

“Using economic analysis to measure the sustainability of urban and peri-urban agriculture: A comparison of cost-benefit and contingent valuation analyses”

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I. Introduction

One of the claims made about urban and peri-urban agriculture (hereafter UPA) is that it adds to the “sustainability” of an urban area. This has been used as a selling point for local, national and international policy-makers to support the development of UPA with clear and fair policies, and to integrate it with other components of the food, planning, and agricultural systems under their jurisdictions. But whether UPA really makes a city more “sustainable” is an open question and will remain so until methods are developed to measure what is meant by sustainability.

“Sustainability” commonly refers to the tendency of something to endure over time. However, applied to UPA the term implies an association with “sustainable development,” a phenomenon or objective that incorporates social, economic, and environmental components. The “sustainability” of UPA therefore present a yardstick by which UPA can be described and analyzed in terms of its contribution to the social, economic, and environmental well-being of individual communities. It also presents a means of formulating policy choices that move a community towards, rather than away from, lasting development.

Methods have been developed in many disciplines to assess the “sustainability” of an activity or enterprise. Common elements are to examine the impacts over a relevant time period of the activity and to consider the linked interactions of social, economic, and environmental phenomena. Only a truly inter-disciplinary approach is able to capture the diverse impacts that arise from activities such as UPA.

Economic analysis is better at measuring quantitative impacts than qualitative ones. For purposes of research on urban agriculture, it is straightforward to use economic tools to look at trends in production, costs or wages. However, in the past two decades, a broader range of economic methods has been developed that allows economic evaluation of non-market impacts and activities, such as the social and environmental aspects that are also

important to UPA. It is worthwhile to consider applying those methods to UPA research, to expand the range of knowledge about UPA and, over time, bring better information to the task of policy-making. This paper suggests the way forward for such application.

New methods of analysis employ newly devised information tools to measure qualitative factors unfamiliar to economists, but still have in common with standard methods an economic way of thinking about UPA designed to answer the question: how to make choices among competing alternatives for resource use. The research begins by defining as “economically-relevant” all the aspects of UPA that use or produce resources. These include not only those that involve buying and selling goods in markets, but any activities related to UPA that affect people’s decisions about the value and uses of resources, including money, goods and services, time, and the natural environment.

Thus, through a combination of standard and recently-developed economic methods, the following questions about the social, environmental, and economic impacts of UPA over time can be addressed:

- In what ways does UPA affect the community, and why? Are the positive and negative effects temporary or permanent and how might they change over time?
- Who are the important stakeholders affected by UPA, what conflicts arise among them, and how might they be resolved?
- Are the impacts of UPA better for the community than an alternative use of the resources, and how should choices be made about alternatives?
- How do factors from outside the community affect UPA and its role in the community?

II. Two Methods of Economic Analysis of UPA

This paper describes and compares two methods of economic analysis that can be used to examine the sustainability of UPA within a community. The information to be gained from both methods could be used to provide guidance to decision-makers at multiple levels about the overall value of UPA, to demonstrate who is most affected by it and in what ways, and to suggest how to improve its sustainability and its contribution to the community through policy or other changes. However, the two methods discussed below differ in significant ways in their informational needs, other resource requirements, and ways in which the results may be used. The first method, cost-benefit analysis, is more heavily dependent on quantitative information and tends to founder when only qualitative data are available. The second method, contingent valuation, produces its own data, which can be either quantitative or qualitative, but is most often used for measuring non-market effects.

Research may focus on very small-scale (a farm or family unit) up to large-scale (the entire community or even country level) impacts from UPA. Analysis of UPA is most

appropriately carried out at the community level, “community” being defined as the local population affected by the presence of UPA, either directly or indirectly. This includes producers and consumers, as well as others to be mentioned below, both within the city/town boundaries and those relatively close by who are affected in some way by UPA.

UPA can affect a wide range of actors: the producers, the consumers, neighbors, competitors for the resources or markets, people living downstream or downwind of UPA activity, etc. This makes the data collection part of the economic analysis critical to getting good results: if any important part of the affected community is ignored, the full impact of UPA will not be known. The analysis should take into account any factors that affect the well-being of the relevant population, their choice sets and, ultimately, their decisions. When measuring “sustainability” these factors include the three components of sustainable development: social, environmental, and economic impacts upon the community.

Cost-benefit Analysis for UPA Research

Cost-benefit analysis (hereafter CBA) is the most common and familiar form of economic analysis used by public policy decision-makers. It is most often used to evaluate the net benefit of specific new projects before they are carried out, but can be used to analyze broader activities or policies. The essential objective of CBA is simple, although carrying out the analysis can be arduous, controversial, and involve numerous judgement calls. The advantage is that CBA provides a systematic, transparent method of determining the net impact of an activity on a specific population. While judgement calls may be needed, they are transparent to the users of the analysis, and can be modified relatively easily in order to evaluate the sensitivity of the final results to changes in them.

A properly done CBA of UPA in a specific town should indicate whether the overall impacts of the activity are positive or negative. The analysis begins by describing two possible situations – one of which is necessarily hypothetical. The first is a baseline and the other is a proposed change from baseline. In using CBA to evaluate the sustainability of UPA in a city where it already exists, I define a hypothetical baseline situation as “No UPA” and compare that to the real situation with UPA, thus measuring the net impacts on the community of the current level of UPA.

The steps in conducting a CBA for UPA are as follows:

1. Define the activity you wish to evaluate and the relevant time period of the analysis. For UPA, this would include the production of agricultural output and related activities, such as marketing and consumption. The choice of time period is somewhat arbitrary for analysis of UPA, compared to CBA of a project that has a fixed duration. Nonetheless, the time period should be chosen to allow inclusion of any significant impacts from UPA. For instance, if UPA production includes fruit from trees with a 5-year growing period, the analysis should be extended for that duration of time. If

environmental impacts of UPA are not evident or measurable immediately, the analysis should be extended to allow those impacts to be included.

2. Define the population affected. For UPA, this is the area of the city or town being studied, adjacent area involved in UPA, and the population in it. The population is involved in UPA as producers, consumers, and users of other resources including the natural environment. It could also include competitors for the resources and markets that UPA affects if there are important impacts on them from the UPA.
3. Identify the types of economically-relevant impacts of UPA on the population. They include the price effects of UPA production on food, land and labor involved; the opportunity cost of time and other non-priced resources involved; impacts on the prices of related goods and services (e.g. food from other sources, adjacent land, farm utensils, etc.); and any other non-price impacts. The latter generally include the social and environmental impacts of UPA activity that are not measured directly through price changes, but that affect people’s choices about using resources.

Examples of the main types of impacts of UPA can be seen in Tables 1 and 2: Benefits and Costs of UPA. Some of these impacts will be more important in one city than another, others are very difficult to measure, and yet others will be insignificant and not worth trying to measure. Nonetheless, the list is indicative of the extent of impacts that affect sustainability of urban agriculture.

Table 1: BENEFITS OF URBAN AGRICULTURE
Agricultural Production <ul style="list-style-type: none"> • Marketed • Non-Marketed
Indirect Economic Benefits <ul style="list-style-type: none"> • Multiplier Effects • Recreational • Economic Diversity/Stability • Avoided Disposal Costs of Solid Waste
<ul style="list-style-type: none"> • Social and Psychological Benefits • Food Security (Available and Affordable) • Dietary Diversity • Individual Psychological Benefits • Community Cohesion and Well-being
Ecological Benefits <ul style="list-style-type: none"> • Hydrologic Functions • Air Quality • Soil Quality

<p>Table 2: COSTS OF URBAN AGRICULTURE</p>
<p>Inputs: Natural Resources</p> <ul style="list-style-type: none"> • Land, rented or purchased • Land, vacant or donated • Water
<p>Inputs: Labor</p> <ul style="list-style-type: none"> • Wage and Salary Labor • Volunteer, Unemployed and Contributed Labor
<p>Inputs: Capital and Raw Materials</p> <ul style="list-style-type: none"> • Machinery and Tools • Fertilizer and Pesticides • Seeds and Plants • Energy (Fuel Oil and Electricity)
<p>Outputs: Pollution and Waste</p> <ul style="list-style-type: none"> • Soil Quality Impacts • Air Quality Impacts • Water Quality Impacts • Solid Waste and Wastewater Disposal

4. Measure the direction and magnitude of the impacts of UPA for each of the identified categories in monetary terms. This step introduces one of the foremost difficulties in conducting CBA to measure sustainability (the other being discounting which is discussed below.) Because many of the outputs and inputs of UPA are not easily quantified in monetary terms, either because markets for them are informal or because there are no markets with which to value them monetarily, special methods must be devised to quantify them. The lack of markets or informal markets is a technical difficulty of CBA rather than a conceptual difficulty of selecting which impacts to include.¹ As a result, the non-market impacts are generally left out of a cost-benefit analysis.

For purposes of UPA analysis, impacts that can be easily measured in monetary terms are: market value of agricultural output, wages to formal UPA workers, changes in land values associated with UPA activity, and changes in consumer prices of food. Impacts of UPA that are difficult to measure in monetary terms – and some of them are virtually impossible without complex methods – are the social contributions (e.g. increased social cohesion, reduced crime on vacant land, reduced vulnerability to conflicts or economic shocks), environmental impacts (e.g. recycling of organic waste

¹ It is important to note that impacts of UPA that are not easily monetized still have value and thus economic relevance and should be included in the analysis, or the results will be faulty. This is especially relevant when trying to measure sustainability because environmental and social impacts are critical components of sustainability.

material, improved hydrologic functioning and soil structure, contamination of surface water bodies with chemical run-off, build-up of waste from livestock products), and other non-market effects (e.g. farm output that is bartered or consumed within the family, family or other unpaid labor, opportunity cost of land used for UPA, etc.)

4. When you have determined the dollar value of each impact over a relevant time period, if that time period is more than one year, the value should be discounted using an appropriate discount rate. A procedure is needed similar to what would be done in a financial analysis to reflect the timing of when impacts occur – earlier impacts being more important than later impacts. The principle behind this step is that both positive and negative impacts that occur some time in the future have less weight than those that occur immediately. For instance, if a farmer will receive a payment for selling some product, he or she would rather receive the payment today than next month, and would prefer receiving it next month to next year. Thus, discounting both the costs and the benefits to reflect the importance placed on today compared to the future is an important step.

When conducting CBA it is difficult to select an appropriate discount rate. For example, an urban farmer may anticipate a good price on a crop of fruit from trees planted this year and use her land for that purpose instead of growing maize. But the payment from the fruit trees will not arrive for 5 years and therefore will be more discounted than a payment for maize that goes to market each year. The difference in return on those two crops is determined in part by the selection of the discount rate. A higher discount rate will make the fruit crop appear less attractive and the maize crop more attractive. The appropriate discount rate is the interest the farmer would receive by investing in the best alternative activity – commonly known as the opportunity cost of the investment.

5. The final step in the CBA is to add the discounted values of all the positive impacts and all the negative impacts and subtract the negative from the positive impacts. The result is the net benefit of UPA for the community.

The steps of CBA are described above in very general terms. The best way to learn how CBA can be used to illuminate the contributions UPA can make to the sustainability of a city is to carry out a CBA following these steps. A simplified version of the exercise was done for a city in North America by Nugent (in Furuseth, 1999.) The analysis included only major market impacts of UPA. The results show a net benefit of commercial urban agriculture of between \$100,000 to \$3.6 million per year, and a net benefit of community-based urban agriculture of \$155,000 to \$173,000 per year. The results demonstrate a positive impact from urban agriculture, but lack of data about non-market impacts prevented conclusions about the longer-term sustainability of UPA.

As discussed, the data needs of CBA -- particularly for non-market impacts -- constitute the greatest barrier to using this method in a wide range of cities. Further research could

improve the potential to use this valuable method, and allow comparison of the sustainability of UPA across cities.

Contingent Valuation Analysis for UPA

Contingent valuation (CV) is a broad term used to refer to methods of economic analysis that find values for goods and services that are not bought and sold in markets. It is an attempt to find a “price” when there is no market mechanism for doing so. Because UPA creates social and environmental impacts that are not priced, the use of CV method can be very important to a true assessment of UPA. There are many different forms of contingent valuation, but the objective of all of them is to establish a “contingent” market, that is, one that can find the prices that society would attach to those non-market impacts if there were a market for them. For any type of CV, most of the information for the analysis is obtained from the affected populations and the primary challenge is to determine how best to elicit this information.

CV is often carried out by asking people in a questionnaire how much they would be willing to pay to receive the individual benefits of UPA or to avoid the risks created by UPA. The responses must be given in monetary terms. So, for instance, one individual might say that the greater freshness of vegetables from UPA is worth \$1 per month to him, and the opportunity to farm his own plot and create a steady supply of food is worth \$2 per month, but he would also be willing to pay \$2 per month to ensure that wastewater is not used to irrigate the urban farms. In this way a representative sample of the entire community can be used to illustrate values for the individual impacts of UPA.

The responses of the sample population are then aggregated and scaled up answer the question: how much would the entire community be willing to pay to have (or not have) UPA in its midst? This figure will be of interest to policy-makers, community leaders, and the population when they make decisions about resource use and policies.

Other CV tools can be used to value the impacts of UPA in different ways. For instance, another CV approach akin to decision analysis employs focus groups and structured interviews to find out how people within a community would make choices among alternatives. In this process, rather than express of monetary willingness to pay, a focus group goes through the steps of choosing between maintaining UPA activity on some vacant land and having a public facility built on the land, as an example. This method of CV can be used to allow the expression of preferences from many types of stakeholders in a structured way.

These two methods of CV analysis have different strengths and weaknesses. The advantage of a questionnaire CV approach is that it can be done as quickly as administering a single survey, whereas the decision analysis approach can be slow and laborious. However, the latter has the advantage of providing a fuller exploration of people’s values and choices than either cost-benefit analysis or a simple questionnaire. If the goal is to provide decision-makers with a full spectrum of information on which to base decisions, it is the preferred method.

Here I will briefly describe these two methods of CV through the steps needed to conduct them.

The steps in conducting a contingent valuation study for UPA are as follows:

1. Determine the specific nature of what impacts or activities need to be valued. This will likely include various impacts of UPA that cannot easily be analyzed with conventional cost-benefit analysis, such as the environmental and social impacts. The lists of social and environmental impacts in Tables 1 and 2 are a good place to start identifying the important aspects of UPA for a particular community, but each town or city will face its unique circumstances in relation to UPA. Thought should be given at this stage to why UPA exists in the community, when it began, and who is served or harmed by its presence. The answers will point you toward the important aspects of UPA for the community and local policy-makers to assess.

If you are interested in understanding the environmental impacts, you would likely identify the area that is most affected by the UPA activity, such as land where crops are planted, water bodies and groundwater under and adjacent to the planted area, and perhaps bio-diversity of species in that area. For assessing the social impacts, you would identify the types of people and groups most affected by UPA, such as the food insecure; the ways in which they are affected; and how many people are affected by those impacts.

2. The next step is to determine which stakeholders are affected by UPA and should be involved. Some will be obvious, such as the farmers themselves, consumers of the agricultural output, neighbors and resource owners. Some less obvious groups will also have an interest in UPA, such as a wide array of public agencies (agriculture, planning and land use, health, waste disposal, emergency management, and others involved in the food system,) schools, environmental groups, etc.

This step is critical to the credibility and completeness of the analysis. If concerned groups are left out of the process, the results obtained will not represent the community and its values regarding UPA. Any policy or resource use decisions made on the basis of partial knowledge would have little chance of being accepted by the community.

3. For all of the important environmental and social impacts of UPA that were identified in Step 1, a scale must be defined to measure the extent of its impact on the people in the community. The people who fill out a questionnaire or participate in focus groups and other ways of expressing their preferences will be asked to use this common scale to indicate their values for the various impacts.

For a questionnaire-based CV study, the monetary scale has already been defined as the measure. For a decision-analysis method, the selection of a common scale is more flexible. It could be one chosen by the focus group or the researchers. The main requirement is that it have an easily and commonly understood meaning to the entire group – such as an hour of relaxation or provision of a needed social service. At a later stage in the analysis, this measure will be converted to a monetary unit which will allow comparison of the values obtained in this process to those obtained through one of the other methods. That step lies ahead.

4. The next step in CV analysis is to carefully prepare the questions to be asked, either in a questionnaire or as part of a decision analysis using focus groups or other methods to elicit information. In this step the goal is to make very clear what trade-offs people will have to make in valuing the various impacts. When using a questionnaire to elicit values, the researcher should pre-test it to ensure that no confusion is inadvertently introduced by choice of wording. Sometimes it is useful to show the respondents pictures of the impacts (for instance, wastewater use for irrigation, or fresh vegetables alongside packaged imported vegetables) in order to make choices clear as the questions are being asked.

Focus groups or structured questionnaires involve interaction among the respondents and researchers in order to clearly define choices and allow respondents to indicate why they choose one alternative or indicate one value instead of another. Through this give and take, the researcher gains greater insight into the reasons for responses, and can introduce further questions in order to sharpen the analysis. What can be learned from this method will be limited by the questions asked in focus groups or on questionnaires. The researcher must present alternatives to the stakeholders that represent the real choices and trade-offs they face.

For example, a researcher may inquire about the choice between maintaining land in use for farming and converting it to a housing development in a fast-growing city. Neighbors, property-owners and other stakeholders will have different views about the matter and the researcher's aim is to determine what aspects of the decision are most important to people. In this example, nearby residents may initially indicate opposition to the proposed housing development. Unless further questioning is allowed by the research protocol, the reasons for their opposition will not be evident. Further discussion through focus groups or specially structured interactive questionnaires may reveal that residents oppose the housing development because its scale would overwhelm local infrastructure services. A feasible compromise may then become possible that would allow for a smaller residential project while maintaining some farming.

5. At this stage, the researcher must also put choices on a common scale. Up to this point, stakeholders may have answered questions indicating their preferences for the different impacts of UPA, e.g. fresh food, green spaces, employment opportunities, etc. Each of these impacts has been measured according to its own scale, as defined at the outset. Fresh food may be measured by a scale indicating how long it takes to get

the food from the farm to the consumer, green space by acres planted, and employment opportunities by numbers of full-time equivalent jobs in UPA. But if people are eventually going to make choices among these impacts – and many others – they will need to use the same scale to weigh them.

This step is accomplished by requesting respondents to compare levels of the different impacts on the same scale. A respondent will be asked, for instance, to use a numerical scale of 1 to 50 and assign different values to an extra day for food traveling from farm to consumer, an acre of green space, and a job created in UPA. In this manner, all of the impacts of UPA will eventually be comparable with each other and can be traded-off against each other in a decision process.

6. The final step in CV analysis is to summarize the information obtained and derive conclusions. By its nature, cost-benefit analysis provides a clear result indicating whether UPA has a net positive or a net negative impact on the community. With CV analysis, the final results are less straightforward.

By adding together the responses of all individuals to the questionnaire-based CV method, a researcher obtains an aggregate figure of willingness-to-pay from the population that was questioned about UPA. The aggregate figure represents how much the respondents valued all the various impacts of UPA that were asked about in the valuation questions. If the CV questions included asking people about most of the non-market impacts of UPA, the result will reveal how much value the community places on those impacts, and *hypothetically* how much money the community would be willing to pay to receive them. Likewise, if the questionnaire asked people how much they are willing to pay to *avoid* some of the risks of UPA, then an aggregation of their responses will reveal *hypothetically* what they would pay to eliminate those impacts.

Using the decision analysis method of CV, the researcher will learn how the community would select among different alternative uses of its resources, and why it makes those choices. The final response will be a weighing of all the choices available to the community in deciding how valuable UPA is to them. These choices will reveal how the community would choose in facing decisions about how much, where, and what types of UPA to allow. The results can be presented to policy-makers who seek to learn the preferences of various stakeholders to assist them in making policy decisions among complex choices.

III. Economic Analysis and Sustainability of UPA

In order to answer the initial question about the sustainability of UPA for a given community, the researcher must evaluate the information obtained from the different analyses, keeping in mind that each of the methods discussed here provides different information and must be carefully interpreted. Further, the interpretation must recognize that there will be important missing information in each case. For instance, cost-benefit analysis does a good job of comparing the quantifiable and monetizable

benefits and costs of one alternative to another, but will ignore the social and environmental impacts. A questionnaire-based CV does a good job of valuing non-market impacts, and can also be designed to obtain information about market impacts, but is prone to a host of technical problems that may compromise the validity of the results.² A decision analysis method of CV will provide a thorough understanding of people's preferences, but may be difficult to translate into a concise picture of the benefits of UPA.

Despite the weaknesses of these methods of economic analysis, they still produce sufficient information to address the question "Does the community receive benefits from UPA and are they sustainable?" Specifically, the following information will become available from the economic analyses that could be conducted to assess UPA:

- The cost-benefit method will reveal the net present value of the combined impacts of UPA that are monetizable. If that value is positive, then UPA can be deemed to be sustainable;
- The questionnaire CV method will reveal how much people would be willing to pay to receive the defined non-market benefits (or avoid the defined costs) of UPA. If people value UPA at a level above the costs imposed by it, it could be considered sustainable; and
- The decision analysis CV method will demonstrate the trade-offs that stakeholders are willing to make in choosing among alternative uses of resources, and the reasons for their choices. If people choose to devote resources to UPA instead of other activities, then it is sustainable.

IV. Ways to Advance the Use of Economic Methods for UPA Analysis

Few communities are prepared to conduct a full economic analysis of UPA. Not only do such studies demand specialized skills and require a significant amount of researcher time, but they require data and information that is difficult to acquire. Most importantly, such methods are utilized most often when there is a problem that requires policy-makers to make choices among powerful competing interests. In such situations, policy-makers demand objective, verifiable information that comes only from thorough investigation of a situation. With rare exceptions, issues surrounding UPA have not risen to the level of concern among local or national policy-makers that would warrant such an information-gathering and analysis effort.

Ultimately, the types of analysis described above will clarify choices among activities and needs within a community. Preliminary work can be performed that will improve communities' capacity to undertake economic analysis of UPA for purposes of better decision-making down the road. Some of these steps and their usefulness are described in this section.

² Difficulties in conducting credible CV analysis are widely discussed in the literature. See ____

A. Use trend analysis to understand UPA impacts

The most important impact of UPA is the agricultural produced. Lack of information about production trends in UPA presents a severe limitation to any assessment of the value UPA contributes to a community. UPA output depends on many factors (see Nugent, 1999) and can fluctuate widely with changing conditions. This can lead to serious misunderstandings of UPA and its impact.

One step toward eliminating misunderstandings about UPA is to collect available information about major quantifiable impacts of UPA and correlate it with underlying conditions. For instance, UPA production would be expected to correlate positively with unemployment rates in a community: greater unemployment encouraging UPA production from informally or unemployed workers. These kinds of relationships should be examined over a minimum of several years to assist in understanding the major influences on and contributions of UPA.

Quantifiable trends available from official or unofficial statistics often include localized employment in agriculture, wage rates, food availability and prices in markets, and sometimes local agricultural output. If these statistics are not readily available, simple surveys can be carried out to begin establishing a reliable database.

B. Carry out limited economic analysis of UPA using only market-based, quantifiable measures

A partial cost-benefit analysis can be done when market-based aspects of UPA are quantified, as suggested in part IV.A. Results of such analysis can be very useful for presenting to policy-makers and others who are often surprised at the economic contribution made by UPA. If reliable data are available, the product of agricultural output and prices paid in the market for the output reveal the contribution to a city's GDP of UPA. If data can be produced that show labor hours invested in UPA and wage rates paid to UPA workers (or proxy for wages), the beneficial impact on incomes and employment can be demonstrated. These figures must be offset by the value of the opportunity cost of resources invested in UPA, such as costs of land, water, and seeds.

C. Develop indicators to proxy non-measurable impacts of UPA

UPA indicators can measure the conditions and trends affecting UPA : are certain things improving or worsening, where are problems occurring, etc. The main reasons to use indicators, rather than simply raw data or qualitative information, is that they can be selected to be simple, comparable, and "indicative" of important objectives. Thus, they can demonstrate the health of UPA itself, and the sustainability of UPA in a city.

The indicators should be selected to provide information, to show trends, to guide policy and give feedback to policy decisions. Primarily, they should show people whether the situation in question is worsening or improving. For UPA, this again suggests different motives for different groups. Some are concerned about the immediate food security impacts of UPA production, others are interested in the environmental effects of soil and water use for agriculture, and others about the social effects of women's involvement in farming, among other issues. These diverse interests complicate the task of selecting a small set of relevant indicators for UPA.

The first step in integrating UPA indicators with city sustainability is to measure the fundamental information about UPA. This should be done through city surveys on a uniform basis. This information can become a part of the extended set of UNCHS indicators available through the Urban Observatory (www.urbanobservatory.org).

The second step is to identify potential alliances with civic groups in individual cities. The sectors most amenable to such alliances include environmental, health, and poverty groups. However, the sectors that are more powerful and likely to have more influence on policy-makers are the employment and commerce concerns.

The next step is to understand what the overall goals of city policy-makers and influential leaders are. The indicators chosen to represent the health of the UPA sector must fit into these overall goals. Then people will pay attention to them. The chosen indicators must not only be policy-relevant, they must be interesting to the public, and they must be used by the media, policy-makers and other interest groups.

D. Conduct a case study economic analysis to demonstrate the unrecognized impacts of UPA to policy-makers

The first step to establish a common methodology to assess the sustainability of UPA across communities is to perform a competent case study. The selected city should be one that has the full range of impacts that can occur from UPA, and the full range of issues and conflicts that face policy-makers and communities in deciding how to manage UPA.

The case study will need to draw on methods described in this paper and should at a minimum assess both market and non-market impacts of UPA. The study should identify important stakeholders affected by UPA and sectors affected by it both directly and indirectly. The issues and hurdles raised in conducting the case study will inform researchers about the demands and uses of economic analysis for agricultural research and planning.

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