.

During the **WAW Meeting “Towards an international Typology of Agricultural Holdings”**, The WAW Consultancy Team presented the top-down & bottom up approach. Participants (Annex 3.2) endorsed the need that the WAW typology should be simple and usable and that additional distinguishing criteria, beyond labour usage, should be incorporated in the identification of international types. The proposal of the WAW Consultancy team to integrate both top-down and bottom-up perspectives was therefore supported along with the preliminary literature review findings.

However, a reconsideration of the proposed internal attributes as characterizing variables led to further simplification and only social, operational and production attributes were considered relevant for undertaking the identification of international types of agricultural holdings. The decisions were guided both by policy interest/relevance and the extent of data availability. For the sake of feasibility and international coverage & comparability, 3 main discriminating criteria were ultimately prioritized among the revision of a total 6 options (proposed by FAO ESS Division).

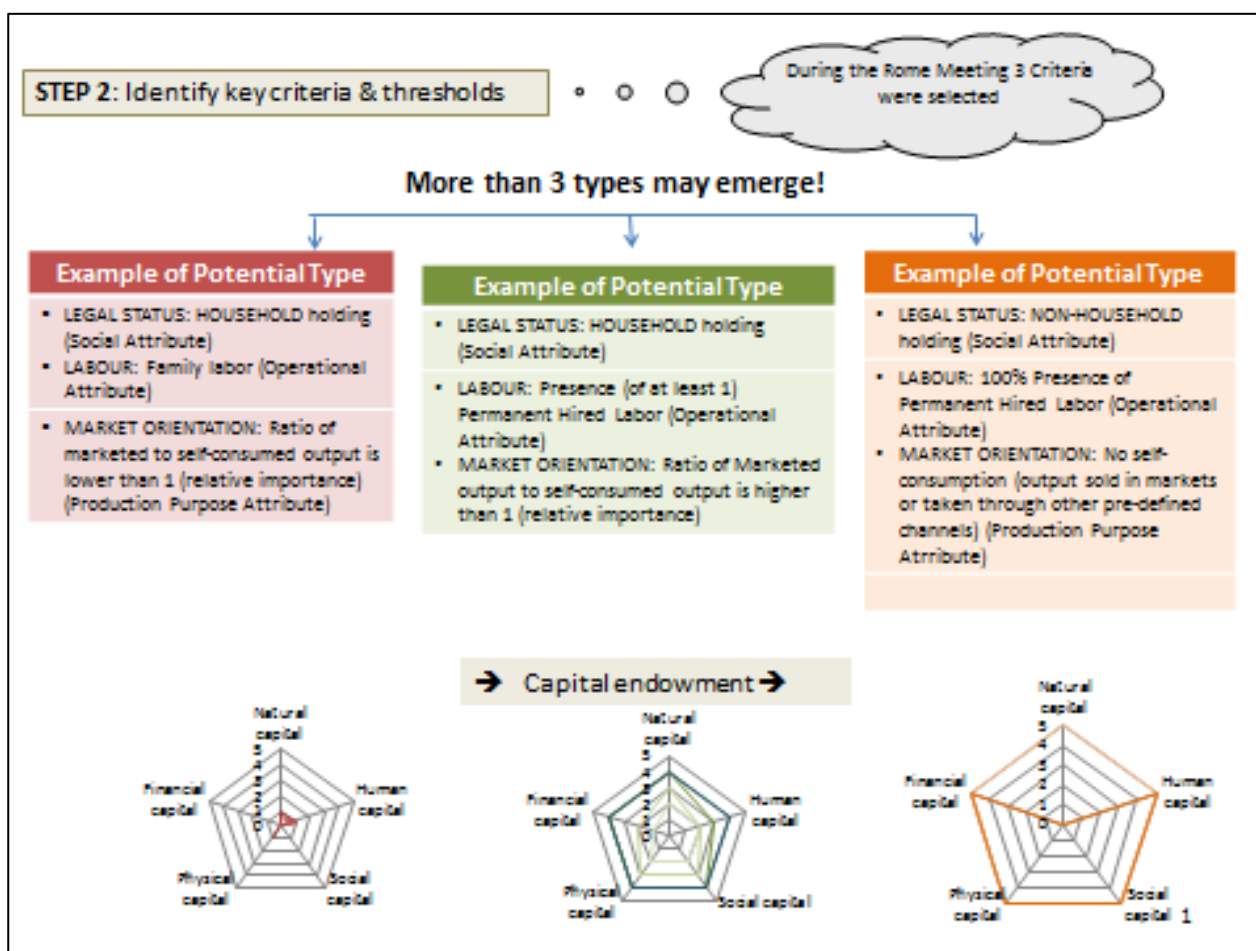
1. Management: Individual, Household, Cooperative, Government, Corporation
2. Scale: Marginal, Small, Semi-medium, Medium, Large
3. Main Source of Labour: Household or Hired
4. Purpose of Production: Home consumption or market
5. Agricultural activity: Crop, Livestock, Forest, Fish or combinations
6. Agro-climatic Zone: Nomadic, Dry land, River basin, mountainous, high altitude, coastal

After extensive discussion among all participants attending the Working Meeting in Rome, consensus was reached that the main distinguishing criteria for building an international typology of agricultural holdings would be based on the following three dimensions:

- I. usage of family vis à vis hired labor (as main operational attribute and also key discriminant criterion under the WAW Methodological Framework)**
- II. management and decision making process at the level of the holding (social attribute)**
- III. production and its relationship to consumption or market (production purpose attribute)**

Figure 3.3: Theoretical overview of types based on selected distinguishing criteria identified during the Rome Meeting.

Note: 3 types are roughly depicted here but the combination of is expected to lead to a higher number of types. The assumptions under each type are thus only examples for this illustration.



While the first two listed criteria were aimed at reinforcing the identification of household/family versus non-household/family agricultural holdings, ultimately supporting the initial WAW Methodological Framework proposition, an additional emphasis was introduced by focusing on market integration which was considered as a highly sensitive policy issue given that a great majority of agricultural programs promote the enhancement of agricultural markets (both output as well as inputs). Also, being family farmers among the most vulnerable and dependent on their output for survival, this criteria is another way to capture the extent of self-consumption at holding level. For example, many agriculture based developing economies have prepared plans that depend on markets for improving agricultural performance. For instance, President Komoro of Sierra Leone in 2009 expressed "Our goal is for us to move away from subsistence to commercial agriculture, agro-processing, adding value to our agricultural products and realizing maximum benefit from the richness of our soil" (Presidential address to the chamber of commerce). Similarly, if a substantial percentage of agricultural holdings are not participating in markets, alternative support policies can be further analyzed and accordingly fostered.

Other aspects such as scale or size (i.e. Marginal, Small, Semi-medium, Medium or Large), agricultural activity (i.e. Crop, Livestock, Forest, Fish or combinations) and Agro-climatic Zone (i.e., Dry land, River basin, mountainous, high altitude, coastal) were also assessed as potential characterizing criteria but each of them were considered to be better included during the identification of sub-types and not international types, given their capacity of capturing locally relevant traits. The decision of participants was related to the difficulties of establishing universal thresholds around (land) size (see figure 3.3) or restricting international comparisons across holdings located in equivalent agro-ecological settings. In addition, the challenges of incorporating agro-climatic zones as a characterizing variable were also amply discussed and were ultimately recognized as strictly connected to exogenous factors affecting the many types of farms operating in the given area. Similarly, the indicators on agricultural activities were deemed as also closely related to the agro-ecological conditions.

Figure 3.3: About the difficulty to classify worldwide agricultural holdings according to their size.

Farm size, a tricky dimension...

- Farm size thresholds are extremely difficult to set to distinguish holding types in an international typology
- The risk is to group the vast majority of holdings in the same type in Asia
- Moreover, farm size is linked with production orientation (grazing livestock / cropping / gardenning / greenhouse horticulture...)

Average size of agricultural holdings (1995-2005):

Continent (# reporting countries)	Average area / holding (hectare)
World Total (114)	5.5
Asia (29)	1.0
Africa (25)	11.5
Europe (29)	12.4
America, South (8)	74.4
America, North & C. (14)	117.8

→ 90% of agricultural holdings < 2 Ha in Asia !

Source: FAO 2010

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Lastly, it was discussed that various sources of data should be considered in order to populate sub-types that are relevant at national and local level (Step 3 of Figure 3.2 above) while comparable indicators of similar sources should prevail for the identification of international types. In this sense, the capital asset framework was also identified as a relevant tool to capture key differences among said sub-types.

3.3 Implementation Challenges at a glance

From the literature review, the Dgroup exchanges and the WAW working meeting (27th May 2013), it became clear that in order to truly develop an International Typology of agricultural holdings which serves as a practical working tool for policy making and debate rooted in cross border comparisons, it is necessary to include additional distinguishing criteria to labour usage, and to

launch the analysis based on existing available data and analogous sources among the existing WAW observatories.

In other words, types of agricultural holdings should be defined or built around the three distinguishing factors (as previously identified during the Meeting in Rome) . The objective of the implementation test is to review the choice of pre-selected distinguishing criteria versus a labour-usage only dimension to international typology building.

Once international types have been set, these can also serve as shared working concepts (or terminology) which may allow identifying similar groups of farms operating in different contexts. Part of the task includes not only exploiting available data sources and identifying comparable indicators (including proxies) and setting up thresholds but also highlighting the missing information from current sources (i.e. relevant indicators or data that could be captured through Agricultural Census (either core or supplementary modules) or topic-specific surveys. Likewise, difficulties associated to capturing transformations and resilience should be highlighted along with potential improvements in data collection (particularly concerning environmental assessments and gender-relevant outcomes). Only when relevant data becomes regularly available for periodic collection, the analysis of transformations²⁷, as originally envisioned in the WAW methodological framework, may be undertaken.

In the following chapter the development of the WAW International Typology of Agricultural Holdings will be based on the three selected criteria and data from the Nicaraguan 2005 census will be used for illustration. Results will be contrasted to the typologies undertaken by WAW pilot observatories. Through the comparison of implementation processes in observatories, it will be possible to assess the practical implementation challenges of an international typology built around the three basic criteria identified during the 27th May 2013 meeting in Rome. However, it is already envisaged that these experiences should ideally be complemented with additional implementation tests. It was proposed by the WAW Secretariat, Consultancy and partners that potential countries of interest include: France, Brazil, Argentina, Sierra Leone, Ghana, Burkina Faso, Senegal, Laos and Moldova. Their incorporation as WAW Observatories will largely depend on data availability as well as institutional support.

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(introduced for the first time in Chapter 3)

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²⁷ The analysis of transformations could include not only transitions from one type to another but also changes in terms of resilience and institutional arrangements.

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