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Waste Concern : A Decentralized Community-based composting through public-private-community partnership

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Sector • Waste Management, Biogas

Enterprise Class • Nonprofit

CASE STUDY



Executive Summary

The perilous waste management situation in densely populated Dhaka city with about 12 million people motivated Iftekhar and Maqsood, two young and dynamic urban planners, to form a research-based non-governmental organization (NGO) in the field of waste management and environment called Waste Concern.

To address the waste management challenge they developed a decentralized community-private-public partnership model for waste recycling to transform the solid waste into organic compost using low-cost, low-tech and labour-intensive method. Their innovative partnership model and composting technique has created lots of enthusiasm among the government, policy makers, researchers, international agencies and local authorities. The model has been replicated both in and outside the country.

The initiative has multiple economic, social and environmental implications for the country. It contributes to creating employment opportunities for the urban poor in its activities like waste collection from the households, and other activities in the composting plants. Involving women in the composting process contributes to their empowerment in the society, and improve quality of life in the households. Other benefits generated by this initiative include saving of landfill area, reduction in top soil fertility degradation, increased agricultural yield, reduction in greenhouse gas emissions and reduction in harmful effects of chemical fertilizers on local fish and wildlife.

The model was successfully piloted in Dhaka in 1995. Later it was replicated in other parts of the country with financial support from international development agencies. Replication of this model has also been done in Vietnam, Sri Lanka and Pakistan with their technical assistance. Recently, this model is being replicated in ten cities in Asia and the Pacific countries in partnership with the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). Despite challenges at the start-up phase in mobilizing funds, and other physical resources including land, marketing, laboratory testing etc., Iftekhar and Maqsood succeeded in overcoming those with the help of private sector, academia, the Ministry of Environment and Forest, local government, and international development agencies. Their success in the area of waste management has earned them a number of national and international awards that has raised the profile of Waste Concern to a very high standard. As a result, they have been able to contribute to formulating and enacting a number of environment-related policies and rules of the government.

Scaling up of the Waste Concern initiative has also been done through its commercial venture, undertaken by its joint venture concern WWR Bio Fertilizer Bangladesh Ltd, in the area of carbon trading-based composting, the first of this kind in the world. This venture has brought a large amount of foreign direct investment into the country and generated substantial economic, social and environmental benefits.



“Waste is a resource which is created through innovations and partnerships.”

A. H. Md. Maqsood Sinha, Executive Director, Waste Concern

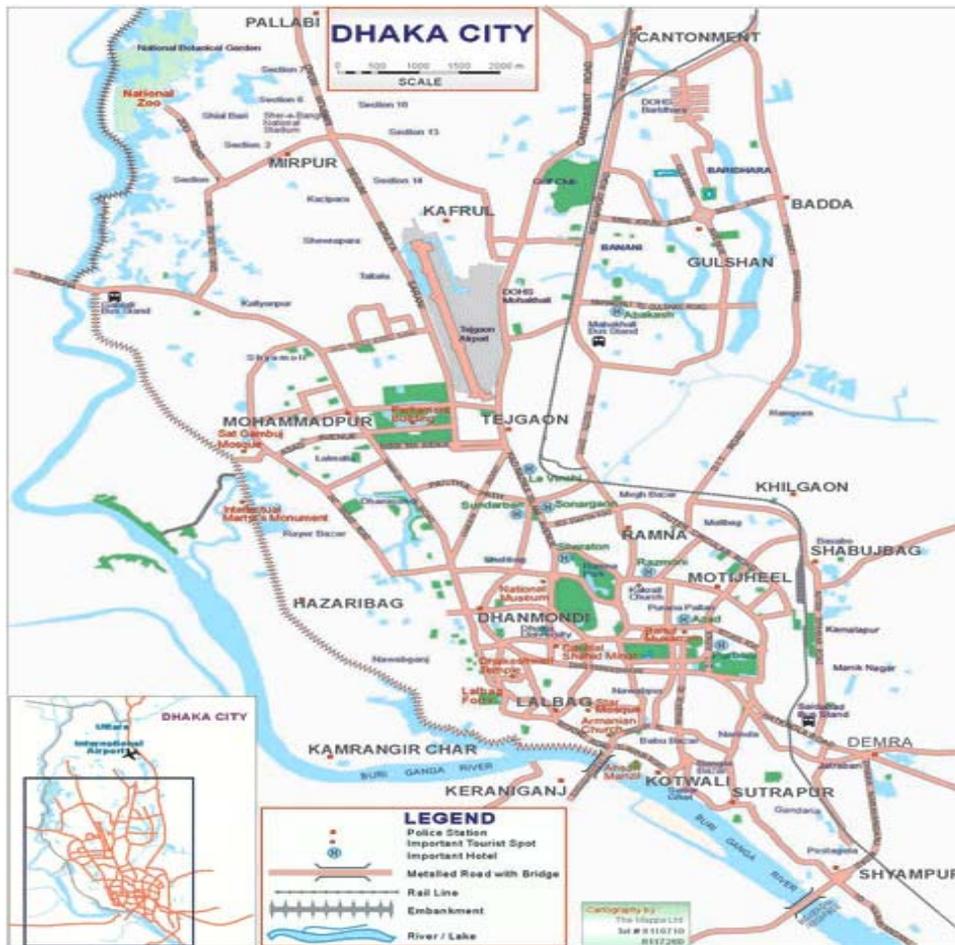
The Context

GROWING URBAN POPULATION IN BANGLADESH

Bangladesh is one of the most populated countries in the world with a total population of about 135 million growing at 2.06% annually¹. Urban population accounts for about 25% of the total population growing at about 6% per year due to large scale rural urban migration. The total urban population is estimated to be 35 million people in 522 cities in the country. More than half of this population live in the four largest cities namely Dhaka, Chittagong, Khulna and Rajshahi.

Figure 1: Dhaka City Area Map

Source: Website (http://www.dhakacity.com.bd/dhaka_city_map.php)



¹ Bangladesh Economic Review, 2009. Ministry of Planning, Government of Bangladesh, Dhaka



WASTE MANAGEMENT SITUATION IN DHAKA CITY

Generation of waste is positively associated with growth in population and GDP per capita. In Bangladesh, urban population generates on an average 14,000 tons of waste per day. The quantity increases by 46% in the monsoon due to larger production of different types of winter vegetables. Average per capita urban waste generation rate is estimated at 0.41 kg per day. About 12 million people live in Dhaka, the world's 11th largest city, in an area of 1,353 square km, producing about 4,700 tons of solid waste per day. Management of this huge quantity of waste has been posing a serious problem to the residents of this mega city. Dhaka City Corporation (DCC) is responsible for managing the waste, but it is only able to collect less than 40% of the total waste, and about a quarter of DCC's annual budget is spent only on this. Moreover, the collected waste is disposed of in a very crude and unhygienic way. Wastes are piled up mostly in the streets and in unmanaged landfill sites, creating several serious social threats, including diseases, insufferable odour, leakage of pollutants into water sources, methane gas, and exposing the waste-pickers ('tokais' as they are commonly known in Bangla) to toxic and otherwise hazardous substances.

Forming an Innovative Social Business Model

FUNDAMENTAL MOTIVATION FOR FORMING WASTE CONCERN

"While dealing with waste related issues as part of our Masters degree program in regional and urban planning, the perilous waste management situation of Dhaka City, the place where we were born and brought up, came into our mind," said Mr. Enayetullah Iftekhar² and Mr. A. H. M. Maqsood Sinha³, the two young and dynamic social entrepreneurs behind Waste Concern. Maqsood said *"we then decided to do something to deal with waste which was creating nuisance in our city life. At the university we were developing knowledge and skills in waste management through our academic program."* Maqsood and Iftekhar had several brainstorming sessions together and felt a serious urge to share their knowledge with the government. They wanted to help the public to turn the waste into a resource through proper management. Riazuddin, the Chief Operating Officer of Waste Concern said, *"these two young men are very good souls, they never did it for profit, they did it as a philanthropy."*

² Iftekhar Enayetullah is a civil engineer and urban planner holding a Masters degree in urban and regional planning from Bangladesh University of Engineering and Technology with specialization in urban waste management and urban environment management. He has about 18 years of professional consulting and research experience in different fields including waste management. He has been awarded a number of national and international awards for his contribution in the area of waste management and environment. He was awarded the prestigious United Nations award "Race Against Poverty" in 2002 in recognition for contributing to waste recycling and providing training to hundreds of waste pickers.

³ Maqsood Sinha is an architect and urban planner holding a Masters degree in urban and regional planning from Bangladesh University of Engineering and Technology and the Asian Institute of Technology in Thailand respectively with specialization in environment, urban waste management and recycling. He has about 20 years of professional experience in different fields including waste management. He has been awarded a number of national and international awards for his contribution and innovative work in the area of waste management and environment. He was awarded the prestigious United Nations award "Race Against Poverty" in 2002 in recognition for contributing to waste recycling and providing training to hundreds of waste pickers.



Initially they tried to convince the relevant government agencies to develop community-based composting plants. They expressed their willingness to provide free consulting services to the government in implementing the ideas but initially did not succeed. One government official listened to their ideas and challenged them by asking to establish practical evidence on their own. These two young researchers accepted the challenge and in 1995 founded a research-based NGO in Maqsood's house in Dhaka called 'Waste Concern'.

WASTE CONCERN ACTIVITIES

The major activities of Waste Concern are in the field of waste management, climate change and environment. They focus on pilot projects on all types of waste and cleaner energy, especially solar and bio-energy projects. Waste Concern conducts research, provides consultation services, project assistance, support for institutional development, policy development, capacity building, and innovation and implementation of waste management and environmental projects with its own capacity comprising about 21 professionals and a team of committed support staff.

Development of the Composting Model

RESEARCH BEFORE PILOTING

"Before piloting our waste management model we decided to conduct a survey. It was needed because we didn't have any idea about the content in the urban waste," said Maqsood while talking on initial piloting of their model. They carried out a detailed survey on their own on a community located in the Mirpur area - a densely populated locality in Dhaka city with around 20,000 people - and the farmers of the adjacent area. The study considered households as an important group of respondents because they generate most of the waste the community face problems with. Farmers were considered as the potential buyers of the compost, as they were planning to use the organic part of the generated waste.⁴ Their survey findings suggested that generated waste contain 80% organic (food and vegetable waste, garden waste, tree trimmings and straw etc.) and 20% inorganic substance (plastic, rubber, leather, metals, glass and ceramics etc.). This composition indicated the potential for recycling organic waste into organic compost which has a good market potential in greater Dhaka and the adjoining rural areas.

FIRST PILOTING OF THE MODEL

Based on their survey findings, Maqsood and Iftekhar went for piloting their composting model in 1995 to promote the concept of the '4Rs' – reduce, reuse, recycle and recovery of waste. But the first challenge they faced in doing that was the availability of land in Dhaka city. *"People don't want to give land in the city as they think waste related activities would*

⁴ Survey was done on a sample of 200 households and 25 farmers were selected randomly. The survey findings revealed that more than 80% of the households were not satisfied with the existing waste management service of the DCC. The majority supported the idea of an alternative door-to-door solid waste collection scheme and willingness to pay for it. It was also revealed that 94% of the farmers were interested in buying compost. Findings indicated decline in average yield compared to ten years back due to decrease in soil fertility. The farmers believe excessive use of chemical fertilizers contributed to this degradation.



create odour in the locality,” said Maqsood. However, they managed to get a piece of land from the local chapter of the Lions Club⁵ of Dhaka. In fact, the Waste Concern founders convinced the Lions Club President of Dhaka North, who happened to be the father of Maqsood, about the potential social, economic and environmental benefits of this initiative. A land that had remained unused was donated initially for three months to see if their waste management practice created odour or any kind of nuisances in the locality. The first pilot project was undertaken on that land with financial and infrastructure support from a friend⁶ who was doing business in Dhaka.

“For experimentation initially we experimented with Indonesian Windrow technology⁷ of composting as it suited Bangladeshi climate, and after we developed Box Type Composting System which we found to be more efficient and convenient,” said Maqsood. The tropical climate with the temperature of 25-40⁰ Celsius and the moisture content in Bangladesh are similar to Indonesia and are conducive to growth of micro-organisms required for easy composting. Moreover, the food habits in these two countries are also similar and the generated waste contains more than 60% organic parts. Piloting of their decentralized community-based composting model was quite successful and developed a great deal of confidence in these two young men to take the initiative forward.

COMPOSTING PROCESS



Box Type Composting (Source: Waste Concern)

The composting process, regardless of scale of operation, starts with collection of solid waste by the waste collectors from the households in the community. The first pilot project of Waste Concern involved four waste collectors to collect waste from about 800 households. They recruited interested poor people from the locality through the local people. The wage rate for these workers was set based on two things - minimum wage fixed by the government and the charges paid by households for waste collection.

“Initially we engaged women for collection of waste from the households but we got reports of harassment of the women collectors against some households. For that reason we changed our approach and replaced them by male collectors and engaged the women in sorting and composting,” said the Plant Manager of Waste Concern Mr. Zubair Ahmed. A compost plant

⁵ Lions Club is the world's largest international volunteer organization with clubs all over the globe.

⁶ Sinha convinced one of his friends, Mr. Ruhul Amin, a businessman in the oil and gas sector, for financial assistance with logistics supported by his own knowledge and their research findings.

⁷ In this method, the compostable organic waste is heaped into piles. This allows micro-organisms to decompose the organic waste efficiently. The pile is aerated using bamboo aerators as it enables the micro-organisms to obtain sufficient oxygen. For maintaining the required optimum temperature of 55 – 65⁰C the pile is turned regularly. Water is also added for rapid decomposition. Optimum Carbon – Nitrogen ratio of 35 to 50 is maintained. The process requires 40 days for decomposition and another 10-15 days for maturing.



was set up in Mirpur with a composting capacity of three tons of solid waste per day. Covered rickshaw vans were used to carry the waste to the compost plant. The next step was to separate the organic matters from the non-organic waste by four waste collectors who also piled the separated waste under a covered shed for efficient decomposition.⁸ Maqsood said *“we finally adopted Box Type Composting technique because it is low-cost, needs less turning compared to Indonesian Windrow Method, it is low mechanized and suitable for Bangladesh’s climate conditions.”* Special measures are taken to reduce the odour at a minimum level. The composting process requires 40 days for decomposition and 10 to 15 days for maturing. After maturing, the compost is screened for different grades and packed for marketing through the private partner using their countrywide fertilizer distribution network.

THREE YEARS OF MOTIVATION CAMPAIGN

After successful piloting, Maqsood and Iftekhar moved on to attract attention of the concerned authorities. From 1995 to 1998, they made several presentations in seminars and conferences on their decentralized community-based composting model. It has been observed that centralized composting plants involve high operational, transport and maintenance cost, and often fails to reach target in the developing countries. A decentralized system, on the other hand, has several advantages in the context of Bangladesh as it is labour intensive, less costly, and suited for the waste stream. It also improves community participation in source-separation and reduces costs incurred for collection, transportation and disposal of waste by the municipal authority.⁹

The main financial resources for developing this initiative were the money they earned from offering consultancy services¹⁰ and financial assistance from one of their friends. However, during the first three years of piloting and model development they spent about Tk 700,000 (US\$10,000) of which about Tk 100,000 (approximately US\$1,500) was given by his friend and the rest was from their own fund.

REPLICATIONS OF THE MODEL ACROSS AND OUTSIDE THE COUNTRY

Replication of the Waste Concern model took place with formal support from the Ministry of Environment and Forest (MoEF), under the Sustainable Environment Management Programme (SEMP) of the UNDP. Replication was done in four communities of Dhaka City in the year 1998¹¹. In the year 2000 replication was extended to two other cities - Khulna & Sylhet. In 2002, UNICEF with the Department of Public Health Engineering of the government provided further support for replication of the model in 14 towns across the country under its Urban Slums and Fringes Project. Waste Concern prepared the plan, design,

⁸ Organic matters comprise 80% while the remaining 20% are non-organic parts.

⁹ Waste Concern (2005)

¹⁰ Maqsood and Iftekhar worked as professional consultants in the area of urban planning and waste management for the development partners and the government of Bangladesh.

¹¹ The four community areas in Dhaka city were (1) Mirpur; (2) Dhalpur; (3) Green road; and (4) Baily road.



and undertook the construction works under its consulting agreement with UNICEF¹². “Till today more than 50% of these projects are running and the rest continued for six months as long as UNICEF funding was available for this period,” said Zubair. Since 2005, 47 replications of this model had been done in more than 23 cities and towns in Bangladesh.

Table 1: Replications of the Waste Concern Model across the Country

	1998	2000	2002-04	2005-08
Number of locations	4	14	12	38

In 2000, this model had also been replicated in a couple of other Asian countries namely Vietnam and Sri Lanka with support from the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). Waste Concern provided technical assistance in implementing those plants. Recently with the support from UNESCAP and Bill and Melinda Gates Foundation, this model is being replicated in ten towns in Asia and Pacific countries and in ten cities in Africa. Waste Concern’s model is also being replicated in a slum settlement in Karachi in Pakistan with support from Leapfrog Fund of the Lemelson Foundation.

FINANCIAL MODEL

Waste Concern involves poor women in the community at a reasonable wage rate. About 70% of the staff is comprised of women workers. Zubair said “*there is no discrimination of payments by gender.*” Average monthly salary of the four waste collectors was Tk 800 (US\$11.5) per month, and increased to Tk 2,000 (US\$29) in 2009¹³. For carrying the waste to the plant one person was engaged with a covered rickshaw van at a monthly salary of Tk 1000 (US\$14.5). In addition, four composting workers were also engaged at an average monthly salary of Tk 1200 (US\$17)¹⁴. The plant was built on land that was provided free of charge. Waste Concern used to pay a small amount for electricity services although water was supplied for free. The households used to pay Tk 20 (US\$0.29) per month for collection of waste, which could cover the cost of house to house waste collection. Currently, the charge is in the range of Tk 10 (US\$0.14) to Tk 40 (US\$0.57) and is set based on the income level of the households.

A three-ton capacity composting plant could produce a total of approximately 600 kg of organic compost. The production cost stood at Tk 1.80 per kg (US\$0.026) and they sold the compost for Tk 2.50 per kg (US\$0.036) resulting in a negligible profit of Tk 0.70 (US\$0.01) per kg. In fact, it was not a commercial venture of Waste Concern and therefore they did not go for making higher profit. MAP Agro, one of the country’s largest fertilizer trading

¹² Donor funds for project implementation are provided through the relevant government agencies.

¹³ The wage rate for an unskilled worker, proxied by agriculture sector wage rate in the absence of data on skill / unskilled classification, is Tk 109 (US\$1.58) per day in 2007 and in 2005 it was Tk 84 (US\$1.38) per day.

¹⁴ A three-ton per day capacity composting plant requires four to six composting workers in general.



company, made a considerable profit margin adding little micronutrient to the organic waste and selling it at Tk 6 per kg (US\$0.086) Waste Concern developed three types of composting methods under the UNDP supported Sustainable Environment Management Programme (SEMP). These are Aerobic Composting, Box Type Composting and Barrel Type Composting methods. All three are simple, low cost and labour intensive and are suitable to the socio-economic and climatic condition of Bangladesh. The estimated cost of such a plant of 3, 5 and 10 tons composting capacity along with expected revenue earning and payback period is presented below.

Table 2: Cost of Different Sizes of Community based Aerobic Composting Plants

Items	Capacity of Composting Plants		
	3 ton / day	10 ton / day	20 ton / day
Land required per plant (sq ft)	5040	14,400	25,200
Fixed cost per plant (US\$)	14,609	41,739	73,043
Operating cost per plant (US\$)	4,348	14,493	28,986
Total labour per plant	4	12	25
Compost produced per day (kg)	750	2500	5,000
Expected revenue from sale of compost (US\$)	8,696	28,986	57,971
Expected revenue from sale of Certified emissions reduced per year (US\$)	2,976	9,918	19,837
Pay Back period (years)	2	1.71	1.5

Note: Without land cost. 1 US\$ = BDT 69. Estimation is done by Waste Concern

DEVELOPING A STANDARD BUSINESS MODEL

“Based on our long piloting experience we have developed four management models for decentralized composting schemes for the cities of low and middle income countries,” said Maqsood. These models are based on partnerships between the municipality, the community and /or private sector. All these models have municipality as a common partner. This benefits them by reducing cost of waste management in the areas of transportation and disposal. The four models as developed by Waste Concern are:

Municipality owned – municipality operated: These schemes are planned, implemented and operated by the municipality with a view to achieving the benefits for the entire solid waste management system by lowering transportation costs, improving landfill management and reducing quantities of waste to be handled. The compost produced can generate a certain income for the city which they could utilize for improving the facility provided to the poor people engaged in the composting process.

Municipality owned – community operated: These schemes are planned and operated by the municipality while the operation and maintenance is handled by the beneficiary community. This model reduces transportation costs by reducing and treating waste as close to its source



as possible. Collection charges paid by the households and the revenue earned through the sale of compost cover the operation and maintenance costs.

Municipality owned – privately operated: Planning and implementation of the programmes is done by the municipality. The plant is constructed on the municipality land and the system is owned by the municipality. Operation and maintenance is contracted to the private sector or NGOs and the cost is covered through the generated revenue.

Privately owned – privately operated: This scheme is based on a profit making venture by the private sector. In this system, the cost of the composting plant is covered by the waste collection fees and revenues earned through the sale of compost. To ensure long term operation of the scheme and appropriate returns on investment, the municipality may provide land on long term lease.

CHALLENGES AND SOLUTIONS

Challenges

“Our development path has never been smooth,” said Maqsood, the co-founder of Waste Concern. He added “challenges came at every stage of development as waste management as a business was completely new in the country. People don’t want to give land in the city,” said Maqsood. He mentioned several other constraints which include skepticism of the concerned government officials about the project, unwillingness of the local government bodies and the community to provide land, lack of availability of low interest credit facilities for piloting the initiatives, and problems linked to marketing the compost. Absence of proper regulatory framework, large volume of paperwork, negative attitude of the officials – all created unnecessary delays in implementing the projects (see Table 3).

Table 3: Constraints faced by Waste Concern

Type of constraints	Description of the constraint
Financial constraints	<ul style="list-style-type: none"> • Lack of financial resources for pilot projects • Lack of adequate fund for R&D • Lack of access to credit facilities
Market information	<ul style="list-style-type: none"> • Lack of information about the fertilizer market
Knowledge and skills	<ul style="list-style-type: none"> • Lack of proper understanding from the concerned government agencies • Negative attitude of the government agencies
Regulatory environment	<ul style="list-style-type: none"> • 53 permissions required instead of the usual 35 for general projects
Physical infrastructure	<ul style="list-style-type: none"> • Scarcity of land in the urban areas particularly in Dhaka City • Lack of office space, furniture, etc



Solution Strategies

Despite all the challenges faced by the two social entrepreneurs, with sky high confidence and a strong level of commitment for contributing to the development of their country, they were able to create a success story from something which is generally viewed as a nuisance.

They motivated the business community to participate in the initiative through demonstration of its commercially viability, social desirability, and potential large scale environmental benefits for community people. Maqsood said *“we had a big pile of compost and was finding it difficult to sell. We then contacted ALPHA Agro, the largest fertilizer company in the country but they were reluctant to buy such small quantity.”* He added *“we then talked to Dr. Shahidul Islam, the then Director General of Bangladesh Agriculture Research Institute of the country, who knew us through different seminars where we made presentations on our model. Dr. Shahidul Islam introduced organic vegetables grown on compost to the chairman of ALPHA Agro, the good taste and smell influenced the chairman to market compost. He said ‘I will buy it’. ALPHA Agro then came forward.”* They agreed to purchase the entire produce and it was indeed critical for the success of the initiative.

In addition, their high level of commitment created a strong influence among the local government officials and the business community that helped implementing their model in several locations in the country. Where necessary, they took assistance from dignified officials from both the government and the donor community to develop a positive impression about Waste Concern for getting the required assistance. *“Getting permission and contract for the compost plant’s waste supply from DCC area, took as long as two years as we didn’t want to pay any extra. But we never gave up,”* said Maqsood. Success of these Waste Concern professionals earned them prestigious international and national awards and raised their profile to a high standard within the country. As a result, they were invited by the government to participate in environmental policy formulation committees and make contributions. They have so far been able to influence formulation and enactment of a total of 27 policies of the government relating to waste management and environment, water and sanitation¹⁵. Their policy recommendations in these areas are also incorporated in the relevant policy matrix of the second Poverty Reduction Strategy Paper (PRSP II)¹⁶ of the Government of Bangladesh.

Success of this innovative model that involves the key players in society has been able to attract a large amount of foreign direct investment in the area of organic composting and carbon trading using the Clean Development Mechanism (CDM) of the Kyoto Protocol.

¹⁵ For example, National Agriculture Policy 1999; Poverty Reduction Strategy Paper (PRSP) 2005; National Sanitation Strategy 2005; National Industrial Policy 2005; National CDM Strategy 2005; Solid Waste Management Action Plan for Eight Secondary Towns in Bangladesh 2005; Fertilizer Act 2006; Lead Acid Battery Recycling and Management Rules 2006; Biomedical Waste Management Rules 2008; Draft Hazardous Waste Management Policy of Bangladesh 2009; Draft National 3R Strategy 2009 etc.

¹⁶ “Moving Ahead”, National Strategy for Accelerated Poverty Reduction II (FY 2009-11)



Table 4: Solution Strategies

Type of constraints	Strategies	Description
Financial constraints	Friends	<ul style="list-style-type: none"> Collecting funds from friends
	Consulting services	<ul style="list-style-type: none"> Personal fund generated through providing consulting services
	Forming Organization	<ul style="list-style-type: none"> Formed an NGO to collect funds
Market information	Approaching Private Marketing Company	<ul style="list-style-type: none"> Took assistance from an agro products marketing company
Knowledge and skills	Model Demonstration	<ul style="list-style-type: none"> Demonstrating their models
	Meetings and seminars	<ul style="list-style-type: none"> Awareness building campaigns through meetings, posters
Regulatory environment	Formulating and enacting policies	<ul style="list-style-type: none"> Have been able to formulate and enact 27 policies of the government
Physical infrastructure	Model demonstration and supply of information	<ul style="list-style-type: none"> Motivating local government authority to allocate land by demonstrating their model, providing adequate information in its support
	Use officials of the government and international agencies	<ul style="list-style-type: none"> Took assistance from influential government representatives and international agencies to motivate DCC for waste collection agreement

Contributors to the Waste Concern Model

DEVELOPMENT OF THE COMPOSTING MODEL

“We faced a lot of difficulties in implementing our idea because we deal with waste and the common perception is that it simply creates lots of nuisance in the locality,” said Maqsood. People didn’t really want to give their land for piloting the project as they were dealing with waste that generates bad odour. *“But after disproving their common perception with a strong scientific experiment we were able to make them understand that it can be a resource as well. Then we received a lot of support from different sources,”* said Maqsood.

Friends and other individuals, university, agencies, and international development partners all extended support to take the initiative forward once they convinced them with sound logic and impressive demonstration.

Waste Concern started its composting initiative with its own and fringed sources in 1995. Later, this model was replicated by external support agencies as a pilot scheme during 1998. The model was replicated in other cities with the support from external support agencies as well as local entrepreneurs. In 2005, to scale up its model with private investment, Waste Concern in partnership with a Dutch recycling company called World Wide Recycling BV



initiated a project where carbon trading has been harnessed. This is the world's first compost plant using CDM opportunity.

First support by the German Cultural Centre

Maqsood and Iftekhar remembered the first support that they got from the Director of the German Cultural Centre in Dhaka in 1995. Maqsood said *“When we were looking for funds to conduct research before going for piloting our model we approached the German Cultural Centre. The Director of the Center was really impressed with our idea. She helped us with student volunteers as support for data collection for our initial baseline study.”* That support was quite helpful for conducting their first survey successfully.

Support from a businessman friend

During their initial experimentation, one of Maqsood's friends, Mr. Ruhul Amin, Chairman of Ahmed Amin Group, a gas and oil exploration business provided Tk 100,000 (approximately US\$1,500). This money was used for research and piloting their model in Dhaka city. *“I was really convinced with the scientific way of managing waste by these two young, confident and dynamic researchers,”* said Amin. *“Their level of commitment to do something for the country developed a sense of trust in me which led me to take part in their novel initiative,”* he added.

Support from academic institution and research organisations

Seeing their impressive demonstration and successful piloting of their composting model, Dr. Imamul Huq, professor of the Soil Science Department of Dhaka University provided Waste Concern with subsidized laboratory testing facility. Bangladesh Agricultural Research Institute (BARI) also carried out field trail on the application of compost in different soils and crops, such as they conducted studies on the impact on potato crops and found it helpful in boosting output.

Support from a private marketing company

In the process cycle of composting, marketing is the last link in the chain and critical for the success of the initiative. MAP Agro, one of the country's largest fertilizer trading companies, played a critical role in the business development of the Waste Concern initiative by purchasing their compost. Mr. Rafiqul Islam, Executive Director of ALPHA Agro, a sister concern of MAP Agro said *“It was not difficult for us to market their product as we had a large marketing network for selling chemical fertilizer across the country.”* MAP Agro bought their entire organic compost at Tk 2.5 per kg (US\$0.036) and enriched it with micronutrients to suit different customers. They sold it through their marketing company Alpha Agro to the farmers at Tk 6 per kg (US\$0.086). Rafiqul said *“we didn't make any significant profit margin because we wanted to promote a new product.”* MAP Agro also installed an enrichment plant with an investment of Tk 250,000 (US\$3,571) as there was a good demand for enriched fertilizer. He added *“the market for fertilizer is quite large as opposed to their production but they did not continue supply in large volume, and for a long time it was only a pilot project of Waste Concern for demonstration.”* Recently ACI Fertilizer,



one of the largest agricultural input marketing companies, has signed an exclusive agreement with Waste Concern to market the project all over Bangladesh.

Support from development partners

When Maqsood and Iftekhar failed to attract the attention of the DCC Mayor despite giving several presentations in different forums including the ones organized by the DCC itself, they sought help from the Ministry of Environment and Forest and UNDP. A couple of high officials from the Ministry and the UNDP accompanied them to their meeting with the Mayor who would be the key player in the implementation process. They provided sufficient information about the project and its enormous potential environmental, social and economic benefits. *“This initiative worked as it would save their collection and dumping cost - about Tk 1,700 per ton (approximately US\$24),”* said Maqsood. *“In fact there were some vested interest groups in DCC who were against this initiative because if we handle waste they would not be able to appropriate money allocated for this purpose,”* he added. However, successful demonstration of the initiative inspired the DCC Mayor and the Public Works Department to provide public land for community composting.

USAID-RUDO (Regional Urban Development Office – South Asia) also provided financial support for operation of the plant at the initial stage. UNDP has been contributing to the initiative by providing start-up funds.

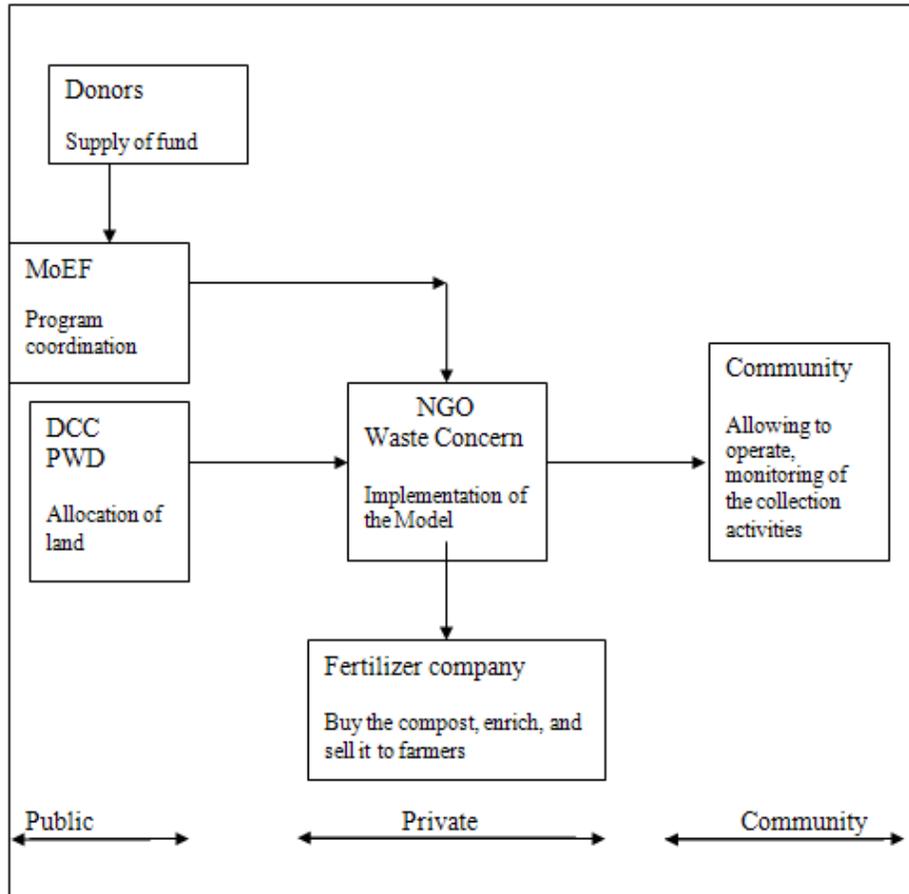
UNICEF also came forward with financial support for implementation of this model. They provided financial support for replicating the model in 14 towns under its Urban Fringe Project. Supporting cleaner environment in terms of safe water and hygienic sanitation facilities, and management of solid and liquid waste have been the major activities of this project. Recently, to promote composting and recycling, UNICEF in partnership with the Department of Public Health and Engineering has engaged Waste Concern to prepare the Solid Waste Management Plan for 19 towns in Bangladesh.

PARTNERSHIP ARRANGEMENT

Waste Concern decentralized community-based composting model involves a number of actors and partnerships including local communities, an NGO (Waste Concern), the Ministry of Environment and Forest (MoEF), Dhaka City Corporation (DCC), Public Works Department (PWD), donor agencies and the private sector. The key roles played by these actors are as follows:



Figure 2: Partnership Arrangement for the Community Based Composting Model



Source: author

Communities: The community plays a critical role in the whole process as it has to allow establishment of the plant in their locality as the main ingredient for the product is solid waste which is generally viewed as a pollutant and nuisance. Their responsibilities for proper implementation of the model include monitoring house to house waste collection, paying for the collection, and appointment of staff for collection and composting.

NGO (Waste Concern): Waste Concern is at the centre of all the activities in this partnership-based composting model. Due to its appropriate skills in model development and organic composting, Waste Concern is responsible for providing technical assistance to form a waste management committee and small scale composting units (1-5 tons/day), training the community in management, operation and maintenance of the plant, and assisting in marketing the compost.



Ministry of Environment and Forest (MoEF): As an apex body in the relevant government agency, MoEF has been coordinating the programme and providing strategic support on behalf of the government.

City Corporations and Municipalities: They are entrusted with land ownership, acquisition / requisition of land and construction of physical and social infrastructure in the public sector. These organizations are responsible for allowing set up of the waste recycling plant in the residential area, providing land for the plant free of cost, and water and electricity connection to the plant.

Donor agencies: Financial support for implementation of the model comes from the donor agencies. The United Nations Development Programme (UNDP), the United Nations Children's Fund (UNICEF) through its Urban Fringe Project and United States Agency for International Development (USAID) through its Regional Urban Development Office provided start up funds for replicating the model across the country.

Foreign Private Companies: For implementation of a large scale decentralized CDM based composting project; a Dutch private company named World Wide Recycling BV has been working with Waste Concern. FMO bank and Tiodos Bank from the Netherlands have been providing long term loans comprising onshore and offshore facilities to this project.

Private Sector: ALPHA Agro and its sister company MAP Agro, ACI Bangladesh and private sector fertilizer companies in Bangladesh play a critical role for marketing the organic compost. They purchase the entire produce from the composting units and market through their distribution networks to sell to the farmers. Their involvement in this business model is important due to the capacity constraint of the government (shortage in staff, lack of entrepreneurship capacity, lack of technical knowledge, etc.).

Value Creation by the Waste Concern Model

Waste Concern was formed to achieve a common vision to contribute to waste recycling, environmental improvement, and renewable energy, employment generation for the urban poor and sustainable development. In attaining these objectives the model has been proved commercially viable and sustainable and clearly demonstrated large scale economic, social and environmental benefits for the urban dwellers.

From 2001 to 2006 the Waste Concern compost plants had been able to reduce 17,000 tons of greenhouse gas emissions¹⁷. It also generated employment for 986 urban poor who collect and process the waste, and saved a landfill area of 33.12 acres with a depth of 1 meter.

¹⁷ Composting 1 ton of organic waste can reduce half ton of greenhouse gas (CO₂ e) per year.



During the same period about 124,400 tons of organic waste had been processed which produced 31,100 tons of compost. The composting activities of Waste Concern benefited 60,000 people in Dhaka, and an additional 434,290 people from its replication in other parts of the country. People benefited by being offered a systematic way to dispose of their household waste for a small fee. The poor people involved in the waste collection, transportation and processing got employment opportunities. Jarina, a Waste Concern compost worker, said *“I am earning Tk 2,000 (US\$29) a month. If I didn’t have this job I would have to work as domestic help (maid servant) which is harder and less income earning.”* Rina, another compost worker, said *“I pay my house rent from this income. It would have been difficult to survive in Dhaka city with my husband and three kids. My husband is a rickshaw puller and two of my kids go to school.”* The model has also created self employment opportunities for the waste pickers. Ahmed Ali, a waste picker, separates organic and inorganic parts in the waste in a composting plant of Waste Concern. He said, *“I earn about Tk 200 (US\$2.8) per day selling the inorganic parts. It helps me run my family in a modest way. Recently, I bought a piece of land in my village at a cost of Tk 50,000 (US\$714).”*

The Waste Concern model benefits the farmers - the end-users of the product. They get organic fertilizers as an alternative to chemical fertilizer that saves further degradation of top soil fertility. Application of the nutrient enriched compost reduces the use of chemical fertilizer up to 30% and increases per hectare yield by 30% to 50%¹⁸. It returns the organic matter to the soil and ensures effective release of plant nutrients such as nitrogen, phosphorus, potassium and sulfur. It also improves soil quality by increasing water retention capacity and improvement in soil aeration that makes cultivation easy.

This social business model has many implications for the economy, society and environment. Its contribution to generating employment will reduce poverty and income inequality in society. It will reduce the waste management cost of the municipalities. Women empowerment, reducing girls’ young marriage, reducing birth rate, hygienic and improved living quality may be mentioned as some of the social and health related implications. Environmental implications include cleanliness, reduction in carbon dioxide emissions, reduction in top soil degradation due to the use of chemical fertilizer, reduction in harmful effects on fish, etc.

Growing popularity of industrial poultry farming in the country has been creating increasing opportunity for the compost as it is used in poultry feed.

¹⁸ Iftekhhar *et al* (2003)



THE CDM PROJECT – A COMMERCIAL VENTURE OF WASTE CONCERN



Organic compost sorting, CDM Project (Source: Waste Concern)

Although a commercial venture in nature, the Clean Development Mechanism (CDM)¹⁹ of the Kyoto Protocol has created opportunities for generating enormous amounts of economic and environmental benefits for Bangladesh. Under this initiative, WWR Bio Fertilizer Ltd. Bangladesh, a joint venture of Waste Concern, has been implementing the world's first carbon trading-based composting project at a cost of Euro 12 million. The project has a capacity of composting 700 tons of waste per day along

with a landfill gas extraction and utilization through its three planned recycling plants. One of these three plants was established in Bulta Narayangaj in Dhaka Sylhet road with 130 tons per day recycling capacity. From 130 tons of organic waste, it will produce 32 to 39 tons of organic compost per day and will create employment opportunities for 90 persons. This initiative will also reduce 15,600 tons CO₂e/year and save 52,195 m²/year area of landfill.

In return for carbon credits, compost and gas production, a Dutch private company, WWR and two other international financial institutions are financing the projects. This is a commercially viable venture as it will generate significant revenue once the project is fully operational.²⁰ About 70% of the revenue will come from selling organic compost while carbon trading will provide the remaining 30%. The expected results of these projects are about 1 million tons of greenhouse gas reduction over a period of eight years, production of 50,000 tons of compost per year and creation of 1,000 new jobs for the poor. This project ensures workers' welfare by creating provisions for employment of women, child day care centres, workers' insurance, free meal for the workers, minimum wage of the government which is about Tk 4,200 (US\$60) per month and other admissible benefits.

Concluding Remarks

The Waste Concern model of decentralized community-based composting has demonstrated enough evidence that an effective partnership arrangement can be developed between the public sector, the community, and the private sector. Moreover, Maqsood and Iftekhar, with their long endeavour, established the idea that 'waste is a resource'.

¹⁹ The Kyoto Protocol allows the 39 countries, to reach their emission reduction targets in different ways through flexibility mechanisms. Clean Development Mechanism (CDM) is one of these mechanisms that allow the 39 developed countries to achieve part of their reduction obligations through investment in projects in developing countries that reduce greenhouse gas emissions or fix or sequester carbon dioxide from the atmosphere.

²⁰ Full implementation of the first 130 ton capacity CDM project in Narayanganj will be completed by the end of December 2009. The other two planned projects are in process and expected to be implemented fully by 2011.



Despite these facts, ensuring quality of the compost would be a critical issue from a compost marketing point of view. Enriching it with appropriate proportion of micronutrient can add greater value to this organic compost. However, it is indeed important that the farmers understand the negative effects of chemical fertilizer to which they have been used to for a long time and switch to environment friendly organic compost which is cheaper and more productive.

FUTURE GROWTH

Despite the challenges, this unique approach has attracted considerable attention of a number of NGOs, private sector and the donor community. Proven commercial viability and self sustainability indicates a strong potential for replication of the model in most parts of the country as well as other Asia Pacific and African countries. While talking about the future growth potential of their model, Maqsood said *“we have recently made an agreement with the government for preparing a waste management action plan for 19 districts in the country. The government has decided that all the city corporations will have an action plan for this purpose. UNICEF is going to provide financial support for this project and also for piloting our model in five of those cities”*.

LESSONS LEARNT

Strong commitment to do something can result in a big success. Despite difficulties in getting support at the start up phase, Maqsood and Iftekhar the two young entrepreneurs, won a big challenge with a high level of confidence and strong commitment to contribute to the development stride through a successful demonstration of their idea in a completely new field.

Private sector can be quite instrumental in a development initiative. The fertilizer marketing companies made a significant contribution when Waste Concern was finding it difficult to market their produced compost because of lack of appropriate knowledge and marketing skills.

Waste Concern has successfully demonstrated, through its community-based composting model, that a sustainable working model can be developed with a partnership between the community, the government, and the private sector. This kind of partnership arrangement scales down the barriers to implementation of the model.

The opportunity of carbon trading from aerobic composting can make solid waste related projects more attractive from the investors' perspective.

The Waste Concern model of organic composting is a clear demonstration of a successful inclusive business model that includes the poor both in the supply and the demand chain. Their active participation in both sides expedites the movement towards reduction in mass poverty which is at the top of the government's agenda and a cross-cutting issue for the eight Millennium Development Goals.



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