

AFNs in periurban areas: the meeting of food demand and supply as an emergent issue

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Abstract: Alternative Food Network (AFN) is a broad term used for the definition of new food chains, characterized by a shortened relationship between the producer and the consumer, allowing to redistribute between them the social and economic benefits. In periurban agriculture, AFNs are a concrete way to better establish a direct contact between the urban area and its local farming system. At the local level there is also an increasing demand for local agricultural products by urban consumers as well as many examples of policies focused on the food provision for the city. At the same time the risk of having ephemeral experiences of AFNs, demand a deeper knowledge of the relationships between producers-suppliers and the other stakeholders of AFNs. The overall purpose of this contribution is to analyze the selling of local products in urban groceries and to compare their demands with the provision and production strategies of farmers involved in AFNs. The case study was the periurban area of Pisa (86.000 inhabitants, 6 municipalities). In this area, existing AFNs have already been described. Furthermore, several research and policy initiatives have investigated the role of short food supply chain in the area of the Province of Pisa (Piano del Cibo). To explore the relationships in AFNs, we surveyed 4 groceries with different legal status (association, cooperative, individual enterprise) which reflect different strategies to achieve a common goal: be an alternative of the conventional food distribution through the promotion of food quality. All the groceries are small, located in the city centre and they all have tried to have a direct contact with farmers-suppliers of the local products. The groceries involve about 10 farmers producing vegetables, meat, cereals, olive oil, while 32 farmers supplying these products and participating to AFNs were also surveyed in the surrounding area. Farmers' interviews underlined a high potential for the urban food provision for the city, nevertheless all shops have reported troubles to find the local farmers and a lack of knowledge about the agricultural production system. This result suggests a discrepancy in the network at the local level between the supply and the demand strategies. This point confirms on the one hand the need of a deeper knowledge at the micro level about the constraints and conditions that enable actors to be involved in AFNs and some troubles in finding practical instruments for translating into practices the policy's ambition.

Keywords: periurban farming, food system, constraints, on-farm surveys, stakeholders' network

Introduction

The innovative aspect of AFNs is the possibility of new relationships along the food chain, especially between farmers and consumers, and the stronger weight that quality and sustainability have in the food production and provision. (e.g. Marsden *et al.*, 2000; Renting *et al.*, 2003; Deverre and Lamine, 2010; FAAN 2010). Moreover, several studies have underlined the economic, social, environmental benefits that are provided by AFNs (Sage, 2003; FAAN, 2010; Rossi *et al.*, 2013). Different examples of AFNs have been identified in literature, e.g. direct selling, CSA, box-schemes, farmers' markets (Holloway *et al.*, 2007; Aguglia *et al.*, 2008; Marino *et al.*, 2013). However, many differences in case studies investigated, depending on the high degree of flexibility that characterizes the "territorialisation" (Lamine *et al.*, 2012) and the "embeddedness" (Watts, 2003) of these new networks. This led to broader definitions of the different AFNs' typologies (Holloway *et al.*, 2007), in order to better include the territorial complexity, with the risk of including in the analysis "everything" is not conventional and also ephemeral experiences of AFNs (Venn, 2006). For these reasons, it has been claimed a deeper knowledge of the relationship between the farming system and the food system (Venn, 2006). Studies on such two systems have different approach depending on the starting point of the analysis. For example, while usually the literature in AFNs has its starting point in the food chain itself (eg. Aguglia *et al.*, 2008; Brunori *et al.*, 2007; 2012), other approaches focus on producers, and recognise the hybrid and creative character of the solutions orchestrated by farmers and the other food chain's actors both from the so-called "alternative" and "conventional" food chain (Deverre and Lamine, 2010). This means initially to overcome the polarity between "alternative" and "conventional" food chain (Ilbery and Maye, 2006; Sonnino and Marsden, 2006; Holloway and Kneafsey, 2000) that will led to a more extensive and complex understanding of the reason of different stakeholders to participate and promote AFNs.

The overall purpose of this contribution is to analyse the interface between the farming and the food systems through the analysis of the sale of local produce in urban groceries and to compare their demands with the supply and production strategies of the farmers involved in such supply-chain. We considered that this is an AFN since these groceries were born to promote local and quality produce for urban consumers and they searched when possible a direct contact with local farmers. At the same time farmers needed to organise new commercial relationships based mostly on the proximity with the urban local demand's expectations (Renting *et al.*, 2003).

This work has several goals. Firstly, it has a methodological goal, since it is part of a wider research on the strategies of local farmers and local buyers of produce and intermediate actors. Secondly, it is a contribution to the studies that have stressed the importance of local medium-small sized groceries in the promotion of local products, based on the personal relationships and trust between consumers and shopkeepers (Adams and Salois, 2010; Casini *et al.*, 2010).

The analysis starts from the farming system of periurban area of Pisa, a medium-sized city in Tuscany, Italy. In our opinion, AFNs could represent for many farmers in periurban areas an opportunity for the sustainability of their production (Paül and McKenzie, 2013). On the one side, AFNs can help the control of the farm decrease that affect European farming system, and on the other side it will promote a sustainable agricultural land use, thus supporting the food provision (Ansaloni, 2009; Butt, 2013). In medium-sized cities, AFNs development has been claimed as easier, indeed we can assume that the higher proximity between producers and consumers, creates a new market that can support both a higher food production capacity alongside the sustainability of periurban farming (Arnal, 2012); moreover the choice of a short supply chain in these periurban areas has been considered as one an indicator of the farming systems' adaptation to the urban spread (Houdart *et al.*, 2012). Several studies have also pointed out that the periurban farming systems are faced to specific issues of sustainability and constraints, for example regarding some specific kind of AFNs (Brunori *et al.* 2007; Filippini *et al.*, 2013; Giacchè *et al.*, 2013;

Halliday, 2012; Henderson, 2005); this confirms the need of a deeper knowledge of the farming system involved in AFNs. Pisa's case study is also interesting because several research and policy initiatives have investigated the role of short food supply chain in the area of the Pisa Province within a local food plan (Piano del Cibo), highlighting the interest of local authorities to food planning (Di Iacovo *et al.*, 2013).

Materials and methods

To understand which relationship exists between groceries selling local produce in the urban area and periurban farmers supplying them, we proceeded in three steps: the farming system analysis (32 surveys), the food system analysis of the groceries (4 surveys) and a stakeholder analysis of the stakeholders at the interface between the farming and the food system. The 4 groceries are all located in the city center of Pisa (Italy), while the farmers belong to the Pisa's periurban area.. This urban area follows the European urban demographic trend for the last decade: in the last national census (ISTAT, 2011) while the number of citizens has decreased in the city centre (-4%), the nearby urban centers have increased their population on average by 8%. The area is also representative of the Mediterranean small-scale farming where the most important farming systems are winter cereals oriented (26% of cereal oriented farms on the total farms) horticultural oriented (8 %), olive groves oriented (34%), and forage/livestock oriented (16%). The last agricultural census has revealed a decrease in the number of farms (-36% since 2000), especially for horticultural production (-92%), while the average size has slightly increased for all the farming systems (Marraccini *et al.*, 2012).

Farming system analysis

The farms' sample (58 farms) was at first selected regarding the main on-farm land use, the farm's size, and the geographical location in the periurban area (Filippini *et al.*, 2013). Then, among the first sample we selected the 32 farms that deliver at least a part of the production to a local and/or an AFN (Filippini *et al.*, 2013). AFNs types were defined according to Renting *et al.* (2003), particularly the on-farm direct selling and the off-farm direct selling, e.g. door to door, local supermarket, schools, restaurants, oil mills and local groceries. Direct selling away from the urban region has not been included in the analysis, and at the same time has been included the sale of productions to local cooperative, or to supermarket through the collaboration of local intermediate actors.

The farms (Fig. 1) were all surveyed in 2013 with on-farms interviews dealing with their farm territory, the crop management, farm management, land use intensity and individual characteristics. The local food supply has been classified regarding the panel of the on-farm produce: e.g. meat, milk, olive oil, cheese, bread, eggs, vegetables, fruits, honey, the total produce delivered to local market are 50. For each produce, we analyzed the different marketing network in which farmers participate. For each produce the analysis has been made regarding 5 criteria: a) the territorial level of production; b) the processing (inside the farm, external and not necessary) and its location; c) the presence of labels; d) the presence of local intermediate actors for the marketing; e) the presence of constraints that farmers meet when supplying to AFNs. Main constraints analyzed were urbanization constraints, commercial constraints, internal organization constraints, socio-political constraints, regulatory constraints and technical or production constraints (for further details on these constraints see Filippini *et al.*, 2013; Giacché *et al.*, 2013). Between the 32 farms, we selected the 11 farms that are included in the commercial network of the 4 selected groceries, and we analyzed their food productions, regarding the same criteria.

Food system analysis

We surveyed, with a semi-structured interview, four groceries in summer 2013. These groceries are only a part of interviews to the main stakeholders of the food system in the urban region of Pisa (Italy). The groceries are all small (1-2 employees) located in the city centre and have differ-

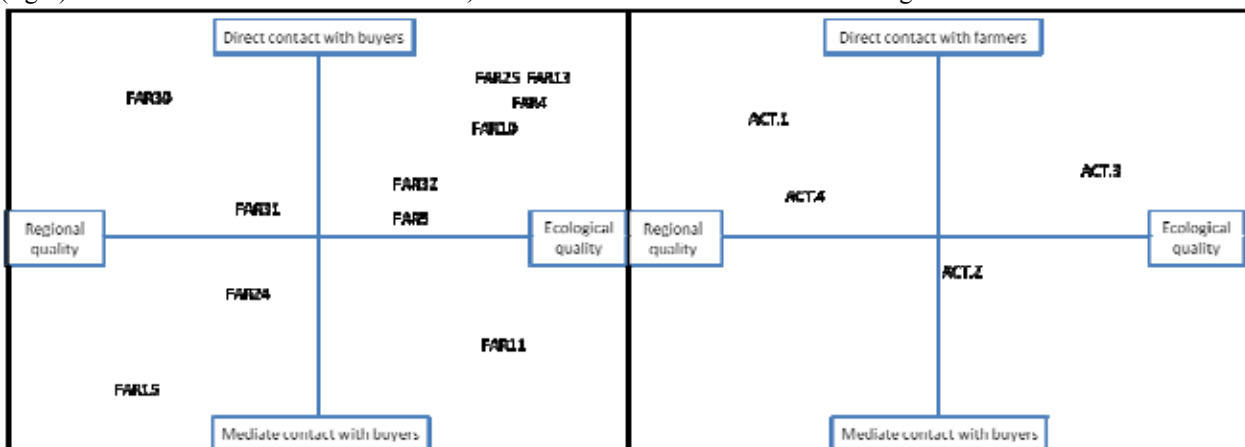
ent legal statuses, i.e. co-operative, association, individual enterprises. Their common mission is to be an alternative to the conventional food network through the promotion of local and quality food, thus with the involvement of the local farmers. This mission is carried out in different ways (Fig.1), reflecting different definitions of quality, from the promotion of organic farming to the promotion of the regional and local farming system; at the same time different strategies are developed reflecting a different approach to the farming system, from the direct to the indirect involvement with farmers in the definition of prices, quantity, general project' mission.

The analysis of the groceries strategies was based on: a) the general produce demand; b) the produce demand from the periurban agriculture; c) the produce quantities, qualities and prices; d) the type of contract with farmers; e) the relationship between farmers and groceries; f) the constraints that the groceries face when they works with periurban farms. For these actors, we identified 4 types of constraints: food availability constraints, prices constraints, food quality constraints and food-chain constraints.

Local food system analysis

In this part we crossed the farming system and the food system analyses. We built the resulting stakeholders' network in order to understand the number of relationships that each grocery has, as well as the total number of alternative commercial relationships that the farms supplying groceries have. We also considered the presence of labeled products (both concerning their origin and their practices of production) and the presence of local intermediate actors in the groceries food supply chain.

Figure 1: Representation of the different surveyed farms supplying local groceries (left) and of the four groceries (right). FAR indicates the code of the farms, whereas ACT indicates the code of the groceries.



Results

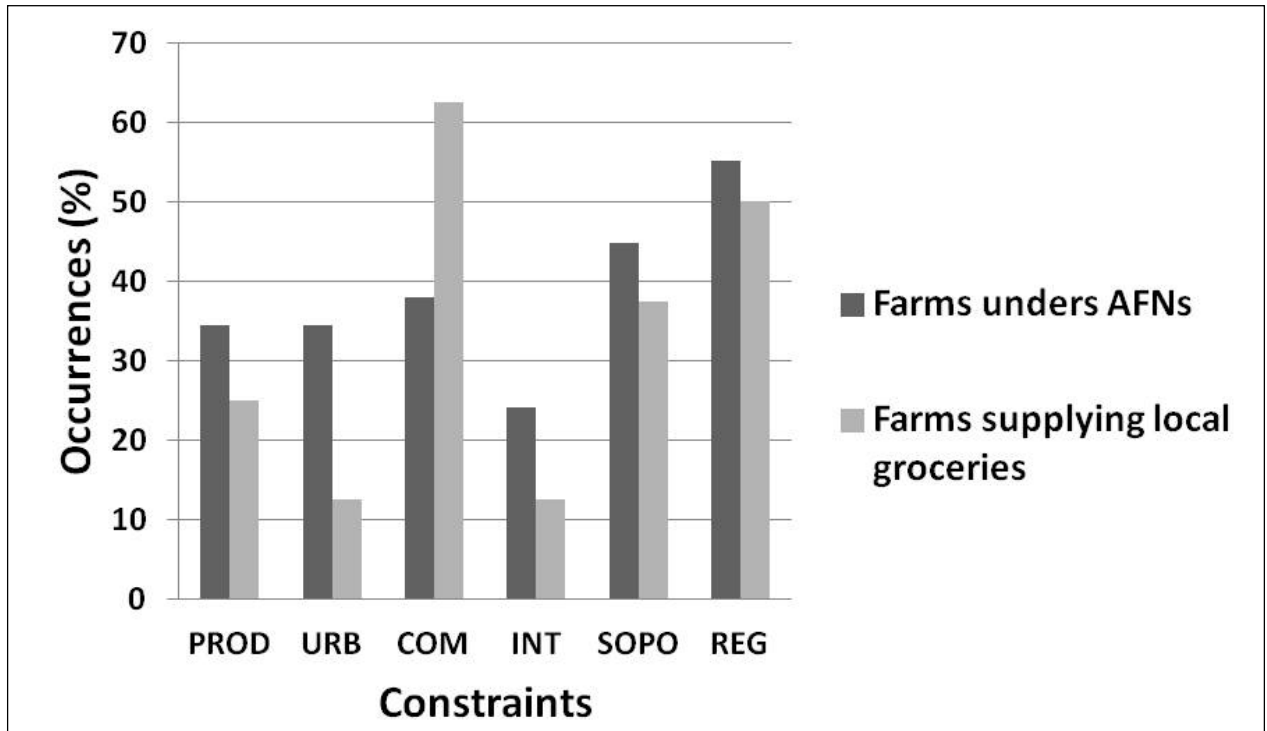
Periurban farmers providing food to local groceries are different than farmers participating in other AFNs

On a total of 32 farms participating to AFNs in the periurban area of Pisa, almost one third (11) were supplying their products to the 4 groceries analyzed. We found differences between these two groups of farms in terms of type of sold produce, labeling and perceived constraints to food production and marketing.

Among the sold products, differences were highlighted either for the type of sold products than for their processing. Both types of farms provided a high panel of produce (12 and 10 products respectively), however those of farms supplying groceries are more oriented to some of them (mainly vegetables, olive oil, cheese and cattle beef), whereas in farms under AFNs we noticed a

less relative importance of these products (data not shown). Moreover, processed products represented around a half of the total farm productions for both types of farms. However, we found that in the farms under AFNs group, on-farm processing represent 28% of the total products, instead of 38% in the farms supplying groceries, thus suggesting that on-farm processed produce are more required by local groceries.

Figure 2: Constraints perceived by farmers under any type of AFNs and by farmers supplying to the analyzed local groceries. PROD indicates the technical constraints, URB the urbanization ones, COM the commercialization ones, INT the internal farm constraints, SOPO the socio-political ones and REG the regulatory constraints.



Furthermore, farms having a label are higher in the latter group (66%) than on the former one (48%). Within the surveyed farms, those presenting a higher labelling are those producing beef cattle (75% and 100% respectively), olive oil (67% in both cases) and vegetables (50% and 100% respectively).

This result also suggests that products with labels may be preferred by local groceries. Perceived on-farm constraints were different for the two groups (Fig. 2), particularly for commercialization, urban and internal constraints. Commercialization constraints were higher in farms supplying local groceries probably because these farms manage a high number of different networks for marketing their products (on average more than two). Probably internal constraints were lower in such farms because farmers have to deal with different marketing networks, therefore are more organized with the technical work. Finally, urbanization constraints are lower for the farms supplying local groceries because they are not proximal to the city but at an average higher distance from the nearest urban areas (on average 2.6 km from the farmstead).

Groceries ask for high quality, organic, processed and tasteful local products

The interviews to the groceries manager showed that they sell a wide range of produce as such milk, meat, cheese, vegetables, olive oil, fruits, jam, eggs, ice-creams, pasta. Such produce illustrate the large panel of local different productions typical of the mixed farming systems of the area. All the shopkeeper stated a preference for processed produce which are easier to preserve and make the consumers more comfortable. The relationships with farmers are often informal and

driven by personal knowledge except in one case where the manager of the grocery asked the intermediation of a farmers union (ACT4). Even though all groceries focus on local produced and quality food, local has a different meaning for them, as such a regional park within the urban region (ACT4), the whole urban region of Pisa (ACT1), the whole Province or to the Tuscan region (ACT2). In one case (ACT3) the focus is on organic food, so the manager has no interest except seasonality to search for local produced food. Of the total amount of farmers currently supplying groceries, farmers from the periurban area represents an important part going from 30% to 60%. Anyway, the shopkeepers claimed for a difficult search of the urban region on-farm produce and in all the cases they declared to be ready to change their suppliers from outside in case they find other farmers meeting their quality criteria. At the interview date, there was no clear knowledge about the food sold, since many of them have just been starting their activity.

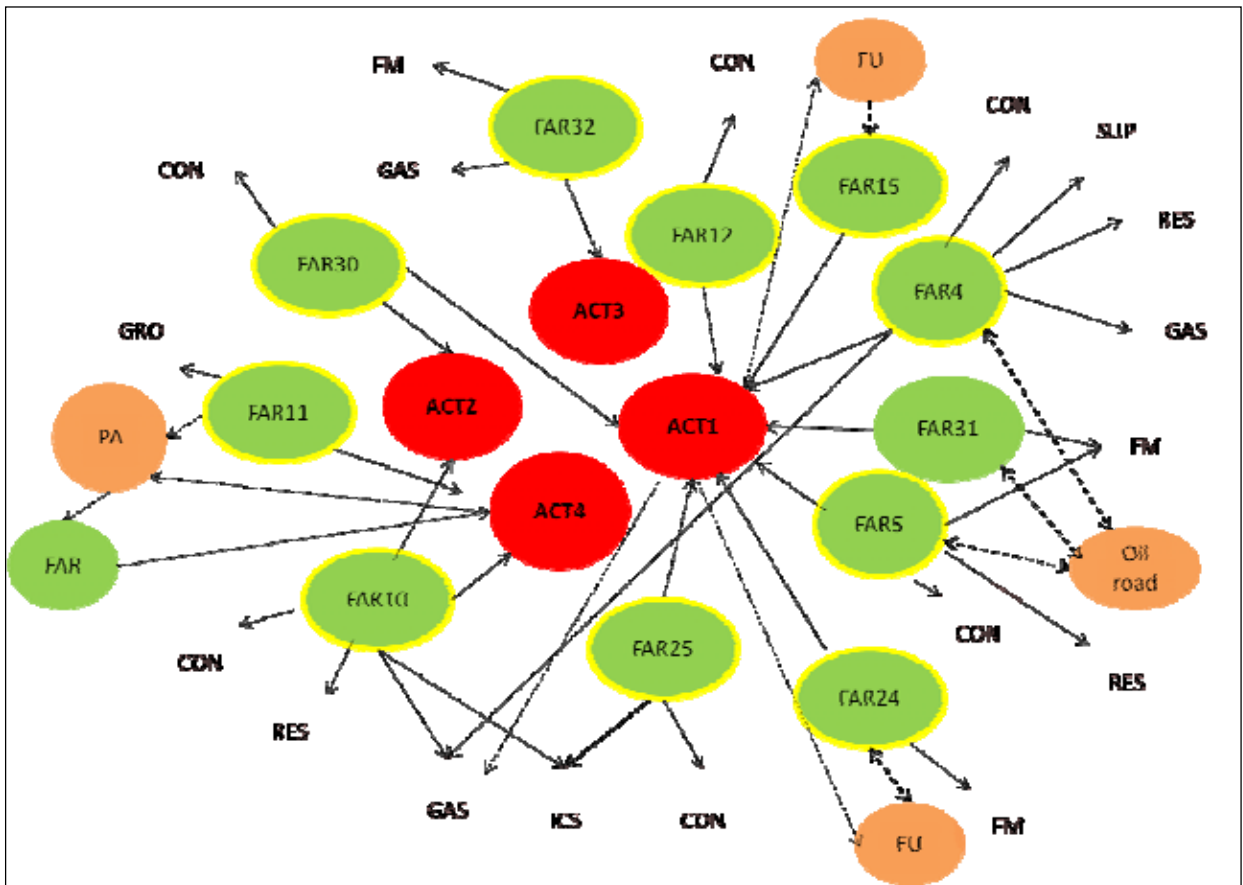
The main constraints for the shopkeepers were the availability of produce, their quality and the food chain organization (data not shown). About the produce availability, beyond the difficult contact with local farmers, the managers highlighted some constraints related to the low quantity of productions related to the small-scale farming in the area which prevents a continuous offer of some products. Furthermore, another issue is the panel of the produce offered by each farmer which is not large, thus claiming for a higher diversification of local farms. About the quality, it was declined by four criteria: local, organic, processed and tasteful products. In almost all the cases, except for the organic criteria, finding such produce is a constraint for groceries. Finally, about the food chain organization, the main constraints are on the one side, the lack of a local food chain, on the other side the consumers' demands in terms of quality food produce.

A complex local food chain around local groceries: role of farmers and other intermediate stakeholders

In Figure 3 we presented the stakeholders' network (suppliers) around local groceries. It is possible to notice that farms supplying groceries have a larger network which is never only link to one grocery, whereas it involves at least one groceries and another network (e.g. farmers' market or direct selling) until five other different networks. This diversification of the commercial networks is not related to the farming systems (no significant differences in the number of commercial relationships) but seem to be related to an individual strategy of the farmer who try to diversify in order to guarantee a regular sale of his produce. Moreover, it is also possible to observe that only in two cases farms supply more than one grocery (FAR10 and FAR30). We explained this result by the recent development of such groceries (except that in ACT3, who is also different from the others because of its focus on organic produce). On the one side, groceries are not aware of their quantitative needs, so they probably try to buy small quantities of produce in order to test the consumers preferences, on the other side, farmers are testing this commercial option among others.

Finally, Figure 3 shows that in some cases, there are some intermediate actors that foster the relationships between the groceries and the farmers, as such farmers unions or producer associations. What it is interesting is that the action of these intermediate actors is more in linking the farmers to support a regular and higher amount of produce supply (ACT1, ACT2, ACT3) rather than in a direct contact with the groceries (ACT4). This is probably an adaptation to the small scale farming of the area, particularly for the fresh produce.

Figure 3: Stakeholders network of groceries selling local produce in the urban region of Pisa. ACT indicates the groceries, FAR the farmers supplying groceries. Other farmers' local buyers (in pink): CON the direct sale to consumers, RES to restaurants, ICS to ice-cream shops, GAS (Solidarity Purchasing Groups), and FM to farmers' markets. The intermediate actors are indicated in orange: PA the producers' association, FU the farmers' union. Farmers with yellow borders have at least one labeled production.



Discussion and conclusions

Results from the stakeholders' network in Figure 3 has showed a high degree of diversity in the organization of the commercial network between farmers and groceries. Above all we noticed that the articulation of the commercial network between local farmers and groceries is mainly driven by individual initiatives. An important role in this process is played by the intermediate actors: the grocery that has involved more local farmers (ACT1) has also contacted different intermediate actors; the grocery without intermediate actors (ACT3) is also the grocery that has more difficulties in approaching local farmers. An illustrative case is the grocery that asks for fresh and organic products (ACT3): our analysis show that different organic producers selling fresh vegetables are already selling to AFN, so they are available to sell products directly in local food chains, but the shopkeeper seems to be not aware of the effective possibility to enlarge the number of farmers' suppliers.

In our opinion, the lack of coordination is a first issue affecting this AFN: generally the farmers that participate in groceries' commercial food network are participating in many other networks, and we wonder the degree of knowledge of other farmers willing to participate, but not already involved. No actions of coordination is made between producers in the supply's strategies (e.g. exchange of products, agreement in the production system supply, action of supply's cooperation), and each producers seem to sell its small contribution of products, balancing the expectations of groceries with the expectations of other commercial network.

The lack of coordination in AFNs is reflecting also in the groceries' strategies approaching local agricultural production: first it is the individual initiative of the different shopkeeper that assures the involvement of different farmers with a diversification of local products offered to the customers; second we notice the necessity of a deeper knowledge of the nature of the local agricultural production, in order to elaborate strategies for the effective meeting of local production system. All the groceries require products with high quality, and effectively farmers have labeled produce, both with territorial or organic labels. Furthermore, they ask processed products that are better preservable, and this could represent a problem for farmers since the internal procession has an initial high cost with many regulatory constraints. To process the products outside could represent another cost and a lengthening of the food chain; moreover groceries and farmers complain the fact that the enterprises of transformation have other strategies and strict regulations to follow.

Beside the lack of coordination between the actors involved in AFN, we notice a risk of ephemeral AFN experiences. Firstly there is difficulty from both farmers and groceries to define the quantities delivered. This means that the commercial actors struggle to define the quantities demanded by consumers: simply when they have finished the produce they require it to farmers; by the other side also the quantity supplied varies greatly because farmers are small, they participate in many networks, they are very flexible in the provision between the different AFNs.

Secondly, the commercial relationships between groceries and local farmers usually come from personal contacts, on the initiative of the individual, for social capital and knowledge, and there is not a structure to lean on. A grocery claimed also for a lack of tools to translate into practices the paradigm of AFNs, often sustained by policy-makers. The territorial organisation arising from our results is mainly based on individual initiatives, confirming a general concern for the sustainability of the agri-urban projects (Marraccini *et al.*, 2013). To ensure an evolution of the organisation of AFNs more in line with the knowledge of stakeholders' strategies, constraints and expectations (Venn, 2006), we think that intermediate actors can play a stronger role in coordinate the knowledge and the process of evolution of AFNs.

The issue of better understanding the strategies of stakeholders in AFNs, emerge especially now that different examples of food planning policies have been promoted, attempting to involve the local agri-food production (e.g. Nölting *et al.*, 2009; Harper *et al.*, 2009), with innovative processes based on a stronger coordination and communication between the different stakeholders (Di Iacovo *et al.*, 2013). The role of local institutions should be more investigated as well as efforts need to be made in the coordination of policies' objectives (Arfini *et al.*, 2013). A first attempt to survey projects involving policy-makers and stakeholders in the studied area was provided by Marraccini *et al.* (2013). In this contribution we want to stress the need of a better understanding about how stakeholders network organisation in AFNs, in order to better evaluate the effective benefits of such experiences (Holloway *et al.*, 2000; Watts *et al.*, 2005).

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