Integrating Organic Solid Waste Management with Urban Agriculture: Using a Community Design Process in the Philippines[1]

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ABSTRACT

The design of sustainable cities requires the design of systems that facilitate more sustainable urban living practices. Engaging the community in the design of such systems is therefore critical to successful implementation. This article describes a project in the southern Philippines where three communities were engaged in a participatory design exercise to develop site plans for the integration of organic waste with urban agriculture. It points out some of the challenges in developing a process that is designed with and for the community to fit their own particular cultural context. It explains how the Asset Based Community Development ("ABCD") approach was integrated with community consultations and a five-day training course that served both as a structured design charrette and capacity building exercise for a core group of "Community EcoAids" who subsequently returned to their communities to spearhead project implementation. The article makes the case that because the ABCD approach is consistent with the basic principles of urban design, it is well-suited for participatory urban design in a variety of cultural settings.

Key Words: *organic solid waste management; participatory urban design*

1 Introduction

Three urban communities in the Philippines were engaged in a participatory design exercise to develop site plans for the integration of organic waste with urban agriculture. This article describes the development of an appropriate community participatory process, explains how the Asset Based Community Development ("ABCD") approach was adapted to the particular social context, and makes the case that because ABCD is consistent with the basic principles of urban design, it is well-suited for participatory urban design in a variety of cultural settings.

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1.1 The Design Problem

This design project assumes two basic premises in the design of sustainable cities. One premise is that we need to "close the nutrient loop." In conventional planning, food production and the solid waste management stream are treated as separate urban systems. That approach results in the loss of an important potential nutrient source – the organic portion of solid waste, which could be processed (i.e. composted) and used for local food production, especially in cities where malnutrition and lack of food security contribute to urban poverty. What is needed is the design and development of urban systems that facilitate recapture of these nutrients for use in food production.

The second premise is that urban design has a role in encouraging such a shift. Waste collection and waste disposal occur in the public realm; and while urban food production usually takes place on private land, it, too, can occur in public space. Therefore, although this issue lies at the intersection of several disciplines, it does fall appropriately within the purview of urban design. Moreover, to ensure successful implementation of such projects, public participation is required in the design process.

1.2 Purpose

The purpose behind this project is to encourage integration of organic waste with urban food production in order to: 1) recapture nutrients for urban food production; 2) improve local environmental conditions by promoting hygienic waste disposal; and 3) reduce landfill loads. This will contribute towards more food security and lead to better nutrition and improved health of the urban poor, particularly in the cities of the developing world.

1.3 Objectives

The objectives were to develop an illustrative site design that would demonstrate the effective integration of organic waste management with urban agriculture. This was to be achieved through the use of a participatory process to engage the community in the design development.

1.4 Location

Cagayan de Oro City in the Philippines was selected for this project for two reasons. One reason is the allotment garden concept that was introduced in 2003 by the PeriUrban Vegetable Project ("PUVeP") of Xavier University's College of Agriculture. This has been a successful initiative, with ten allotment gardens currently in operation around the city, some of which have become self-sufficient without external funding (PUVeP website: 2009). The second reason is the Ecological Solid Waste Management Act (RA 9003), national legislation that came into effect in 2000. It requires segregation at source, recycling and composting, and represents an important shift in municipal planning - away from the conventional practice of a single centralized dumpsite towards a decentralized approach with several smaller facilities. This project provided an opportunity to explore how these two initiatives - the allotment garden concept and RA 9003 - could be integrated.

2 Background

2.1 Cagayan de Oro City

Cagayan de Oro City ("Cagayan") is located in Mindanao in the southern Philippines. The population is approximately 500,000 but with a growth rate of 4.4% per annum, the population is expected to double every 16 years (City Stats: 2008). Rapid growth exacerbates the problems common to most cities in the developing world, putting even more pressure on inadequate infrastructure such as waste collection, and contributing further to poor sanitation and health.

As in other Philippine cities, much of Cagayan's population is comprised of urban poor. The poorest sector is estimated to comprise 40% of all households, which spend about 60% of available income on food alone (Holmer: 2007 (1), citing the Philippine Association of Nutrition). At the same time, about 40-50% of the waste delivered to the Cagayan landfill is biodegradable and could be converted into organic fertilizer for food production (Holmer, *et al*: 2000).

2.2 Cagayan's Allotment Gardens

Allotment gardens were introduced as an effort to alleviate hunger among urban poor by bringing vacant land in the city into production. The minimum area that is suggested is 3000 square meters; this can accommodate eight families with each one having a parcel of 300 square meters, plus common areas for composting (Garden Manual: 2008). Allotment gardens offer beneficiaries an opportunity to acquire gardening skills and to contribute to their own livelihood. An agreement is entered into among the landowner, the local council and the gardeners, which sets out the rights and responsibilities of the parties. The term is usually fixed for 5 years, after which period the gardeners must relinquish possession if the landowner is unwilling to renew the lease (Garden Manual: 2008).

Allotment gardens contribute significantly towards improving the nutritional intake of a neighbourhood. Almost 90% of gardeners surveyed responded that their vegetable consumption had increased; for about 75% of gardeners, their vegetable consumption had doubled (Miso:2007). Surrounding households also benefit; surveys indicate that 25% of the produce is consumed by the families themselves, 7% is given away to friends and relatives, and 68% is sold (Holmer: 2007(1)).

Not only are the allotment gardens productive food growing areas, they also serve as important social nodes where gardeners and customers visit, exchange information, and make purchases. They are recreational areas, where children play and experience nature. They are also attractive aesthetic spaces and in crowded urban areas may provide what little refuge is left for wildlife in the city. With vision and planning, these productive pockets throughout the city could eventually become interconnected contiguous open space to create what has been described as Continuous Productive Urban Landscape ("CPULs")(Viljoen:2005). Lastly, in the context of this project, the allotment gardens were viewed as potentially instrumental in organic waste management.

2.3 Cagayan's Solid Waste Management

Uncollected solid waste is evident throughout Cagayan and contributes to several major problems: 1) ground and surface water is polluted through leachates; 2) disease vectors are spread from open and uncovered waste; 3) methane is emitted due to anaerobic decomposition; 4) uncollected waste is often burned in open pits, which contributes to deteriorating air quality; 5) nutrients that are lost for use in food production are substituted by fertilizers made from non-renewal fossil fuels. While recapture of those nutrients is the objective behind this project, if successful, it could alleviate the other problems as well.

Although plans are in place for a sanitary landfill, the municipality currently uses a controlled dumpsite comprised of 13.5 square hectares, about half of which remains available (City Discussions:2007). In 2007, the amount of waste deposited varied from an average of 60 to 98 metric tonnes per day (City Stats: 2007). At the dumpsite, waste is combed by the waste pickers who make a livelihood by selling the recyclable materials. Approximately 40-50% of the waste is biodegradable (Holmer, *et al*:2000), although once it arrives at the dumpsite, the organic portion is no longer effectively recoverable. To capture the organic stream, what is needed is segregation *at source*, which is what the new legislation requires.

2.4 New Legislative Requirements

The combined effect of the national act and a city ordinance is to transfer most of the responsibility for segregation to the barangay ("village" or neighbourhood) level. Section 10 of the Ecological Solid Waste Management Act, provides that "segregation and collection of solid waste shall be conducted at the barangay level specifically for biodegradable, compostable and reusable wastes" and that "collection of non-recyclable materials and special wastes shall be the responsibility of the municipality or city."

The city ordinance requires that waste be segregated primarily at source (Article 3) and that Material Recovery Facility Stations (MRFS) be established throughout the city at the barangay level (Article 9). MRFS is defined as a "drop-off center designed to receive, temporarily store, sort, separate and recover waste before the transfer, transport and final disposal or remaining non-reusable waste into the identified sanitary landfill" (Article 2).

The legislation is clear. The barangay is responsible for collecting the recyclables and compostables; the municipality is responsible for collecting special wastes (i.e. hazardous) and the residuals (i.e. what is neither recyclable nor compostable). Therefore, because waste management is a joint responsibility of the municipality and the barangay, both were stakeholders in this project and both had to be engaged in the participatory process.

3 Identifying "Community"

3.1 Engaging Leadership

Advice from a variety of sources indicated that for any community participatory activities to be successful, it would be necessary to enter the community through the official political leadership; if an outside researcher were to approach the community first, and seek the

support of the leadership *afterwards*, it would be impossible to realize implementation of the project (because the local leadership power would be seen to have been usurped).

At the initiative of a city councillor and Chairman of the Committee on Agriculture and Environment, the city administration established a Technical Working Group ("TWG") comprised of representatives from the following departments: Public Services (i.e. waste collection), Agricultural Productivity, Natural Environment and Resources, Public Heath and Sanitation, Planning, Community Improvement, and Economic Enterprise (responsible for the public market areas). The presence of TWG members at project activities was significant not only because of the value of their substantive contributions but also because their participation demonstrated the city government's support for the project.

The process began with an open house to which representatives from potentially interested barangays were invited. This included officials from the city, officials from the barangays that already had some connection with PUVeP, and members from the allotment gardens. The purpose was to introduce the project, to ascertain which barangays were interested in participating, and to provide an opportunity for feedback on the proposed participatory process.

3.2 The Community Defines Itself

Adopting a truly participatory approach meant relinquishing not only expectations about possible outcomes, but also over the process. This was clearly evident at the following three stages.

First, a city-wide stakeholders' consultation had been suggested to the TWG as an appropriate starting point. The objective was to bring together the larger players in the city, i.e. the major generators of organic waste (such as the market vendors' association) and potential end users (such as nurseries and other growers). The rational for such a meeting was because very large problems, such as the organic waste at the so-called "vegetable landing area," (where produce from rural areas is delivered) were seen as beyond the capacity of one barangay. It was thought that this would be a way to discover potential linkages at the city scale. However, members of the TWG thought that what was needed was for participants to take ownership of specific and immediate realities "in their own backyard" and suggested, instead, stakeholders' meetings at the level of the barangay.

Secondly, although the barangay council is the elected representative government at the level of the community, it is not necessarily representational of all its constituents. For example, although the "vegetable landing area" is located in Barangay Lapasan, the associated waste issues seemed too overwhelming for the local council. Thus, considerable effort was required to ensure stakeholder representation from that area during subsequent barangay consultations. Choosing the council as the entry point had consequences for how the "community" was defined, however, bypassing the council was not an option.

Thirdly, the type of stakeholder representation also had consequences for the project outcome. The interests of many participants at the barangay level concerned their own neighbourhood, with less interest in the "big picture." This explains how the focus of the project shifted from market waste to household waste. The "community" identified itself and then identified the issue of greatest concern to its residents.

4 Participatory Urban Design in the Cultural Context

The participatory urban design process relies largely on the design "charrette," an open studio which usually takes place over three to five days. It was challenging to adapt that process to the local context, given certain logistics: there was no available function room or suitable place within any of the participating barangays to set up for such a length of time; it had to be held in a venue where people of all sectors would feel comfortable; the issues were sufficiently complex that it would not be easy for residents to engage in "drop-in" participation; and it would not be easy for residents to commit to the longer periods of time that would enable meaningful participation. Of even greater concern was how the process could best benefit the community.

What emerged was an alternative idea to structure much of the design component as a five-day training course for stakeholder representatives. This was thought to work better in the given cultural context: the training would provide the participants with at least a basic level of knowledge about a fairly complex design challenge, it would improve the level of the design contributions, it would provide participants with something tangible (certification), and the community would receive the benefit of participants who had developed the site plans on the community's instruction and which they could take back into the community for implementation.

As was pointed out to the councils, both approaches have advantages. The traditional charrette is open to everyone in the community, but the outcome is dependent upon the level of participation. In the training course format, while participation is assured, the outcome is dependent on the dedication and interest of the participants. All three barangay councils opted for the training course format.

The challenge this raised, however, was how the most appropriate participants for the training course were to be selected. While it was necessary to engage the barangay council in the selection process, it was equally important that the process be seen as transparent and fair, rather than politically driven. The ideal solution seemed to be to enable the community to select participates from among themselves during the barangay-wide stakeholder consultations. Selection criteria made clear that the course participants should be persons with demonstrated interest in the subject matter, with potential to see the project through to implementation, and representative of the various stakeholder interests (including market vendors, gardeners, waste collectors and waste pickers) and ensuring representation of women, youth and seniors.

5 Barangay-Wide Stakeholder Consultations

5.1 Objectives

Consultations were held in each of the three barangays for 50 participants (a number considered large enough to be inclusive but still manageable.) The process was intended to achieve several objectives. As a "soft" goal, it was expected to build broad-based and collaborative support among stakeholder representatives within the barangay, but also between the city TWG and the barangay leadership. Another goal was for the group to

collectively identify one major waste management issue (and a site) that they would want to select as a pilot project. Thirdly, it was expected that potential course participants would emerge – individuals who seemed to be natural community leaders, with demonstrated enthusiasm and interest in the subject. It was also hoped that the process would develop a "seedbed" of community interest so that the course participants could return to a supportive community for further consultation and project implementation.

5.2 Facilitation of Community Participation – TWG Involvement

The approach chosen for the community consultations is the method known as Asset Based Community Development, or "ABCD." This approach is based on the premise that communities can better develop themselves from the inside out by identifying and mobilizing resources that already exist within the community (Kretzmann & McKnight: 1993). This is in contrast with the traditional "needs-based" model, which starts with problem analysis and frequently results in communities turning to external solutions. This shift in focus towards the assets of a community, rather than needs, represents a major shift in community development practice in recent years (Green & Haines: 2002).

Community consultations and discussion had to be conducted in Visayan, the local language, in order to encourage full and active participation. Facilitation was therefore to be conducted by members of the TWG who were trained community facilitators. However, they were much more comfortable with the traditional needs-based model known as "SWOT" analysis, which identifies Strengths, Weaknesses, Opportunities, and Threats. Once the basics of ABCD were explained, because they were experienced facilitators, most of the TWG members were able to adapt quickly to the new tool. By the end of the consultation process, all TWG members were highly enthusiastic advocates of the ABCD approach.

Photograph 1: Community consultations - sharing "success stories" (Barangay, Macasandig)

5.3. Applying ABCD to the Consultations

Six consultation sessions were conducted, two in each barangay. In keeping with local cultural norms, the program was opened with an invocation and singing of the national anthem, introductions were made, and a welcoming address was given by the barangay chairman, a TWG member, and the researcher. After an explanation of the process, participants were divided into small groups and invited to share their “success stories” – any accomplishment by an individual or group that was related to organic waste management or urban agriculture. There were many stories, and examples included waste clean-up drives, vermicomposting operations, and new gardens. As these stories were recounted to the plenary by a representative of each group, participants identified the factors that had contributed to these successes. This included physical assets (e.g. land and equipment), human resources (e.g. skills and learning) and social capital (e.g. organizations and leaders). Participants located these community assets on base maps of the barangay.

Out of these exercises, the group was invited to develop a vision statement for their community.[2] This was followed by a brainstorming session to generate ideas for projects that would help the community achieve its vision. Participants then "linked" these project ideas with the existing assets that had been previously identified. Finally, the group prioritized these ideas and selected one of them as a pilot project. Because the local political climate and the issues were so different in each barangay, the consultation process and the outcomes were also quite different. In all three barangay, however, the pilot project that was chosen involved development of an MRF and accompanying allotment garden.

As a result of the consultations, progress was made in each barangay towards the objectives mentioned above: awareness was brought to the waste management issue, linkages were formed or strengthened between officials in the municipality and the barangay, a group of 7-8 participants was selected for the training course, and barangay-wide support for project implementation was initiated.

6. Community Ecoaid Training Course

6.1 Training Course Objectives

The purpose of the course was twofold. One, it was an alternative to the traditional design charrette. Structured as a course, it required participants to attend for five days during which they could gain at least a basic level of knowledge for a fairly complex design problem. The "data" participants generated through exercises enabled them to develop more realistic site designs and implementation plans. Secondly, it served as a capacity-building exercise. Participants received basic training in the principles of solid waste management, composting techniques and the use of compost for urban agriculture. The course included lectures, field trips, group discussions, exercises and presentations. They were also given an opportunity to learn composting "hands on;" in order to complete the course every participant had to earn a pair of composting gloves. All of this was learning and skills that the participants took back with them into their communities.

6.2 Course Outputs - Site Designs

Each of the Community EcoAid teams developed a site design for an MRF and accompanying allotment garden using diagrams and drawings as well as written and verbal explanations. This information was transcribed by the researcher into conventional urban design "language."

The EcoAid plans included proposals for waste collection routes, which is a reflection of the importance of this issue to the communities. Different routes were proposed for collection by larger trucks along the wider streets, collection by smaller trucks along narrower side streets, and collection by tricycles in the most narrow lanes and alleyways. Although many complex issues around waste collection had not been resolved,

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[2] One of the vision statements is as follows: "After 5 years, Barangay Kauswagan will be the model and the cleanest barangay of Cagayan where solid waste segregation and a waste disposal system have been implemented and are successful. There will be zone-based community gardens, additional income through recyclables and a source of organic fertilizer."

by putting collection routes into the plan, the Community EcoAid teams essentially brought visibility to these issues.

Photograph 2: Community EcoAid Collection Route (Barangay Lapasan)

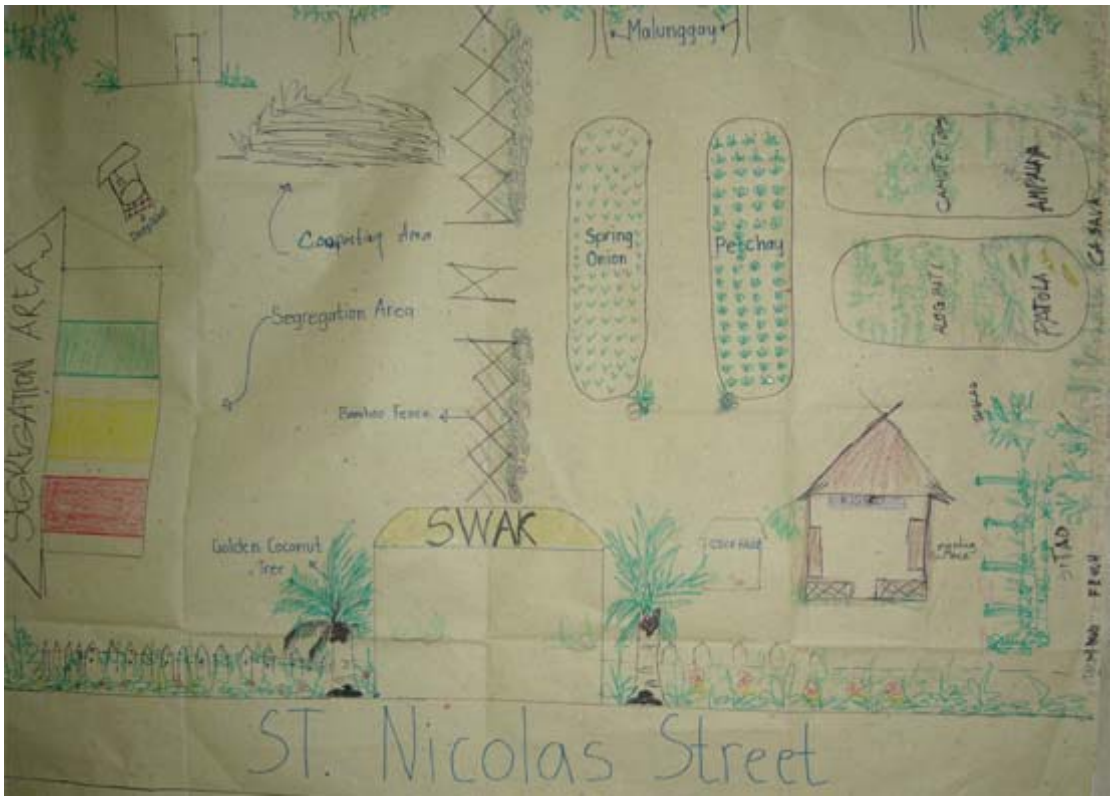
As was described above, the legislation requires each barangay (or cluster of barangays) to develop an MRF to which segregated waste will be transported and processed. To date, only one barangay in Cagayan has a functioning MRF, which the Community EcoAids visited as part of the training course. In addition, precedent studies from other municipalities in the Philippines and elsewhere were examined to give an approximation for some of the technical requirements (e.g. area requirements).[3] Each of the teams developed site plans so that the compost produced at the MRF could be incorporated into food production activities either in the accompanying allotment garden or in container gardens. They proposed barrel composting to begin operations, which was the method they had learned during the course, with plans to convert to other methods when required by larger volumes.[4]

Water is usually over abundant in Cagayan during the rainy season but scarce in the dry season. Relatively low cost measures that have been proven to operate satisfactorily in the other gardens include rainwater catchment systems and drip irrigation. These measures were incorporated into the proposed site designs. Meeting sheds were situated so that they

[3] It is estimated that about 1000 square meters is required to compost 3 metric tonnes of organic material using the Indonesian windrow method (Eawag/Sandec: 2006).
[4] To process larger volumes would require a shredder, which is costly to purchase and maintain.

may serve both a place for site surveillance and as a natural gathering place. Informal discussions revealed the preference for an elevated structure with an open design so that users could look out over the garden. Similar discussions revealed that gardeners generally do not like to visit a toilet that is situated near an entrance; the proposed site designs reflect these preferences.

Observations that were made during that process are as follows: participants liked the systematic layout for plots and plantings (orderly rows, rather than informal plantings); they preferred indigenous materials (e.g. bamboo) to build fences and sheds, not because of aesthetic or cultural considerations, but because such materials were generally more affordable; they preferred to mark the garden entrance with a fruit bearing palm such as the golden coconut, rather than the fan palm which had been used in other allotment gardens; nonetheless, they wanted to include ornamental plants along front entrances for beautification; specific border plants were preferred along the garden edges (e.g. malungay); and they wanted to include provisions for raising livestock.[5] Illustrations from the workshop also indicated a preference among participants for arched gateways to mark the entrances.



Photograph 3: Allotment Garden Siteplan (Barangay Kauswagan)

[5] These observations were simply made based on the drawings and discussions, without any quantitative analysis.

6.3 Course Outputs - Capacity Building

The training course also provided an opportunity to build connections among people across the city who might not otherwise have met each other. Friendly rivalry between the teams resulted in some good fun and tested the realities of their plans. The group developed an acronym for itself, derived from the names of the three barangays – "MALAKAS" – which means strength in the national language.

All 23 participants completed the course requirements and were certified as Community EcoAids. This recognition was of great personal (and professional) value to the individuals and to their communities. Each of them also received a set of course materials that could be used in the community followup activities.

6.4 Community Followup And Implementation

Each team of Community EcoAids reported on the training course and their proposed site designs to their respective barangay councils. During the month that followed, another community meeting was held to provide the EcoAids with an opportunity to present their plans to their community in order to receive feedback and garner support for implementation.

Photograph 4: Community EcoAid - Information Education Campaign (Barangay Macasandig)

In all three barangays, the Community EcoAids have begun their implementation plans with an "Information Education Campaign" or "IEC." The teams have been employing various strategies, including door-to-door visitation, leaflets, workshops, posters

and school lectures. Some of the learning methods that they learned during the training course are methods they are replicating within the communities. Efforts are underway in each barangay to implement the physical site designs as well.[6]

7. Observations

This case study from the Philippines was presented to demonstrate the value of community participation in the design of more sustainable urban practices, such as "closing the nutrient loop." It has also illustrated the application of Asset-Based Community Development to participatory urban design practice.

As a development approach, ABCD begins by focussing on the existing assets and strengths of a community (Mathie & Cunningham: 2005). A basic principle of urban design is to begin with what (built and natural form) already exists. Therefore, ABCD is well-suited to participatory urban design. By using this method, it was the participants themselves who discovered the assets that had contributed to the success of previous community initiatives and who determined whether or not and how these assets should be identified on the map. This made a significant difference in how these assets or urban elements were viewed by the community. A particularly important shift in mindset occurred, for example, when participants began to identify organic waste as an asset - an ingredient for compost for use in food production - rather than as "garbage." Because of the nature of this "participant-driven process," it is suggested that ABCD can be effectively used as a participatory urban design tool in any cultural setting.

Decentralization has been advocated as a mechanism for promoting democracy in the developing world, although it remains unclear whether that has stimulated democratic decision-making (Green & Haines: 2002). It has been suggested that where responsibility has been shifted from centralized government entities to local levels, ABCD may be an effective tool (Mathie & Cunningham: 2003). This was just such a case, given that responsibility for waste management has recently been shifted to the barangay levels; the ABCD approach appeared to have been effective as a mechanism by which the community was able to identify the assets and build internal capacity to address this new challenge.

Drawing from a variety of success stories, it has been observed that, "what stands out is the role of particular individuals who catalyze the process of development in their communities and the strong base of associations or social networks that are mobilized" (Mathie & Cunningham: 2005,176). In this case study, the training course for Community EcoAids was an attempt to train a core group of community organizers who could act as such catalysts for a change towards more sustainable urban practice.

However, one of the challenges in the ABCD approach is to determine an appropriate role for the external agency (Mathie & Cunningham: 2003). Perhaps that role could best be a supportive one, fulfilled by assisting the community in developing the

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[6] Implementation is well underway in one barangay, whereas in the other two, delays in obtaining permission from the landowners to use the proposed site have held up progress.

process. In this case study, it was the outside researcher who initiated the project and initially introduced the use of ABCD. With input from a variety of sources from within the community, the process was modified to best suit their needs and to fit the particular cultural context.

Another challenge concerns how to provide for inclusive participation, especially if the community is not particularly cohesive (Mathie & Cunningham: 2003). That challenge also arose in this case study, where attempts were made to include representatives from the various stakeholder groups, such as waste pickers and collectors, although this was not necessarily understood or welcomed by the wider community. In order to include the voice of marginalized groups, their involvement may have to be achieved by alternate means.[7]

A risk inherent in the ABCD approach may be to overlook class and power relations in the social relationships at the community level (Mathie & Cunningham: 2003). Although the community may be able to identify its own resources and recognize its own social capital, the forces that can hamper the effective use of those assets cannot be ignored. That was a reality in the within case study; the proposed site design and implementation plan by Community EcoAids in one barangay met initial resistance from the political machinery at the stage of implementation. Nevertheless, community members who have been empowered by a process like ABCD are unlikely to retreat to the same level of subordination.

As this project progressed, the site designs became of secondary importance; developing an effective community consultation process with and for the community became the primary goal. This also enabled the issues of greatest importance to emerge, such as the need for a comprehensive Information-Education-Campaign. This was only possible, however, by relinquishing any preconceived ideas of the project outcome or any useful purpose. As has been noted, "ultimately, the only real lasting effect is the community's ability to organize" (Freedman: 1994).

[7] For example, waste pickers were included as part of a panel discussion during the training course.

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