CASE STUDY

"BERGAMOT, CONVENTIONAL AND ORGANIC PRODUCT" (ITALY)

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1 Introduction: What is the case study about?

Bergamot is a high-specific species of citrus cultivation, diffused mainly in the Reggio Calabria Province, in the most coastal part of the area. Uniqueness of this production derives from the following characteristics:

- More than 90% of the world production is coming from the Reggio Calabria province in southern Italy, that is from the study area;
- It is used almost exclusively as a fragrance ingredient. Bergamot is a significant ingredient for the perfume industry where it is used in more than 65% of women's perfumes and almost half of men's fragrances.However, a small portion of the production is used as a flavouring and in the pharmaceutical and cosmetics industries;
- The essential oil produced in this area is characterised by 354 diverse fragrance components which makes the oil of high quality for the perfume industry, such components are unavailable in other production areas;
- The cultivation of bergamot and the high quality of the essential oil is due to the specific climatic conditions of the area (temperate climate even in wintertime, mitigating action of the sea, low difference in temperature between day and night, etc.). There is a stretch of land approximately 120 km length that is one of the only places in the world where Bergamot trees grow this kind of high quality fruit, rich with desirable essential oil;
- The cultivation was introduced in this area for the first time in 1740 and since then it was rooted in the cultural identity of population living in the area.

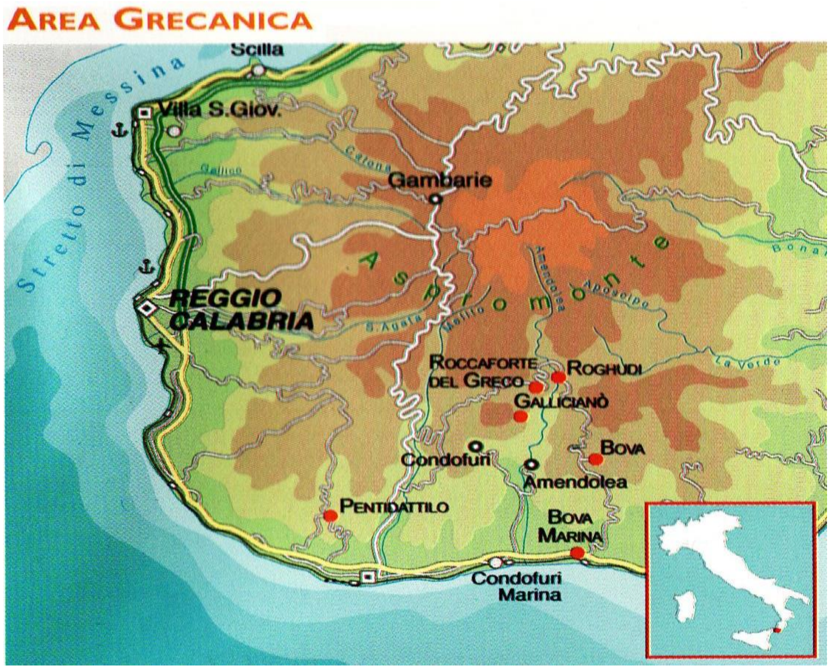

Figure 1: Map of the Grecanica Area

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The socio-economic characteristics of bergamot farming system has been studied in depth in recent years (Nesci et al, 2005; Ciani et al, 2014). There are more than 600 farms specialized in the bergamot, few of them have a big size, most of farms are of small and very small size (see . More than 90% of production is sold on the market. From our interviews, 5 ha is the minimum size to get a sufficient family income. Given the prevalence of small farms, part-time farming is largely widespread. This area is characterised by the lack of employment opportunities, which caused the continuous process of outmigration to North of Italy and other countries. This process has still continued in the last decade.

The ecological context is extremely fragile, devastated by the disordered urbanization and hydro-geological erosion of land, both in the more internal areas and in the coastal area. In this context the bergamot cultivation is a way to maintain **landscape** (bergamot is part of the image and identity of the area**), biodiversity and rural vitality**. Since bergamot is a water-demanding cultivation, the water systems adopted in this area have strong impact on **the quantity of water at territorial level**. Over time there has been a certain decline in biodiversity in the area, linked to mass tourism development in ‘70s-’80s and high demand of land for urbanisation purposes: abusive and second houses by natives and main city’s inhabitants. Biodiversity is strongly linked to the permanence of the bergamot cultivation and, on turn, to its economic viability. The typical landscape is also strongly dependent by the permanence of bergamot cultivation in the area, which is strongly appreciated by local tourism and notably by external naturalistic tourism which has developed in the area since the second half of ‘90s. This implies that bergamot chain, including also the processing of the primary products, has important second-order socio-economic impacts on the local economy. A lot of typical products (local sweets, bergamot beverages, perfumes, etc.) use as primary ingredient bergamot fruits and provide local economy a further source of income linked to this specific product.

Governance of such ecosystem services is highly complicated by the structure and distribution of powers within the bergamot food chain. It is impossible to understand the provisions of ESBOs without taking into account of the complexity of this chain. Key actors are as follow:

- Bergamot farms;
- Three different Consortia of primary producers: two of them producing conventional essence, one producing organic essence;
- A series of small industries processing bergamot fruit to produce essential oil, concentrated juice and other minor by-products for animal feeding (the so-called “pastazzo”);
- A series of local small artisanal firms producing typical food and non-food product using bergamot oil and juice as main ingredient (local sweets, bergamot beverages, perfumes, etc.);
- Very few (only four) wholesalers dominating the essential oil trade and exports to European, USA, Cina, India, Japan and South Corea markets.

As we will see in the next chapters, there is a strong link between the bergamot market, the governance of the food chain and the maintenance of the cultivation in the area with positive ESBOs effects.

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Table 1: Key features of the bergamot case study

Region or locality	Area Grecanica (Greek area), province of Reggio Calabria, Italy
Main Farming/ forestry system	Fruits (citrus) and vegetables, arable lands.
Area (ha) of initiative (& Case Study)	There are 623 farms and 4931 hectares of total agricultural land, whose bergamot area is 885,5 hectares
Key ESBOs covered	Landscape, biodiversity, rural vitality and water quantity.
Total no. of farmers/ foresters involved	623 farmers, with a total bergamot production of 7,8 million € and an average production of 12,568 € per farm.
Other key stakeholders involved	• Three different Consortia of primary producers: two of them producing conventional essence, one producing organic essence; • A series of small industries processing bergamot fruit to produce essential oil, concentrated juice and other minor by-products for animal feeding (the so-called "pastazzo"); • A series of local small artisanal firms producing typical food and non-food product using bergamot oil and juice as main ingredient (local sweets, bergamot beverages, perfumes, etc.); • Very few (only four) wholesalers dominating the essential oil trade and exports to European, USA, Cina, India, Japan and South Corea markets.
Source(s) of funding	Regional agricultural policy (from the regional budget); Rural development policy (mainly agri-environmental policy and Leader programme) and Cohesion policy over the programming periods 2000-2006 and 2007-2013.
Start date of initiative	Main initiatives considered here are two consortia Bioassoberg (1995) and Unionberg (2003), both promoting several activities to enhance marketing and sustainability of the production
End date of initiative	Several activities are still under implementation by two consortia

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2 Definition of the social-ecological system (SES) studied

2.1 Figure of the SES, using the revised SES Framework

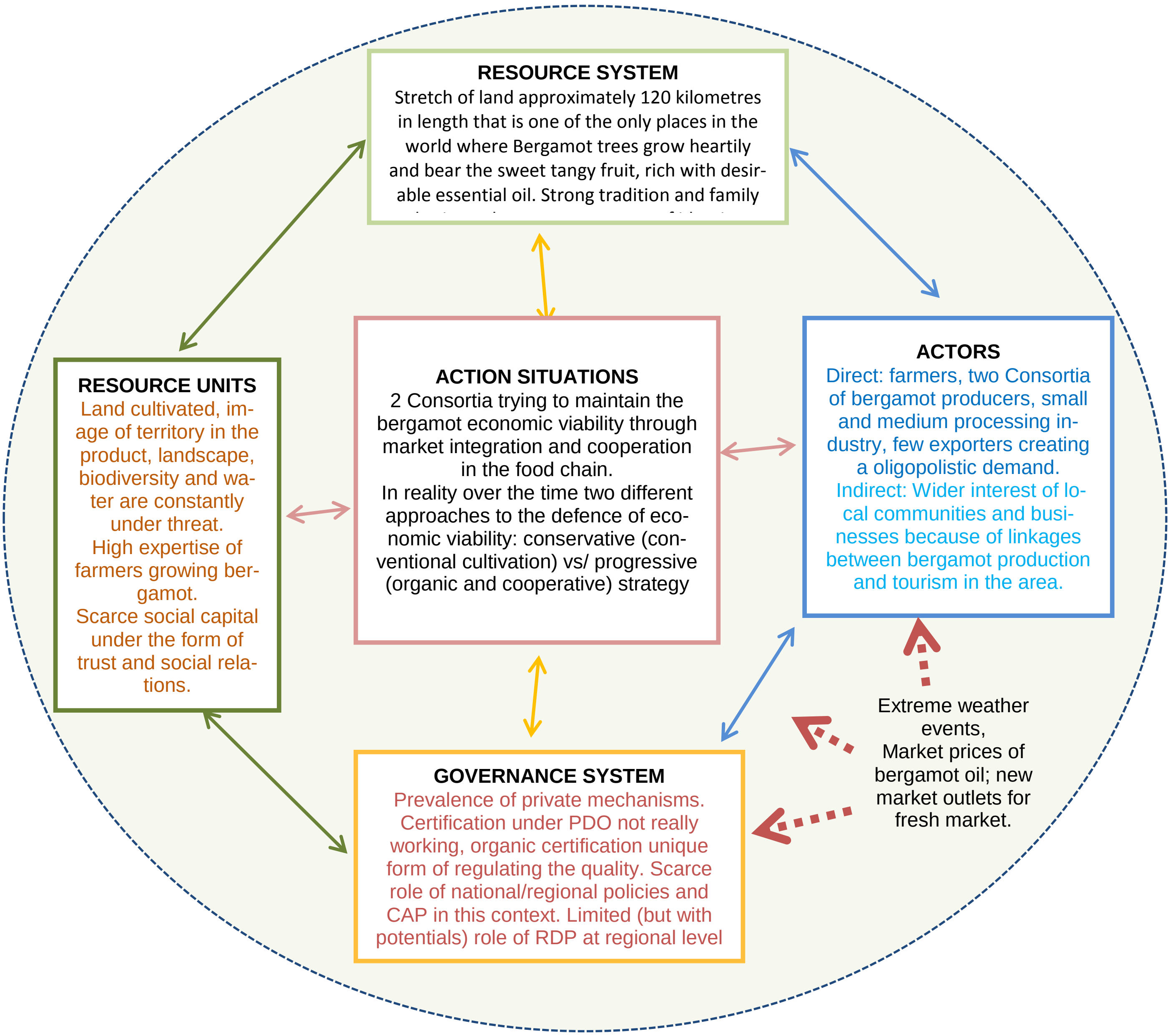

Figure 2:
Summary of the SES framework for case study
(adapted from Ostrom and Cox 2010; McGinniss and Ostrom 2014)

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2.2 Description of the SES

The first phase (1930-1990s)

The market prices of bergamot essential oil are structurally considered as a source of instability for farmers' income, due to:

- Strong variation of the bergamot fruit and essential oil production from year to year;
- The oligopolistic structure of the demand (the final demand by the perfume industry) and the fragmented structure of the supply (given by too many small and very small producers);
- The presence of diffused phenomena of adulteration of the essential oil (mixtures of pure essential oil with other fragrances imitating the bergamot characteristics, produced artificially by chemical industries).

In order to reduce the influence of these factors on market prices and consequently on farmers' income, a public consortium was set up by the State in the beginning of 1930s with the aim of stabilising market supply, control the quality of the pure essence and avoid frauds by private operators (notably the processing industry). This consortium was under the control of the Ministry of Agriculture. The public intervention was strongly supported politically by bergamot producers and their official organisations, under the assumption that this new institution would have maintained the economic viability of this peculiar production.

Main policy tools under the consortium management were: the compulsory storage of the bergamot oil production and a collective selling strategy under the control of the same consortium in the interest of primary producers. This policy was day by day managed by the consortium, but at the same time it was under the influential control of the State (Ministry of Agriculture) that definitely determined the governance structure of the consortium (president and management board). Despite this reinforced state intervention on the governance of the productive chain, the quality of the essential oil did not improve, and surpluses of essential oil were stocked in consortium storehouses and finally huge debts were accumulated.

The crisis of the bergamot production was particularly severe since the beginning of 1970s, when the lack of an effective governance by the consortium was accompanied by new socio-economic and political drivers: the diffusion of mass tourism in the coastal area, the lack of spatial planning and the widespread illegal process of urbanisation, which led to the most pervasive consumption of fertile soil in the history of this area. On the other hand, the crisis of the consortium intervention on market pushed single producers to return to previous atomistic regime of relations with the oligopolistic demand by processing industries and private wholesalers and exporters. These drivers (market and governance) led to the decline of the resource system.

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Table 2: Evolution of the local SES

SES Component	Decline of the bergamot production (1930-1990s)	New governance in the bergamot chain (1990s onwards)
Social, economic and political settings	High price volatility. Adulteration of essential oil by exporters. Emigration from agriculture	Increasing price trends. Improved bergamot farm viability. Reduction of outmigration from agriculture.
Governance system	State-managed consortium. Scarce collective action initiatives.	Birth of two new consortia: UNIONBERG (Producers organisation) and BIOASSOBERG (Organic farmers association)
Actors	Oligopolistic structure of the productive chain, dominated by few wholesalers. Non cooperative behaviour of primary producers	Producers are better organised under two consortia. Growing awareness of bergamot farmers of their force and positive effects on ESBOs.
Resource system	Decline of the resource system: reduction of the bergamot surface and productive soils.	Increasinf surface under bergamot production. Reduction of use of soil for urbanisation purposes.

Source: Our elaboration

In the first phase (1930-1990s) the action arena is dominated by the presence of many small producers and few large exporters with very unbalanced bargaining power. The public intervention tries to mediate conflicts through the creation of a state-led agency (the consortium), but in a community characterised by patronage and clientelism, scarce entrepreneurial spirit and non-cooperative behaviour, the consortium is unable to find the right legitimation to stabilise price volatility and improve the bargaining power of bergamot producers. Dominant interests becomes then those driven by rent-seeking orientation: few large landowners and those seeking for urban development in a period of increasing mass tourism, lack of spatial planning and no control of soil use. In conclusions, dominant interests of main actors and the failure of positive mediating role of the State are both the reasons why landscape degradation and loss of biodiversity prevail in the socio-ecological system of the bergamot area. The only institution that should have aimed to keep alive the bergamot chain was dominated by large landowners and was strongly conditioned by local political forces willing to preserve the status quo (local municipalities, regional administrations, etc.). They had major interests in urbanisation and touristic development of the area. A synthetic representation of this action arena and main drivers is in figure 2.

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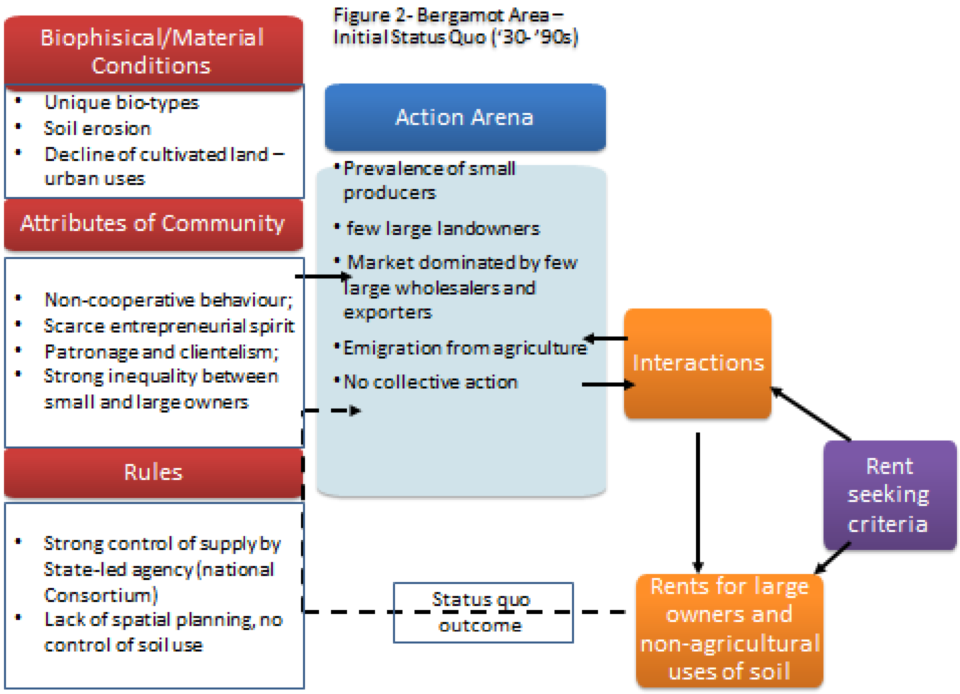

Figure 3: Bergamot Area – Initial Status Quo ('30 – '90s)

The second phase (from 1990s onwards)

In this phase, there is a relevant change in the local governance system of the bergamot chain which is complemented by new market drivers. We could state that the new governance system created by local actors cooperating makes possible the exploitation of the new market trends.

In 1995 a new consortium of organic producers (Bioassoberg) is set up by innovative bergamot growers and some years later (1998-99) new direct relations with the perfume industry (the English Body Shop) are established to sell small quantities (compared with the whole production) of essential oil. This allows the creation of alternative chain and better prices for producers. This alternative chain makes evident that diverse organisations of the market are possible and prices can be negotiated and agreed outside an oligopolistic structure.

In 2003 the second consortium (Unionberg) is created, under the initiative of a bigger group of producers and under the form of Producers Organisation, but these producers, differently from the previous ones, prefer to follow a more conventional method of production. However, they benefit from the price set by Bioassoberg and are able to negotiate this new price with wholesalers and exporters thanks to the bargaining power of their relevant memberships. Within the bergamot chain new power relations are now established and this allows redistributing the value chain more in favour of primary producers.

So in this period two different organisation modes operate in the bergamot chain, one (Bioassoberg) based on organic production and direct market relations with perfume industries, exploiting directly the increasing international market demand for organic essential oils; the

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second one (Unionberg) producing more conventional essential oil, but supported by the majority of producers (about 500 farmers) and able to negotiate better prices thanks to the size of memberships. This membership also supports the creation of the PDO "bergamot of Reggio Calabria", that on turn strengthen the bargaining power of producers with respect to the oligopolistic demand.

In the most recent years the demand of bergamot has shown a new impulse: the natural essence is more appreciated and consumed and new applications of bergamot products are found in the food industry and pharmaceutical fields. Naturalistic/green tourism in the area has grown and the knowledge of bergamot properties are more and more widespread, together with the appreciation of the places where bergamot is grown. Recently, bergamot juice has been successfully introduced in gastronomy, confectionery, liqueurs, and other component of the food industry. The essential oil finds novel applications in pharmaceutical preparations, exploiting a segment of demand for high specialised sectors because of its properties.

In conclusion, in the second period (from 1990s onwards) new equilibria were introduced by some participants entering into the action arena with innovative orientations, trying to set up direct relations with bergamot oil industries. These innovations were decisive in generating change because they showed that something different from the past rent-seeking behaviour could be done. And this relatively small change (few producers contributed to that) paved the way to an institutional change at the local level: the creation of two producers' consortia (Bioassoberg in a first step and Unionberg in a next moment). These institutional changes caused relevant improvements in small farms' incomes and increasing profits for large landowners. Moreover, consumers began to appreciate increasingly biodiversity and landscape linked to bergamot presence in the area, due to the preference towards more sustainable modes of touristic recreation. In other words, high-quality demand for tourism, organic production and new applications of the bergamot oil and juice in pharmaceutical preparations and food products were all economic and social external factors that contributed to change previous equilibria in the action arena (figure 4).

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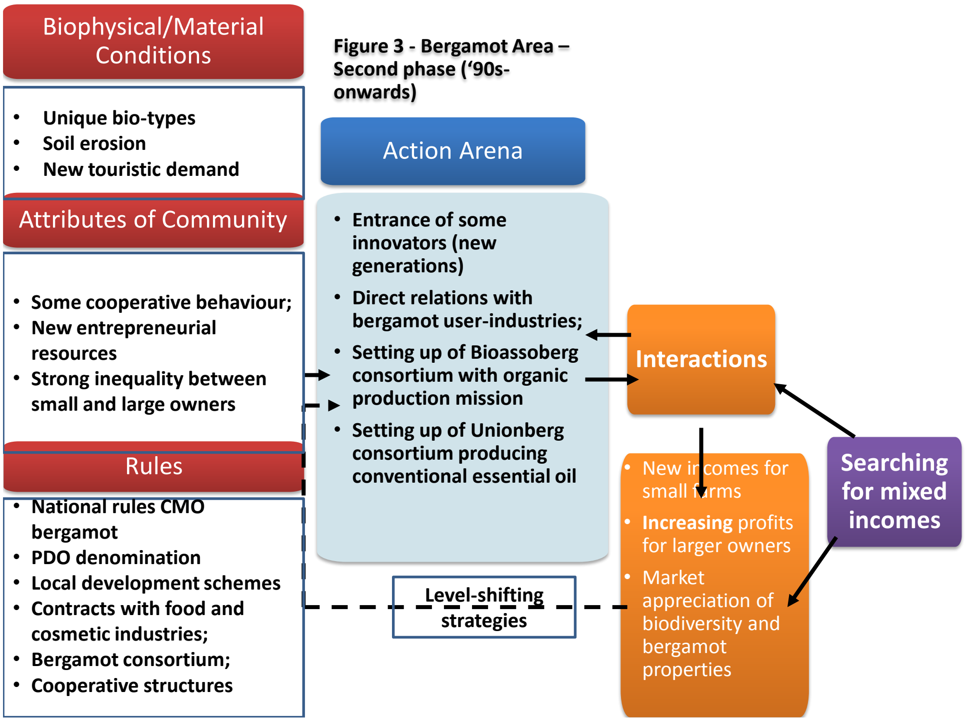

Figure 4: Bergamot Areas – Second phase ('90s – onwards)

Institutional changes which have been promoted through the creation of two consortia generated outcomes that reinforced disposition to change of main actors. As Ostrom says (2005): "When outcomes are perceived by those involved (or others) is less valued than other outcomes that might be obtained, some will raise questions about trying to change the structure of the situation by moving to a different level and changing the exogenous variables themselves"(p. 14). It is what happened when two consortia, especially Biossoberg, discovered over time that they were able to gain increasing margins of the value chain. Always following Ostrom, these actors have tried "to contemplate how to change any of the constraints on an operational situation (or, on a collective-choice situation) that are potentially under the control of the participants in that situation" (2005, p. 62). In these cases Ostrom says that actors are trying to shift from a level of action to another one.

2.3 Levels of ESBO provision, trends and determinants

The levels of the ESBO provision have changed relevantly moving from the first period (1930-1990s) to the second one (1990s onwards).

In the first period there are evident signals of the declining provision, that can be summarised as follows:

- the bergamot surface has been reduced as the effect of different socio-economic and political drivers;
- the bergamot production and the same cultivation survival was severely jeopardised by viruses, attacking bergamot trees as the effect of bad agronomic techniques, as it pointed out by a publication of the Istituto Sperimentale per l'agrumicultura di Acireale-Catania (Caruso et al, 1996);

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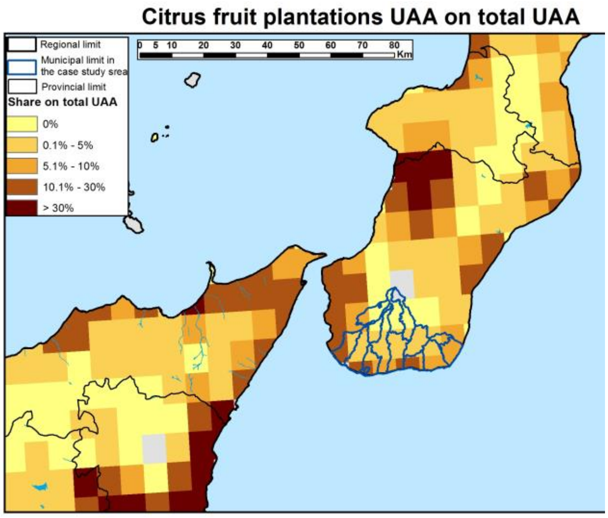
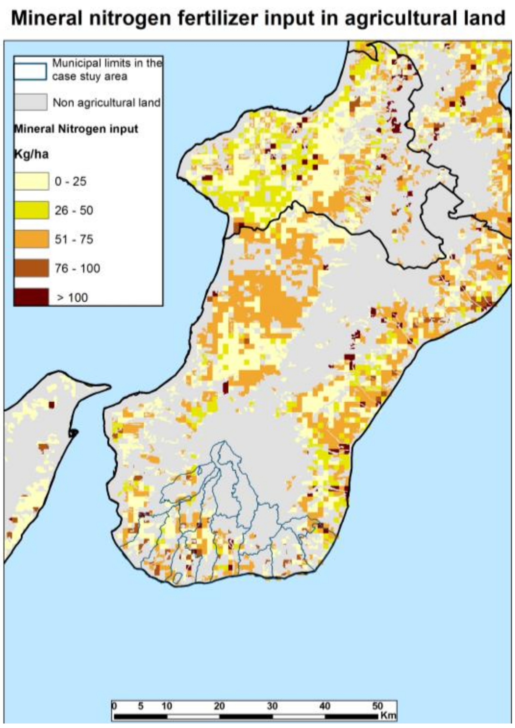
- the bergamot cultivation was characterised by intensive use of fertilizers in about 20% of total farms, both for nitrogen and for phosphorous, and in excess with regard to optimal plants' needs (the use of nitrogen was about 300 Kg/hectare when optimal needs were quantified in 150-180 kg/hectare). Consequently, this caused ground-water pollution, hampered the nutritional balance of plants and affected negatively the production. Instead, the level of adoption of organic fertilizers was quite scarce;
- irrigation in bergamot farms was possible thanks to ground-water sources (80-90% on the average) and water was delivered mostly through traditional methods at the farm level (over 69% of land was irrigated through surface irrigation and 30% through sprinkler irrigation) (Caruso et al, 1996).

In conclusion, in the first period the bergamot production is based on inefficient agricultural practices, determining low economic returns at the farm level and depletion of natural resources, notably soil, water and landscape (this latter is depleted simply because bergamot cultivation is abandoned by farmers using land for urbanisation purposes).





Figures 5 and 6: Diffusion of citrus plantation and mineral nitrogen fertilizer in agricultural land

Source: Joint Research Centre, Ispra – Italy

As we have already pointed out, the bergamot cultivation is diffused mainly in the coasta area in the province of Reggio Calabria. This is confirmed also in our study area (the area Grecanica) which is part of the province. According to recent data provided by JRC-ISPRA, the intensity of mineral nitrogen input (Kg/ha) does not seem linked to the bergamot cultivation (figure 6) and overall is characterised by medium values in the study area.

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Farm structures are mostly characterised by small sizes: 2/3 of bergamot farms are below 1 hectares and 89% below 3 hectares, occupying about 72% of the entire bergamot area (table 3). Below 1 hectare the contribution to the family income is rather marginal, and between 1 and 3 hectares can be considered as more relevant. Above 3 hectares the bergamot production allows the employment of at least one full-time working unit.

Table 3: Characteristics of bergamot farms in the study area

Farm size (hectares of bergamot)	No. of farms	%	Agricultural utilized land (AUL) Total hectares	%	Bergamot cultivated land - Hectares	%	Value of bergamot prduction (farmer prices, €)	Value of bergamot production per farm (farmer prices, €)
<=1	397	63,7	2.030,7	41,2	170,82	19,3	1.510.476	3.805
1.01-3	158	25,4	1.524,0	30,9	290,36	32,8	2.567.508	16.250
3.01-5	35	5,6	360,7	7,3	134,43	15,2	1.188.697	33.963
> 5	33	5,3	1.015,7	20,6	289,87	32,7	2.563.175	77.672
Totale complessivo	623	100,0	4.931,1	100,0	885,48	100,0	7.829.857	12.568

Source: our elaborations from Agricultural Census data (2010)

The role of the bergamot cultivation on the creation of the landscape is not only through the presence of a typical tree ever green over seasons (quite similar to other citrus trees like oranges, lemons and tangerines), giving the image of a lush countryside, but also through the presence of other structural landscape components linked to farming practices: hedges, rows and dry stone walls. These components identify territorial capital needed to maintain a sustainable land management and the quality of landscape. Bergamot farms in the study area adopt and maintain hedges, rows and dry stone walls more than non-bergamot farms (table 4) and these components increase as the bergamot size increases: the highest share of farms adopting conservative practices is above 5 hectares of bergamot surface (table 4).

Table 4: Components of landscape (hedges, rows and dry stone walls) by farm size in the study area (% of total farms of each size group)

Farm size (hectares of bergamot)	Farms with hedges	Farms with rows	Farms with dry stone walls	Total farms
no bergamot land	5,5	8,0	14,8	100,0
<=1	6,5	12,3	16,9	100,0
1.01-3	8,2	11,4	19,0	100,0
3.01-5	5,7	11,4	20,0	100,0
> 5	18,2	21,2	24,2	100,0
Total	5,8	8,7	15,2	100,0

Source: our elaborations from Agricultural Census data (2010)

Bergamot farms have also a strong impact on the water resources consumption because, as every other citrus cultivation, bergamot is a highly water demanding type of farming. The need to fulfil increasing demand of water as the surface of bergamot increases can explain why the biggest farms tend to use more ground-water resources than the small ones (table 5). Looking at the other water sources, the water provide by the water consortium decreases as the bergamot surface increases: this means that the cost of water from consortium sources is higher than from private pumps drawing from underground layers.

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Table 5: Sources of water for irrigation by farm size in the study area (% of total farms of each size group)

Farm size (hectares of bergamot)	Underground water	Farm basins	Lakes, rivers and other superficial water sources	Water consortium (collective sources)	Other water sources	No answer	Total
no bergamot land	4,4	2,8	1,9	2,7	6,4	81,8	100,0
<=1	33,5	3,5	4,3	20,7	12,1	25,9	100,0
1.01-3	46,2	4,4	1,9	27,2	7,6	12,7	100,0
3.01-5	54,3	2,9	5,7	14,3	5,7	17,1	100,0
> 5	69,7	6,1	3,0	9,1	9,1	3,0	100,0
Total	9,7	2,9	2,2	5,5	7,0	72,7	100,0

Source: our elaborations from Agricultural Census data (2010)

Methods of irrigation in the study area are still mostly traditional in the smaller farms (table 6). The other methods allowing saving water techniques (micro-irrigation) are used when the farm size increases. These findings imply that sustainable use of water by the bergamot farmers is partly linked to the farm size. Intensification of the bergamot production does not necessarily mean more water consumption, but on the contrary more care to reduce water costs.

Table 6: Methods of irrigation by farm size in the study area (% of total farms of each size group)

Farm size (hectares of bergamot)	Surface irrigation	Flood irrigation	Sprinkler irrigation	Micro-irrigation	Other methods	No answer	Total
no bergamot land	1,6	0,1	0,7	0,4	0,3	97,0	100,0
<=1	24,2	1,3	24,7	9,1	10,1	30,7	100,0
1.01-3	27,2	1,3	35,4	13,3	6,3	16,5	100,0
3.01-5	20,0	0,0	22,9	22,9	14,3	20,0	100,0
> 5	12,1	3,0	27,3	33,3	21,2	3,0	100,0
Total	5,0	0,2	4,7	2,2	1,7	86,2	100,0

Source: our elaborations from Agricultural Census data (2010)

Sustainable methods are also embodied into the organic production, but organic production is scarcely adopted by bergamot farms (table 7). However, the share of surface under organic production grows as the bergamot surface increases in the farm.

Table 7: Surface under organic production by farm size in the study area

Farm size (hectares of bergamot)	Surface under organic bergamot (hectares)	% of the total organic surface	% of bergamot surface
no bergamot land	2,38	0,0	-
<=1	9,06	0,0	5,3
1.01-3	108,88	0,2	37,5
3.01-5	71,17	0,4	52,9
> 5	186,65	0,4	64,4
Total	378,14	0,1	42,7

Source: our elaborations from Agricultural Census data (2010)

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In conclusion, bergamot intensification within farms does not normally translate into less sustainability of the production techniques. Vice versa, intensification is generally linked to more attention to the landscape, more water-saving methods of irrigation and finally higher shares of organic production (see figure 7).

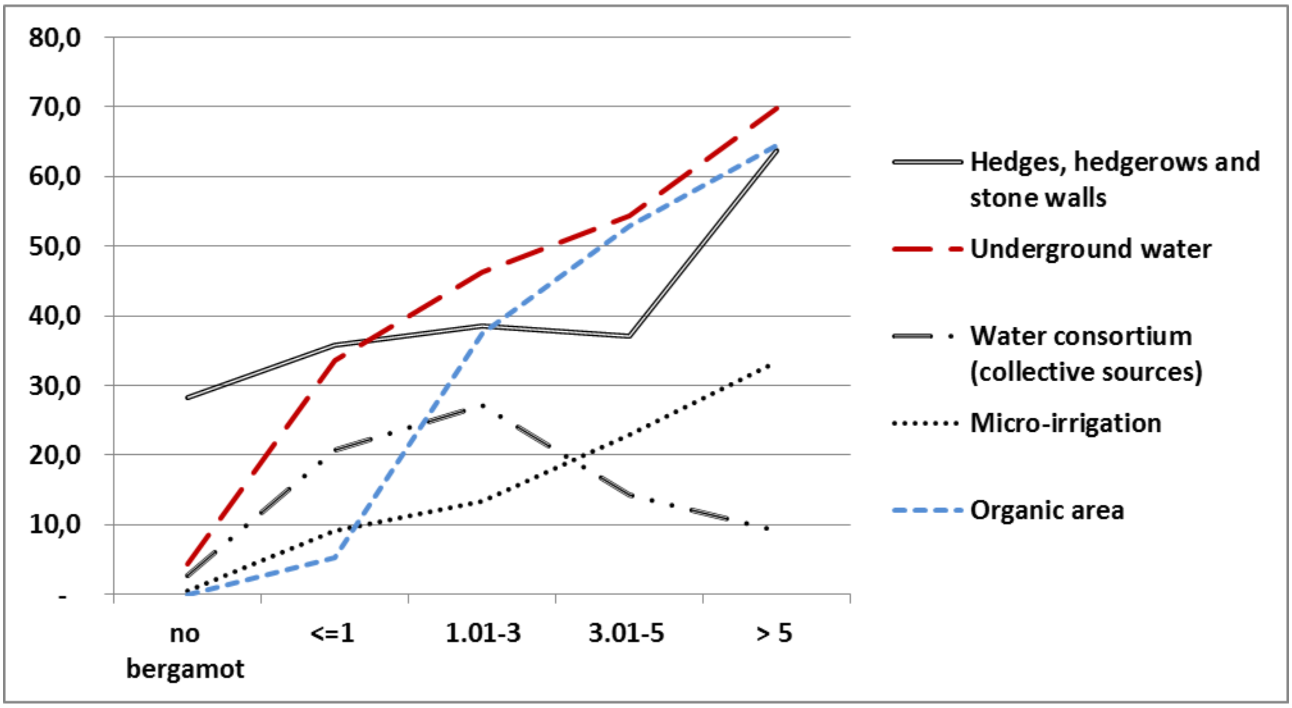

Figure 7: Key variables of landscape, water use and organic practices (*). Comparisons among no bergamot and different classes of bergamot sizes

Source: our elaboration from agricultural Census data (2010).

(*) Excepting organic area, all other variables are expressed in terms of % of number of farms

2.4 Ancillary economic and social benefits provided 'on the back' of ESBOs

The bergamot production is highly intensive in terms of capital and labour resources. The direct employment, at the farm level, is relevant when compared to other types of farming. The table 8 illustrates how many differences are between bergamot farms and other farms in terms of agricultural employment. First, agriculture in the study area does not affect so much the labour force: an average of only 120 working days per year (table 8). In general, family labour is underemployed when work opportunities are limited to farm. Farms need to reach a size between 1 and 3 hectares of bergamot in order to employ at least one full-time working unit per year (282 working days). These conditions of labour intensity can be ensured only by the bergamot cultivation: this gives an idea of the importance of this type of farming in the area.

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Table 8: Farm labour working days in the study area and distribution among family and hired labour

Farm size (hectares of bergamot)	Total agricultural working days	Annual working days per farm	Annual working days/UAA	% Family labour	% Permanent hired labour	% Seasonal hired labour
no bergamot land	398.195	112	26,3	69%	16%	14%
<=1	40.112	101	19,8	68%	14%	19%
1.01-3	26.452	167	17,4	66%	14%	20%
3.01-5	9.859	282	27,3	41%	39%	20%
> 5	22.179	672	21,8	23%	59%	17%
Total	496.797	119	24,8	66%	18%	15%

Source: our elaborations from Agricultural Census data (2010)

The family labour is a key component of the labour force until the size of 3 hectares of bergamot, then hired labour (permanent or seasonal) prevails since the family cannot fulfil alone working needs at farm level. Consequently, bergamot generates an additional demand of hired labour when farm size is above 3 hectares and this involves notably permanent hired labour (figure 8). This component is very relevant, about 60% of total labour requirements, above 5 hectares of bergamot. This implies that a further diffusion of bergamot cultivation and, in particular, the increase of bergamot at the farm level could have very positive impacts on the labour market in the study area.

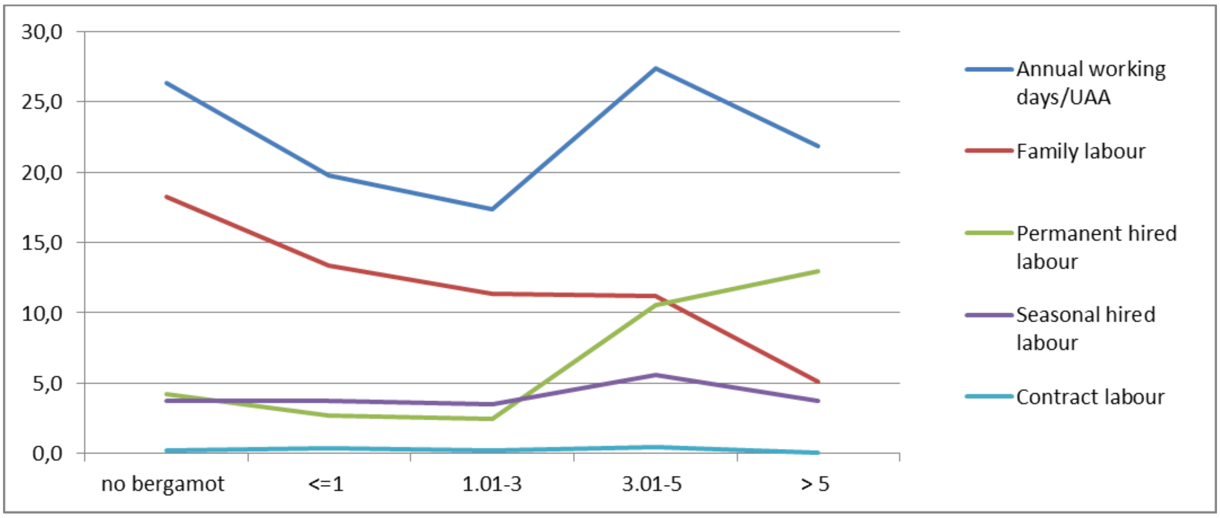

Figure 8: Annual working days per UAA by classes of farm size in the bergamot cultivation
Source: our elaborations from Agricultural Census data (2010)

Other indirect effects of the bergamot type of farming can be described as follows.

A Employment effects on the sector of services to farms

Bergamot farms need a series of technical services, partly supplied by processing industries (technical assistance), partly by other firms, notably contract firms specialised in agricultural operations (contract labour). Usually bergamot farms demand contract labour for farm operations (table 9), and relatively more than other farms. The smallest bergamot farms use contract labour quite often and this can represents event the 10% of the seasonal hired labour in farms below 1 hectare.

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Table 9: Contract labour used by different farm sizes of bergamot (annual working days)

Farm size (hectares of bergamot)	Contract labour outside farm (A)	Contract labour inside farm (B)	Seasonal hired labour (C)	A/C	B/C
no bergamot land	534	3.456	57.259	1%	6%
<=1	275	728	7.559	4%	10%
1.01-3	100	356	5.317	2%	7%
3.01-5	10	182	2.012	0%	9%
> 5	-	72	3.819	0%	2%
Total	919	4.794	75.966	1%	6%

Source: our elaborations from Agricultural Census data (2010)

B Employment effects in the processing industry and commercial firms

The processing of the bergamot fruits to produce the bergamot oil, juice, etc. is only localised in the study area. There are also other types of activities directly linked to the use of bergamot oil and juice:

- small and medium food industries in the confectionery sector, notably typical products linked to the cultural traditions of the Greek Calabria;
- commercial firms specialised in the export sector.

Unfortunately, no reliable data can be gathered for these activities, but they are developing in terms of volume and value of exports in the last decades.

C Employment and income effects in the tourism sector

Employment and income effects are increasing in the tourism firms supplying services for excursions, trekking, biking, etc. This new demand for naturalistic tourism is concentrated in spring and summer. The possibility of conciliate nature, culture and coastal tourism has simulated tourism flows in the last decade. Naturalistic tourism has also activated the use of mountain villages, abandoned in the past by original inhabitants, for hospitality. This is representing an important source of additional income for those inhabitants who are still living there. This has also contributed to reduce the traditional strong pressure on coastal hotels and bed-breakfast structures.

3 Shifting societal norms, collective learning and voluntary actions

As we will point out in the paragraph 4.1, the bergamot value chain is not homogeneous in terms of composition of actors and their innovation capability. There are two parallel value chains: one of conventional type, another made up of organic producers having direct commercial relations with international buyers.

The organic value chain was created thanks to the initiative of farmers who set up over time direct contracts with an English corporate forms (the Body Shop) at that time searching for pure and high-quality essential oil. The success of this contract and good prices ensured by the firm represented strong incentives for a widespread diffusion of the organic cultivation in the area. Other farmers became available to participate to a new consortium led by the first

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innovator. This new consortium was opened to all farmers available to follow the rules and certification procedures for the organic production.

Motivations behind these changes were not only the certainty of better prices and the selling of all bergamot production, but also the desire to escape from oligopolistic structure of the value chain (few big exporters making the market price, representing the main constraints to the agricultural change in the area). Moreover, among main motivations there are also the strong sense of identity linked to the bergamot production, the sense of the family heritage and the identification of bergamot with one of the main cultural patrimony in the area.

"*Our bergamot is a unique production in the world. It is part of our culture. When I travel I bring with me bergamot as part of my identity. This uniqueness is part of us. I don't sell simply a commodity, I am selling part of my identity, when tourists come here. Everyone here has a family history linked to the bergamot. Our grandfathers and fathers were very wealthy producers of bergamot"* (interview with the president of Assobioberg).

All these motivations are shared among the members of the Assobioberg consortium. This is a small consortium (only 14 members) but the main strength of this organisation is the common basis of shared values (trust, high-quality of the production and the adoption of sustainable methods).

What does it mean "shared values"?

"*Assobioberg aims to valorise the product quality. The big consortium (Unionberg) instead aims to get only better prices, and the satisfaction of farmers for the price. We believe that quality is essential in the relation with our clients (buyers). Other farmers in Unionberg don't care about who is buying your product, the main concern being price. They sell all product to exporters and do not have any contact with their clients, they never know who are the clients buying the product. Clients of our consortium instead contact us directly because they know who we are and that we are able to provide high-quality* product" (interview with Assobioberg president).

If we had to conceptualise the mechanism of social innovation in this area and reasons to join the Assobioberg consortium (figure 9), we could say that beyond the profitability conditions given by market prices (guaranteed by international buyers against the provision of high quality product), an important role has been played by shared values of this small consortium of farmers and by the desire to abandon the oligopolistic structure of the supply chain: sense of identity linked to the bergamot culture, family heritage, desire to maintain/improve landscape and soil through sustainable practice as fathers gave them.

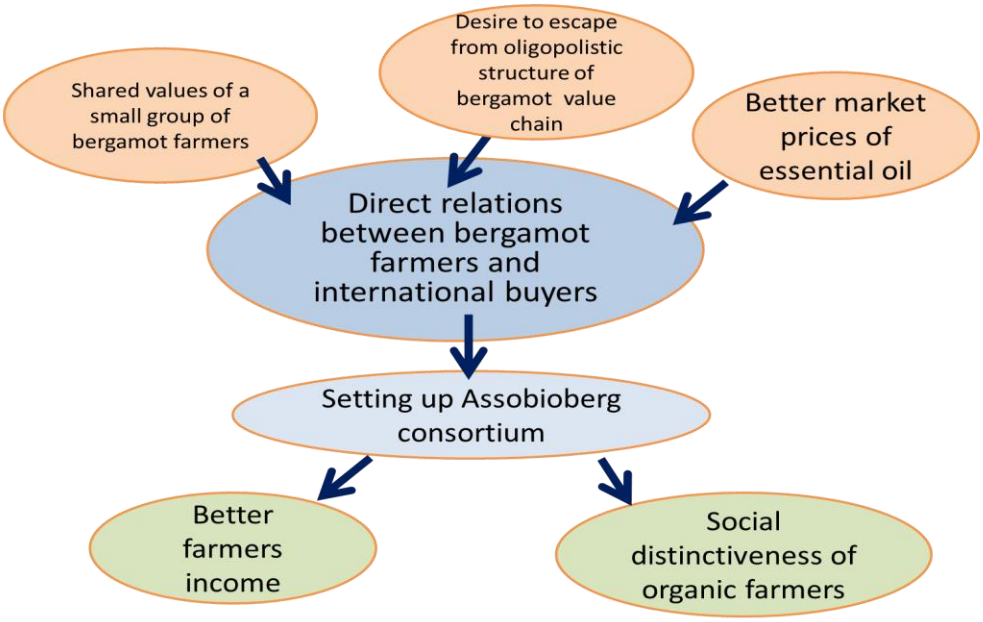

Figure 9: Motivations of voluntary actions in the organic bergamot supply chain and main socio-economic effects

These values fostered the search for innovative solutions against the oligopolistic dominance of few local actors. One farmer, the present president of the consortium, searching for a way out from this economic and social barrier decided to use some opportunities to establish direct contact with the market. When perspectives of market outlets became interesting then a small group of farmers were asked to cooperate and set up a new consortium. This impacted on the farmers income and also on the social distinctiveness and the reputation of this small group in the local context. This in turn consolidated the image of the consortium and confirmed to all members they were right in searching for solutions other than the traditional consortium.

The small size of the consortium was a crucial variable explaining its success:
"*The small size helped to maintain the quality of production. The size is a factor of strength, not more than twenty members. Big size doesn't usually work because over time members tend not to sell to consortium, but to private exporters*" (interview with the Assobioberg president).

In this story there was also a process of collective learning because direct contacts with international buyers meant continuous exchanges with markets, so that farmers learned how markets work in practice. They also learned that markets give value to credibility and reliability over time. They meet at least two-three times a year to discuss about contracts and initiatives of the consortium. Collective learning was not only about markets and prices, but also about co-decision and self-government methods. This was a radical change of the traditional individualistic culture in a context where experiences of cooperation and self-government have always been really scarce.

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4 Mechanisms, (collective) actions and governance arrangements to enhance the level of ESBO provision

4.1 Organisational capacities, leadership, networking and communication

In this case study organisational capacities, leaderships, networking and communication should be analysed within the specific value chain. Main networks, in fact, are among the operators of the value chain (figure 10). In the frame of this research, WP3 report defined four types of action: a) individual action; b) collective action – public policy driven; c) collective action – private actors driven; d) collective action – public/private partnership driven. In this case we would define the initiatives undertaken within the bergamot value chain as mainly collective action – private actors driven, although along the history of the bergamot value chain there are periods where public policies have been relevant drivers.

As we have already said in the previous description of the SES, during the time two different consortia among bergamot producers have been set up: Bioassoberg in 1999 and Unionberg in 2003. These two consortia can be seen as result of two different collective actions driven by private actors. Unionberg gradually took the place of the previous State-driven consortium and contributed to consolidate the conventional value chain. Within the conventional value chain 905 of the entire bergamot oil production is processed. The processing plant was created by the previous State-driven consortium whose president is also ruling the Unionberg Producers' Organisation. The processing plant has been rented to one private entrepreneurs who is one of the most important exporter of the area. Bergamot essence is exported in international markets through four private wholesalers having direct relations with cosmetic perfumery industry and food industry abroad.

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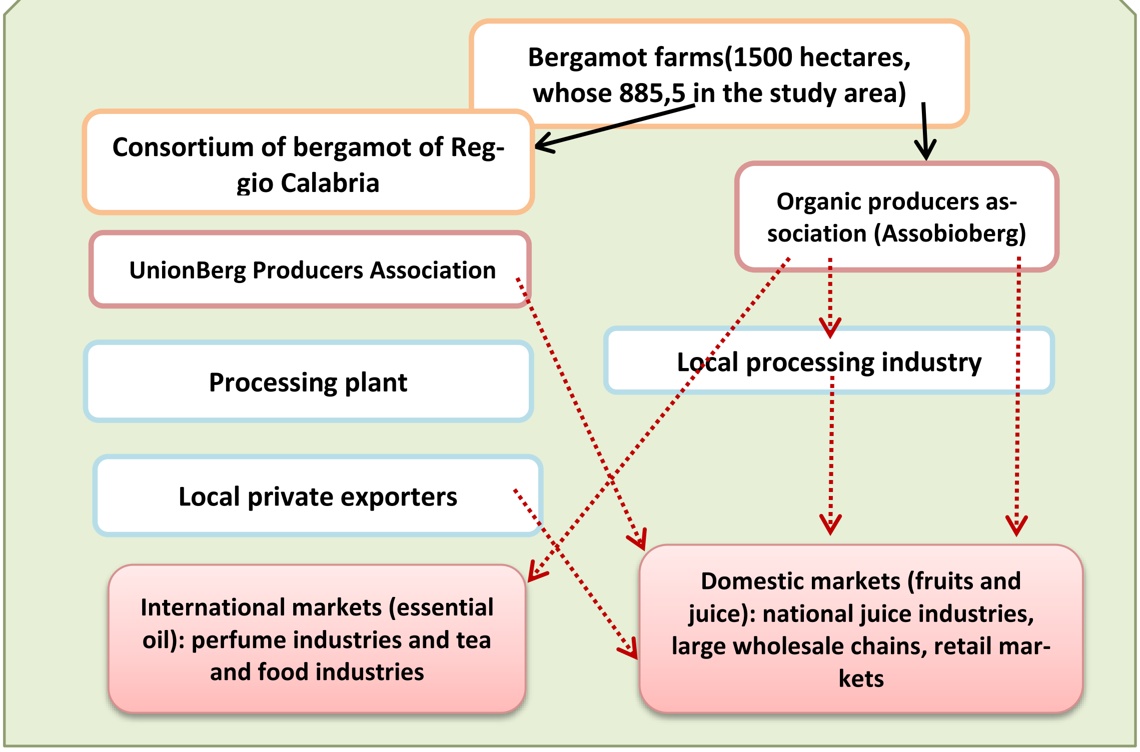
Figure 10 - The bergamot value chain in Calabria



Source: our elaboration from interviews and focus groups

The conventional value chain do not use usually organic production methods. In 2001 a DPO named "The bergamot essence of Reggio Calabria" was created. This is essentially aimed to protect and fulfil rigorous rules of production so as to supply in the market a genuine and high-quality essential oil. In reality, DPO is scarcely used to defend the purity of the bergamot oil: there are huge quantities of essence obtained artificially through chemical or physical processes and also through other mixed citrus oils, with physical/chemical manipulation of the natural bergamot cold-pressed oil.

Despite of the presence of a Producers' Organisation (Unionberg), the market is characterised by a oligopolistic structure, where few local private exporters buy the essence (and partly also process the primary production to obtain the essence) and sell it to big cosmetic perfumery industry and food industry abroad. Annual price of the bergamot essence is practically set by exporters on the basis of international demand and the annual supply of bergamot fruit in the area. There is some margins of negotiation between Unionberg and exporters, which is exploited by Unionberg to ensure not only price stability for farmers, but also a continuous increase year by year.

The alternative value chain is represented by a small consortium of producers under Assobioberg. Motivations to join this consortium have already been discussed in the paragraph 3. This consortium gather a small part of the production (about 5%), but the high-quality is certified as organic and pure essence, without any sort of manipulation. This production, in fact,

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is processed by a small local industry and it is sold directly to international buyers (multinational cosmetic and perfumery industry), without any sort of brokering by some commercial operators. Assobioberg undertakes direct commercial relations with international buyers. This allows all farmers who are members of Assobioberg benefitting from two price additional pluses: a) the additional price for organic production; b) the commercial margin that is usually appropriated by exporters.

Fresh market involves the commercialisation of fresh fruits. A demand from domestic and European consumers was growing in the last 2-4 years. The production of the bergamot juice is also developing in this period, stimulated by anti-cholesterol and other medical properties of the natural components of the juice and the fruit.

These two value chains (conventional and alternative) in reality can be identified with two different territorial networks. The focal point of each network is just the producers' consortium (Unionberg and Assobioberg). In the conventional network the leadership has been taken by the president of Unionberg, who took at the same time the role of president of the old State-driven consortium of bergamot. He gained a consolidated legitimation in the study area, both among farmers joining Unionberg and among regional and provincial institutions. He negotiates directly the public support from the Calabria region, on one side, and annual prices with main exporters. As president of the consortium, he has also promoted the multipurpose use of the bergamot and communication campaigns of medical properties of the fruit on the domestic market. Under his presidency, a series of research project have been funded (to University centres) by the consortium budget on the potentialities of bergamot for human health. Another relevant subject of this network is the Capua processing industry, through which a relevant share of the essence production is processed and marketed on international markets. This is the biggest industrial firm in the bergamot sector, that is able to influence the market price and relations with international buyers.

In the alternative network, based on the presence of Assobioberg consortium, the leadership is of the consortium president, a farmer combining agriculture wit tourism hospitality in the farm. Assobioberg has been pioneering organic production since the end of '90s and succeed in establishing its own network with international buyers of the bergamot essence. The organic essential oil is paid slightly more than the conventional oil (5-6 €/kg), but what is relevant for Assobioberg is the strength of commercial relations supporting the international network. In practice, this is a niche network, smaller than the conventional one, but with a very strong potential of innovation and also high reputation for all bergamot producers.

4.2 Innovative governance arrangements and mechanisms supporting ESBO provision

Improvements in the provision of ESBOs in this study area strongly depend on governance arrangements in the sector of the bergamot production. Governance arrangements depend, in turn, by the mix of collective action initiatives and policy changes. We have already examined collective action initiatives and their drivers in 4.1 and we are going to examine policy changes in 4.3.

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In this paragraph we describe governance arrangements in the sector of bergamot production. As North (1990) says, governance can be identified with the creation of new organisations among producers, on one side, and on the other side with the definition of new rules enforcing the new acting organisations. In this case study the main governance arrangements can be summarised as follows:

a) **New organisations among producers**:
- the creation of the Unionberg Producers' Organisation, which takes the place of the old State-driven bergamot consortium;
- the creation of Assobioberg consortium;

b) **Rules enforcing the new acting organisations and the market**:
- the contractual arrangements that Unionberg and Assobioberg agree every year with the main buyers (local exporters for Unionberg, international buyers for Assobioberg). They represent actually the concrete definition of rules in the private sector of bergamot that influence indirectly (through price mechanism) and directly (through the definition of specific agricultural practices) the provision of ESBOs.

Table 10 summarises the main effects on ESBOs of new organisations among producers. The table focuses on the creation of main institutional changes in the private sector in the study area. For both organisations there are positive indirect effects, notably on incomes of bergamot farms via a better cooperation and the strengthening of the farmers' bargaining power. This was acknowledged by all stakeholders participating to focus groups.

Table 10: Effects of governance arrangements on ESBOs in the study area: institutional changes in the private sector

Governance arrangements	Indirect effects on ESBOs	Direct effects on ESBOs
Creation of the Producers Organisation (Unionberg)	Positive on farm income. Via cooperation and better bargaining power of farmers	-Landscape: maintenance of bergamot cultivation; valorisation of bergamot oil and juice properties -healthy sols and water: no effects - Rural vitality: better immage of the area at the national and international level
Creation of the organic consortium (Assobioberg)	Positive on farm income. Via cooperation and better bargaining power of farmers	-Landscape: maintenance of bergamot cultivation -healthy sols and water: reducing pesticides via organic methods - Rural vitality: increased diversified activities in the farm

Source: our elaborations based on focus groups in the study area

Direct effects of new organisations on ESBOs are more complex to be evaluated. Main effects are on landscape and rural vitality, no effect can be found for healthy soil and water. The effects on the landscape are linked to the maintenance of bergamot in the area and those on rural vitality are linked to the ways bergamot induces changes in the whole economy of the

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area. In fact, both organisations have contributed to the maintenance of a favourable economic context for the bergamot cultivation: Unionberg contributed to explore and valorise peculiar medical properties of bergamot oil and juice and enhanced the public immage of the area at the national and international level through a series of promotional activities on media (tv, radio, newspaper, etc.). These activities had positive benefits for bergamot economy and for the rural economy as a whole. Assobioberg worked much more to reduce pesticides via organic methods, in this way impacting positively on the soil/water quality. Assobioberg also promoted integration of farming with diversified activities like naturalistic tourism.

Contracts are the specific governance arrangements enforcing the role of two organisations. Contracts require specific activities of design, control and monitoring of main stakeholders at stake. There are diverse typologies of contracts in conventional and alternative value chain. In the conventional one the most relevant contracts are between Unionberg and exporters; in the alternative one relevant contracts are between Assobioberg and international buyers.

Both types of contracts have positive indirect effects on farm incomes, via the stabilisation of annual market prices of the bergamot essence. In this sense Assobioberg was pioneer when in 1999 contributed to set the price for the organic essence. This price was agreed with the English cosmetic industry Body Shop and was higher that the market price, considering the size of the demand by buyers and the production costs at the farm level. This price level soon became the «reference price» for the whole bergamot market, including those producers belonging to the conventional value chain. Since then Assobioberg negotiates every year contracts with international buyers on the basis of prices slightly higher than the conventional market prices and increasing by 1-2% maximum per year, and never decreasing. In practice, international buyers acknowledge a differential (premium) prices for organic product; this price also embodies a plus value for the purity of the essence, which is certified by external organisms. In the conventional market, Unionberg benefitted from this contractual model that was also applied in the commercial relations with exporters of non-organic essence. Even Unionberg agrees every year a market price that cannot be below the price of the previous year. Exporters are committed to buy the entire production at that agreed price. This contract model ensure not only stable and even increasing price to farmers, but also allows commercialising the entire production in the international market without excessive volatility over time.

These contractual arrangements have ensured not only stabilising the market price of bergamot, but since 2006-7 they fostered increasing prices at a slow rate (figure 11).

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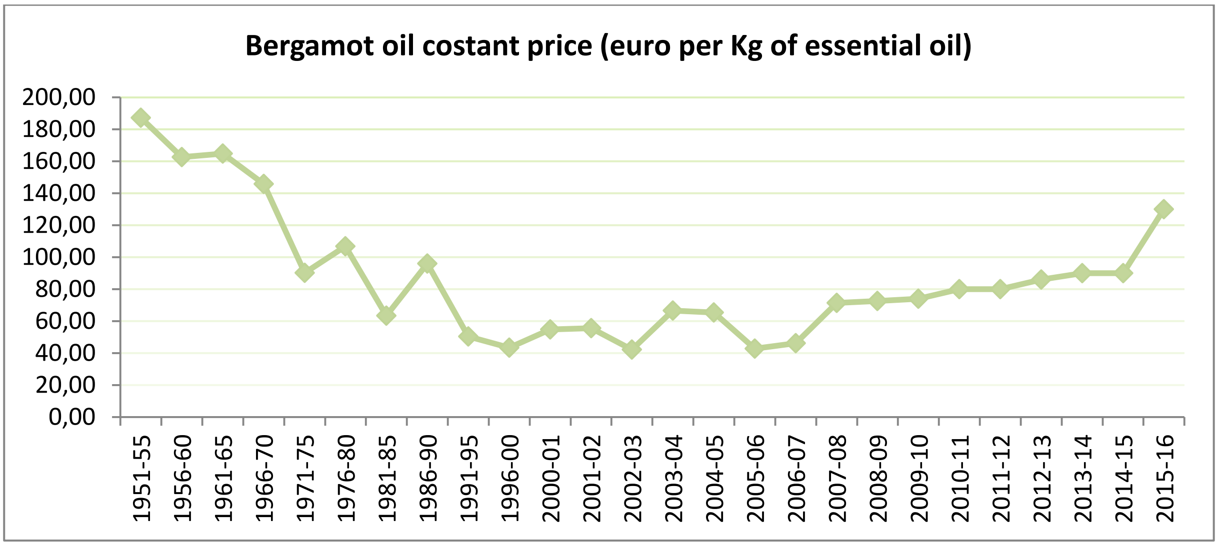

Figure 11: Trend of bergamot prices in the long run (constant prices 2010)

These contractual arrangements had positive direct effects on ESBOs: in both cases they contributed to the reprise of the bergamot cultivation and consequently to the conservation of the landscape; they had positive impacts on rural vitality as well, notably through the increase of employment in the local processing industry of essential oil and in the tourism sector (table 11).

Table 11: Effects of governance arrangements on ESBOs in the study area: contractual arrangements in the private sector

Governance arrangements	Indirect effects on ESBOs	Direct effects on ESBOs
Contracts between Unionberg and exporters	Positive on farm income. Via stabilisation of annual market prices of conventional bergamot essence	-Landscape: maintenance/increase of bergamot cultivation -healthy sols and water: no effects - Rural vitality: Employment effects in the local processing industry of essential oil
Contracts between Assobioberg and international buyers	Positive on farm income. Via stabilisation of annual market prices of organic bergamot essence	-Landscape: maintenance/increase of bergamot cultivation -healthy sols and water: reducing pesticides via organic methods - Rural vitality: Employment effects in the local processing industry of essential oil and in tourism sector

Source: our elaborations based on focus groups in the study area

4.3 The role and impact of policy in ESBO provision

The study area has always been interested by diverse types of policies. In the EU definition this area is within a less developed region (formerly Objective 1) for all Structural Funds, including the rural development funds. According to the definition of rural areas officially used in Italy for rural development policies this area also belongs to the "D" type (Areas with development problems).

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Unfortunately, there are only few available information on funds spent for bergamot types of farming by the two CAP pillars. A first analysis can be done on the amount and composition of funds delivered by the CAP to all farms of the study area (table 12), including bergamot farms. This is relevant to understand:

a) How much the study area is practically considered as a territorial target by the most recent policies;
b) Which policies can have an indirect effect on some ESBO and for which kind of measures they are spending money in the study area.

In this area 2/3 of total expenditures are represented by direct payments from CAP – I pillar, addressed mainly to non-bergamot farms. All investment for bergamot sector in the period 2007-13 have been delivered mostly outside the regional RDP, under a specific regional law providing structural public support to renovate old bergamot plants, enlarge the bergamot area and renovate the processing machinery of the bergamot industry. Six million € have been committed and paid (about 14% of the total amount of funds delivered to the area). It is a relevant amount of money when we consider that 8,4 million € have been spent by all RDP measures in the same period and that no other sector could benefit from specific funds by the Calabria region in this period. This public effort undertaken by the region contributed to increase of the bergamot surface in the last five or six years, alongside with the stabilization of the bergamot oil market price.

Table 12: Expenditures on the study area by the CAP and regional policy in 2007-13

Types of policy measures	Value (€)	%
Coupled payments	16.788,76	0,04
Direct payments	27.938.610,42	65,91
Tot Pillar 1	27.955.399,18	65,95
Agro-environmental payments	3.815.734,12	9,00
Less favoured area payments	1.238.418,38	2,92
Investments in farm and processing industry	1.570.957,85	3,71
Investments in diversification and Leader	1.809.842,29	4,27
Tot Pillar 2	8.434.952,64	19,90
Investments in bergamot farming and processing industry	6.000.000,00	14,15
Tot CAP + regional policies	42.390.351,82	100,00

Source: our elaborations on data from AGEA (Italian Payment Agency) and from Calabria region

Bergamot farms get also support from RDP through agri-environmental measures addressed to organic practices: in the case of bergamot a subsidy of 300 €/hectare has been provided conditioned to the commitment of organic fertilization and no use of pesticides. In the present RDP the support to organic methods for bergamot has been substantially increased (740 €/hectare).

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Regional Department of Agriculture has given an annual contribution to the bergamot consortium to cover overheads expenditures and promotional activities (about 150.000 €), contribution decreasing over time.

In conclusion, public support from regional policies to bergamot production was relevant in the last decade and contributed to accompany the reprise of this type of farming, that was possible thanks to more effective collective actions in the two value chains (conventional and alternative).

When we look more carefully to policies by types of ESBO, we can distinguish between soil/water and landscape on one side and rural vitality on the other side. Policies directly impacting on the soil/water are represented by measures for organic production within the RDP and PDO rules on the certification of bergamot oil of Reggio Calabria. Landscape is influenced by policies directly supporting the renovation of old trees or the plantation of new bergamot area. Indirectly, the creation of the consortium of bergamot by the regional law contributed to create a new institutional setting more favourable to good agricultural practices for soil/water resources.

Table 13: Policies and multi-level institutional governance in the study area for soil/water/landscape

Policy frame impacting on healthy soil/water/landscape	Level of governance		
	EU	State/Region	Local area
Regulatory framework	- general rules on cross-compliance - general rules on PDO	- Cross-compliance guidelines - PDO rules on "the bergamot essence oil of Reggio Calabria"	- Rules on spatial planning at the municipal level
Policies with direct focus		- Organic measures within Agro-environmental measures (regional RDP) -Regional measures supporting investments in renovating bergamot trees and new bergamot area	
Policies with indirect focus		- Support of the Consortium of bergamot (regional law)	

Source: our elaboration from focus groups in the study area

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The objective of rural vitality has been addressed directly by diverse policy instruments (table 14). This area has been intensively interested by Cohesion policies aver years. These policy instruments and funds have addressed rural infrastructures and socio-cultural endowments of the area much more than RDP measures, which was directed essentially to agriculture investments. In this area Leader programme has always played a crucial role in stimulating rural vitality in a wide sense. The Local Action Group has been very proactive in defining interventions for renovating rural villages, strengthening the sense of cultural identity of local population (via the old Greek cultural heritage) and enhancing facilities for naturalistic tourism. These policy interventions are perceived as really effective and innovative by local population, although there is a general sense of frustration due to the lack of working opportunities in place for most of young population. These interventions are considered as positive examples of innovative policies, because they contributed to renovate ancient villages and increased the knowledge of the area at national and international level. The ERDF, LIFE, Leader, etc. promoted also collaboration among municipalities and private organisms, due to the partnership approach that was required to implement these policy instruments. In conclusion, all policy instruments that were used for local development in this area can be considered a necessary complement to sectoral policies (RDP, and regional agricultural policies). There were strong synergies among these policies, notably because the Local Action Group and a series of municipalities were able to coordinate them over years and finalise them to a shared strategy. They made possible to improve the rural context and non-agricultural activities connected with the economy of bergamot.

Table 14: Policies and multi-level institutional governance in the study area for rural vitality

Policy frame impacting on rural vitality	Level of governance		
	EU	State/Region	Local area
Regulatory framework			
Policies with direct focus		- investment in technological innovation in the bergamot processing industry - investment in rural diversification (Leader) - valorisation of Greek cultural heritage - facilities and services for naturalistic tourism (leader, ERDF) - support to urban renovation of small villages (ERDF)	
Policies with indirect focus			

Source: our elaboration from focus groups in the study area

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Policies that have been examined in this area can be less or more effective depending from how they interact with:

- governance arrangements;
- private schemes designed to valorize ESBOs, including those based on market price mechanisms.

In the table 15 we have summarized three possible role of policies in providing ESBOs, in general, and which measures have been used to perform these roles.

In the bergamot area policies have influenced local governance arrangements via the promotion/support to collective action, in two ways:

a) State and Region administrations promoted the creation of the bergamot consortium (through a regional law), in other words they stimulated bergamot farmers to cooperate in order to improve their bargaining power within the value chain. It was not properly a form of collective action, because principal initiative was undertaken by bureaucratic bodies. When the consortium was created it was mainly driven by the State. In a second phase, however, a Producers' Association took the lead of the consortium and this became something more similar to a form of collective action. This was relevant to promote initiatives aiming to the maintenance of the bergamot cultivation;
b) ERDF, Leader programme and some other EU programmes (LIFE) have promoted partnership approaches and activated in this ways collective actions as well, with important effects on rural vitality.

Table 15: Role of policies in providing ESBOs

Role of policies	Policy interventions/measures/tools	ESBOs involved
Promoting and supporting collective action	- Creation of the bergamot Consortium	All
	- support to urban renovation of small villages (ERDF)	Rural vitality
	- all measures managed through the Local Action Group	Rural vitality
Complementing private schemes	- PDO rules on "the bergamot essence oil of Reggio Calabria"	Soil/water
Supporting individual actions	- Cross-compliance guidelines	Soil/water
	- Organic measures within Agro-environmental measures (regional RDP)	Soil/water
	-Regional measures supporting investments in renovating bergamot trees and new bergamot area	Landscape
	- investment in technological innovation in the bergamot processing industry	Rural vitality

Source: our elaboration from focus groups in the study area

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Looking at the second possible role of policies in the area, interactions of policies with private schemes to valorize ESBOs were really scarce. PDO rules had this potentials, but in reality PDO certification was not implemented because the demand and prices of the conventional essence were high over time. The premium price given to organic production was not so high as to incentivize the diffusion of organic practices and related certification. Some industrial entrepreneurs and experts said that the low interest for organic certification shown by farmers on a wide scale in this area is justified by chemical manipulations of the essence in the industrial phase, which is capable of eliminate pesticides during the processing of the fruit.
In reality organic certification matters and it is required by international buyers as proof of purity and quality of the essence in the non-conventional value chain. But in this value chain there is no interaction with public policies. The international buyer looks for a product that embodies features of environmental sustainability. In this case collective action (cooperation under the name of Assobioberg) was not promoted by public policies, it was a spontaneous and innovative reaction to escape from the oligopolistic domination of few exporters and gain a greater share of the value added.

In conclusion, the role of policies in the bergamot value chain was mainly supporting individual action with a long series of policy instruments and only partly promoting and supporting collective action. The role of complementing private schemes was quite limited in case they were not sufficient to valorize ESBOs.

4.4 The role of the private sector in ESBO provision and enabling factors

In this case the role of private sector is crucial in the provision of ESBOs. All ESBOs examined here are provided only whether bergamot farmers survive and their organisations (Assobioberg and Unionberg) work well.

Main motivations of private sectors initiative are described quite extensively in the paragraph 3 and main actors operating in the supply chain of bergamot in the paragraph 4.1.
The interplay between public policy and market mechanisms, public policies and links between private sector initiatives and CAP are discussed in the paragraph 4.3.

The future of the private sector initiative is discussed in the paragraph 5. Potential gaps in the provision of ESBOs and the potentials to be filled by EU policies are discussed in the paragraph 5 as well.

Benefits related to the provision of ESBOs through private sector schemes was discussed in the paragraph 2.4.

5 Potential pathways towards an enhanced provision of ESBOs

The provision of ESBOs can be further enhanced through:

a) A more widespread diffusion of organic production in the area, through the collective action organised by Assobioberg consortium;

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b) More targeted promotion of the characteristics and properties of the bergamot fruit, carried out by the producers' association Unionberg;
c) A diversification of the bergamot production, now focused on the essential oil, but with strong potentials in the fresh market that is developing more and more in the biggest cities (Rome, Milan, etc.) in the last years.

The provision of ESBOs is linked to further diffusion of the bergamot cultivation, on one side, and on the use of sustainable production methods (in terms of soil, landscape and water conservation), on the other side. Given the present and the likely future trends in the demand from the market (supply is relatively rigid in the short-medium term) we could envisage that the bergamot surface will increase in the next ten years of about 500-600 hectares. The diffusion of more sustainable production methods is linked to:

a) The participation of farmers to organic schemes promoted by Assobioberg;
b) The effectiveness of bergamot-targeted agro-environmental measures introduced by the 2014-20 Rural Development Plan of Calabria Region, which deliver a subsidy of 740 € per hectare to farmers which commit themselves to use natural and non-chemical or mechanical control of the spontaneous vegetation in the bergamot area for a period of 7 years.

While this second policy measure will have likely wide adoption by local farmers, the same success cannot be envisaged for further participation to organic schemes promoted by Assobioberg. This does not exclude some limited increase of members of Assobioberg.

Main limiting factors are both internal and external to the consortium. Assobioberg members stated very clearly that they wish to avoid to grow too fast, since their size is considered as optimal for the decision-making process and the control of sustainable practices among participants. Another very limiting factor is the oligopolistic nature of the supply chain, dominated by very few exporters. There is no effective counter power in the area: the producers association Unionberg does not want to generate new conflicts with exporters because these latter control the market and relations with cosmetic and food industry abroad.
Future changes in this situation can be driven by:

- Small and medium processing industry at local level in search for new market outlets (for example, the fresh market can generate new development in the future and promote the access of new subjects in the supply chain, more prone to social innovation);
- The desire of the Unionberg members to change strategy, and move towards more sustainable production practices.

6 Suitability of the SES framework and 'action-orientated approach' in the analysis of ESBO provision

Comments raised in the D.4.1 report on the bergamot about SES are partly valid now. In this report we add some further reflections.

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- The idea of S-E-S is already in the minds of our stakeholders, but this way of representing it is meaningless for them. In reality it was not relevant in interviews. Interviews work better when there is a simple scheme showing the main actors playing a role and suggesting possible interpretation of the conflicts and alliances between them.
- The objective of integrating of ecological and social aspects and thus providing a holistic viewpoint is very important, but at the same time is too ambitious and remain a wishful thinking since there is neither a theory nor a model helping to put together all the components of the SES in a coherent and convincing way. Nonetheless it is extremely helpful in forcing the researcher to find some global picture of the system.
- Single Interviews added many elements to our understanding of the system.
- The more useful elements of the SES in this case were motivations and objectives of the playing actors, their governance arrangements and the feed-back effects of the governance arrangements on the objectives and motivations. See the figure 5 in this report to have a good ideas of these elements. This can work very well also in the dialogue with stakeholders because these elements have to do with their feelings about themselves and their behaviour in a given situation.
- A certain surprises on the discussion on ESBOs, because interviews highlighted as farmers prioritised cultural identity as form of ESBO (as part of rural vitality).
- The SES framework needs to be further articulated when you have to consider the dynamics of the socio-ecological system.
- The collective and common pool of resource aspects is decisive in understanding the provision of ESBOs and it is clearly understood by some of the actors, in particular those more innovative in environmentally conservative practices.
- In this case action-oriented approach, despite the objective of this research, was unfeasible because of the time needed to develop it with main stakeholders and also because in both supply chains (conventional and organic) the representatives that were interviewed knew quite well the directions and potentials to be exploited. We simply elicited solutions and ideas that were already boiling in their minds.

7 Main conclusions derived from the Steps 3-4 analysis

7.1 Key findings on the particular SES and the provision of ESBOs

The role of the bergamot cultivation on the creation of the landscape is not only through the presence of a typical tree ever green over seasons (quite similar to other citrus trees like oranges, lemons and tangerines), giving the image of a lush countryside, but also through the presence of other structural landscape components linked to farming practices: hedges, rows and dry stone walls.

- Bergamot farms have also a strong impact on the water resources consumption because, as every other citrus cultivation, bergamot is a highly water demanding type of farming.
- Sustainable methods are also embodied into the organic production, but organic production is scarcely adopted by bergamot farms. However, the share of surface under organic production grows as the bergamot surface increases in the farm.

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7.2 Key findings on governance arrangements and institutional frameworks

In this case study the main governance arrangements can be summarised as follows:

a) **New organisations among producers**:
- the creation of the Unionberg Producers' Organisation, which takes the place of the old State-driven bergamot consortium;
- the creation of Assobioberg consortium;

b) **Rules enforcing the new acting organisations and the market**:
- the contractual arrangements that Unionberg and Assobioberg agree every year with the main buyers (local exporters for Unionberg, international buyers for Assobioberg). They represent actually the concrete definition of rules in the private sector of bergamot that influence indirectly (through price mechanism) and directly (through the definition of specific agricultural practices) the provision of ESBOs.

Policies that have been examined in this area can be less or more effective depending from how they interact with:

- governance arrangements;
- private schemes designed to valorize ESBOs, including those based on market price mechanisms.

7.3 Other enabling or limiting factors

- If we had to conceptualise the mechanism of social innovation in this area, we could say that beyond the profitability conditions given by market prices (guaranteed by international buyers against the provision of high quality product), an important role has been played by shared values of this small consortium of farmers and by the desire to abandon the oligopolistic structure of the supply chain: sense of identity linked to the bergamot culture, family heritage, desire to maintain/improve landscape and soil through sustainable practice as fathers gave them.
- Main limiting factors are both internal and external to the consortium. Assobioberg members stated very clearly that they wish to avoid to grow too fast, since their size is considered as optimal for the decision-making process and the control of sustainable practices among participants.
- Another very limiting factor is the oligopolistic nature of the supply chain, dom-inated by very few exporters. There is no effective counter power in the area: the producers association Unionberg does not want to generate new conflicts with exporters because these latter control the market and relations with cosmetic and food industry abroad.

7.4 Contributions to EU strategic objectives

- The bergamot production is highly intensive in terms of capital and labour resources. The direct employment, at the farm level, is relevant when compared to other types of farming.

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- The family labour is a key component of the labour force until the size of 3 hectares of bergamot, then hired labour (permanent or seasonal) prevails since the family cannot fulfil alone working needs at farm level.
- Bergamot farms need a series of technical services, partly supplied by processing industries (technical assistance), partly by other firms, notably contract firms specialised in agricultural operations (contract labour).
- There are also other types of activities directly linked to the use of bergamot oil and juice: small and medium food industries in the confectionery sector, notably typical products linked to the cultural traditions of the Greek Calabria; commercial firms specialised in the export sector.
- Employment and income effects are increasing in the tourism firms supplying services for excursions, trekking, biking, etc. This new demand for naturalistic tourism is concentrated in spring and summer.

7.5 How about the transferability of the approach/mechanism used?

- The approach used to provide ESBOs can be applied in other areas with peculiar/niche supply chains, especially for initiatives taken by the Assobioberg consortium. This approach seems really appropriate to overcome oligopolistic barriers created by few wholesalers and many small and medium producers.
- This approach can be further enhanced through:
  a) A more widespread diffusion of organic production in the area, through the collective action organised by Assobioberg consortium;
  b) More targeted promotion of the characteristics and properties of the bergamot fruit, carried out by the producers' association Unionberg;
  c) A diversification of the bergamot production, now focused on the essential oil, but with strong potentials in the fresh market that is developing more and more in the biggest cities (Rome, Milan, etc.) in the last years.

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