salsa

small farms
small food businesses and
sustainable food security

WP3

Deliverable 3.2.

Report on diverse small farm situations and livelihood strategies, for all regions, identifying similarities and trends, and requirements for the improvement of existing typologies.

University of Évora & International Institute for Environment and Development (IIED)

29/03/2019

Prepared under contract from the European Commission

Project number: 677363

Collaborative project

Horizon2020

Project acronym	**SALSA**
Project full title	Small Farms, Small Food Businesses and Sustainable Food Security
Duration	April 2016 – March 2020
Coordinating organisation	Universidade de Évora (UEvora)
Project coordinator	Teresa Pinto-Correia
Project website:	www.salsa.uevora.pt
Deliverable title	Report on diverse small farm situations and livelihood strategies, for all regions, identifying similarities and trends, and requirements for the improvement of existing typologies.
Deliverable number	3.2
First Version	29/03/2019
Revised version	02/05/2019
Work package	WP3
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Table 0: D.3.1 Abbreviations

Acronym	Full term
AF	Analytical Framework
CF	Conceptual Framework
FNS	Food and Nutrition Security
FS	Food System
FSP	Food Self-Provisioning
FSR	Food System Report
FTE	Full time equivalent
KP	Key Product
PPP	Purchasing power parity
RR	Reference Region
RQ.	Research Question
SF	Small Farms
WP	Work Package

Executive Summary

This document presents the small farm typologies developed from SALSA's sample (n=892) and provides a detailed comparative analysis on the key characteristics and livelihood strategies of each of the types, identifying similarities, differences and trends.

WP3 data collection was done through 5 major steps described in D.3.1. and D.3.3. The data used in this report was gathered through the second step of this process: small farm interviews. Step 2 provided direct information on small farms and small food businesses from a survey based on questionnaires to a diversified sample of small farms in each region.

The data analysis consisted of a multivariate analysis which includes ordination and clustering methods. Multivariate and cluster analysis are used to identify explanatory variables (discriminating variables) and to group farms in homogeneous types. Through this method, five main types –or clusters—of small farms have been identified.

The results are divided into two main sections. The first one provides a description of the typologies obtained through the cluster analysis, and the second one, shows a deeper comparative analysis of the main attributes characterising each of the types.

The development of typologies allows to improve our understanding on small farms and their role on food and nutrition security, as it is a tool that reduces complexity and allows us to make sense of their diversity. The variability and differences between the types will allow for improved research outcomes and policy recommendations.

1. Introduction

1.1. The outstanding diversity of small farms

Small farms (SF) are the most common type of farm in Africa and still very common and prevalent in European regions (Davidova et al 2012; FAO 2014). Small farms have many roles, but supporting economic and social welfare in rural communities is one of the key ones (Davidova and Bailey, 2014). However, small farms are not all the same, not across European and African regions, and not even across countries and regions themselves. Small farms are managed by people, and people have different backgrounds, histories and environments. This means that the way they are as farmers, the way they develop their farms, and their farming strategies change depending on their specific objectives, needs and available resources (Davidova et al, 2012). Biophysical, institutional, social and economic drivers also differ between contexts, resulting in different responses from farmers and their communities (Alvarez, 2014; EPRS 2014; FAO 2014). Some small farmers are successful commercial farmers, linked to the market as other, larger, farmers. For some small farms, farming acts primarily as a household "coping strategy" and as such it reduces the risk and the extent of rural poverty. For others, farming is a lifestyle choice or a part-time activity they enjoy doing (Davidova and Bailey, 2014), and for many others—as we shall see below—farming is rooted in tradition but nonetheless a successful commercial enterprise. Often, one single small farmer has mixed different roles and functions.

To improve our understanding on small farms and their role in food and nutrition security, the creation of typologies was chosen as a tool to reduce the complexity surrounding small farms and to deal with their variability and diversity. The development of typologies has often been used as a tool to capture variability and reduce the complexity of farming systems (Alvarez, 2014; Hoppe et al, 2013; Daskalopoulou and Patrou, 2002; Davidova et al, 2012; Chaplin et al, 2007). Typologies in development projects are used to efficiently develop best-fit farm adjustments, as well as perfected policies and innovations in order to meet the goals of projects (Alvarez, 2014).

The objective of the typologies developed in SALSA is therefore to reduce the complexity about small farms and their relationships to their particular food systems across a North-South and East-West gradient of regions in Europe and some examples in different parts of Africa, and to create an improved discussion platform on which research results and the best policies to address the findings can be distinguished and discussed. The methodology used for creating typologies is a multivariate analysis which includes ordination and clustering methods. Multivariate statistics methods are often preferred over expert knowledge-based approaches because of the reproducibility inherent to their statistical foundations (Pacini et al., 2013). Multivariate and cluster analysis are used to identify explanatory variables (discriminating variables) and to group farms in homogeneous types. Multivariate statistics allow reducing the number of variables and preserving the maximum of the total variability of the sample (Alvarez, 2014). The method used in WP3 followed the guidelines document by Alvarez (2014) on typology construction.

Through this method, 5 main types of small farms have been identified and are described in this document in detail. The variability and differences between the types will allow for improved research outcomes and policy recommendations.

1.1.1. Small farms food production – is there a share of un-seen food?

Many small farms are linked to the market, and produce food products that they sell in different ways, being some of them specialized producers as much as larger farmers. Besides this, as stated above, it is widely acknowledged that for many small farms around the world, farming acts as a household "coping" strategy which helps reducing the risk and the extent of rural poverty, or more recently, which relates to lifestyle and a rising concern about food quality and ecological footprint (Baysse-Lainé and Perrin, 2018). Small farms cope, primarily, by selling products into the market. Another important feature of this coping strategy is the reliance, at least partially, on non-marketed production: food that is either consumed directly by the household, traded or given with neighbors or family, or sold informally to local consumers. There is thus a share of what is produced in a small farm which remains as un-seen. By "un-seen food" we refer to the food which remains out of the radar of most economic calculations of farm income: food products which do not enter market mechanisms, and therefore are not accounted for within farm or household income. As such, these food products remain un-seen when the farm performance or the household livelihood basis or income are assessed. By this we mean what can also be named as "home-grown food", "home/household food production", or what is most widely mentioned as "food self-provisioning" (FSP) (Jehlička, Daněk, and Vávra 2018; Schupp and Sharp 2012; Smith and Jehlička 2013; Teitelbaum and Beckley 2006). This term corresponds to food products which are produced in a farm and are consumed, fresh or processed, in the farm household; they may also be exchanged or given away to family members, friends and neighbours, as interhousehold exchange (Balazs 2016).

The few previous research on FSP suggests that in the Global North, an extensive informal food self-provisioning and food sharing network exists, involving considerable amounts of food and people (Jehlička and Daněk 2018; Teitelbaum and Beckley 2006). In a context of progressively globalized food supply chains, food production and consumption are becoming increasingly spatially and socially disconnected. FSP has been described before, as an important adaptive capacity, by being a source of food independent of global changes, market fluctuations and economic crisis (Renting, Schermer, and Rossi 2012). In the context of Food and Nutrition Security (FNS), this informal, non-market circulation of food is particularly relevant when food access is put at the centre of the Food and Nutrition Security debate, as it is increasingly occurring (FAO 2017; Ingram 2011). The Food Self Provisioning is important to all four dimensions of FNS described by Erickesen (2008), though mainly to food access and food utilization. Through the food produced by themselves, households can more easily afford food, in particular the food that suits their habits and preferences (access), which at the same time has a social value and reduces food safety problems (utilization) due to less need of conservation and transport (Ingram 2011).

The economic significance of FSP has often been downplayed or coined as marginal. Perhaps due to this there is a surprising lack of studies in the literature about the multidimensional importance of FSP, especially for the Global North. Taylor and Lovell (Taylor and Lovell 2014), make reference to the "invisibility" of home productions, in the North. So far, literature references to FSP are mostly about the reality of the Global South. Smith and Jehlička (Jehlička et al. 2018; Smith and Jehlička 2013) write about FSP in countries of Eastern Europe. While also acknowledging the lack of attention that this food system mechanism has had so far in Europe, their empirical evidence reinforces our understanding of FSP as "practices that do not relate directly or indirectly to market transactions, but, even without sustainability goals, result in beneficial environmental or social outcomes and increased resilience of the farm household". These authors consider FSP as the ultimate form of food relocalisation. Furthermore, FSP is often connected also with food sharing, which fosters social relations and strengthens trust, a fundamental component of social resilience.

Even with no intentional challenge to the mainstream food economy, by developing a diverse portfolio of food sources, those who produce their own food are reinforcing social resilience, and protection against disturbances. And it is extremely interesting to see FSP as a form of resilience that can be internally produced in the households, rather than externally induced. Therefore, it seems the FSP has a growing future potential. Existing practices and drivers need to be further analysed to understand prospects for more localized, alternative food futures and their potential to enhance the sustainability of food systems and the resilience of households (Balazs 2016; Schupp and Sharp 2012).

1.1.3. What are SF resilience strategies to face social, economic and environmental constraints?

Small Farms are faced with constraints of different orders, as changing market power distribution and increasing globalized value chains, decrease in the number of small farms and thus less bargaining power in relation to larger farmers in the context of regional, national and supranational institutions, ecological degradation and climate change, and other.

Resilience is a concept increasingly used in science and policy as an attribute that enables people, systems, and organizations to successfully adapt to a changing environment (Darnhofer 2014). As change is generally occurring faster in an increasingly globalized world, with uncertain or unknown consequences far outside the context where change occurs, resilience (Rosa, Dorre, and Lessenich 2017) is increasingly under focus. The concept has been widely used in multiple contexts over a few decades, and retains multiple meanings and interpretations. (Darnhofer et al. 2016). We consider resilience as "the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure and feedbacks, and therefore identity, that is, the capacity to change in order to maintain the same identity" (Folke et al. 2010).

In SALSA we looked at the role of SF in strengthening the resilience of the food systems, as a fundamental characteristic of the food system influencing or even determining its outcomes to Food and Nutrition Security (Grando et al. 2018). For this we aim to identify what is the role of small farms in strengthening the resilience of food systems. But we do also look at the resilience of small farms themselves, and of the contribution of small food businesses to the resilience of small farms and the food systems.

Farm resilience is directly linked to adaptation, and there are different pathways for adaptation. Darnhofer (2014) defines the resilience of farms as their buffer capability, adaptive capability and transformative capacity. These three characteristics refer thus not only the automatic response capacity deriving from the characteristics of the farm, but the ability to identify opportunities, to mobilise resources, to implement options, to develop processes, to learn as part of an interactive, reflexive process. The buffer capability relates to persistence, e.g. the capacity to absorb a shock without change in the functioning of the farm, by reallocating resources (Folke et al. 2010). Adaptive capability is the capacity to adjust to changing external drivers, and continue farming (Folke et al. 2010). And transformative capability means the capacity to implement radical changes, if required, leading the farm to a new operational model with new basic operating assumptions (Darnhofer 2014).

Furthermore, Darnhofer et al. (2016) demonstrate that a relational perspective allows for a more comprehensive approach to understanding the resilience of farms. Focusing on all types of relations, between the ecological and the social dimensions and between factors internal and external to the farm, enables a closer analysis of how ecological and social processes interact influencing resilience. A farm's relations to the broader rural context and communities have shown to be crucial for the farm's sustainability and for keeping rural

communities alive (McManus et al. 2012; Shuckmith and Ronningen 2011). This approach supports the complementary approach of SALSA, which looks both at the small farms' characteristics and profiles, and at the food system and how small farms are placed in these systems – their relational positioning.

Having this conceptual framing, the next step is to understand what strategies are developed by small farms to strengthen their resilience. This depends on a diversity of factors.

The resilience dimensions that best can be addressed with the SALSA approach are diversification and the control of the resource base, as well as the relational network of farmers (Darnhofer 2014). Stronger resilience has shown to be related to diversification strategies, not only diversification in production but also diversification in farm-based activities and in the family income. Moreover, the more the farmer has control over his farm's resource base, the more he or she is resilient.. The relational network of the farmers, both within the farming sector and concerning advisory needs, and with other actors in the food system, can also be addressed in SALSA – mostly with the food system and governance analysis.

1.2. Objective of this Deliverable

Work Package 3 aims at carrying out, in the 30 reference regions selected in WP2, an in-depth assessment of local and regional food systems. The assessment aims to improve the understanding of the current and potential role of small farms and other small and medium-sized food businesses in regional Food and Nutrition Security, paying particular attention to the diversity, complexity and context-specificity of local and regional food systems.

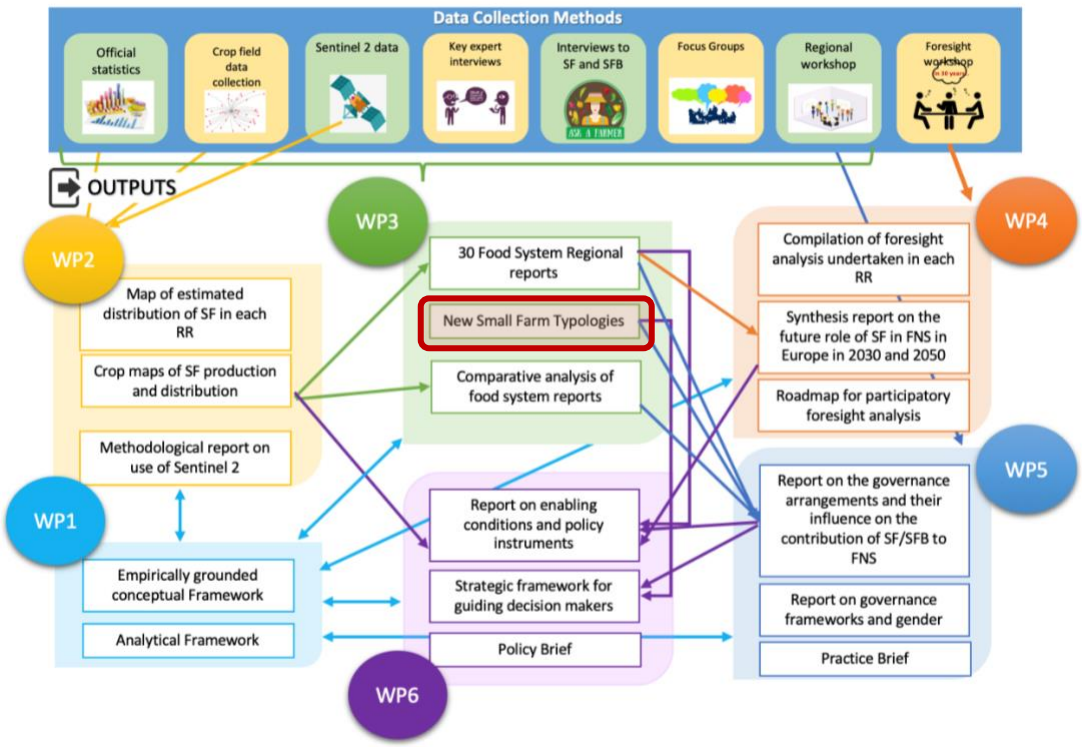
The results from WP3 analysis will be presented in 3 deliverables:

- **D.3.1** – Set of 30 regional reports with the results of the validated in-depth analysis of regional food systems and the contribution of small farms and related small food businesses to FNS (reports based on a common reporting template). M33
- **D.3.2** – Report on diverse small farm situations and livelihood strategies, for all regions, identifying similarities and trends, and requirements for the improvement of existing typologies. M36
- **D.3.3** – Synthesis report on the main insights gained from the in-depth assessments in 30 regions (Synthesis report).M36

This document is **D.3.2. Report on farm diversity and typologies** and responds particularly to task 3.5. Comparative analysis and synthesis. Its main aim is to highlight the key results from the small farm and small food business interviews for each of the 30 reference regions, putting particular emphasis on identifying commonalities and context specificities, and on extracting the more generalizable lessons learned. For the full list of reference regions analysed please refer back to Deliverable 3.1. section 1.2.

Figure 1 below shows the main interconnections between all SALSA's WPs. Output for deliverable 3.2. is highlighted with a red square.

Figure 1. Main outputs per WP and data flows



1.3. Research Questions

The objective of Table 1 is to serve as an updated simplified guide to understand which WP is mainly responsible to analyse the data and report the answers. There are a few differences compared to the table presented in D. 3.1. section 1.3. which are due to a structural reorganisation of deliverables and internal talks within SALSA's partners. SALSA's research questions addressed in this Deliverable (3.2) are those highlighted with the red square below.

Table 1. FNS dimension, hypothesis, related research questions and reporting WP

FNS Dimensions	Hypothesis	Research Questions	Reporting WP	Deliverable
Food Availability	**Hypothesis 1.** SF is a relevant source of sustainable food production (availability) for many regional food systems	1. Which food system actors and activities are involved in the generation of the FNS outcome in the reference region?	WP3	D 3.1 (Regional level) D 3.3 (Comparative analysis)
		2. What is the estimated production capacity of SF in each region	WP2	D.2.4.
		4. What is the position (and importance) of SF in the Regional FS	WP3	D.3.1 (Regional level) D.3.3 (Comparative analysis)
		5. How are SFB connected to Small farms and the regional food system?	WP3	D.3.1 (Regional level) D.3.2. (Comparative analysis)
Food Access	**Hypothesis 2.** SF and SFB provide food and incomes for rural households (access and utilization) in many regional food systems	3. What is the relevance of non-marketed SF production for rural HH?	WP3	D.3.2.
Food Utilization				
Food Stability	**Hypothesis 3.** SF and SFB increases food systems' diversity thereby contributing to its resilience (stability)	7. What supports and threatens the role of SF in the food system?	WP5	To be provided by WP5 leader
		8. What have been the trajectories of SF?	WP3	D.3.2
		9. What are SF and SFB perspectives for the future?	WP4	To be provided by WP4 leader
		10. What are SF resilience strategies to face social, economic and environmental constraints?	WP3, WP5, WP4	D.3.2.; and to be provided by WP4/5 leaders
Cross Cutting Issue		6. Which types of SF are identifiable within each region?	WP3	D.3.2

2. Methodology

This section is divided into 2 sub-sections: 1) data collection through face to face interviews and 2) data analysis, where the detailed procedures for the creation of the small farms typologies and the comparative analysis presented in this document is provided.

2.1. Data collection

This Deliverable presents a new set of typologies of small farms for Europe and Africa, and an analysis on small food businesses. The analysis is done at farm/household level, and is based on Step 2, "Interviews with Small Farms and Small Food Businesses" (D.3.1. Section 2.1.2), which provided direct information on small farms and small food businesses from interviews to owners and renters.

Step 2 was carried out in each of the 30 reference regions. All teams were provided with identical protocols and reporting templates to ensure the homogeneity of the data in Step 5. Both protocols and templates were checked, informed and validated by WP3 leads.

2.1.1. Step 2. Interviews with Small farms and Small Food Businesses

Step 2 focused on the small farm and small food business level. The aim was to produce a clear picture of the diversity of small farms and businesses, as well as a general understanding of the relationships between farm/business and the household, how they are integrated into the market, and what challenges and potentials they face looking into the future.

This step generated three main results:

1. A description of small farms and small food businesses, including their background and historical trajectory, economic functioning and intra-household dynamics.
2. An analysis of the farms' or businesses' links to the markets and the regional food system, including access to inputs, markets and governance institutions.
3. An analysis of the strategies and perspectives of small farms and food businesses, identifying the drivers of their decisions, as well as their potentials and constraints.

The work on this part of the project focused on farms/businesses that are directly related to the production or processing of the Key Products (KP) identified in Step 1. The results of Step 2 are detailed in table 2 below:

Table 2. Step 2 Results

Nº	Result	Description
1	A description of small farms and small food businesses, including their background and historical trajectory, economic functioning intra-household dynamics	This result includes the following information: a) Background and history of the farm or small business. This includes information on the farmer's or business owner's education and background (place of origin or migration), as well as a narrative of the typical trajectory of a farm or business: the main reasons for starting the enterprise, and the key turning points over the course of the farm or business history (changes in technology, demand, family, etc.), including information on education. b) Characterization of the economic functioning, including information on size, crops or products produced, crop rotation, post-harvest processing, labour force, output, yield or productivity, expenses and turnover, sources of income (farm and off-farm). c) Household structure and dynamics. This includes information about the household composition (number, age, gender), processing, sales; access to resources (labour, inputs, advice), sources of food and their relative importance, and livelihood challenges and bottlenecks.
2	An analysis of the farms' or businesses' links to the markets and the regional food system, including access to inputs, markets and governance institutions.	This result provided an overview of the relationships that farms and small businesses have with the food system, covering the topics described below: a) Inputs, including use of and access to seeds and fertilizers, sources of raw materials. b) Market relations, including relationships with buyers and intermediaries, retailers (supermarkets and others), destination of production (domestic consumption or export), and proportion of production that remains in the local economy. c) Governance and institutions, including access to government or other subsidies, access to credit and finance, membership to cooperatives or other forms of association, use or importance of third-party standards or certification (e.g. organic)
3	An analysis of the strategies and perspectives of small farms and food businesses, identifying the drivers of their decisions, as well as their potentials and constraints	This result provides an outlook of the situation of small farms and food businesses from their own perspective. The main objective was to identify how the context for small farming and small businesses is changing, and how farmers and business owners see their future in that changing context. a) The farm's or business' own future, including the farmer's or business owner's own objectives and plans for the future; b) The changing context, including their view on the future of farming or food processing in the region, identifying the main drivers of change, both external and internal, that will shape them. c) The enabling conditions which would support the maintenance of SF and SFB

Sampling Methodology

The interviews were meant to provide an illustration of the diversity of histories, strategies, activities and challenges for small farm and small food business households in each region. Time and resource constraints only allowed for a relatively small sample. Furthermore, sampling was purposeful rather than random, so the **information derived from these interviews is illustrative rather than statistically representative.** The details of the sampling methodology for small farms and small food businesses are provided below:

A) Small farms

- Sample size: Approximately 30 interviews per reference region (or 5-10 interviews in sub-contracted regions)
- Sample composition: Selected farms are around 5 ha in area or below 8 Economic Size Units. No minimum size was established, as this varies from one region to the other, but gardens were not included.
- Sampling criteria: The sampling strives to capture the diversity of farms in the region. The following order was used to ensure that diversity: 1) farms that produce each of the selected KP in the RR were selected, ensuring balance between the different KP. 2) Farms with different degrees of market integration were sampled (when possible, within the same KP) (see SALSA's CF for more information). 3) Farms that have different degrees of self-sufficiency in the household were selected and 4) it was ensured that farms cover a wide geographical area within the RR.

B) Small Food Businesses

- Sample size: Approximately 10 interviews per reference region (or 1-2 interviews in sub-contracted regions).
- Sample composition: the sample included food processing, preparation, cooking or retail businesses which have no more than 5 employees.
- Sampling criteria: the sampling strived to capture the diversity of businesses. Given the small sample, the businesses selected: 1) relate to the KP selected for the RR, 2) have direct links to small farming, and 3) are locally owned (i.e. the capital remains in the RR).

2.2. Data analysis

For the elaboration of the results presented in this deliverable on small farms, the data analysis used the method on multivariate analysis described by Alvarez et al. (2014) and followed the following steps:

1. The 892 surveys conducted in the 30 reference regions were merged. An exploratory data analysis was conducted to identify gaps and errors in the variables, and also to correct and standardize responses. These corrections were critical to guarantee the largest sample size possible without compromising the quality of the results to be considered; the corrections involved several loops of interactions between the members of the different teams, to solve pending questions and make necessary corrections.

2. The selection of variables to construct the typologies was done, following 3 main criteria: [1] number of valid responses; [2] the readability of each variable; [3] the distribution/frequency to guarantee variability. The statistical analyses were initially performed using the following variables: Turnover (€; we have used a Purchasing Power Parity conversion factor), Income of household from agricultural activities (%), Utilized Agricultural Area (ha), Land ownership – Own (%), Products kept in the household (%), Diversity of crops sold (number), Member of a cooperative (Y/N), Certification schemes (Y/N), Distance to the nearest urban centre (5 categories), Age (5 categories), Why did you start farming? (5 categories). The variables used implied a reduction of 18.62% of the overall survey, reducing the sample size from 892 to 717.

3. After variable selection (combining numeric and categorical variables) several approaches were tested taking into consideration:

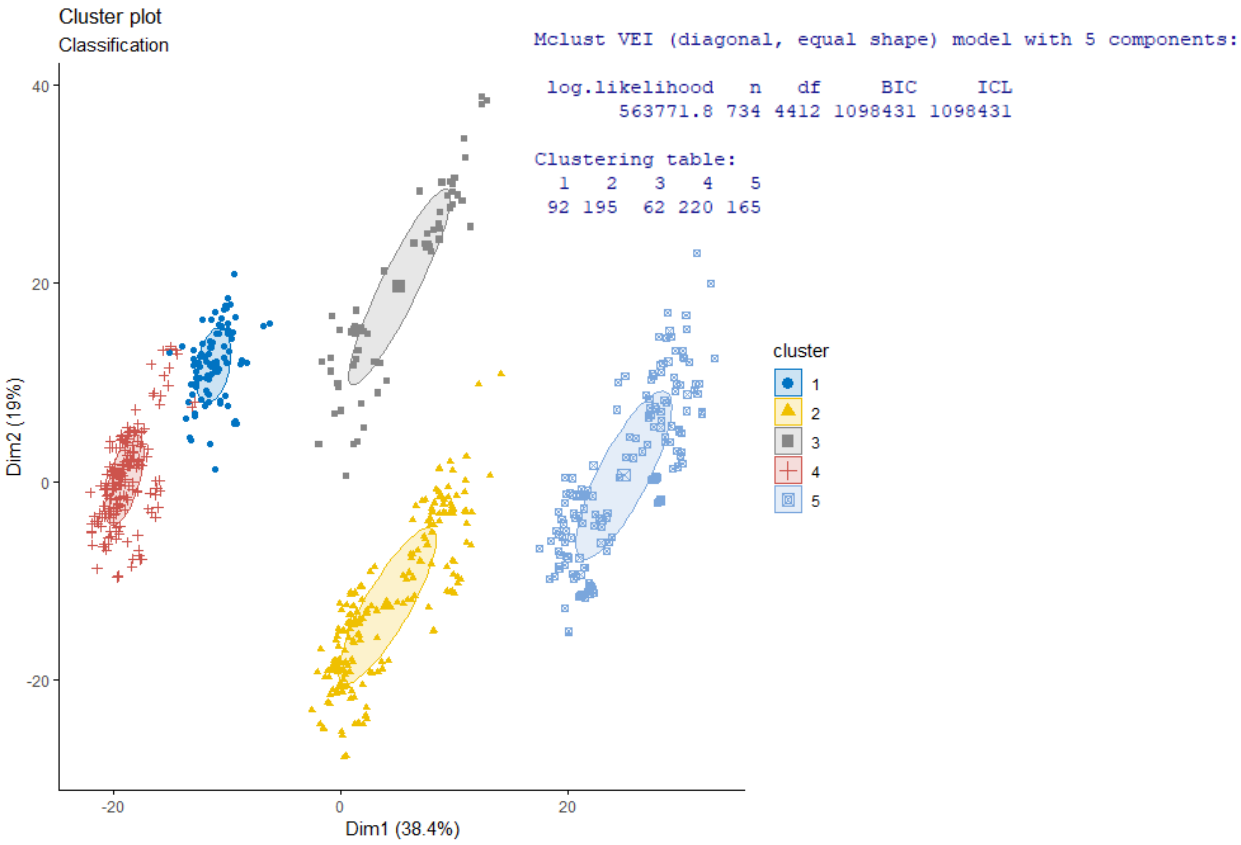
1. Different statistical techniques: principal component analysis, factor analysis, discriminant analysis, and cluster analysis;
2. Different combination of variables (implying different sample sizes);
3. Different number of clusters.

Considering the difficulties faced, particularly with the categorical factors, the following changes were made in the variables: reduction of the number of classes in the categorical variables and use of the mean size of the plots of the farms instead of the utilized agricultural area to integrate the effect of the farms' fragmentation, by dividing the agricultural area by the number of plots. We have removed from the subsequent tests the diversity of crops sold due to the low variability in its distribution.

It was decided to limit the number of clusters to 5, since, according to the first analyses, the results with a higher number of clusters were difficult to interpret due to the overlaps between clusters. A lower number of clusters did not capture the variability of the variables used.

4. The final tests were performed using a model-based clustering with a Bayesian Information Criterion constrained to 5 clusters maximum to select the best model (Kassambra, 2017). We have used the mclust (Fraley et al., 2012), factoextra (Kassambara & Mundt, 2017) and StatMatch (D'Orazio, 2016) packages of the R software version 3.4.3. (R Development Core Team 2017). The StatMatch was used to compute Gower distance, indicated for mixed type variables. The model parameters were fitted through maximum likelihood estimation and the geometric features of each cluster were determined by the covariance matrix. The best model was selected using the Bayesian Information Criterion (large values indicates strong evidence for the best model). The model selected with our data was VEI, which means that all clusters have variable volume, the same shape and orientation equal to coordinate axes. Figure 2 below, shows the final outcome of the cluster analysis, with the 5 typologies finally selected.

Figure 2. Cluster plot final classification of small farm typologies



5. Once the typology was defined the types were validated with all SALSA partners, based on a first description of the values attached to each type (each cluster) and the corresponding first narrative of what each type represents. Following, descriptive statistics of the most relevant variables were used to finalise the description, or narrative, of each small farm type and to perform the comparative analysis enclosed in this Deliverable.

3. Results – Small Farms

The results section is divided into 2 main subsections. The first one provides a description of the typologies obtained through the cluster analysis, and the second one, shows a deeper comparative analysis of the main attributes characterising each of the 5 different types.

3.1. Description of typologies

Below are the small farm types that resulted from the process described in the section above and after several different iterations of clustering tests. The final clusters used to define what we consider as SF types, corresponding to the clustering outcomes which provides the best statistical fit to the data gathered, while making sense from an analytical perspective. The different tests as well as the present results, were in successive steps, discussed with all SALSA partners, in particular those who collected data in the field and filled the data-base at the regional level – those who know the data and the diversity of small farms situations in their regions.

One note of caution: many of the attributes used to describe the differences between the types must be considered in relative terms. For example: there are no clusters of farms in this sample that are not integrated to the market. All of the clusters described here sell, on average, much more than 50% of what they produce. Thus, when we talk about different degrees of market integration, we refer to differences of degree between one cluster and the other.

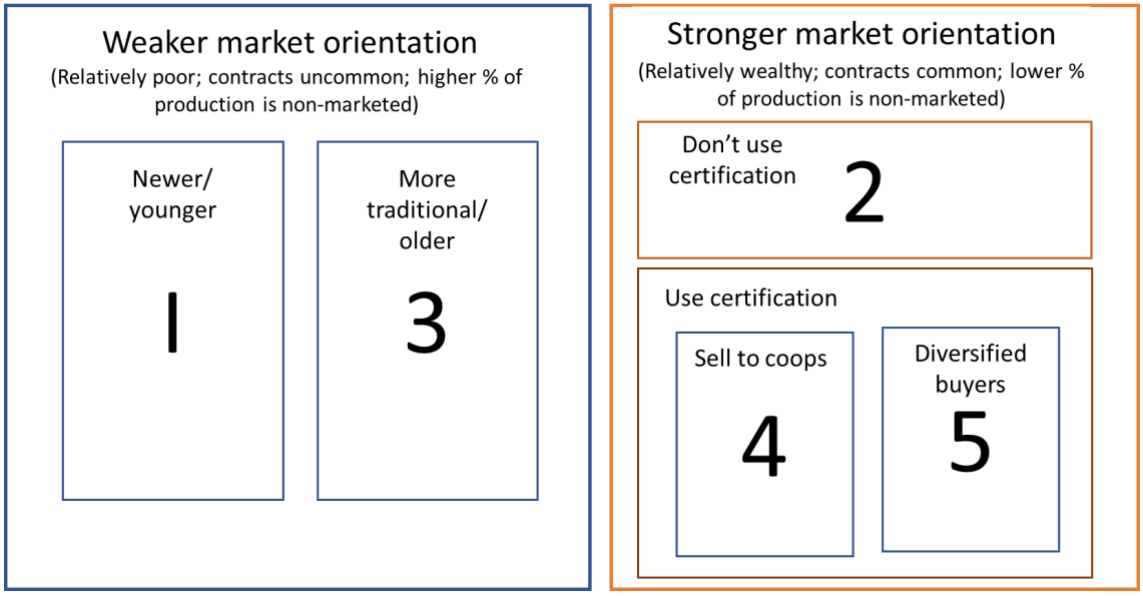
3.1.1. The types

We found that there are fundamentally **two big groups of farms**: ones that have relatively **weaker market orientation** – these have the lowest percentage of marketed production – and others that have relatively **stronger market orientation**, meaning they are mostly commercially focused – these are wealthier, and tend to market more of their production, including through cooperatives.

Within the first group we recognize two types (clusters 1 and 3); number 1 is made up of much younger farmers, newer to farming, and number 3 is much older, with farmers rooted in tradition. The farms in this group come mainly from African and Eastern European regions.

Within the second group we recognize two further divisions, between farms that use certification as a commercialization strategy (clusters 4 and 5) and those that don't (Cluster 2). We take certification as a key proxy for ability to innovate and add value. Clusters 4 and 5 are further differentiated by their reliance on cooperatives for market access and a more diversified portfolio of buyers, respectively (see figure 3 for an illustration).

Figure 3. Types of small farms



The details for each cluster are summarized in the table below, and more details are found in the excel sheet attached. The main characteristics of the clusters, and the proposed labels for each, are as follows:

"Weaker market orientation" group:

- **Cluster 1, "Part-time self-provisioners":** poorest cluster in terms of household income and farm turnover; farming appears to be a secondary activity that supplements other sources of income, by generally young farmers, who started farming as their own option; a high proportion of production stays in household. *11% of the sample. Common in: African regions, Romania, East Scotland*
- **Cluster 3, "Conventional strugglers":** second poorest cluster in terms of household income, and oldest; farming is rooted in family tradition and it accounts for high proportion of income; high proportion of production stays in household. *32% of the sample. Common in: African regions, Eastern Europe*

"Stronger market orientation" group:

- **Cluster 2, "Conventional entrepreneurs":** relatively wealthy, relatively old and established in farming; do not use certification; access to markets through cooperatives. *26 % of the sample. Common in: Mediterranean region*
- **Cluster 4, "Business specialized "**: wealthiest group, relatively old and established in farming; access to markets through cooperatives, invest in certification. *23% of the sample. Common in: Greece, Lucca, Norway*.
- **Cluster 5, "Business diversified"**: wealthy, relatively young and new to farming; invest in certification; diverse portfolio of buyers. *8% of the sample. Common in Northern Europe.*

Table 3. Summary of key characteristics of each SF cluster					
	1	2	3	4	5
Farmer profile	Young, relatively new to the region, relatively new to farming, low education; high percentage of females; lowest exclusive dedication to farming	Relatively old, long time in region and farming, driven by tradition, relatively low education; high exclusive dedication to farming	Oldest farmers, longest time living in region and farming, 100% driven by tradition, lowest education	Relatively old, long time in region and farming, high education, high exclusivity of farming, highest % of females	Relatively young, relatively new to the region and farming, highly driven by tradition, highest education, low exclusivity
Labour	Relatively low reliance on permanent hired labour, but high reliance on occasional hired labour	Relatively high reliance on permanent hired labour, but low reliance on occasional hired labour	Relatively low reliance on permanent hired labour, but high reliance on occasional hired labour	Relatively high reliance on permanent hired labour, but low reliance on occasional hired labour	Relatively high reliance on permanent hired labour, but low reliance on occasional hired labour
Income and turnover	Lowest median turnover, lowest median income; Low % of farming in HH income	2nd highest median turnover, 3rd highest median income; high % of farming in HH income	2nd lowest median turnover, 2nd lowest income; highest % of farming in HH income	Highest median turnover; highest median income; highest % of farming in HH income	3rd highest median turniover;2nd highest median income; low % of farming in HH income
Market linkages	Low contract farming; high % of production stays in household	Highest use of contracts; smallest % of production that stays in household; diverse set of buyers, including coops	Low use of contracts; high % of production stays in household	High use of contracts; highest % of production sold to coops	High use of contracts; diversified buyers
Self-sufficiency	Low food self-sufficiency	Low food self-sufficiency	High food self-sufficiency	Lowest food self-sufficiency	Highest food self-sufficiency
Farm characteristics	Smallest farm size; smallest plots,	Medium farm size; medium-sized plots,	Small farm size; small plots, medium number of	Large farm size; largest plots;	Largest farm size, largest plots; lowest

	smallest number of plots, little irrigation	medium irrigation	plots, low irrigation	highest % of irrigated	% of irrigation
Subsidies & support	Low access to subsidies, credit, finance or technical assistance; highest support of neighbours	High access to subsidies, credit and technical assistance; low support of neighbours	High access to subsidies, low access to credit or support from neighbours	Highest access to subsidies, highest access to finance and training; high support from neighbours	High access to subsidies, high access to credit and training; high support from neighbours
Regions	Ugunja, Balaka, Giurgu, East Scotland	Varazdinska, Ileia, Pisa, Pieriga, Alentejo Central, Bistrita-Nasaud, Castellon, Cordoba, Haouaria	Santiago, Gushegu, Ileia, Pieriga, Balaka, Rzeszowski, Nowosadecki, Nowotarski, Oeste, Bistrita-Nasaud, Giurgu	Ille et Vilaine, Imathia, Larisa, Lucca, Pisa, Ugunja, Vilniaus Apskritis, Hedmark, Oeste,	Latgale, Hedmark

3.2. Comparative Analysis of small farms

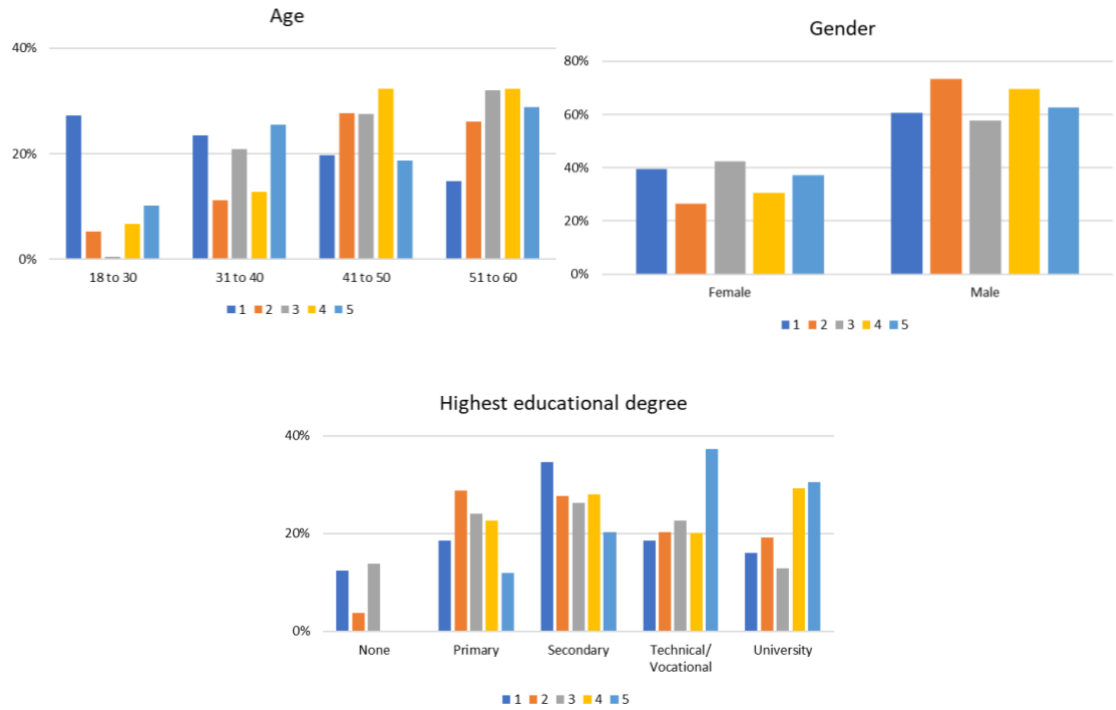
3.2.1. General socio-economic characteristics

The farms in our sample cover a wide range of socio-economic and cultural backgrounds. Most of the farmers surveyed are relatively old (older than 40), although those in Cluster 1 are much more evenly distributed across age classes. The sample is unbalanced in gender terms, with males being the clear majority across all types. This imbalance may reflect the overall dominance of male farmers in Europe[1], but it is also worth noticing that females are much better represented in our sample than in the European farming population. As the data collected here is not statistically representative of the population, it is unclear whether these numbers represents selection bias or an underlying characteristic of small farms in the regions we studied.

Formal educational attainment is relatively low across all types (i.e. about 50% of farmers only having a secondary degree), with type 5 having a much higher proportion of farmers with post-secondary education.

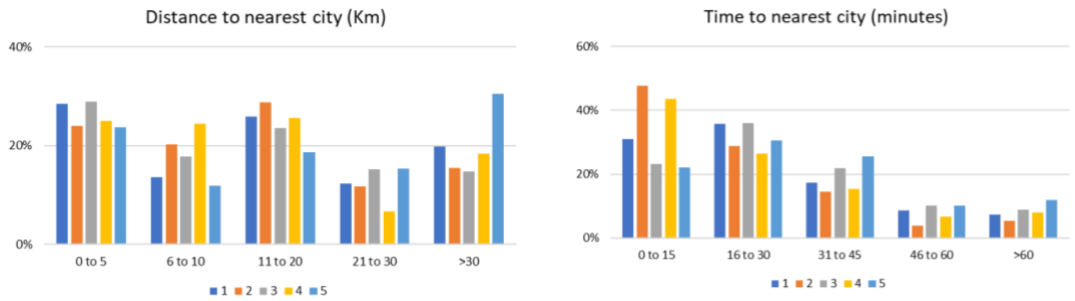
[1] (https://ec.europa.eu/eurostat/documents/3217494/9455154/KS-FK-18-001-EN-N.pdf

Figure 4. Socio-economic characteristics



With regard to location, the farms in the sample are situated in regions with very different degrees of urbanization and transport infrastructure. The majority of farms across clusters are located relatively close (less than 20 km) to urban centres. Cluster 5, however, has a relatively high proportion of farms situated at a greater distance. Despite these spatial differences, the majority of farms in all clusters take less than 30 minutes (in their typical mode of transportation) to reach the nearest urban centre, suggesting again that most farm have a relatively easy access to towns. Those who take an hour or more to reach the nearest urban centre are a clear minority, and are distributed more or less evenly across clusters. Location does not appear to be, at least in principle, a major hindrance for accessing markets, services or inputs.

Figure 5. Time and distance to nearest urban point

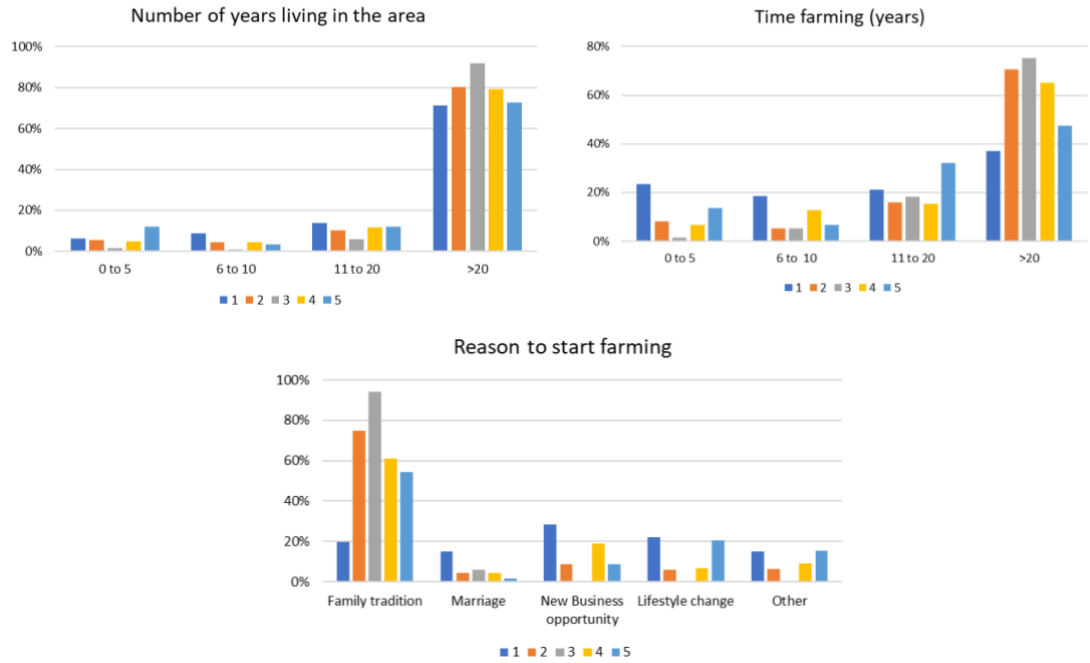


3.2.2. History/ experience / motivations

Farmers in our sample are overwhelmingly originally from the region in which they currently live. This is true across types, with some minor differences – for example many farmers in cluster 1 have only recently arrived. Farmers also have, for the most part, many years of experience farming. We see some minor differences across types here, with type 1 again showing a higher proportion of farmers who are newer to farming.

The vast majority of farmers in our sample started farming as a continuation of a family tradition. The exception is the farmers in type 1, many of which said they were motivated by lifestyle change or a new business opportunity. This is consistent with cluster 1 having relatively younger and newer farmers. Cluster 3 has the highest proportion of older farmers, those who have spent the longest living in the area, have been farming the longest time, and whose reason to start farming was "tradition", meaning they have inherited the farm and have continued the family tradition. This cluster is thus the one with the deepest roots in farming.

Figure 6. History, experience and motivations



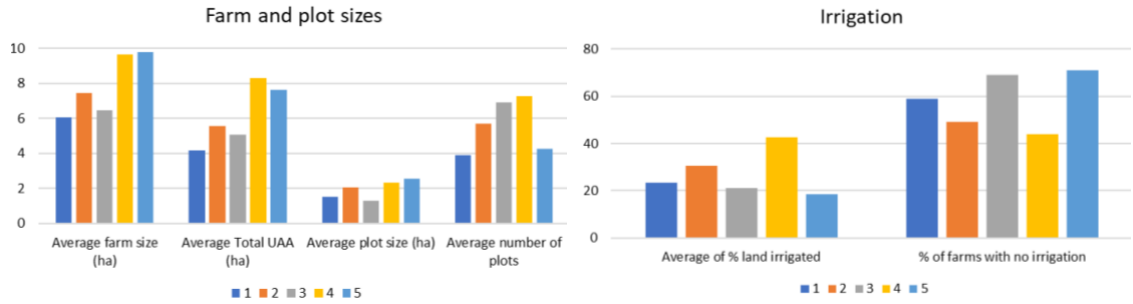
3.2.3. Land assets

The definition of small-farming was one of the key methodological and conceptual decisions in this project (see D.1.). Within the selected bounds (area smaller than 5ha OR standard gross margin lower than 8 Economic Size Units), the farms in this sample cover a very wide range of farm sizes, from less than one hectare to several dozen hectares. Part of this variety represents different levels of wealth and access to land, and in others it is a function of the type of crop (i.e. in Western Scotland even a small number of livestock uses extensive areas for grazing). The data from the survey should therefore be seen with these differences in mind. We found the average farm size to be around 8 ha, with farms in clusters 1, 2, and 3 having relatively smaller average sizes, and those in 4 and 5 being on average larger (Figure 7). The same relative differences apply to the Utilized Agriculture Area (UAA), which is a more accurate descriptor of functioning farm size. These differences reflect different socio-

historical backgrounds of the farm structure, as well as different levels of wealth, geographical contexts (mountainous vs flat) and prevalent crop types (Jepsen et al 2015). The plot size data reflect in general the same factors, but they also suggest differences in the economic rationality of the small farms, with larger plots indicating more capacity for mechanized work and for rationalization of field routines. Accordingly, the smaller plot size is found in cluster 1, which are those with weakest connections to the market and lower turnover. And the largest plot size is in Type 5, those who appear to be wealthier.

Access to irrigation provides an important insight into how this land asset is used. Whereas the lack of irrigation may simply mean that irrigation is not needed (due to crop types and/or rain regime), the presence of irrigation does mean that a farmer is able to deploy the considerable resources that this requires. We found that most of the farms in the sample do not use irrigation, with only cluster 5 having slightly more than half of its farms using some sort of irrigation. Unsurprisingly, water was reported to be one of the most important inputs mentioned by farmers (see table 5 below). Irrigation is an issue in regions where water scarcity in critical periods of the year is a strong limiting factor for crop production and for pastures, as is the case for Southern Europe, Southern regions of Eastern Europe and many regions in Africa. For those farms which do use irrigation, the pattern varies across clusters. Clusters 2 and 5 have the highest land area under irrigation, reflecting their strong commercial orientation, as well as the types of crops they produce and which are prevalent in the regions where they are common (e.g. drier Mediterranean exporting regions). Clusters 1 and 3 have relatively lower areas under irrigation, which is consistent with their lower levels of wealth and market orientation. Cluster 5, which is one of the richest is also the least irrigated; this may have to do with the prevalence of extensive livestock rearing in the Northern European regions, or otherwise to the prevalence of the farms in this cluster being from Northern European regions, where irrigation is not a usual production need.

Figure 7. Land assets

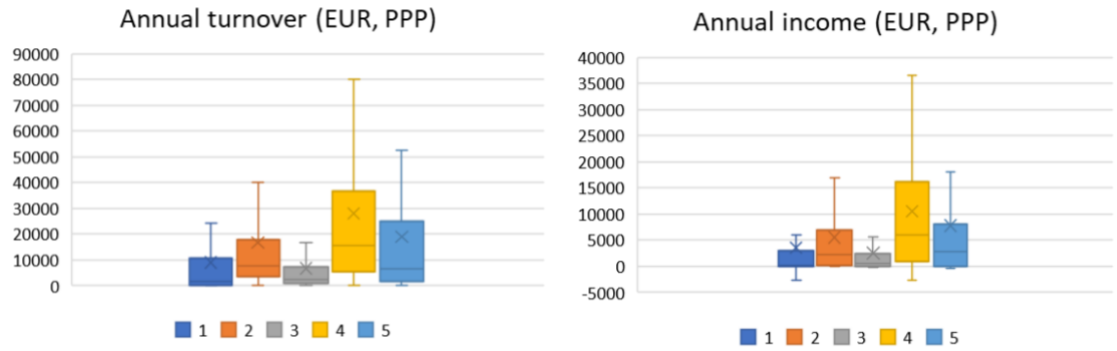


3.2.4. Income

Turnover and income display a huge amount of variability among the farms sampled, even when they have been normalized by power purchasing parity (PPP). This is not surprising, considering the great discrepancies in wealth between the countries and the regions included in this study (see D. 3.3. for details). The variability in annual turnover and incomes cuts both within and between the different types. Our analysis has identified that clusters 2, 4 and 5 are the wealthiest, both in terms of turnover and of income, while 1 and 3 are poorer. These two last clusters are also clearly those where the internal variability in turnover is smallest – meaning there is a similarity in the small size of the turnover, for the concerned farms. This means that apparently there is higher similarity across the regions considered, within the smallest small farms, those who are not so well connected to the market and struggle to survive, than within small farms that connect to market as part of their strategy – and seem to have a highly diversified profile. The annual turnover data, combined with the share of

the production which is kept in the household, clearly suggests that farms in clusters 2, 4 and 5 have a much stronger commercial orientation than those in other clusters. These clusters have a lot of variability within them, as shown by the long range they occupy (for example in cluster 4, from only a few hundred EUR to several thousand), reflecting wide differences in local conditions—including wages, cost of living, and available markets.

Figure 8: Annual turnover and income, by quartiles[2]

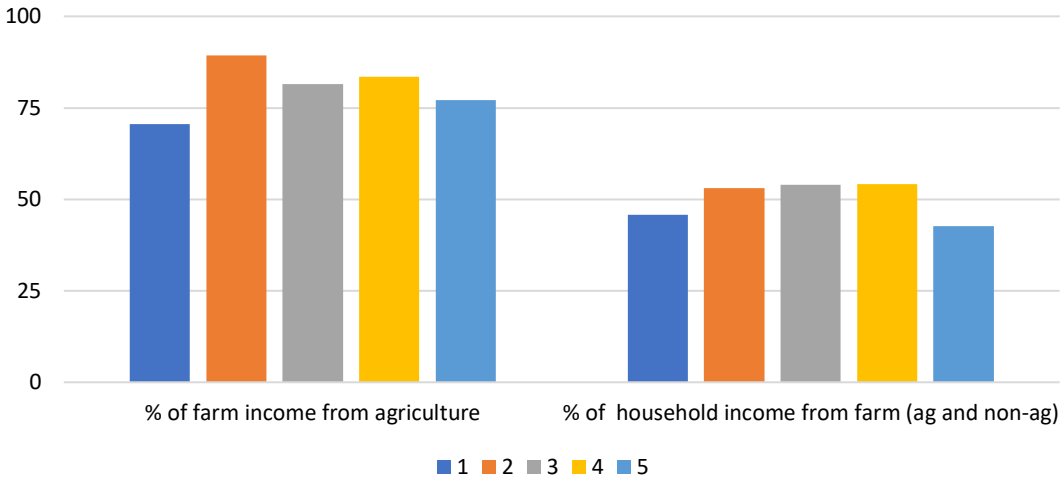


3.2.5. Role of farming in income generation

Farming is a very important component of household income in the farms in our sample—but it is in no way the only one. Across clusters, farm-related activities (both agricultural and non-agricultural) account on average for about one half of the household income. The data also reveals some differences between clusters: households in clusters 1 and 5 are relatively less dependent on farming than those in other clusters. This is consistent with other characteristics of these clusters, which are overall younger and less rooted in the tradition of farming. Between 1 and 5 the main difference is that 1 is less market oriented and with generally low farm income, while 5 are wealthier, relate to the market and is dynamic in terms of turnover. Looking more closely at the importance of agriculture (rather than farming, which is broader as it includes non-agricultural activities such as catering or tourism) as a contributor to income, the majority of farms in our sample derive most of their farm income from agriculture. The highest levels of agriculture as a percentage of farm income are in clusters 2,3 and 4, which have a relatively stronger agricultural orientation.

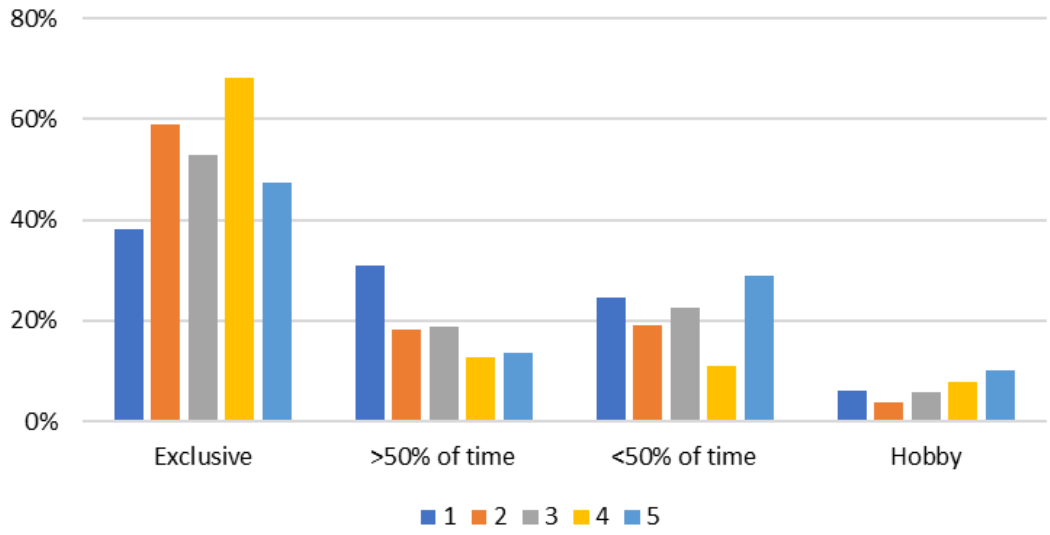
[2] The box represents the two middle quartiles, separated by the median, which is the horizontal line; the two outer quartiles are indicated by the "whiskers"; the x represents the mean.

Figure 9. Income derived from farm and agriculture



This data on sources of income can be helpfully read together with the evidence on part vs. full time farming. Most of the farmers in our sample are exclusively dedicated to farming, or they spend more than half of their time farming, i.e. most are professional farmers with a high level of time commitment. This is consistent with the relative importance of farming in their income generation. Part-time farming is more common in certain types, particularly 1 and 5. Interestingly, this higher prevalence of part-time (and hobby) farming spans one of the poorest clusters (no. 1) and one of the richest (no. 5), and is entirely consistent with these types having the lowest relative proportion of income coming from farming. This seems to reflect considerable differences in what part-time farming can be: in some cases an important contribution to household food provision and income which helps preventing poverty; in other cases a lifestyle option for families that develop farming alongside other activities, link to the market with diversified and quality production, and receive an extra income for the household; and for other, especially young farmers who are beginning to farm, part-time farming can be a first step in a trajectory towards expanded production as obstacles are overcome. There is undoubtedly a context differentiation here, as the first type is most frequent in Africa regions and Romania, while the last is most frequent in Northern Europe. This may indicate we need to look at small farms with part-time occupation, with a carefully differentiated perspective.

Figure 10. Time dedicated to farming



3.2.6. Labour

Small-scale farming is conventionally equated to family farming, and the assumption is that most, if not all, labour is family-based and unpaid (Wiggins, 2010). The data presented here largely support this assumption, but with important distinctions across the different clusters regarding the type, quantity and permanence of the labour. Most farms across clusters use a combination of paid and unpaid labour, relying on both family and non-family members. Table 4 shows the percentage of farmers who say they use a particular type of labour. Permanent family labour was mentioned by a relatively high proportion of farmers in clusters 1 and 3 —as expected, given that they are poorer and less commercially oriented— and more surprisingly by farmers in cluster 5. This high share of family labour in cluster 5 can be explained by those being small farmers who seem to be doing farming as an option, thus performing the required farm work as a lifestyle activity, jointly with family members or even also occasionally neighbours and friends (they also often indicate they use unpaid occasional labour). This farm type is most frequent in Northern Europe, and here the high cost of labour, including of farm labour, may also explain why the farm business model relies much on unpaid labour – otherwise it could become hardly sustainable. It is important to note that these numbers do not necessarily accurately reflect how much family labour is *actually* used by these farms, as indeed many respondents may have not construed their own contribution to farming as "labour". Permanent hired labour was mentioned by a relatively small proportion of farmers across types, as would be expected. Here again cluster 5 appears with a relatively higher proportion, and this is turn may be explained by the higher turnover and higher farm size, requiring more labour investment than smaller farms, especially when production in based on a diversity of products. Cluster 4, "Business Specialised", has the second highest share of farms with paid labour, both permanent and occasional, what again can be explained by their business model, tuned to the market with specialised production. These are often productions which require specialized labour, and concentrated extra labour needs in specific periods, for example at harvest. The data on occasional labour shows that all types of farms rely on both family and hired labour from time to time. Farmers in clusters 1 and 3 mentioned unpaid family labour in lower proportions, while those in the wealthier clusters 2, 4, and 5 mentioned it more frequently. Paid occasional labour was mentioned by farmers in all clusters, but it was more frequent in clusters 4 and 5, as seen above.

Table 4. Farm labour force (% of farms saying they use the type of labour)				
Cluster	Permanent unpaid family labour	Permanent paid non-family labour	Occasional unpaid family labour	Occasional paid non-family labour
1	30%	4%	16%	20%
2	8%	2%	24%	18%
3	20%	1%	14%	17%
4	13%	6%	20%	26%
5	54%	8%	25%	27%

The data on labour force, estimated using Full Time Equivalents (FTEs) provides an additional level of insight (Table 5). Across the farms in our sample the highest average number of FTEs was on unpaid, family labour, as would be expected by theory (Davidova et al 2012; Shucksmith and Ronningen 2011). Clusters 3 and 1 have the highest averages (1.6 and 1.3 respectively), while clusters 5, 4 and 2 have the lowest (0.9, 1.1, and 1.3 respectively). The ratio of non-family paid labour to family unpaid labour shows two interesting patterns: first, for permanent labour, this ratio is highest in clusters 2, 4 ad 5, and lowest in clusters 1 and 3; this is in line with the expectation that the wealthier, commercially oriented farms have a higher reliance on hired labour relative to family labour over longer periods of time. Second, for occasional labour, the magnitude of the ratio is reversed: poorer farms have a clear and much more pronounced reliance on hired labour relative to family labour during the critical activities (e.g. planting or harvesting) that are time-sensitive.

Table 5. Farm labour force (average Full Time Equivalents)						
Cluster	Permanent unpaid family labour	Permanent paid non-family labour	Occasional unpaid family labour	Occasional paid non-family labour	Permanent non-family paid as % of family non-paid	Occasional non-family paid as % of family non-paid
1	1.53	0.06	0.23	0.47	3.7%	208%
2	1.30	0.12	0.72	0.64	8.9%	89%
3	1.55	0.06	0.32	0.57	3.9%	179%
4	1.12	0.16	0.53	0.46	14.4%	86%
5	0.89	0.21	0.56	0.32	23.5%	57%

3.2.7. Inputs

Small-scale farms rely on a wide variety of inputs. The importance of different inputs varies across farm types, but there are some important similarities (Table 6). Water was ranked highly by our respondents across all types; energy and transport were also ranked relatively high across the board. Other inputs have especial relevance for only certain types of farms. For example, seeds were ranked relatively high by farms in clusters 4 and 5, both of which have a very strong commercial orientation, have invested in certification, and for which good

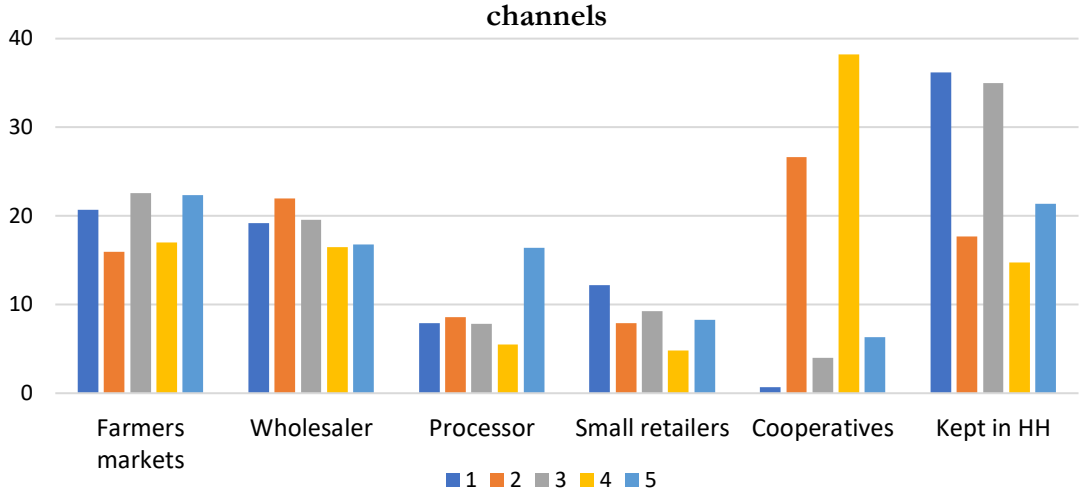
quality seeds are likely to play an important role. Hired labour is ranked highest by the farms who rely most heavily on family labour (clusters 1, 2 and 3), and for which hiring labour is likely to be a significant expense.

	Table 6. Importance of different farm inputs, according to mean ranking score (min=1, max=10)									
Cluster	Seeds	Water	Fertilizers	Pesticides	Petrol	Machinery	Transport	Hired labour	Animal feed	Energy
1	2.8	5.4	3.9	3.5	3.5	4.1	4.7	4.3	2.9	5.0
2	3.0	5.1	2.9	3.8	3.7	4.0	5.6	4.9	3.8	5.3
3	3.0	5.9	3.0	3.5	2.8	3.4	4.5	4.6	3.7	5.2
4	4.0	4.9	3.4	2.2	3.2	3.3	3.9	3.1	2.9	4.8
5	3.7	4.1	2.9	3.6	2.2	3.6	4.4	2.1	2.8	4.4

3.2.8. Commercialization strategies and market linkages

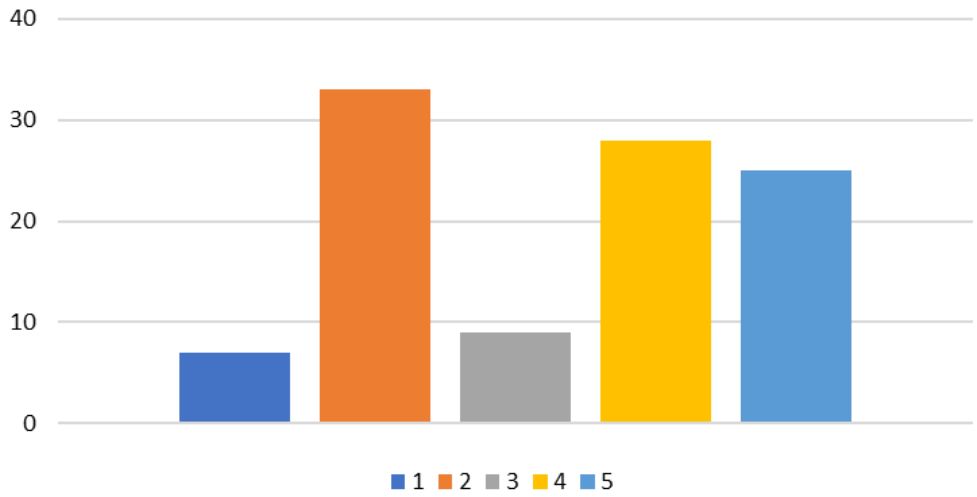
The vast majority of farms in the sample are focused on selling to the market. As we have seen, there are differences in the strength of this commercial orientation among the different clusters, but in general small farms are in the business of selling. Who they sell to, and how much, is a telling indicator of their role in the food system (we explore this in detail in D.3.3.). Moreover, their pathways to commercialization underline small farms' different strategies, possibilities and constraints. The evidence presented here illustrates the diversity of commercialization pathways available to small farms in the regions we studied. Farms in all clusters sold more than they kept in their household—with important differences (Figure 10). The farms in clusters 1 and 3 (the poorest) evidently keep the highest proportions of their production for household use, indicating very clearly their weaker orientation towards commercialization. The figure below also shows clearly that cooperatives are the key commercialization channel for farms in clusters 2 and 4. Farmer's markets are an important commercialization channel across all types, and particularly for farms in clusters 1, 3 and 5, suggesting that many of the small farms in our sample are connected with their local food systems and directly to consumers. Wholesalers are also important across types, providing connections to retail and export chains. Farms in cluster 2, "Conventional entrepreneurs", rely on wholesalers more than those in other clusters, possibly due to the diversity of products they have, which makes it difficult to sell exclusively through cooperatives. Farms in cluster 5 sell much more to processors than farms in other clusters, suggesting they are producing specific, or more exclusive products which require processing and may bring back added-value to the farmer – thus contributing to the higher turnover of this type of farms in relation to the others.

Figure 10. % of production sold to different commercialization channels



The use (or not) of production contracts provides an additional level of insight into the differences in the market linkages described above. Contracts signal a formal arrangement between producers and buyers. While they can provide greater certainty for producers about prices and timing, they also demand compliance with strict quality and quantity standards. Contracts therefore can both drive better practices and involve higher costs for farmers. The use of production contracts is starkly segmented in our sample, divining the clusters 1 and 3, for which contract farming is a very small proportion, and clusters 2, 4, and 5 in which a considerable proportion of farms uses production contracts. This is largely consistent with the previous observation about the stronger commercial orientation of clusters 2, 4 and 5.

Figure 11. Farms with production contracts

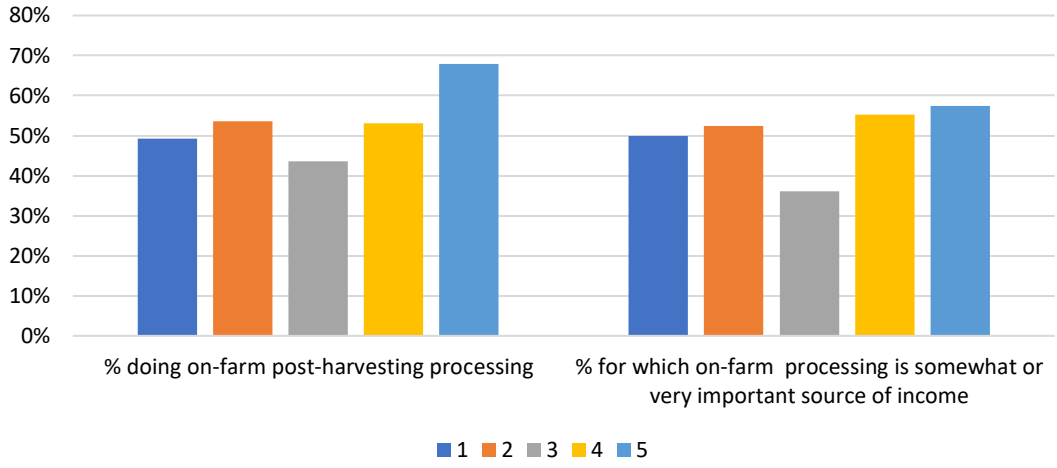


The use of certification is an important marketing strategy for farms, as it allows them to increase the value added of their products. Certified products are typically credence goods—i.e. consumers cannot materially "see" the difference in the quality or claim made by the certification, but *trust* that those claims are true because they have been certified by a third party. Certification is relatively costly; it is therefore commonly used by farms that are strongly commercially oriented, as it is often mediated by contracts and other formal commercial arrangements. All the farms in clusters 4 and 5 in our sample engage in some sort of certification scheme, and the presence of this attribute in fact sets them apart from all the other types. Even if there might be particular cases where certification only reflects

the opportunity to receive higher subsidies, in most cases certification suggests a higher level of innovation, ability for investment and degree of formalization. The specific types of certification vary between and among these two clusters. About half of the farms in Cluster 5 mentioned organic certification, and 15% integrated production. In cluster 4, 26% mentioned certification, nearly 40% integrated production, and 12% denomination of origin.

On-farm processing is another strategy used by small farms to add value to their crops. This can range from very simple sorting, cleaning and packaging, to more complex forms of processing such as wine-making or milling. Processing is common in the small farms we studied. It is done by close to half or more of farms in all clusters—with highest numbers in clusters 2, 4, and particularly 5. This reflects the prevalent products in these clusters, as olive for olive oil or grapes for wine. About half of the farmers in the sample see processing as an important source of revenue – probably showing a match between those farms which do processing and those which think it's important. Processing seems to be slightly more important for farms in clusters 2, 4, and 5, suggesting that the more commercially oriented farms also tend to add more value through processing than the poorer farms in clusters 1 and 3.

Figure 12. Importance of on-farm processing



3.2.9. Subsidies and support

The vast majority of farms in our sample have some access to government subsidies, but the number is much lower in cluster 1, reinforcing the notion that most of these farmers are newer to farming and perhaps less able to or experienced at obtaining public funds, or also the fact that they are to a large extent found in Africa, in regions where subsidies to farming are a less established reality than in Europe. The access to financial services and training reflects clearly the division between the wealthier, more commercially oriented clusters 2, 4 and 5, and the poorer counterparts in clusters 1 and 3. Notably, the poorer farmers in cluster 1 may be able to compensate for the lack of formal support by tapping into their networks of family and neighbours. But this is clearly a practice that is not exclusive to poorer farms – it shows up very strongly in the richest clusters as well.

Table 7. % of respondents who receive different types of support				
Cluster	Government subsidies	Access to credit or finance	Support from neighbours or relatives	Access to marketing training
1	43%	44%	62%	48%
2	75%	55%	46%	70%
3	73%	46%	47%	62%
4	79%	80%	58%	84%
5	75%	70%	65%	77%

3.2.10. Food self-provisioning ("unseen food")

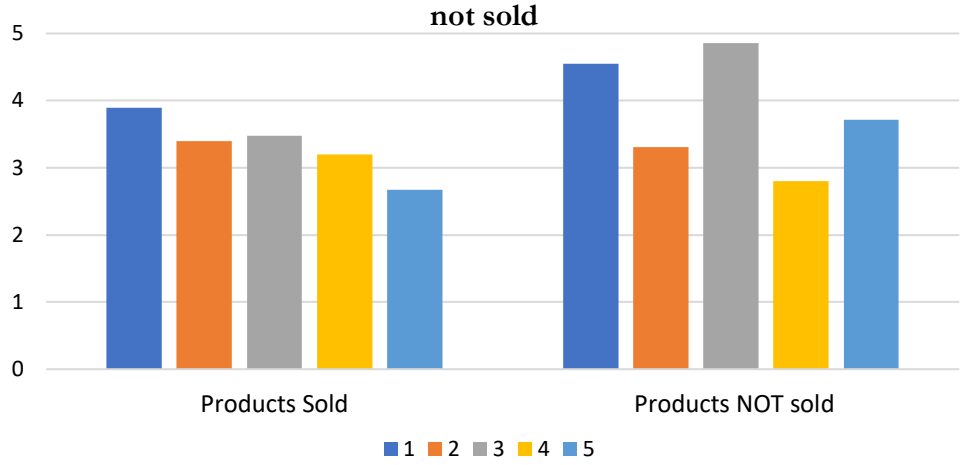
As we have seen, the small farms in our sample have different degrees of market orientation, but none are purely subsistence farms. However, the data presented here also suggests that a considerable part of the production is not sold, but kept in the household. This section aims to understand what happens to this part of "unseen" food that is not marketed, usually named as food self-provisioning (Jehlička et al. 2018) and to illustrate the diversity of strategies used by small farms to provide food for themselves and their networks.

Most of what small farms keep outside the cash market is for their household food consumption (Table 8). However, from what they keep, there is in some cases a portion that is shared and given away to neighbours, family or friends, or traded with them. Farms in all clusters use part of their non-marketed production for gifts or trade, but the proportion is smaller for Cluster 5, which is much more specialized in producing for the market.

Table 8. Destination of production that is not sold (%)				
Cluster	Used for household food consumption	Used for animal feed in farm	Used as Gift	Used for Trading
1	65	10	15	3
2	52	8	13	3
3	56	17	12	2
4	62	8	8	4
5	61	6	11	2

The number of products sold and kept can give us an additional insight about the significance of this "unseen food" (Figure 13). The small farms which have a weaker market orientation (Clusters 1 and 3), produce on average more products for self-consumption than those they sell. On the contrary, and as expected, most of those who have a strong market orientation (especially in clusters 2 and 4) have a higher number of products to be sold than those to keep in the household. Only Cluster 5, composed of small farmers who are market oriented but also multifunctional, self-provisioning seems to be significantly more important, in terms of product variety, than their relationship to the market. Most of the small farms included in the survey stated that they could possibly produce more in their farm. This means that both the market component, but also this self-provisioning component, could be increased, if there was a need, an incentive or support conditions, what may be relevant in terms of assessing future developments in different types of scenarios.

Figure 13. Average number of different products sold and not sold



Food that is produced in the farm and consumed directly in the household is a key part of the "unseen food" that does not circulate in markets. The data presented here on the proportion of food needs that are satisfied through farms' self-production (Table 9) is important to assess how relevant is FSP (Food Self Provisioning) for the four dimensions of FNS, in particular for food access and food utilisation.

In all SFs types, a big share of the households gets more than 50% of their food from their own farm. The proportion of households that satisfy more than half of their consumption through self-production is highest in clusters 5, 3 and 1. The proportion is lower in clusters 2 and 4, which are more specialized in commercialization. These farms are oriented to the market in a more conventional way, and thus relatively less concerned with the family food being derived from the farm.

When considering particular groups of products, we can see that self-produced food accounts for a high percentage of the food consumed at home, especially vegetables and potatoes. Cluster 5 has the highest proportion of households satisfying their food needs with self-produce food; farmers in this cluster are well linked to the market and are relatively wealthy, and they are also apparently also highly concerned with their capacity to provide food to the family. Farmers in cluster 3 also seem to be rather focused on self-provisioning, probably by economic need, but they cannot satisfy their household needs as much as farms in Cluster 5. This could possibly be explained by the smaller size of the farms, the lower technology capacity and lower economic capacity to structure production in a more efficient way. As expected, relatively fewer households in the more specialized cluster 4 are able to meet their food needs using their own production.

Table 9. % of households for which self-produced food satisfies more than half of their consumption						
Cluster	All food	Vegetables	Potatoes	Fruit	Dairy	Meat
1	37%	53%	45%	34%	24%	45%
2	32%	54%	53%	42%	34%	39%
3	41%	60%	62%	40%	54%	45%
4	25%	43%	29%	45%	20%	22%
5	50%	74%	71%	44%	47%	38%

3.2.11. Small farms resilience strategies

In our sample, small farms tend to be diversified in terms of what they produce to supply the household, but also in terms of what they sell. We have seen in the section on Food Self Provisioning, that in average, all small farm types sell more than 3 different products from their farm, with Type 1 selling in average almost 4, and Type 5 selling a less diversified basket (2, 6). Looking beyond the average, in Table 10 we can see that there is a significant share of all small farms who sell only one or two products out of their farm. This share is relatively higher in the types more market oriented, what could be expected- although the difference between groups is not so high. In terms of resilience, what this seems to indicate is that in each group of farms, there are quite many who do not sell a diversity of products, and can therefore be more prone to suffer shocks from changes in external drivers, be it the market, the climate, or other. The question remains as to which farmers will have the capacity to deal with these shocks and continue farming, in the same or an adapted model.

Table 10. Diversity of products sold

	Weak market orientation		Strong market orientation		
Diversity of products sold	Type 1 Part-time	Type 3 Conventional strugglers	Type 2 Conventional Entrepreneurs	Type 4 Business specialized	Type 5 Business multifunctional
Only one or two products sold	40%	48%	47%	51%	58%

In terms of autonomy, what we can say on the basis of the survey data relates to the importance of self-provisioning, and to what seem to be the farms' strategy or business model. According to resilience thinking, small farms who are less dependent on the market and function more on a self-provisioning basis tend also to be more autonomous and therefore less prone to suffer the influence of food market shocks (Darnhofer 2014). This is confirmed by the figures showing the perception of risk in all the small farms types (Table 11).

In all types of farms there seems to be a high share of those who are concerned about natural hazards and climate change, with the more specialized showing a higher degree of concern; this may be explained by their dependence on water or favourable climate conditions to secure their specialized production in order to satisfy a specific market. But what is more relevant here is that the perception of external risks related with market variations and financial conditions, is significantly higher in the market-oriented farmers than in the others. These are farmers with a higher degree of dependency of external socio-economic factors, and therefore more at risk of lower resilience levels. Small farms less oriented to the market are more autonomous and more in control of their resource basis, and therefore less under the pressure of changing external drivers. This confirms what we know from the literature. Even though it does no tell us much about the resilience strategies of small farms, it tells us where it seems to be highly relevant to look at strategies to cope with such external shocks to understand farmers resilience capacity.

Table 11. Perception of risk

	Weak market orientation		Strong market orientation		
Perception of risk – external factors	**Type 1** Part-time	**Type 3** Conventional strugglers	**Type 2** Conventional Entrepreneurs	**Type 4** Business specialized	**Type 5** Business multifunctional
Climate and other natural events	57%	56%	51%	71%	64%
Market and financial risks	33%	44%	58%	53%	57%

For Small Farms of type 3 (Conventional Strugglers), resilience is affected by the risk related to the durability of such farms, since many of them do not have successors. These are the older farmers, with low incomes, poorly connected to the market, which probably will not be taken over by a successor – as stated clearly by these type of farmers at least in some regions. They are, therefore, declining farms, which threaten to "fall out" at all from agricultural production, what will undoubtedly affect FNS in their regions. And these farms constitute up to a third of all farms in our survey, so a significant proportion.

4. Results – Small Food Businesses

Step 2 of data collection within SALSA included targeted interviews to small food business (SFB) owners at the studied Reference Regions. (For an in-depth description of data collection methods see Section 2.1.1). The goal was to assess how SFB are connected to SF –namely, how they interact with SF by means of trade and supply - and the regional food system, as well as their contribution to making food available, accessible (both at the household and regional level), and guaranteeing a stable flow of foodstuffs. Our sample consisted of 233 SFB owners interviewed in 29 out of the 30 RRs selected for the project, following the selection criteria described also in Section 2.1.1. of this Deliverable. Subcontracted regions (e.g. Vaucluse) were not required to include interviews to SFB owners, therefore they are not being considered in this analysis.

Data collected confirmed the diversity of SFB in the studied rural regions, in terms of their profile, structure and regional situation (Steiner and Atterton 2015) and their role in linking producers and consumers along the food chain (Macfadyen et al. 2015). In line with the geographical distribution of the RRs selected across the four macro-regions, 36% of the sample is situated in the Southern European macro-region (SE); 32% in the Eastern European macro-region (EE); 19% in the Africa macro-region (A); and 12% in the Northern Europe macro-region. Despite the research teams' attempt effort to guarantee gender balance in their sampling, the sample has slightly more male than female owners (55% to 45%, respectively). Most of the interviewed SFB owners in our sample belong to the age bracket 41-50 years old. Family tradition and new business opportunities were the main answers given as reasons to start their business.

Relevance of Small Food Businesses

Small food businesses can add value to the activities developed by small farmers. SFB owners choose their activities based on the possibilities and resources available in their localities (i.e. the local challenges, opportunities and characteristics), plus their capacity and skills to turn them into entrepreneurial opportunities (Steiner and Atterton 2015). SFB play an important role in the contribution to local resilience of food systems. They have direct and indirect effects over the economic and social aspects shaping rural communities, such are employment creation, service/product delivery, and promoting demographic balance in these areas (*ibid.*).

One of the direct contributions of SFB as rural enterprises to rural development is the creation of local employment (*ibid.*). SFB owners in our sample claimed they relied mostly on permanent non-family paid, permanent family non-paid, and occasional non-family paid labour. According to Eachus (2014), rural enterprises tend to rely in more than one form of employment to avoid getting exposed to extreme vulnerability at times of economic downturn (Eachus quoted in Steiner and Atterton 2015). Our data highlights the strong use of family labour by SFB across all regions. This phenomemon is likely an adaptation strategy SFB develop toward economic resilience, either to reduce production costs, overcome labour shortage or as a buffer against market shocks (Steiner and Atterton 2015). According to our interviews, most SFB owners reported giving a payment in kind– aka. as non-paid labour – to relatives, friends and helpers who help seasonally with the business (e.g. wine grapes, fruit and olive picking, etc.).

4.1. Comparative Analysis of small food businesses

4.1.1. A Simple typology of Small Food Businesses

To understand the contribution of SFB to the regional food system, especially in terms of their placement along the food chain and their point of connection with small farmers, we grouped SFB of our sample into four types, based on the main activity developed by the business. Most businesses carry out more than one activity, they have vertical integration over their products and control all phases from production to retailing. For this analysis, we have selected the *main* value-adding activity as reported in the interviews, dividing them into four groups: 1) cooking; 2) processing; 3) retailing; and 4) other activity. Table 12 shows the distribution of SFB types across the four macro-regions.

Table 12: The SFB types across all reference regions

SFB Type	Macro-regions				Overall SFB sample
	EE	SE	AFR	NE	
Cooking	13%	12%	33%	10%	16%
Processing	49%	52%	2%	31%	41%
Retailing	24%	35%	64%	41%	35%
Other	13%	1%	0%	17%	7%

The most common SFB type across macro-regions is *processing*, accounting for over 40 percent of the businesses interviewed. This category includes refining, milling, grinding, fermentation of fruits and vegetables, wine making, brewing, destilling, cheese making, meat curing, nut cracking, ice cream making, and food drying. The second most common category (35% of the sample) is *retailing*, with tasks encompassing marketing and distribution of goods. The third most common type is *cooking* (16%) with activities including pastry making, general meal preparation, roasting and baking, and jam making, etc. Finally, the broad category *other* (7%) includes diverse activities such as bottling, canning, food storing (e.g. particularly relevant for businesses using fresh fruits, vegetables and cereals), packaging, marketing, and agri-tourism related activities (e.g. room preparation and wine tasting tours).

Table 12 above shows the diversity of SFB types from a macro-regional perspective. Processing is the most common SFB type in Eastern and Southern Europe, whereas retailing is the main SFB type in Africa and Northern Europe. The reasons may be related to the types of key products that are most commonly used or transformed in these regions. (See full list of key products selected in each RR in Section 2.2.2. of Deliverable 3.1.). For instance, many of the key products selected in EE and SE require some kind of transformation before entering the market (i.e. wine grapes, olives, dairy, meat, etc.), whereas in A and NE many of the key products selected can enter the market in raw form (i.e. fruits and vegetables). Similarly, Northern Europe shows a greater diversity of SFB types when compared to the other three macro-regions.

4.1.1. Small food businesses' connections with small farms

One of the selection criteria for SFB was a direct link to small farms in their region, either through the purchase of raw materials or through the provision of services. We asked SFB owners to provide a list of suppliers for each of the various raw materials used in their

activities. SFB owners hinted to multiple suppliers (e.g. nearby farmer, wholesaler, small retailer, etc.), which we later organised in order of relevance and number of intermediaries between SF and SFB. We classified the linkage of the SFB to the regional SF for each data entry into three categories to assess SFB's degree of connection with SF: i) high (zero intermediaries or directly bought from SF); ii) medium (one intermediary between SF and SFB); and iii) low (two or more intermediaries). Table 13 shows the distribution of SFB at the macro-regional level, based on the identified level of connectedness (dependence) of each SFB to SF within the region.

Table 13: Degree of connection of SFB to the regional SF – by Macro-region

Degree of connection to SF	Macro-regions				Overall SFB sample
	EE	SE	AFR	NE	
High	44%	49%	2%	34%	36%
Medium	44%	35%	47%	21%	38%
Low	12%	17%	51%	45%	25%

Our data suggests that many small food businesses have strong relationships with small farms, but with important regional variations. The strength of the relationship (or dependence) appears to be higher is Eastern and Southern Europe, and lower in Africa and Northern Europe. Together with the prevalence of *processing* SFB in Eastern and Southern Europe, these results suggest that SFB have direct, short-distance supplying connections to small producers in their region. In Africa and Northern Europe, where cooking and retailing are more prevalent, the businesses appear to be sourcing from a broader range of suppliers.

4.1.1. Small food businesses' connections to the regional market

Small food businesses seek different commercialization pathways based on their size, location, and type (Steiner and Atterton 2015). Small-scale businesses must deal with strong pressures to keep up with a competitive market in the food system (Macfadyen et al. 2015). Some SFB owners in our sample hinted to the need to create interesting interrelationships with other actors along the food system and develop alternative products and chains to help secure their income (e.g. direct purchasing groups, food basket schemes, agri-tourism, organic food products, among others).

Most SFB in our sample use multiple commercialization channels. Considering the length of these channels (short vs. long, inferred from the number of intermediaries) plus the form of distribution (direct vs. indirect), we determined the primary distribution channel for each business and classified it into one of 6 categories: i) wholesaler (including wholesalers and the HORECA industry), ii) small retailer; iii) supermarket; iv) direct sale (direct sales, purchasing groups and e-commerce); v) farmers' market; and vi) other channels (including other processors and those not falling under any of the categories) (Table 14).

Table 14: SFB's main distribution channel by SFB type

SFB type	Main channel of distribution					
	Wholesaler	Small retailer	Supermarket	Direct sale	Farmers' market	Other
Cooking	16%	13%	3%	53%	11%	5%
Processing	35%	13%	5%	27%	9%	10%
Retailing	30%	12%	6%	38%	7%	7%
Other	0%	13%	0%	69%	6%	13%
All RRs	28%	13%	5%	38%	8%	8%

The majority of SFB in our sample use direct sale as the main distribution channel. Direct sales allow SFB businesses to have a greater control over price, provides convenience as they can sell from their farm shop or road stand, and gives them the flexibility of selling ad hoc (Mundler and Laughrea 2016). This channel makes also sense in cases where SFB are dealing with added-value products (e.g. certified organic), which they can protect and also establish direct connection with local consumers via short food supply circuits.

The primary channel of distribution in Eastern Europe, Northern Europe and Africa is direct sales (see Table 15 below). Sales to wholesalers are very important in Southern Europe, possibly because these businesses are linked to export-oriented markets and processing activities (e.g. olive oil, wine or citrus fruits) through cooperatives. Small retailers and farmers' markets provide another link between producers and consumers, and give SFB access to markets that are unavailable through direct sales. Supermarkets were reported to be the least common channel for SFB to market their products (5%), suggesting that small businesses cannot meet the demands for volumes and standards that are required to supply big retail chains.

Table 15: SFB's main distribution channel per macro-region

Macro-region	Main channel of distribution					
	Wholesaler	Small retailer	Supermarket	Direct sale	Farmers' market	Other
EE	16%	9%	7%	48%	13%	7%
SE	42%	10%	5%	25%	6%	13%
AFR	27%	22%	2%	39%	7%	2%
NE	17%	17%	3%	52%	3%	7%
All RRs	28%	13%	5%	38%	8%	8%

5. Conclusions: What new have we learnt?

In relation to the cross-cutting question identified in SALSA and expressed in this Deliverable in Table 1, "Which types of SF are identifiable within each region?", we have provided new evidence on the types of small farms that can be found across a gradient of regions in Europe and some regions in different parts of Africa. Just by the fact that our sample covers a diversity of small farms across all these regions, and analyse them together, the evidence is new, as existing typologies focus on the African context per se, or on Eastern Europe, or on particular case study areas (Davidova et al 2012; EPRS 2014; Sutherland 2019). Furthermore, our sample shows there are quite differentiated types of small farms, that although sharing some characteristics, also have specific profiles. The degree of orientation to the market and the wealth generated seem to be the most differentiating dimensions.

The SALSA Analytical Framework (D.1.2.) proposes that the main differentiating dimensions of small farms types would be the farm's degree of market integration and household self-sufficiency, which would result in the classification of the different small farms in a "continuum from self-sufficiency to export-oriented" (Brunori et al 2017). The results of the data analysis presented in this Deliverable do partly support this assumption, but also challenge it. A novel differentiation of small farm types emerges from the SALSA sample. For the farms considered in the sample, no doubt that market integration is a strong differentiating factor, and clearly Types 1 and 3 are positioning in a side with a weaker relation to the market compared to Types 2, 4 and 5, which have stronger relations to the market, and as such, more market dependency. Interestingly, all types of small farms show a quite close relationship with their household, keeping a share of their production (higher for 1 and 3 than for 2, 4 and 5) and thus supplying a considerable share of the food consumed by the family. A small share is also given to friends and neighbours.

The share of the family's income derived from farming, expressing how important farming is for the household's economy, is relatively varied across types, but tend to be around 50% in the largest part of the sample. What appears as highly differentiating is the turnover in the farm and thus the income generated, dividing small farms in between those which seem to struggle and may be close to poverty, from those small farms who are doing well, by being specialized and organized in cooperatives, or multifunctional and integrated to the market in diverse ways. Besides market integration, the different position of small farms seems to be in a continuum between poor and richer farms. This seems also to have a context-based explanation, as some types appear clearly more frequently in some regions than in others. The high geographical pattern in the distribution of types (Annex I), is nevertheless not a new finding, as it already stated in existing literature (EPRS 2014; FAO 2014).

In relation to research question 3, "What is the relevance of non-marketed SF production for rural HH?", shown in Table 1, we are presenting new evidence. Our results bring new insights not clearly foreseen in SALSA's Analytical framework and will justify in any case the revision of the SALSA Conceptual Framework planned for the end of the project. The fact that literature is so scarce in the analysis of Food Self Provisioning (FSP) for small farms within the European context (Jehlička et al. 2018; Smith and Jehlička 2013), any knowledge provided on this dimension is new. But in addition, the intensity of FSP across all types of small farms in our sample is noteworthy.

As a food system outcome, the share of the food which does not circulate to the market is extremely relevant, as it contributes mainly to the FNS dimensions which should be paid particularly attention to access and utilization (Ingram 2011). Furthermore, it secures adequate access and utilization of food, avoiding the environmental costs of food conservation and transport, and also, and most probably in most cases, due to the scale of

production, reducing strongly the environmental costs of production per unit of food produced (Ericksen 2008b).

Considering all the qualities and potential of FSP, described in the scarce literature on the subject, this dimension of the small farms' role in the regional food systems, and thus on food and nutrition security, should deserve reinforced attention – also in Europe.

With regard to research question 8, "What have been the trajectories of SF?" (Table 1), through the present analysis there are new outcomes to be highlighted. Most small farmers exist because of family's heritage and tradition, which is not new. But still, there are types of small farmers where a significant proportion started farming looking for new business activities, and others looking for a lifestyle change. This means that small farming can be attractive for some people. When lifestyle is the main reason, it is not surprising that the income generated is not one of the highest. But for those who opted for farming as a business opportunity, mostly in Type 1, it is worth noting that they have one of the lowest turnovers and do not seem to generate much income from the farm. The difficulties that this type of small farms is facing should be further explored and understood.

Regarding research question 10, "What are SF resilience strategies to face social, economic and environmental constraints?" not much can be gleaned from the household surveys alone. As Darnhofer *et al.* 2016 argue, a relational perspective allows for a more comprehensive approach to understand the resilience of farms. Thus, this question needs to be answered in a joint effort between WP3, 4 and 5 in order to obtain a more holistic view. The results shown in this Deliverable demonstrate that small farms in general tend to diversify production (both to stay within the HH and to be sold), although the more market integrated, the less diversified they are, thus, increasing their chances of suffering from shocks in external drivers, be it the market, climate, or others. This is also directly related to autonomy. Those farmers who are less market oriented are less likely to suffer from external shocks than those who depend on markets etc. for their work to be continued unaltered.

We can conclude that the use of typologies in order to understand the role of small farms and their livelihood strategies, problems and future expectations is a good tool, which reduces complexity for research purposes and allows planning better tailored policies and interventions, and thus, facilitating the success of development strategies.

On small food businesses, our results suggest that a variety of small food businesses provide links between small farms and their markets, and that the businesses themselves are a source of livelihoods and market connections for rural households. However, our data showed SFB are flexible to adapt their production and business strategies (e.g. by extending their seasonality) and, thus, choose multiple distribution channels to reach the market.

Most of the businesses in our sample carried out some sort of processing. Retailing was another common activity, followed by cooking and others. Processing is more prevalent in Eastern and Southern Europe, whereas retailing was more common in Northern Europe and Africa. The links between small food businesses and small farms were found to vary by region. This connection is particularly strong in Southern and Eastern Europe, suggesting the importance of small farms as suppliers of raw material for agro-food processing. In Africa and Northern Europe, the connection between small farms and small food businesses is less strong.

Small food businesses use a variety of commercialization pathways, but we found the most common to be direct sales to consumers. This pathway gives small food businesses greater control and flexibility, and presumably better prices. Sales to wholesaling were very important for businesses in Southern Europe and the processing SFB type, possibly due to their connection to specialized export markets.

5. References

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ANNEX I

Figure 1. Regional distribution of small farm types (%)

Reference Region	Code	Types				
		1	2	3	4	5
Montana (BG)	RR01	60	20			20
Santiago Island (CV)	RR02	14	14	71		
Varazdinska (HR)	RR03		100			
Jihocecky Kraj (CZ)	RR04	25	25	0	50	0
Ille-et-Vilaine (FR)	RR05	10	20		50	20
Vaucluse (FR)	RR06	11	22	33	33	
Gushegu District (GH)	RR07	25		75		
Imathia (GR)	RR08	3	5	3	82	8
Larisa (GR)	RR09	13	21	16	42	8
Ileia (GR)	RR10	5	50	29	13	3
Lucca (IT)	RR11	12	23	4	50	12
Pisa (IT)	RR12	8	42	8	29	13
Ugunja (KN)	RR13	38	8	21	21	13
Latgale (LV)	RR14	3	21	24	17	34
Pieriga (LV)	RR15	5	29	43	14	10
Vilniaus Apskritis (LT)	RR16	20	10	10	50	10
Balaka District (MW)	RR17	29	18	36	11	7
Hedmark (NO)	RR18	3	3	7	62	24
Rzeszowski (PL)	RR19	7	11	81		
Nowosadecki (PL)	RR20	2	13	52	17	15
Nowotarski (PL)	RR21		18	65	18	
Alentejo Central (PT)	RR22	16	39	13	13	19
Oeste (PT)	RR23	6	18	30	39	6
Bistrita-Nasaud (RO)	RR24	3	37	53	5	3
Giurgiu (RO)	RR25	31	15	50	4	
Castellon (ES)	RR26	4	58	25	13	
Cordoba (ES)	RR27		67	21	13	
Haouaria (TN)	RR28	6	76	18		
East Scotland (UK)	RR29	57	29		7	7
West Scotland (UK)	RR30		50			50