XLIII Incontro di Studio del Ce.S.E.T.: 51-64

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Keywords: *urban agriculture, inclusive benefits, economic valuation, stated preference, deliberative valuation*

Towards integrated urban agriculture systems: economic and valuation aspects

The Paper defines an integrated urban agriculture system (A-URBIS), outlining the complications associated with its launching and implementation, and a methodological guidelines for the valuation of an A-URBIS, taking into account the inclusive and qualitative impacts on the community. Finally the Paper proposes a Direct Deliberative Monetary Valuation procedure which derives from the combination of a participatory deliberative process, which is necessary to develop instruments of direct democracy, and Stated Preference Techniques, which are essential to capture the value related to inclusive use.

Introduction

Based on a critical analysis of recent international urban agriculture (UA) experiences and main scientific reference literature, this paper aims at:

- Defining a knowledge base on the main aspects concerning UA and the benefits that this practice can bring;
- Proposing a definition of integrated urban agriculture system, outlining the complications associated with its launching and implementation;
- Defining methodological guidelines for the valuation of integrated urban agriculture systems, taking into account the inclusive and qualitative effects on the community.

Most peri-urban areas of major world cities are characterized by uncultivated areas, abandoned or unused building envelopes, unsold or unfinished residential buildings, entire run-down districts, where no actual redevelopment processes have been started. These portions of land and the social groups living there are the epicentre of new regeneration phenomena based on the synergistic effects of agriculture in urban areas.

According to FAO, more than 130 million people grow vegetables in urban areas in Africa and about 230 million in Latin America (source:www.fao.org), while WWF estimates that about 800 million people throughout the world draw an income from urban agriculture work, producing up to 20% of the world's food.

In China, where 1% of agricultural land is lost every year, the phenomenon of urban agriculture is glaring: in Beijing, UA has become a real trend, so much so

that the administration is committed to maintain at least 120 million hectares of agricultural area for cultivation. In Shanghai, for a long time there have been peri-urban areas intended for food production (Girardet, 2005).

Terrassa, a town in the metropolitan region of Barcelona, has 1,200 urban vegetable gardens, covering about 0.65% of the municipal area (Domene and Sauri, 2007).

In the Netherlands, there are about 250,000 community gardens covering an area of more than 4,000 hectares, while in Amsterdam there are 350 hectares of land used for urban gardens (Van Leeuwen and Nijkamp, 2010).

Over time, Montreal developed an UA system based on more than 8,200 parcels of land amounting to 100 community gardens.

The United States are the Country that is best exploiting this new approach: the forms of agricultural use in urban areas are reshaping the geography, landscape, vitality and economic prospects of entire communities; it is estimated that, in the US alone, there are over 70 million urban gardens (source: WWF). In San Diego, UA became one of the tools with which the wide area plan intends to pursue the regeneration of the entire city, introducing – among the possible uses of soils – uses such as Farmer Markets and Urban Farm, and regulating agricultural uses, as evidenced by the "Urban Agriculture Regulatory Summary Table" (www.sandiego.gov). In San Francisco, the "Urban Agriculture Strategic Plan" has been recently published (www.sfuaa.org). The whole South Side district of Chicago is central to a project that will transform the area in the largest urban farm in the United States. In New York, new projects will supplement the already many agricultural areas: more than 500 community gardens and over 30 urban farms. Detroit is completing its transition from Motor City (the old Fordist city, par excellence) to Farm City (avant-garde of the cities aspiring to sustainability) through redevelopment and regeneration programmes based on the agricultural exploitation of urban land clear of demolitions.

The growing interest in these types of agricultural activity, and the resulting benefits observed in the urban centres that adopted them, led to the recognition by APA (American Planning Association) of the role of UA in improving public health, increasing environmental sustainability, obtaining social benefits, effects on cultural heritage and a better integration of ethnic minorities.

Urban Agriculture: Main Definitions

The economic and productive characteristic is a key element since the first definitions of UA. Many cultural currents initially converge on the definition of UA as a form of economic activity referring to the production of food products and no-food products in urban or peri-urban locations (Quon, 1999). This first definition does not provide for distribution activities, but locates agricultural production in peri-urban areas characterized by discontinuous elements, diversity of the populations inhabiting them, heterogeneity of land uses, discontinuous densities and complex functional relationships (Allen, 2001).

Some subsequent definitions of UA (Bailkey and Nasr, 2000) extended the activities to include animal farming and fish production, and integrated the concept of production with distribution, recognizing the importance of the relationship between urban agricultural production and market demand in the urban area. For an urban agriculture production system, it is clear that the economies related to a close-to-market location have a greater weight than scale economies associated with large-scale production (that are typical of rural agriculture).

In the same period, another definition develops that associates a concept of sustainability to the above-mentioned characteristics, including circularity between the use and return of human and material resources in agricultural activities in urban areas (Mougeot, 1999). This approach establishes an exchange relationship between the agricultural system and the urban system.

In its technical publications and in the framework of the UN-HABITAT Urban Management Programme, FAO defines UA as a sector that produces, processes and distributes food, responding to a consumer demand coming from the urban context in which it is located, using intensive production methods and reusing natural resources and urban waste to produce a variety of crops and raise cattle.

Although widely accepted, the definition given by FAO does not cover the social, environmental, cultural and recreational vision of UA seen as a complex activity. Whereas, in the definition by CAST (Council on Agriculture, Science and Technology), UA assumes the features of a multi-functional system, comprising a spectrum of traditional activities (production, processing, marketing, distribution and consumption) and a wide range of benefits associated with spare time, economic vitality, entrepreneurship, individual health, common welfare of the community and the aesthetic aspects of landscape and environment (Butler and Moronek, 2002).

The interest in UA finally extended to the concept of food security and justice (Brown and Carter, 2003), thus becoming an element that can provide an assurance system, based on the possibility given to all the members of a community to access a healthy diet.

Urban Agriculture: a Complex Framework of Benefits

UA tends to provide its benefits in an overlaid and integrated manner, in all dimensions of the urban area; the resulting positive effects are numerous, heterogeneous and strongly associated with the paradigm of sustainable development. Actually, the selection of the appropriate types of farming in urban areas greatly improves the sustainability of towns (Deelstra and Girardet, 2000). Furthermore, over a long period of time and on a territory able to systematize urban elements with agricultural elements, the benefits are set to grow at exponential rates.

In terms of direct economic benefits, it is estimated that the gross yield of a grower that sells directly in a market farm is generally 200-250% higher than the gross yield of a grower that sells to wholesalers or distributors; moreover, for 100 dollars spent by a consumer, the growers' gain is 22% on average, while this figure reaches 30% in case of direct sale (Abel, 1999).

When the balance is positive for the growers, the entire community enjoys a number of indirect economic benefits that, in the long run, tend to increment and amplify. The birth of new urban agriculture activities improves employment both in terms of number of employees and creation of work groups that turn into business incubators. There are several activities associated with job training and teaching functions. The new small businesses that are directly related to agricultural production may boost the attractiveness and start-up capacity of the territory also for the micro-enterprises that are indirectly related to the agricultural cycle.

The general economic revitalization produces an increase in the levels of consumption, since access to local products with a lower trading price increases the spending and saving power of the inhabitants. Finally, a food system based on large-scale distribution tends to concentrate the benefits on a small group, while the market and local distribution are forms of redistribution of benefits.

Another group of economic benefits is associated with the increase in market value of the properties located in the districts redeveloped through UA actions, thanks to the environmental, social and economic improvements that these actions trigger in urban areas.

Among the environmental benefits, a first group relates to the reduction of greenhouse gas emissions, energy conservation and the consequent reduction of the impact on global warming due to an increased distribution of farm-to-table produce that do not require transport and energy-consuming, environmental-impact systems. Urban agricultural activities can create beneficial changes in the microclimate, regulating its humidity, reducing temperatures and wind action, providing natural shading, contributing to the reduction of CO_2, reducing nitrogen pollution in case of rain, reducing noise and containing storm-water runoff.

Other environmental benefits arise from the reuse of waste products in the agricultural cycle, in particular bio-waste recycling and the reuse of waste to create low-cost compost, as well as the use of filtered rainwater and grey wastewater from urban sewage networks for irrigation purposes. The reuse of food waste reduces the consumption of land required for the installation of disposal facilities; reforestation and terracing activities contribute to the hydro-geological reclamation of eroded slopes, wetlands, ravines and hills.

Furthermore, many urban areas are redeveloped due to the tendency of UA to reuse empty, abandoned or underused spaces. Uncultivated and interstitial spaces become well-kept green places, accessible and aesthetically appreciated by the whole community. Free or uncultivated areas may become attractive and welcoming places with a view to aggregation and re-launch (Reid, 2009). If the urban area is the target market for local agricultural production, there will also be a redevelopment of small abandoned built-up areas in order to use them as market farm. In addition, there is an improvement in the landscape aspects of urban areas. The range of environmental benefits must be considered both in direct terms and in terms of alternative to be preferred to a new construction that, if realized, could worsen environmental conditions.

From the point of view of social benefits, a first example concerns the access to fresh foods by urban residents, particularly as regards low-income communities

that spend between 60 and 80% of their income on foodstuffs (Bryld, 2003); this also has a positive effect on the health of urban dwellers.

Other benefits directly fall on the individuals engaged in agricultural activities: as a result of outdoor gardening activities, farmers are more relaxed and their physical and health condition improves dramatically.

Another group of benefits is characterized by an improved ability of the families at risk of becoming insolvent to maintain home ownership, thanks to the income deriving from the new agricultural work.

In communities that have been heavily affected by the economic crisis, the psychological consequence of unemployment created entire social groups of depressed people; the psychological profile of the persons, who were re-employed in urban agricultural activities, showed an improvement thanks to the awareness of improving the food security of their household.

There are benefits associated with the quality of life of the inhabitants and the redevelopment of the physical environment; UA promotes and strengthens the sense of belonging to a community, fostering social exchange between groups of different ethnic, socio-economic and generational connotations. The common objectives of area protection can have direct effects on reducing the rate of crime, and on raising common civic sense.

The Agro-Urban Integrated System (A-URBIS)

A society, which has culturally set itself the goal of development models focusing on sustainability, cannot exclude different forms of UA from its possible models of aggregation. Here, we are proposing an urban agriculture model designed as an integrated system that we call A-URBIS (Agro-Urban Integrated System).

An urban agriculture system can be defined as a set of agricultural and urban elements interconnected with each other, that behaves as a whole according to its general rules and where each element contributes to the common goal of sustainable development. This system is characterized by different, organized and coordinated, areas that tend to produce an overall balance.

To maximize the efficiency and effectiveness of an urban agriculture system, it has to be integrated, i.e. multifunctional, where agricultural areas integrate urban uses and functions, while urban areas integrate agricultural uses and functions.

For example, the function related to the agricultural market can be located in urban areas; at the same time, an agricultural area can accommodate some urban green functions by integrating the food production system with the cultural or recreational functions of green spaces.

The agricultural activity must relate to the urban context where it is inserted and consider that the resulting system is, at the same time, a place of production, a target market, a source of income and an area where people live. Likewise, urban activities must relate to the characteristics of agricultural production activities to share some elements (urban services, infrastructures, lines of mobility, etc.). The new districts could be reorganized around agricultural areas and be characterized

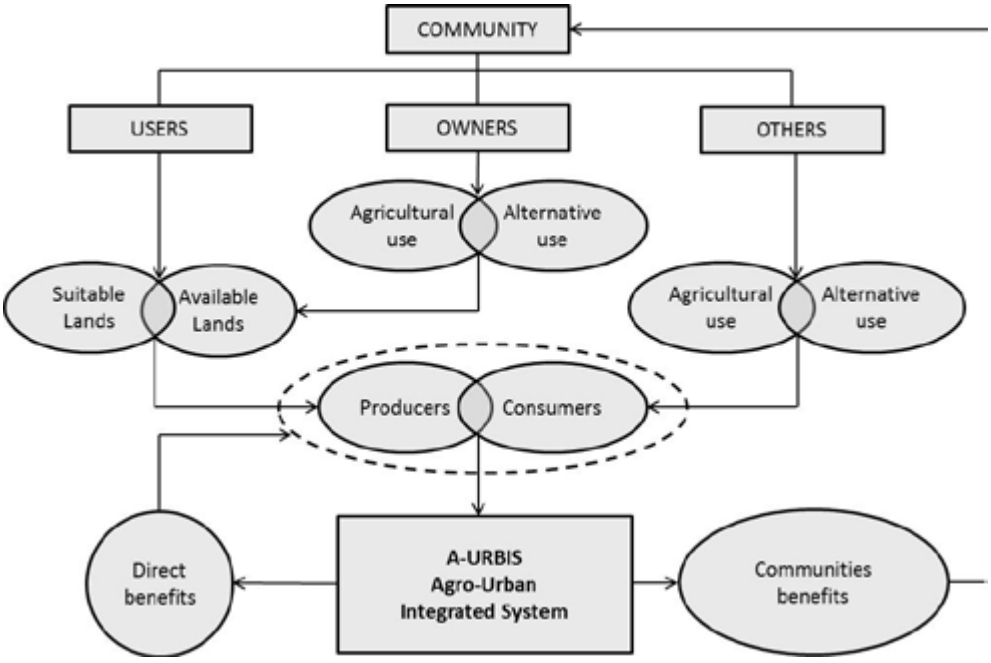
by the quality of their open spaces, which could become the centres of the social and production life of the community.

The improvement of the quality of life and of the development of urban areas is closely linked with the success of agricultural activities; the better the condition of the urban area where the agricultural activity is inserted and the greater the opportunities and benefits on agriculture.

An A-URBIS is an aggregative model that allows more widely preferable balances to be realized in the long run. The feasibility of the system is based on the gradual consensus of the community towards an agro-urban integration. This consensus is strongly influenced by the cultural conditions and levels of information and awareness (related to the benefits associated with living within that system) spread in the community.

The minimum conditions required to initiate and implement an A-URBIS lie in the behaviours of the main three macro-stakeholders of an agro-urban community and in their interrelationships. These macro-stakeholders are: the Users, those who are willing to start and invest in agricultural activities; the Owners of available land; the Others, i.e. the rest of the community that is not directly involved in agricultural activities. The relationships that are created among different actors and the expectations that people have towards urban areas are the basis of the main issues to be addressed for the start of an A-URBIS (Fig. 1).

Figure 1. Conditions for the Creation and Implementation of an A-URBIS.



The first issue concerns the Users, who do not have access to land since the Owners are not willing to grant it because of the opportunity cost of vacant lands in urban areas. Actually, the agricultural use is in direct competition with alternative uses that are more profitable for the owner (agricultural use vs. alternative use).

International case studies offer partial solutions to this problem: in many towns, the Users start cultivating vacant lots, without direct consent of the Owners. However, spontaneous activities are limited, not very durable and unable to trigger virtuous mechanisms.

In other situations, the administration acts as intermediary for the agreements between User and Owner, thus playing a key role (as attested by the P-Patch programme of the town of Seattle).

In other contexts, it is believed that the problem can be resolved through planning, that considers UA uses. This does not guarantee the fairness of choices, since it establishes a priori quotas of building permits and urban agricultural uses leading to different economic values. This approach can only be effective in case of agreed upon, clear and transparent, mechanisms that do not cause conflicts between owners and decision-makers.

Another element that can limit the creation of an A-URBIS is related to the characteristics of land that must be suitable for agricultural use (Suitable Land) in terms of location, exposure, size, physical-chemical characteristics and accessibility to resources (e.g. water). It must be ensured that urban development will not prevent access to resources or modify the characteristics of the area. Furthermore, a Suitable Land must not be contaminated by previous activities. In case studies, where reclamation operations were costly, valid alternatives have been identified, such as activities not related to the food cycle, crops able to filter out contaminants, crops on raised beds of earth. In order to avoid a waste of resources, it is appropriate to previously verify the suitability of the areas through valuation methods, that are current in rural areas. Whereas, in urban areas, these methods must implement mechanisms for evaluating agricultural soils in relation to urban transformations.

Finally, a vacant land in urban areas is an asset to the entire community and, when it is located in peri-urban areas that often lack high quality or equipped green spaces, the opportunity cost of this land takes on new meanings (agricultural use vs. alternative use). For the Others, an urban agricultural activity has an opportunity cost if we consider the possibility of locating group, recreational, sporting activities or other services in that area.

People, who are not aware of the benefits that UA can bring to the whole community, only see the direct benefits of the Users or Owners. This can easily lead to a lack of consensus on the implementation of an A-URBIS; transformations without consent have little chance of triggering virtuous processes, since they are more prone to risks of conflict (Miccoli et al., 2010).

In the absence of awareness, community consensus and information, two fundamental assumptions of agricultural activities (availability of land and presence of an urban target market) would fail, thus preventing the implementation of an A-URBIS.

Once the issues listed above have been addressed, new actors are created: the Producers (Users who find it convenient to start agricultural activities) and the Consumers (Others who find it convenient to buy products coming from the UA). The future of an A-URBIS and its ability to produce direct benefits to the Producers (benefits derived from farming) and Consumers (purchases at a reasonable price) depends on the market equilibrium between these two entities. Moreover, a range of integrated (social, environmental and economic) benefits would be generated to the entire community (Communities benefits).

The development and efficiency of the A-URBIS system are strongly influenced by the level of information of the community living there, which must be made aware of the number of benefits deriving from the system.

For the Economic Valuation of an A-URBIS: the Approach of Direct Deliberative Valuation (DDV)

For the economic valuation of an A-URBIS, different methods and techniques can be used. In this study, the analysis is based on the monetary approaches and impacts perceived by the users from a social point of view.

First, it should be borne in mind that, because of its multifunctional and qualitative nature, an A-URBIS discloses its utility not only on direct users, but on the entire community, and most of this utility is essential to satisfy human needs. Many impacts produced may not be quantified and have no market price. Moreover, in an A-URBIS, intrinsic values (independent-use values) are various and considerable.

Basically, an A-URBIS is not likely to be generated on public initiative only, through redistributive policies or standardized functions, or on private initiative, although associated with the public sector, for the limited role that it would play in an extensive and complicated operation, such as the one at issue here.

An A-URBIS, because of the fundamental benefits disclosed on the community, tends towards the new frontier of the "common goods" that are necessary to guarantee to each person the enjoyment of fundamental rights and to identify collective interests. To be enjoyed, produced and managed, common goods require social ties, cohesive relations and protagonist, participating citizens, engaged in solidarity and subsidiarity actions.

From an economic perspective, an A-URBIS has its foundation in a platform of exclusive benefits, but can only develop through inclusive benefits that, as such, may be freely and simultaneously enjoyed by the entire community. It follows that inclusive benefits are not offered by the market or are offered in limited quantities only, that are often insufficient.

Based on this statement of fact, a few decades ago, the "social use-value" was identified as an appropriate criterion for the valuation of inclusive real estate. This value did not correspond to market value, but with a larger value, inclusive of the economic impacts of environmental, historical, cultural, aesthetic, etc. importance, also from a social perspective.

If we draw an aggregate demand curve, the estimate of the social use-value of public real property is equal to its market value plus consumer surplus, where the latter amounts to the monetary value that users would be willing to pay in addition to the market value for the overall utility derived from that asset.

Despite the difficulties inherent in accounting for qualitative impacts, the valuation of an A-URBIS can be reduced to a single monetary expression by estimating the "total economic value".

As regards marketed benefits, their basic value may be deduced according to traditional estimated criteria: market value, cost value and derivates. In case of non-marketed benefits, their total economic value may be obtained from their use value plus their passive use value, which is related to the intrinsic features of the resource. For non-marketed benefits, their total economic value - as defined above – is to be calculated using direct and indirect estimation procedures, suitable for monetization.

To express passive use value, current scientific literature admits the concept of existence value as exclusively related to the intrinsic peculiarities of the resource, regardless of any instrumental use that man could make of it. Also the estimate of the existence value remains subject to the possibility of identifying the actual willingness to pay "just to know that a given resource exists", regardless of its actual use.

For the monetization of benefits, generally two groups of techniques are used: the Revealed Preference Techniques (RPT) and the Stated Preference Techniques (SPT). The first techniques are based on the concept of complementarity (or substitution) of the markets, estimating the benefits through the effects that non-marketed goods produce on the actual market of other goods. The second group refers to hypothetical markets, and is based on surveys carried out on a representative sample of the community; respondents are asked to state the economic value they attributed to non-marketed benefits. Both techniques may be used to estimate use value, but only SPT (classified as contingent valuation and choice modelling techniques) allow estimating passive use value, which may be determined through the Willingness To Pay or Willingness To Accept (WTP or WTA) of the respondents. For the purposes of a more rigorous assessment, choice modelling techniques are preferable for their ability to examine the attributes that are crucial in the formation of total economic value. Despite these advantages, using choice modelling techniques, costs are higher and time is longer to carry out the valuation.

Total economic value can be considered as a valuation criterion close to the logic of estimates, since it expresses a mere monetary valuation.

An A-URBIS stands out for its importance, long time, substantial commitment of resources and change in social attitudes required for its implementation.

These complexity factors, combined with the plurality of common social interests that the initiative is able to solicit, involve a valuation process open to the community dimension.

For the implementation of an economically sustainable A-URBIS, the views of the public sector and of the private sector are only one necessary - but no longer

sufficient - condition. The role played by the community involved is decisive in that, by recognizing the qualitative and quantitative, multifunctional, essential and sustainable benefits of an A-URBIS, the community can consciously determine its success. It is the community involved that states the value of an A-URBIS, expressing its preferences.

This approach allows to obtain the sharing and consensus of the community to the creation of an A-URBIS which, without full social support, could never take off.

The new participatory processes, based on the direct involvement of citizens in decision-making, can provide the theoretical and operational basis for an advanced valuation, in tune with the common feeling of citizens, who on the one hand are aware of the increasing critical situations produced by traditional forms of representative democracy and, on the other, are prone to a wide introduction of direct democracy instruments, which in many respects appear to be more appropriate to socially reflect on the relationship between means and common objectives.

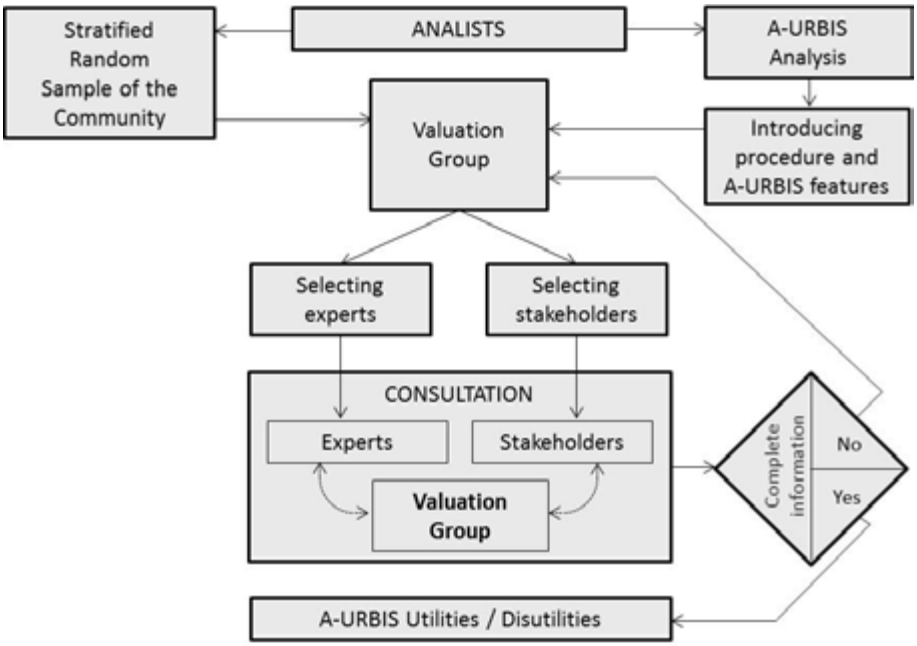
Participatory methods may be classified according to the share of power transferred from the institutional decision-maker to the participatory context. There are procedures that merely create information among citizens, others that stimulate community consultation, some that seek the cooperation of all the participants to outline scenarios or identify solutions, and still others that leave the decision to citizens. In any case, the intention is to reach democratic, transparent and accountable, choices.

In the most recent practice, directly deliberative procedures based on assemblies, groups or juries of citizens get more consolidated. Among the various deliberative techniques developed over the years, we mention the Plannungszelle (Dienel, 1978), the Citizen Juries of Ned Crosby (Smith and Wales, 2000), the Opinion Deliberative Polls (Fishkin, 2001) and the Consensus Conferences. In each of these techniques, the end result is a preference expressed on the basis of informed, conscious and consensual, choices and obtained by highlighting one's own opinions, discussing them and changing them after they have been debated. Information and dialogue are the prerequisite and fundamental elements of each procedure: it is direct, as citizens directly participate in the solution of problems affecting them using their concrete experiences; it is deliberative, since the decisions affecting the community should be taken with an adequate information base and argued with much discussion and convincing reasons.

The valuation based on deliberative participation processes leads community actors to formulate opinions of value through an informed, dialogical, negotiation and sociable relationship with the stakeholders of the A-URBIS. This leads to the progressive reduction of the areas of conflict, outlining balanced profiles between strong stakeholders and the advocates of common good that often have no voice in the matter.

These opinions are expressed either individually by the members of a group or in the name of the group as a whole. In conclusion, a deliberative participatory valuation procedure allows expressing a fairer and more democratic opinion value, since it is the result of consensual and shared social choices.

Figure 2. Phase 1, Problem Setting.



The Deliberative Direct Valuation (DDV) derives from the combination of two elements: a) a participatory deliberative process, which is necessary to develop instruments of direct democracy; b) the Stated Preference Techniques, which are essential to capture the value related to inclusive use in economic calculation.

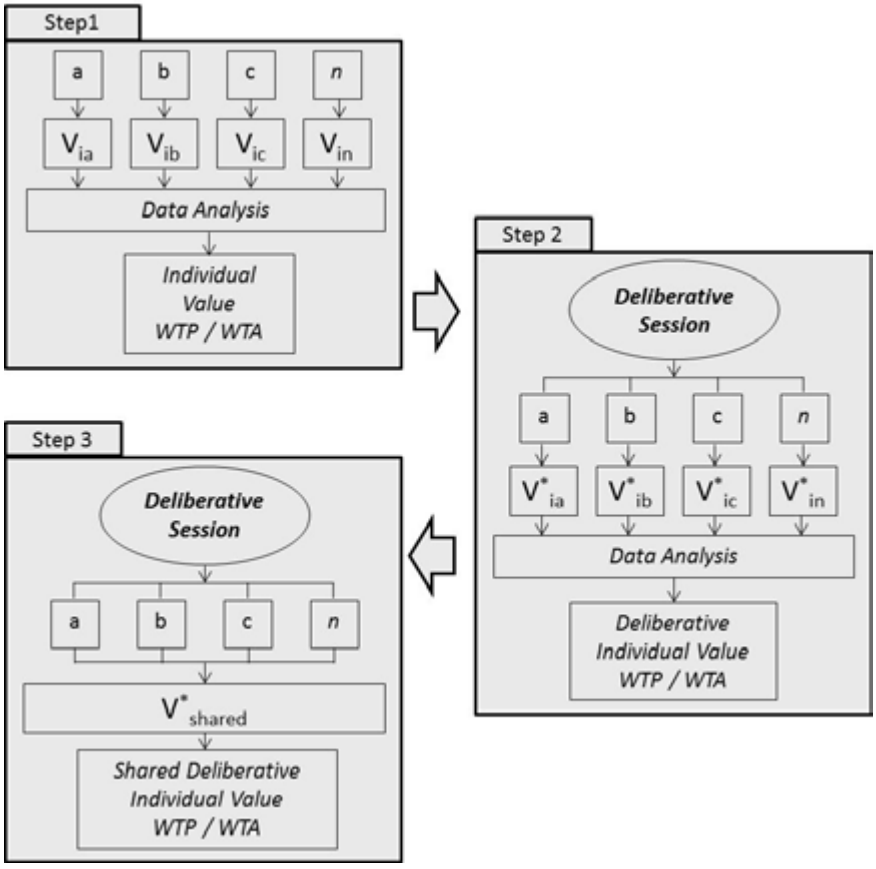
The application approaches of a DDV differ according to the characteristics of the A-URBIS to be valued and to the context, in which it is located.

Random drawing of names and stratification of the sample that will form the valuation group are the preliminary steps to represent the target population affected by the system. The procedure consists of two phases: the Problem Setting and the Direct Deliberative Valuation. Once the group has received from the analysts the main information on the valuation process and urban agricultural system, the aim of the first phase (Fig. 2) is to identify, in an open and participatory manner, a list of utility/disutility items associated with the creation of an A-URBIS.

By interacting with each other, the members of the valuation group can propose new experts to be consulted in order to deepen their knowledge and clarify any doubt. Moreover, the valuation group selects and consults a team of stakeholders to better understand their point of view; analysts involve other stakeholders that freely ask to participate in the meetings.

The valuation group is the community involved, which has become acquainted, aware and able to make choices that take into account the complexity of the issue at stake.

Figure 3. Phase 2, Direct Deliberative Valuation.



Using the SPT integrated in the social deliberative process, the WTP and WTA are estimated; Figure 3 shows a diagram of one of the possible procedures for direct deliberative valuation.

In Step 1, the actors (*a, b, c, n*) formulate their estimate of the WTP and WTA (Individual Value). In Step 2, the valuation group undergoes a new deliberative process. Including experts and stakeholders, the previously set forth reasons of the WTA or WTP are discussed and a new individual value is estimated (Deliberative Individual Value).

In Step 3, the valuation process is repeated again through an additional deliberative dialogical phase. The aim of the group is no longer the expression of individual values by individual actors, but the identification of a single individual value expressed unanimously by the entire assembly (Deliberative Shared Individual Value). The extension to the target population of the value obtained allows estimating aggregate WTP or WTA. The so-obtained result is a shared monetary

value, informed and mediated among the different positions of the deliberative context, after consideration of the views of the stakeholders and experts involved in the process.

Only through a widespread and growing experimental activity, it will be possible to improve the validity of monetary valuation procedures that are directly deliberative. The difficulty to implement them and the checks that they require should not discourage their use. The experimental valuation of the procedures under consideration in one way questions the assessment methods that ignore or neglect the actual preferences of the community and, in another, encourages the creation of shared solutions. By innovating the ways of participation in civic life, monetary deliberative valuation procedures make public choices more democratic, enhance the self-determination of citizens, spell out the extent of the value assigned by a community to goods or social projects.

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