

## Strategies to valorise agrobiodiversity

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**Abstract:** *The current food value chain is characterised by a highly standardised offer produced in an increasingly monotonous agricultural system. In parallel, there is a growing interest among consumers for traditional or regional crop varieties. The conservation of these crops is often done by civil society organisations like Arche Noah, Pro Specie Rara, Rete Semi Rurali, Réseau Semence Paysanne or Red Andaluza de Semillas. Some networks sell their food products in local niche markets, specialised stores and supermarkets. To increase their visibility, some producer groups in the networks are interested in developing or improving a label to valorise agrobiodiversity to the consumer. Based on a representative consumer survey in four European countries, we show that consumer awareness with respect to traditional, old varieties is low but the interest in "Diversifood", defined as more diverse, locally adapted, healthy and tasty produce, is substantial. Therefore, we state, that the availability of a label to valorise agrobiodiversity would respond to consumer needs and increase the visibility of the work done by the networks – but only if it is embedded in an appropriate communication strategy aimed at raising consumer awareness about agrobiodiversity.*

**Keywords:** *Agrobiodiversity, consumer awareness, diversity, food value chain, valorisation strategies, brand triad*

### Introduction

Agricultural biodiversity or agrobiodiversity is the diversity of agricultural systems from genes to varieties and species and from farming practices to landscape composition (Pautaso et al., 2012). This agrobiodiversity in terms of diversified landscapes and landraces is created by generations of farmers from diverse environments.

On the policy level, the topic of agrobiodiversity was addressed for the first time 1996, within the process of implementation of the Convention of Biological Diversity at the Conference of the Parties – COP 3. Afterwards, the Convention of Biological Diversity and the Food and Agriculture Organisation included the topic of agrobiodiversity in their work (Martins 2015). Today national and international gene banks are mandated to preserve crop varieties with different strategies, e.g. in-situ or ex-situ, in vivo or in vitro (Martins, 2015). In spite of ongoing conservation efforts, in many regions, this crop agrobiodiversity is under threat, e.g. by land use intensification, structural changes in the agricultural sector (including seed regulation) or invasive species (Pautasso et al., 2013).

Different from national or international gene banks, which focus on ex-situ conservation, non-profit networks promote the dynamic in-situ management of agrobiodiversity in collaboration with farmers, gardeners and researchers. That includes the sharing of seeds, and exchange of knowledge and expertise associated with seeds, their use and multiplication (EC-LLD, 2018). In Europe, such examples are, among others, Arche Noah from Austria, Red Andaluza de Semillas from Spain, Réseau Semence Paysanne from France, Rete Semi Rurali from Italy, and Pro Specie Rara from Switzerland.

In the recent years, these networks see a growing interest in local, traditional varieties and products thereof. This is why some networks use a label or logo to inform consumers about

the added value of agrobiodiversity, and other are thinking about developing one. In the course of the EU funded multi actor project DIVERSIFOOD ([www.diversifood.eu](http://www.diversifood.eu)), it was investigated, how the networks involved in agrobiodiversity conservation could further develop their valorisation strategies with a special focus on the role of a label for diverse food based on agrobiodiversity (Diversifood).

## Methods

The "Brand Triad" concept was used to develop recommendations for the further development of the valorisation strategies "brand triad" concept was used. The concept has already been used in the analysis of marketing strategies in the organic food sector (Schrot&Korn, 2016) and addresses three topics: (i) consumer awareness, (ii) consumer sympathy/involvement and (iii) consumer purchase. The brand triad says that consumers develop from not knowing a topic to becoming sympathisers and only afterwards to buyers (Blum, 2016).

To develop recommendations for a valorisation strategy, a qualitative and a quantitative approach were combined in two consecutive steps. In a first step, qualitative information about the existing valorisation strategies for agrobiodiversity was collected from four cases from the network. Three cases outside the networks were included, due to their market success (Tab. 1).

Based on the outcome of the qualitative study, a representative consumer survey was designed and conducted in the four European countries, where cases from the network were examined. Based on the brand triad approach, the questionnaire covered (i) consumers' awareness with respect to traditional old vegetable varieties (consumer awareness) (ii) sympathy for the idea of so-called 'diversifood' vegetables (sympathy/ involvement), and (iii) intention to buy as 'diversifood' labelled vegetables (consumer purchase).

**Table 1.** Selected cases included in the qualitative and quantitative analysis.

Country	Example	Products	Product Label	Qualitative study	Consumer survey
Austria	Arche Noah	Annual, perennial crop plants and flowers	Yes	x	
Spain	RAS - Red Andaluza de Semillas	Cereals and vegetables	Under development	x	x
France	RSP - Réseau Semence Paysanne	Cereals and vegetables	Under development	x	x
Italy	Grani Antichi di Montespertoli	Cereals	Yes	x	x
	Pomodori di San Marzano	Tomatoes	Yes	x	
Switzerland	PSR - Pro Specie Rara	Annual and perennial crop plants and flowers, livestock	Yes	x	x
	Bioverita	Organically bred crops	Yes	x	

The survey was conducted in Italy, France, Spain and Switzerland. France and Spain were selected, because of the interest of the networks Réseau Semence Paysanne and Red Andaluza de Semillas in the development of a label. Switzerland and Italy were selected due to the potentially high consumer awareness. Due to financial limitations and the already well-developed valorisation strategy, a survey was not conducted in Austria.

The survey was conducted online in August 2017 (10th to 21st of August). The participants were recruited by country-specific online panel providers, which are known for the active recruitment of their panellists. Respondents were only eligible to participate in the survey if

they stated (i) not to work in the food or marketing sector, (ii) to be between 18 and 79 years old, (iii) to be responsible for food shopping, and (iv) to buy vegetables, even very rarely. In Switzerland, a total of 508 people replied, in France 500, in Spain 568 and Italy 506 (a total of 2082 respondents). For all four country samples, sampling weights were applied concerning age, gender and region. All four samples are representative of the target population.

## Results

### Collection of different valorisation strategies

**Pomodoro San Marzano dell'Agro Sarnese Nocerino DOP:** Besides the organic label, the EU offers three possibilities to label a special quality of food: protected designation of origin (PDO), protected geographical indication (PGI), and traditional specialities guaranteed (TSG). Products registered under one of the three schemes may be marked with a logo for that scheme to help identify those products (EU Regulation No 1151/2012). In 1996, the “Pomodoro San Marzano dell'Agro Sarnese Nocerino DOP” was the first horticultural product to be granted the PDO label by the EU (officially ratified three years later in 1999).

The Consortium of the Pomodoro di San Marzano PDO consists of producers and processors. It aims at improving the valorisation of the regional production of the Pomodoro di San Marzano and fostering the economic development of the region.

The PDO label does not stand for old varieties or traditional tomato varieties, as seedlings for the production can be selected hybrids bought from companies located outside of the PDO production area. However, the PDO label grants that production and processing take place within a defined region. The peeled, canned tomatoes with the PDO sign are sold in Europe and exported to the US and Far East. Certification and control of the label are done by certification bodies (Third-party certification) allowed to control PDO labels.

**Bioverita from Switzerland:** Bioverita is the name of a private label owned by a same-named association. The association aims at promoting the use of organic seeds. The label is used in combination with the organic label and informs consumers about the special quality of the seeds. Today, 40 crop varieties are allowed to use the label Bioverita and about 20 products with the label are available in specialised organic stores and supermarkets.

Concerning certification, there is only an internal control for the use of the label (first party control). Nevertheless, there is the third-party certification for the organic production.

**Grani Antichi di Montespertoli:** The municipality of Montespertoli is located 35 km west of Florence in Tuscany. In 2004, the association Grani Antichi (Ancient Grains) was created to market food products made within a 70 km range. In 2008, a small group of farmers, researchers, a baker and a miller started working with traditional wheat varieties from the municipality. Today, the traditional wheat varieties and products thereof (bread, flour, pasta) are the main products sold by the association. The products are available at farmers' markets, farm shops, box schemes, (regional, national, international scale) and gastronomy.

Bread and pasta are also sold through specialised shops, small-medium size retailers, small bakeries, a mill and a school canteen. The group uses a label for all the products produced in the municipality of Montespertoli. The label fits within the national legal framework of Marchio Collettivo (Collective Trademark) and Chambers of Commerce. All the farmers or companies in the network either are organic producers or participate in a control system, called *Garanzia Partecipata* ([www.garanziapartecipata.it](http://www.garanziapartecipata.it)), involving producers, consumers and technicians.

**Arche Noah:** The association Arche Noah was established in 1990 as an initiative of heirloom gardeners, farmers and journalists, worried about the loss of seed diversity. Today there is an operational office, which connects the different groups and offers training and education. The association works with the Austrian Organic Farmers network, the Slow Food

movement and seed networks across Europe. The funding for the activities comes from projects and donations.

Arche Noah products including seeds and planting materials are mainly available via farm shops, organic shops, pop up shops and markets. The supermarket Spar is allowed to use the logo of Arche Noah on the package of the onion together with the claim “so wie früher” – “like in the old days”. Here, SPAR advertises the onion *Schoderleer Zwiebel* as especially tasteful and as a traditional product of Austria. The packaging of the onion also shows EU organic label, a GMO-free label and a photo of the farmer who maintained the variety.

**RSP - Réseau Semence Paysanne:** The Farmers' Seeds Network was founded in 2003. It is an umbrella organisation of over seventy organisations involved in promoting and using agrobiodiversity and related know-how. The network is coordinated by a small administrative office. RSP has a special focus on the collective management of seeds, and the scientific and legal recognition of farmers' practices of breeding and seed exchange. To finance the activities, the network depends on donations and project money.

In 2011, the Réseau Semence Paysanne RSP decided to work on a tool, which would allow the identification of food (vegetable, fruits, cereals, bread, etc.) produced from farmer seeds. With the tool, they wanted to make their products visible to consumers. Within RSP, the actors agreed on a definition for products to be sold as “semences paysannes”. In 2017, an international supermarket planned a national campaign about food diversity and farmer seeds and approached some farmer's organisation of the networks. As a reaction, RSP stopped the further development of an identification mark and re-started the whole process.

**PSR - Pro Specie Rara:** PSR was founded in 1982 and has today a head quarter in Basle and branches in Geneva, Belizean and Germany. It is the leading organisation dealing with saving, promoting and developing the genetic diversity of cultivated plants and livestock species in Switzerland. It works through supporting and promoting of the cropping of old, traditional varieties, seed propagation and breeding new lines with interesting characteristics from old varieties. Currently, the organisation has 25 employees and 3'700 active breeders/seed savers. The funding for their activities comes from private donors, foundations and projects.

PSR has an established supply chains with one of Switzerland's leading supermarket, but also with restaurants and selected seed companies. In this cooperation, PSR uses its logo. In 2015, there were 558 users of the logo, and 100 of them are selling products. A consumer survey conducted in 2014 showed that 30% of the Swiss population knows the Pro Specie Rara-logo. The organisation is currently working on a control and certification system for their products to maintain consumer trust.

**RAS - Red Andaluza de Semillas:** The network RAS aims at in the reintroduction of local, traditional and farmers varieties in the small-scale production and consumption. The networks link the increasing number of farmers who have recovered some cultivars, with other stakeholders from research and the civil society. Together, they form an informal network to preserve native varieties.






Today, RAS has 300 individual members (e.g. farmers, gardeners, processors, consumers, researchers) and 100 collective organisations, e.g. farmer's cooperatives consumer groups. A small administrative office coordinates the network and links it with the European networks involved in seed conservation and maintaining seed diversity. They valorise these products mainly through short supply chains linked to organic production and local markets. At food festivals, consumers value RAS products for their organoleptic and nutritional characteristics. Some farmers in the network would like to use a label, to distinguish their product from others.

### **Comparison of the valorisation strategies with the brand triad concept**

**Consumer awareness:** Five cases use a label or logo with the aim to raise consumer awareness about the special quality of the product. Among them, the PDO label, which is a

quality label of the EU, which might be familiar to consumers, and the label Grani Antichi di Montespertoli. Other labels from tab. 2, (PSR and Arche Noah) stand for the organisation or the network and do not directly communicate a message. This is why PSR uses the claim "alte Sorten neu entdeckt/ old varieties rediscovered" and Arche Noah "so wie früher/ as in the old days" when the products are sold in a supermarket far away from the producers. In addition, PSR informs consumers in supermarkets at the PoS with booklets and flyers. RSP has planned to use the claim "semence paysanne en réseau" for their products.

**Table 2.** Valorisation strategies used in the investigated cases

Example	Label/Logo used on products	Product attributes	Sales Channels
<b>Examples from the seed networks</b>			
ARCHE NOAH, AT		Diversity, Food diversity Special colour, taste "So wie früher/As in the old days"	Farm shops, Markets Few products sold via a selected supermarket
Semence Paysanne en Réseau, FR	Product sign under development	Agrobiodiversity Peasant seeds, Diversity of crop plants	Farm shops, Markets, Bakeries Some farmers association from the network cooperate with a supermarket
Pro Specie Rara, CH		Agrobiodiversity Local, traditional variety "old varieties rediscovered"	Farm shops, Markets Few products sold via supermarket Coop
Red Andaluza de Semillas, ES	Some farmers are interested in using a PDO label	Local, traditional variety	Farm shops, Markets Bakeries
<b>Examples outside the networks</b>			
Grani Antichi di Montespertoli, IT		Agrobiodiversity Tradition, Taste	Local Farm shops, Markets Bakeries
Pomodori di San Marzano, IT		Produced in a Region Tradition Taste	Supermarkets Specialised shops
Bioverita, CH		Organic plant breeding	Supermarkets

However, activities linked to raising consumer awareness are limited. RAS, Grani Antichi di Montespertoli or RSP involve consumers directly, be it with the participatory guarantee system or by trainings offered to consumers. RAS, RSP and PSR participate in markets with seeds and planting materials or food fairs, which gives them the opportunity to talk about their missions and goals.

All the cases use a homepage providing information about their mission and activities. The consortium of the Pomodori di San Marzano, PSR and RAS use also facebook. Grani Antichi di Montespertoli, RAS and RSP focus on local markets and artisanal processing, where the farmer, producer or baker can provide information about the organisation or network.

**Sympathy/Involvement:** The main messages communicated to the consumers via the home page are crop plant diversity, agrobiodiversity, seeds developed by peasants, organic plant breeding but also traditional varieties and locally produced. Some of the networks relate their activities to a paradigm shift in agriculture and food production.

The focus of the networks like RAS, RSP or RSP to cooperate with peasant farmers, short supply chains or with chiefs could increase sympathy for the product.

**Purchase:** Regarding sales channels, it was found, that some networks cooperate with supermarkets, e.g. Arche Noah, Bioverita, or Pro Specie Rara. The network RSP was interested in the cooperation with a supermarket. The network has carefully chosen a partner, but the cooperation is not in place yet, because a different supermarket chain started a campaign on the topic of "semence paysanne". The canned Pomodori di San Marzano are available in all kinds of shops and there is export to the US. For the seed network RAS and Arche Noah, or Grani Antichi di Montespertoli, the main distribution channels are farm shops, markets, specialised shops (e.g. bakeries) and restaurants. The cooperation with artisanal processors seems to be crucial.

### Results of the consumer survey

With respect to gender, age and household size, the country samples have a comparable structure: The proportion of female and male respondents is almost balanced; the average age is between 45 and 47 years, with the lowest age group (18 to 29 years) having the smallest share (15% – 18%). The average household size in the sample is three members.

With respect to education, employment and income the sample structure differs across countries: In Switzerland and France the target population has a significantly higher education on average; in Italy the share of the working population is significantly smaller; in Spain the population share with a middle income is significantly larger than in the other three countries.

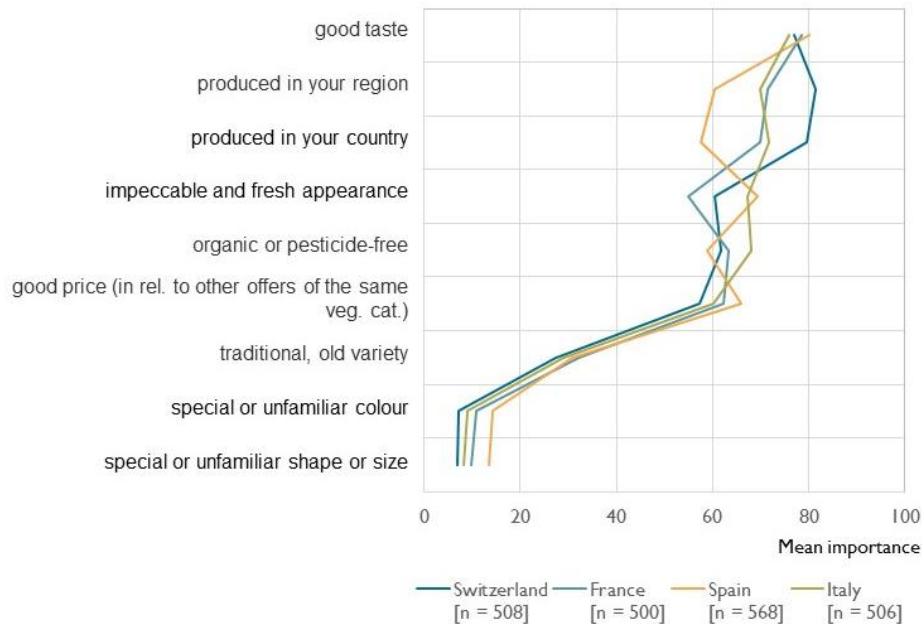
**Consumer Awareness:** To quantify the consumer awareness concerning traditional, old varieties, participants were asked about the importance of nine different purchasing criteria when buying vegetables, including the three criteria 'traditional, old variety', 'special or unfamiliar colour' and 'special or unfamiliar shape or size'.

Overall, responses strongly depended on participants' country of origin. In Switzerland, France and Italy "produced in your region", "produced in your country" and "good taste" are the three most important criteria, with "produced in your region" and "produced in your country" having a significantly higher importance in Switzerland than in France and Italy. In Spain, the three most important criteria are "good taste", "impeccable and fresh appearance" and "good price". The criterion "produced in your region" only comes fifth. However, in all four countries, the criteria "good price" was not a priority.

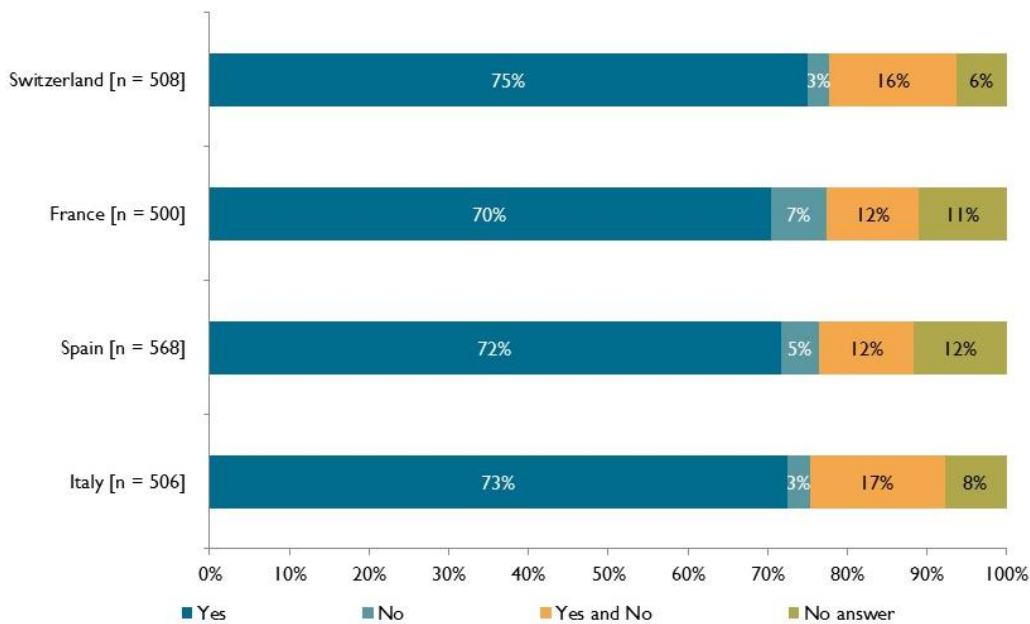
The criteria relevant for the networks, "traditional, old variety", "special or unfamiliar colour" and "special or unfamiliar shape or size", have relatively low importance, compared to the others, occupying the last three ranks in all four countries. Figure 1 shows the relative importance of all nine criteria in France, Italy, Spain and Switzerland.

**Sympathy/Involvement:** To ensure comparability of results across countries, a generic 'diversifood' label was created and introduced to all survey participants half-way through the questionnaire using vegetables as an example. The information given consisted of two parts: (1) raising awareness about the problem of a highly standardized food value chain; (2) 'diversifood' as an idea to solve that problem. The term 'diversifood' was defined as more diverse, locally adapted, healthy and tasty products resulting from the breeding and multiplication of seeds by farmers.

To quantify consumers' sympathy for the idea of 'diversifood' vegetables, participants were asked to evaluate the idea after it was introduced. Figure 2 shows that the majority of respondents liked the concept and about 15% gave a neutral (yes and no) answer indicating the need for further information.



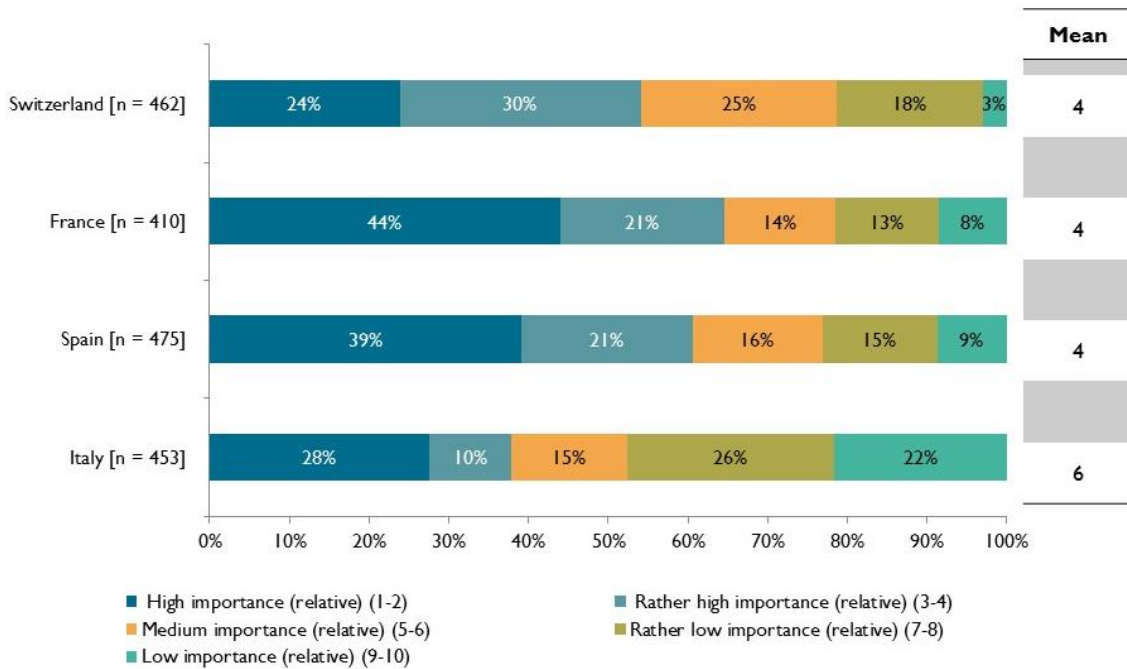
**Figure 1:** Answers to the question: When you are in a supermarket and considering to buy some vegetables, which criterion is most important to you and which criterion is least important to you? The scale on which the importance of criteria is measured is metric and can be interpreted as “points of importance”. Therefore, a criterion with 82 points is for example twice as important as a criterion with only 41 points. Furthermore, a criterion with only 10 points is by far less important than a criterion with 80 points. However, the criterion can still be important. Therefore, a criterion with 10 points is RELATIVELY and not absolutely less important than a criterion with 80 points.



**Figure 2:** Answers to the question: Do you like the idea of 'diversifood'?



**Consumer Purchase:** To quantify consumer purchase participants were asked to rank the introduced “diversifood” label among the other nine purchasing criteria used to quantify consumer awareness on traditional, old varieties. Attitudes varied quite significantly. However, for more than half of the Swiss respondents “Diversifood” has at least a “rather high importance (relative)”, which corresponds to a rank of three or four. In France and Spain, the share is somewhat larger and in Italy significantly smaller with 38%. On average, people in Switzerland, France and Spain would place “diversifood” on rank 4, corresponding to a rather high importance, and people in Italy on rank 6, corresponding to a medium importance (Fig. 2).



**Figure 3:** Importance of the introduced “Diversifood” label compared to other nine criteria shown in Fig 1. The respondents had to reply to the following question: Please imagine again you are in a supermarket and considering to buy some vegetables. As a new feature, this supermarket now also offers “Diversifood” vegetables, which are marked with the “Diversifood” label. It means that you now can choose between farmers’ varieties (= with “Diversifood” label) and industrial varieties (= without “Diversifood” label). Below you can see ten criteria, which can be important when buying vegetables, including the “Diversifood” label. If you had to rank them from 1 (most important) to 10 (least important) what rank would you assign to the “Diversifood” label?

To further investigate the consumer purchase theme, respondents were also asked about channels used to buy food, including the main purchase channel. Respondents in all four countries, said, that supermarkets are the most important place to buy food. When people were asked more generally, “Where do you buy food?” also other purchase channels were selected, but supermarkets remained essential (Fig. 3). A substantial number of people in France, Spain and Italy buy food on the local market or in speciality stores. In Switzerland, the farm shops directly selling food to consumers play an more important role than in the other three countries. Other sales channels are less important, e.g. online stores for food or box schemes.

## Discussion

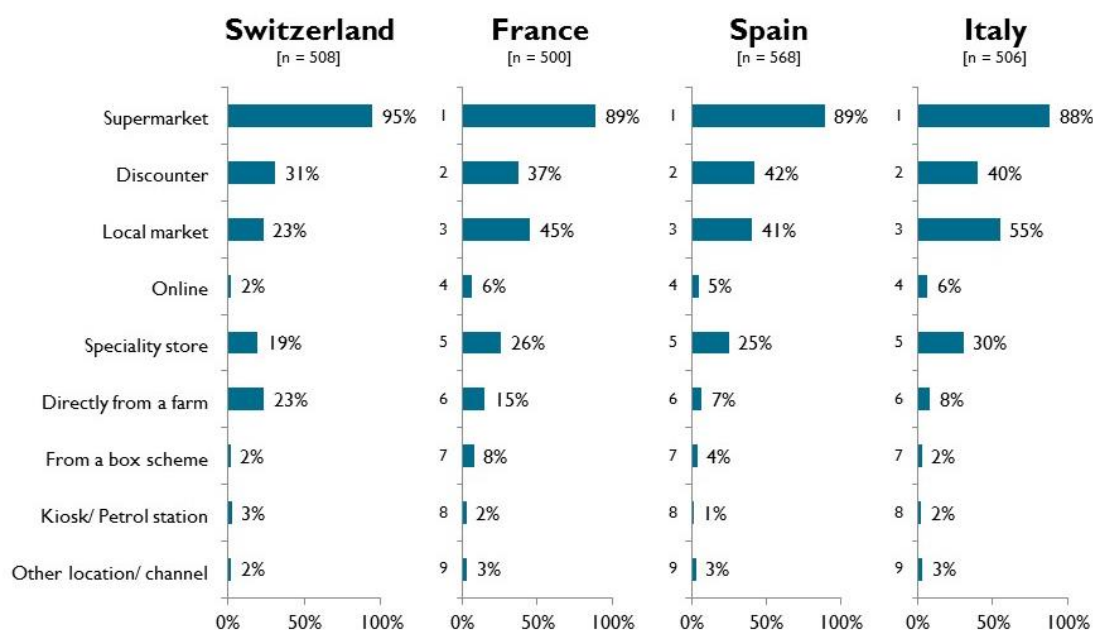
The results of the consumer study show that consumers have a limited awareness of the issues on which seed networks are working. In all countries, consumers attach importance to and are therefore aware of organic or pesticide-free production, local or regional production and good taste. The topics relevant to the networks (e.g. special or unfamiliar shape, size or colour, traditional, old varieties) are clearly less important to consumers, which is most likely due to a lack in consumer awareness. However, the significant sympathy towards



'diversifood' and the importance attached to the hypothetical 'diversifood' label suggest that an appropriate communication strategy aimed at raising consumer awareness can be effective to valorise agrobiodiversity. Furthermore, linking products to organic production, as it is done in the cases of Bioverita or Grani Antichi di Montespertoli, or to local production, as it is done in the case of PDO labels can be a promising strategy as it allows to profit from the existing consumer awareness. The country-specific differences in the importance of different purchasing criteria suggests that in Switzerland, France and Italy a link to regional or local production would be particularly beneficial, and in Spain a link to 'good taste'.

In the literature, several studies show, that there is a growing interest among consumers for organic, sustainably produced but also local, regional food products (Pieniak et al. 2009, Fernández-Ferrín et al. 2017, Herrera and Blanco, 2011; Aprile et al., 2012). Consumer demand for these types of products may derive from opposition to globalisation and industrialisation in food production (Jordana, 2000). Aprile et al. (2012) found, that concerning labels certified by the EU, consumers attribute a higher value to a PDO than a PGI label and that the label for organic farming is valued more than the PGI label. In addition, Fernández-Ferrín et al., (2018) showed, that the PDO profit from the positive image of local or regional products among consumers. The case investigated here covers the topic of regional production, but seedlings are imported, the seeds used for production are neither regional nor traditional and the production system might be traditional, but it is mainly conventional.

Whereas some partners in the different network are interested in using a PDO label, others do not like the PDO label approach because they fear that with the PDO label, the exchange of seeds could be limited. Interestingly, the Spanish consumers are not that interested in regional or national production, even though in Spain, a lot of PDO labelled products are offered to consumers.



**Figure 4:** Answers to the question: In general, where do you buy food? Supermarkets remain the most important purchase channel for food in Switzerland, France, Spain and Italy. Again, local markets are relevant sales channel in France, Spain and Italy but less so in Switzerland. The importance of farms as food suppliers is higher in Switzerland than in the other three countries.

Regarding purchase channels, consumers in the investigated countries buy their food mainly in supermarkets, even if markets, specialised shops and farm shops are relevant (Fig. 4). That sympathisers evolve into buyers, the products must also be recognisable and purchasable in the consumer environment, and this would include supermarkets. Having products in a supermarket could be a strategy to raise awareness among consumers. Also

the supermarkets would profit from the cooperation, the networks should negotiate special conditions for the supply, e.g. product availability only once a month, limited editions etc.

The supply of supermarkets is often linked to the production of high volumes of a product in constant quality. For the producers in the networks, this is only challenging, because they reject the required constant quality of their products. The sales channels selected by the partners in the networks - local markets, speciality shops and farm shops - are adapted to their current ability to supply the market and share the goals of the networks.

Additional measures to inform and sensitise consumers towards the labelled product include the use of social media (i.e. Facebook page, or twitter), print media, or a homepage. Nevertheless, the importance of point of sale information, face-to-face communication at farmers markets, food fairs and in farm shops should not be underestimated.

The project DIVERSIFOOD opened the opportunity to conduct systematic market research. The concept of the brand triad addressed the relevant topics in marketing of Diversifood and was well adapted to investigate the strategies of different labels (Blum, 2016). The results indicate how the existing valorisation strategies could be further developed. The networks often avoid spending money for consumer studies, as their funding is limited. Instead of asking consumers, the networks could listen to consumers by directly involving them. According to Kühne et al., (2010) involvement of consumers, but also suppliers and other customers allows having a clear view of their preferences. The direct involvement of consumer has a potential for the networks because it enables communication to consumers and direct consumer research. Regarding the size and the productivity, this strategy seems to be adapted.

The conservation of Agrobiodiversity is not only a matter of consumer choice. In combination with policy measures, consumers can contribute to achieving a more sustainable food system and more healthy diets by shifting their eating practices towards more environmentally friendly and diverse food consumption.

## Acknowledgement

First, we would like to thank our partners Task 3 work package 5 in the DIVERSIFOOD project for their important contribution to this research. The DIVERSIFOOD project is financed by the European Commission under the H2020 Framework Programme for RTD,

Contract n. FOOD-CT-2006-016264. Following a multi-actor approach, the networks mentioned in the paper are partners in the project in addition to universities and research institutions

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