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# IMPACT ASSESSMENT OF THE GROWTH-ORIENTED MICROENTERPRISE DEVELOPMENT PROGRAM

**BASELINE RESEARCH REPORT**

**microREPORT #104**

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# ACRONYMS

AIIISG	All India Institute for Local Self Government
AMAP	Accelerated Microenterprise Advancement Project
AMC	Aurangbad Municipal Council
CIDCO	City and Industrial Development Corporation
DPCE	Daily Per Capita Expenditures
ESI	Employee Insurance Scheme
FDI	Foreign Direct Investment
FFV	Fresh Fruit and Vegetables
FGD	Focus Group Discussions
GMED	Grow-Oriented Microenterprise Development Project
HYV	High-Yield Variety
IFFCO	India Farmers Fertilizers Cooperative
IHD	Institute for Human Development
ITC	India Tobacco Company
MSE	Micro and Small Enterprise
MSWM	Municipal Solid Waste Management
PF	Provident Fund
PSD	Private Sector Development
RWA	Resident Welfare Association
USAID	United States Agency for International Development

# EXECUTIVE SUMMARY

This report presents the findings from the baseline impact assessment of the Growth-Oriented Microenterprise Development (GMED) Program based in Jaipur, India. GMED's end objectives are to develop effective approaches to stimulate the growth of micro-and-small enterprises (MSEs) through viable and sustainable MSE growth models and in a manner that leads to significant scaling up through widespread industry adoption, increased incomes earned by MSEs, and improved socio-economic well-being of MSE owner/operators and employees of key value chain participants.

GMED currently works in seven Indian states, although it expects to expand its activities to at least three or four additional states. Its largest program component addresses constraints to growth for smallholder fresh fruit and vegetable (FFV) farmers. A second component is aimed at increasing opportunities for small firms to participate in urban services, particularly municipal solid waste management (MSWM) and sanitation services.

The purpose of the GMED impact assessment is to assess whether and how GMED has achieved its end objectives in the FFV and MSWM subsectors.<sup>1</sup> To do so, it assesses program impacts at the value chain, MSE, and household levels using a longitudinal, quasi-experimental research design implemented through a mixed-method (quantitative and qualitative) approach.

The purpose of the baseline research described in this document is to establish conditions in both the client (treatment) and non-client (control) groups at the beginning of the impact assessment. The results of the follow-up study after two years will be compared to the baseline to determine the level and direction of change among a treatment group of GMED farmers and a control group of small-scale FFV farmers. Program impact, or lack thereof, will be inferred from relative changes within the two study groups over the two years of the study using the difference-in-difference method. The difference-in-difference method compares changes in target variables among treatment FFV farmers between the baseline and follow-up research to the same changes among control FFV farmers. Impact will be inferred if the difference between the treatment group and control group is positive and statistically significant.

## THE GMED PROGRAM

GMED initially commenced work in three agribusiness subsectors and one urban services subsector. These included the integrated broiler industry, organically-certified food products, and fresh fruits (mangos) and vegetables in the agribusiness subsector and municipal solid waste management in the urban services subsector. The three agribusiness subsectors were chosen because they appeared to offer the best opportunities for smallholder farmer income growth. GMED later shifted the integrated broiler subsector activity to a focus on the maize (poultry feed) value chain.

GMED later decided, however, to close out its work in the organics and maize subsectors due in part to its inability to find a partner capable of scaling up organically-certified food production, but also due in large part to allow GMED to concentrate its efforts and resources on taking advantage of emerging opportunities in the rapidly growing organized retail sector and the rapidly growing demand for fresh fruits and vegetables.

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<sup>1</sup> The GMED impact assessment is sponsored by USAID and jointly financed by ACDI/VOCA and the Washington-based Accelerated Microenterprise Advancement Project (AMAP). Responsibility for implementation of the study has been subcontracted in part to Woller & Associates, a consulting company based in Sandy, Utah, and the Institute for Human Development (IHD), an Indian non-profit autonomous institution based in Delhi, India

The organics subsector was originally to be evaluated in the GMED impact assessment, and impact researchers collected baseline data for this subsector in addition to the FFV and MSWM subsectors. In view of GMED's decision to terminate its work in organics subsector, however, researchers decided to drop it from the impact assessment as well.

Given the fact that the MSWM component had largely achieved its targets by June 2007, GMED elected to close out this subsector effective December 31, 2007 and reallocate funds for the expansion of the FFV component. Unlike the organics subsector, which was dropped for program failure, the MSWM subsector was phased out for program success (or perceived success). For this reason, it makes good sense to keep the MSWM subsector in the impact assessment. In particular, it offers an excellent opportunity to assess the sustainability of GMED's work in the MSWM subsector given that the follow-up research will take place after GMED has both exited and trained other organization to carry on the work after its departure.

## RESEARCH DESIGN

### KEY RESEARCH QUESTIONS

The key questions to be addressed in the impact assessment derive from the causal models, or underlying project logic, for the FFV and MSWM subsectors. The questions address whether the activities being studied have the impacts hypothesized in the causal model. The impact assessment will also focus on expected outcomes (intermediate results considered necessary for impacts to occur), combining information received from quantitative and qualitative impact assessment.

For the FFV and MSWM subsectors, the impact assessment will try to measure outcomes and impacts at three levels:

- **The subsector:** Do GMED interventions promote the growth and development of the subsector, as well as increased participation by MSEs in subsector activities and increased benefits to MSEs as a result of their participation?
- **Participating firms:** Do MSEs served by the program succeed in upgrading themselves and deriving enhanced benefit from their productive activities?
- **Associated households:** Do the households associated with participating MSEs derive benefits from the program?

### HYPOTHESES

The impact assessment seeks to test a set of hypotheses related to outcomes and impacts at the three levels described above.

#### FFV SUBSECTOR HYPOTHESES

**Hypothesis 1:** Smallholder FFV farmers will benefit from program participation in terms of improved household well-being as measured by increased expenditures, improved housing conditions, increased access to basic services, and increased asset ownership.

**Hypothesis 2:** Smallholder FFV farmers will benefit from program participation in terms of improved poverty status.

**Hypothesis 3:** Smallholder FFV farmers will benefit from program participation in terms of increased possession of productive land, productive land under cultivation, and productive land under irrigation.

**Hypothesis 4:** Smallholder FFV farmers will benefit from program participation in terms of increased ownership of farm assets.

**Hypothesis 5:** Smallholder FFV farmers will benefit from program participation in terms of increased ownership or use (hired or used on exchange basis) of productive assets.

**Hypothesis 6:** Smallholder FFV farmers will benefit from program participation in terms of increased productivity as measured by higher yields and lower wastage.

**Hypothesis 7:** Smallholder FFV farmers will benefit from program participation in terms of increased market value of production and production by-products.

**Hypothesis 8:** Smallholder FFV farmers will benefit from program participation in terms of increased investment in productive inputs.

**Hypothesis 9:** Smallholder FFV farmers will benefit from program participation in terms of increased net farm income.

**Hypothesis 10:** Smallholder FFV farmers will benefit from program participation in terms of increased quantity of produce sold to lead buyers and other higher-value buyers and at higher prices.

**Hypothesis 11:** Smallholder FFV farmers will benefit from program participation in terms of increased use of paid non-family labor.

**Hypothesis 12:** Smallholder FFV farmers will benefit from program participation in terms of increased adoption of targeted farming practices.

**Hypothesis 13:** Smallholder FFV farmers will benefit from program participation in terms of increased borrowing at better terms from commercial lenders, suppliers, and buyers.

**Hypothesis 14:** Program activities will lead to increased and sustainable sector competitiveness in FFV markets. This means that the sector will be able to sell a growing volume of produce of improved quality to higher-end wholesale, retail, and export buyers at higher prices that cover the cost of production and that earn a profit for smallholders.

#### **MSWM SUBSECTOR HYPOTHESES**

**Hypothesis 1:** Program activities will lead to increased outsourcing of municipal solid waste services to formal sector solid waste management firms, including an increased number of new entrants into the SWM subsector.

**Hypothesis 2:** Outsourcing of SWM services will lead to more effective solid waste management overall as reflected by, among other things, cleaner cities and an improved quality of life in urban areas.

**Hypothesis 3:** SWM firms will benefit from increased revenues and profits.

**Hypothesis 4:** SWM firms will increase employment of solid waste workers and will facilitate the transition from informal to formal sector solid waste services among solid waste workers.

**Hypothesis 5:** Solid waste workers will benefit from improved work hours, improved work stability, improved hygienic and safety conditions, increased access to social benefits, increased social status, increased asset accumulation, increased income, and reduced poverty.

## SUMMARY OF FINDINGS

### FFV SUBSECTOR

Overall, treatment and control FFV farmers share similar demographic and socio-economic profiles. The notable exception is poverty status: treatment households are less poor on average than control households. In terms of demographic profile, housing quality, asset ownership, and access to basic services, however, the two groups are quite similar.

On balance, the level variation between the two groups appears well within the range of normal variation one might reasonably have expected ahead of time of groups selected using quasi-experimental methods. In other words, the difference in observable characteristics between the groups is not of the magnitude that would raise significant concerns about their similarity for comparison purposes. Whether observed differences in term of household expenditures and poverty status

From the baseline survey findings, a broad portrait of treatment and control FFV farmers can be formed. On the one hand, there is no statistically significant difference between the groups in terms of productive asset ownership, crop production, rainfall and climatic conditions, net farming income, and labor use.

On the other hand, control FFV farmers own and possess larger plots of land, both irrigated and overall, while treatment FFV farmers produce a wider variety of crops, spend more on inputs, are more likely to adopt “sound” farming practices, produce more waste material (although control FFV diver more to home consumption), and are more likely to adopt certain sound farming practices.

Farmers in both groups are equally likely to take out first and second loans, while treatment FFV tend to have more outstanding, pay higher interest rates, and take out in-kind second loans. Treatment farmers are more likely to borrow from commercial banks, whereas control farmers are more likely to borrow from co-operative institutions.

Finally, the amounts sold, the prices paid, the total value sold, the stored quantity, and period of storage aggregated across all types of crops are broadly similar across the two groups. Treatment FFV farmers are most likely to sell their crops, in order of importance to *mandis*, co-operatives, wholesale buyers, private companies, and others. Control FFV farmers are most likely to sell their crops, in order of importance, to *mandis*, wholesale buyers, villagers, co-operatives, private companies, merchants against debt advance, others, and government agencies.

There remain significant constraints to adoption of sound farming practices, upgrading FFV farmer productivity, linking FFV farmers to higher end wholesale, retail, and export markets. These include a lack of transparency regarding input quality; high input costs; lack of knowledge and training in use of inputs; reliance on costly and non-transparent distribution and sales methods; low prices for goods; uncertainty regarding returns on investment in production technologies or sound farming practices; unsound farming practices that threaten the sustainability and profitability of farming operations; over-indebtedness; herd-mentality cropping patterns; and overall weak linkages to other value chain actors.

There are examples in which FFV farmers have successfully addressed some of the above constraints through the creation and operation of farmer cooperatives. There also appear to be several successful examples of informal cooperation between FFV farmers. Not all FFV farmers have successfully organized, however, and those farmer organizations that do exist must cope with a set of internal and external pressures that may or may not adversely affect their operations.

### MSWM SUBSECTOR

Treatment and control solid waste workers share broadly similar demographic characteristics. Within this general trend, there are a number of significant differences in terms of gender, marital status, education level, major sources of

income and access to basic services, even though the absolute differences in some of these cases are not necessarily large. No or few statistically significant differences exist between the two groups in terms of housing quality, household expenditures, asset ownership, and poverty status.

The differences that do exist between the two groups raise some concerns about the direct comparability between the two groups. It will be necessary to control for these differences in the follow-up research and analysis.

The baseline survey results yield no consistent patterns with regards to the baseline similarities or differences between the treatment and control solid waste workers. On the one hand, treatment solid waste workers enjoy greater work benefits, enjoy a higher (although not materially so) access to productive assets, enjoy moderately better health and safety conditions, work more hours and days during the week (but well below anything that might be considered exploitative), enjoy greater job stability, and earn significantly more.

On the other hand, control solid waste workers have been in the same occupation and with the same employer for a longer period of time, receive better treatment in the workplace, are sick less often relative than non-waste worker peer group members, and perceive themselves to enjoy greater economic and social status.

Finally, there is no difference between the two groups in terms of the frequency of illness and access to finance. In the latter case, both groups enjoy limited access to finance, and the bulk of loans they do receive tend to come from moneylenders and friends/family.

Overall, neither formal nor informal solid waste workers enjoy necessarily “good” working conditions. Working conditions are described as “harsh,” and access to productive assets and safety equipment is low in each group. Few receive benefits in the form of paid work days, paid sick days, maternity leave, bonuses, etc., and the salary is routinely low, effectively below minimum wage for some formal SW workers. Some formal SW workers have even had to accept worse working conditions and at lower pay on transferring from municipal payroll to the private firm payroll.

Whereas formal SW workers do enjoy greater job stability, their positions are far from secure. Firms are free to hire and fire as they see fit, and there is no shortage of job candidates. Formal workers, consequently, live in constant fear for their jobs. So, whereas treatment SW workers do enjoy some improved working conditions relative to the control SW workers, they do so only marginally in most cases, and in some cases, actually appear at a disadvantage to informal SW workers. (As noted above, areas in which formal SW workers do appear to enjoy clear advantages over informal SW workers include pay, job security, and access to medical and social security benefits, though these advantages are not necessarily universal among formal SW workers.)

Part of the explanation for the poor working conditions among treatment SW workers are restrictive terms in the SWM service contracts with the municipalities. Apparently, the terms of the contracts severely limit the profitability of the SWM firms making it difficult in turn for them to provide training, equipment, benefits, and higher wages to their workers. According to one key informant, had GMED made an effort to include more stakeholders in the contractual process, this might have been avoided to a degree.

Another possible explanation stems from the large class differences between some firm owners and SW workers. Almost all SW workers in both treatment and control groups belong to a Scheduled Caste, while firm owners belong to a higher class. The class difference may induce a lack of empathy on the part of owners in terms of their workers’ safety and welfare.

## **QUANTITATIVE RESEARCH**

The quantitative portion of the GMED impact assessment consists of a household-level survey of program participants and non-participants. The treatment group of program participants was selected randomly from lists of

participants provided by GMED and its implementing partners. The control group of non-participants was selected randomly from separate districts selected using the following selection criteria:

1. They share similar characteristics as treatment group members.
2. They are engaged in the same activities as GMED clients.
  - a. They are informal SWM workers in the MSWM subsector.
  - b. They cultivate the same types of crops as client farmers in the FFV and organic produce subsectors.
3. They live and work in similar geographical zones as treatment group members.
  - a. They come from municipalities of similar size, climate, infrastructure, etc. as client in the MSWM subsector.
  - b. They come from locations of similar climate, soil type, growing season, etc. as client farmers in the FFV and organic produce subsectors.
4. They are not working with GMED.
5. They are geographically separated from GMED treatment group sites.
6. They will not participate in GMED during the period of the study.
7. They are not participating in a program similar to GMED, meaning that they are not receiving extension services, production inputs, or benefits from another donor project or private sector firm.

The follow-up survey two years hence will revisit as many of the respondents from the baseline round as possible. Accordingly, information was collected in the baseline that will facilitate finding and identifying respondents for the repeat interviews. Anticipating panel attrition (survey respondents die, move away, change their line of business, or decline to participate), the baseline survey over-sampled respondents in each sector so as to assure a sufficient number of respondents in the follow-up survey.

So as obtain results at a meaningful level of significance and allow for reasonable panel attrition, it was estimated that the target sample size should include approximately 800 in the FFV subsector and 500 in the MSWM subsector. The final sample obtained is shown in the following table.

**Table 1. GMED Impact Survey Sampling Frame**

State	Village	Treatment Group	Control Group	Total
<b>Fresh Fruits and Vegetables</b>				
<b>Andhra Pradesh</b>		<b>74</b>	<b>33</b>	<b>107</b>
	<b>Medak</b>	74	33	107
<b>Maharashtra</b>		<b>404</b>	<b>188</b>	<b>592</b>
	<b>Ahmad Nagar</b>	8	61	69
	<b>Kolapur</b>	282	3	285
	<b>Pune</b>	90	5	95
	<b>Sangli</b>	24	119	143
<b>Punjab</b>		<b>59</b>	<b>34</b>	<b>93</b>
	<b>Sang Rur</b>	59	34	93
<b>Total</b>		<b>537</b>	<b>255</b>	<b>792</b>
<b>Municipal Solid Waste Management</b>				
<b>Maharashtra</b>		<b>184</b>	<b>103</b>	<b>287</b>
	<b>Aurangabad</b>	117	5	122
	<b>Jalna</b>	0	51	51
	<b>Parbhani</b>	4	28	32
	<b>Latur</b>	63	19	82
<b>Rajasthan</b>		<b>67</b>	<b>70</b>	<b>137</b>
	<b>Churu</b>	10	61	71
	<b>Jhunjhunu</b>	66	0	66
<b>Total</b>		<b>251</b>	<b>173</b>	<b>424</b>

The treatment group of FFV farmers was drawn exclusively from FFV farmers working with ITC Limited in collaboration with GMED. At the time of the baseline research, ITC was the only major large-scale fruit and vegetable wholesaler/retailer working with GMED. The control group was drawn from the population of small-scale FFV farmers who lived in the control villages and who possessed the characteristics satisfying the site and farmer selection criteria used by ITC.

The treatment group in the MSWM subsector consists of solid waste workers employed by SWM firms contracting with municipalities for SWM services. The MSWM control group was drawn from the population of informal SW workers in the control municipalities.

## **QUALITATIVE RESEARCH**

The impact survey was complemented by qualitative research to improve understanding of the observed outcomes and impacts and the causal mechanism underlying them. In the FFV subsector, the qualitative research focused on incentives, constraints, opportunities, and risks for small-scale farmers associated with upgrading and accessing new markets. It also looked at incentives and risks for program partners and value chain members and the extent to which GMED is helping them develop and/or improve these activities. It considered the nature of cooperation and coordination among actors within the value chain as it relates to producer participation and competitiveness.

In the MSWM subsector the qualitative research focused on the constraints and incentives for contracting out waste management services from the perspective of municipal governments and SWM firms in addition to perceived costs and benefits of the process and suggestions for scaling up the contracting model. It further explored how contracting solid waste service provision with municipal governments has (1) affected the operations of SWM firms in areas such as revenues, profits, investment, employment, training, and salaries and (2) the differences between the formal and informal SWM sector in terms of social benefits, work conditions, work and stability, social status, and household well-being.

The number and types of qualitative investigations conducted for the baseline study in the FFV and MSWM subsectors are shown in the following two tables.

**Table 2. Qualitative Research Conducted in FFV Subsector**

Type of Group	Research Instrument	Village	State
ITC FFV Farmers	FGD	Nandani	Maharashtra
ITC FFV Farmers	FGD	Kalwadi	Maharashtra
ITC FFV Farmers	FGD	Annasagar	Andhra Pradesh
Extension Agent	Personal Interview	Chas Kalwadi Narodi Absari	Maharashtra
ITC Representative	Personal Interview	Nandani	Maharashtra
Lead Farmer	Personal Interview	Nandani	Maharashtra

In the MSWM subsector, the research team conducted two FGDs with formal solid waste workers employed by firms subcontracted under the program for solid waste services in Maharashtra and Rajasthan; one FGD with informal solid waste workers in Rajasthan; personal interviews with a Municipal Commissioner and a representative of a SWM firm in Jhunjhunu, Rajasthan; and personal interviews with a sanitary inspector and a representative of a SWM firm in Aurangabad, Maharashtra (Table 3).

**Table 3. Qualitative Research Conducted in FFV Subsector**

Type of Group	Research Instrument	Village	State
Formal SW Workers	FGD	Aurangabad	Maharashtra
Formal SW Workers	FGD	Jhunjhunu	Rajasthan
Informal SW Workers	FGD	Churu	Rajasthan
Municipal Commissioner	Personal Interview	Jhunjhunu	Rajasthan
Sanitary Inspector	Personal Interview	Aurangabad	Maharashtra
SWM Firm	Personal Interview	Aurangabad	Maharashtra
SWM Firm	Personal Interview	Jhunjhunu	Rajasthan

# I. INTRODUCTION

This report presents the findings from the baseline impact assessment of the Growth-Oriented Microenterprise Development (GMED) Program based in Jaipur, India. GMED's end objectives are to develop effective approaches to stimulate the growth of MSEs through viable and sustainable MSE growth models and in a manner that leads to significant scaling up through widespread industry adoption, increased incomes earned by MSEs, and improved socio-economic well-being of MSE owner/operators and employees of key value chain participants.

GMED currently works in seven Indian states, although it expects to expand its activities to at least three or four additional states. Its largest program component addresses constraints to growth for smallholder fresh fruit and vegetable (FFV) farmers. A second component (recently phased out) is aimed at increasing opportunities for small firms to participate in urban services, particularly municipal solid waste management (MSWM) and sanitation services.

The purpose of the GMED impact assessment is to assess whether and how GMED has achieved its end objectives in the FFV and MSWM subsectors.<sup>2</sup> To do so, it assesses program impacts at the value chain, MSE, and household levels using a longitudinal, quasi-experimental design implemented through a mixed-method (quantitative and qualitative) approach. Baseline data were also collected for the organically certified food products subsector. For reasons discussed below, this subsector has been dropped from the impact assessment.

The quantitative part of the assessment includes a baseline survey of 1,043 program clients (792 and 251 in the FFV and MSWM subsectors respectively) and 597 non-clients (424 and 173) implemented during December 2006-April 2007 and a follow-up survey of the same clients and non-clients after a two-year interval. The survey is complemented by qualitative research consisting primarily of in-depth key informant interviews and focus group discussions with selected value chain actors in both the baseline and follow-up research.

The purpose of the baseline research described in this document is to establish conditions in both the client (treatment) and non-client (control) groups at the beginning of the impact assessment. The results of the follow-up study after two years will be compared to the baseline to determine the level and direction of change among a treatment group of GMED farmers and a control group of small-scale FFV farmers. Program impact, or lack thereof, will be inferred from relative changes within the two study groups over the two years of the study using the difference-in-difference method. The difference-in-difference method compares changes in target variables among treatment FFV farmers between the baseline and follow-up research to the same changes among control FFV farmers. Impact will be inferred if the difference between the treatment group and control group is positive and statistically significant.

The GMED impact assessment has both narrow and broad purposes. Its narrow purposes are to determine the effectiveness of GMED in achieving its principal objectives and to understand both why and the how those objectives were or were not achieved. Its broad purpose is to assess the effectiveness of private sector development (PSD) projects in general. GMED is a good example of the new generation of PSD projects being implemented by USAID and other donors in developing and transition countries. An assessment of GMED's effectiveness in achieving its principal project objectives will generate information that can be used by USAID/India, other USAID missions, USAID generally, and other donors to gauge the effectiveness of this approach and help to inform decisions about the design of future projects.

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<sup>2</sup> The GMED impact assessment is sponsored by USAID and jointly financed by ACDI/VOCA and the Washington-based Accelerated Microenterprise Advancement Project (AMAP). Responsibility for implementation of the study has been subcontracted in part to Woller & Associates, a consulting company based in Sandy, Utah, and the Institute for Human Development (IHD), an Indian non-profit autonomous institution based in Delhi, India

## II. THE GMED PROGRAM<sup>3</sup>

GMED initially commenced work in three agribusiness subsectors and one urban services subsector. These included the integrated broiler industry, organically-certified food products, and fresh fruits (mangos) and vegetables in the agribusiness subsector and municipal solid waste management in the urban services subsector. These three agribusiness subsectors were chosen because they appeared to offer the best opportunities for smallholder farmer income growth. GMED later shifted the integrated broiler subsector activity to a focus on the maize (poultry feed) value chain. It later decided, however, to concentrate its agribusiness activities exclusively in the FFV subsector and phase out the maize and organically-certified food value chains to take better advantage of the emerging opportunities represented by the rapid growth of the organized retail sector and the growing demand for fruit and vegetables by the export sector.

The MSWM subsector was selected for its potential to encourage the growth of small urban enterprises and improve the urban environment, while creating formal employment opportunities for the urban poor. Having largely achieved its project objectives in terms of number of municipalities assisted and the institutionalization of its solid waste outsourcing model, however, GMED decided in July 2007 to phase out its work in the MSWM subsector as of December 31, 2007.

### A. SUBSECTORS

A more in-depth description of the FFV and MSWM subsectors and GMED's work within them is presented here. This section also includes a short explanation as to why GMED has decided to terminate its work in the organic products subsector and why, consequently, this subsector has been dropped from the impact assessment.

#### II.A.i. FRESH FRUIT AND VEGETABLES

The objective for the fresh fruits and vegetables component is to increase farm incomes by integrating small farmers into modern fresh produce supply chains. There has been and continues to be explosive growth in demand (mostly in organized retail, but also in export and processing) for fresh fruits and vegetables. Some of India's largest corporations, as well as some of the world's largest retail chains, are beginning to invest billions of dollars in building up nationwide retail and wholesale networks showcasing fresh fruits and vegetables.

From the supply side, farmers have been keenly interested in diversifying and improving their fresh produce production to meet market demand. Because of the short production cycle of vegetables, farmers are able to realize a quick and tangible return on their investments in better quality and productivity. By adopting a simple and relatively inexpensive package of improved production and post-harvest practices, smallholder fresh produce farmers can substantially improve their productivity, product quality and family incomes.

The entry point to the FFV subsector for GMED is the absence in India of fresh produce supply chains serving the organized retail sectors. There have been two primary reasons for this absence. First, until the past two or three years, there was no organized food retail sector. Second, farmers until quite recently were legally obliged to sell all of their products through government mandated country markets (*mandis*). The latter restriction is being phased out on a state by state basis in sync with the rapid growth of the organized retail sector.

Until very recently, both the existing corporate entities and the newcomers to the organized retail and wholesale sector have concentrated their supply chain development efforts on the front end. Sourcing of fresh produce has been largely ad hoc, dependent on purchasing from the *mandis*, from traders, and through spot transactions with individual

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<sup>3</sup> The sections of this report describing the GMED program borrow language from the GMED Work Plan for June 2007-September 2008.

farmers. Several of the corporate players have attempted to establish wholly owned production bases through leasing land. Others are attempting to tie up with larger farmers. To meet the anticipated demand for fresh fruits and vegetables, however, the major players in the organized retail and wholesale sector will increasingly be forced to depend for their produce supplies on smallholder farmers, and in order to do so, they will need to establish ongoing relations with organized farmer groups.

Based on developments already underway and those planned for the future, GMED forecasts there will be 6,000 to 10,000 new supermarkets, hypermarkets and specialty fresh produce shops operating in India over the next five to eight years. The majority of fresh produce sold through these outlets will be sourced from smallholder farmers. According to GMED estimates, each of these outlets will on average require at least 150 smallholder farmers to provide the required volume of fresh vegetables. This estimate implies that a million or more Indian smallholder farmers could conceivably become involved in organized retail supply chains. This estimate does not take into account the anticipated growth of the processing industry nor does it consider the comparative advantage that India possesses in the export of both fresh and processed vegetables and fruit.

The first step in developing reliable organized retail and wholesale supply chains is to improve the capabilities of smallholder farmers to become reliable suppliers to these chains. The smallholder Indian FFV farmer is characterized by outmoded production and post-harvest techniques, obsolete crop varieties, low productivity and substandard product quality. Nonetheless, experience has shown that small-scale producers who can meet high quality standards on a regular basis can significantly increase their incomes. What is needed to achieve this outcome is a program to increase small farmer productivity, the quality of product produced by small farmers, and the volume and value of produce flowing through the FFV value chain through adoption of sound planting, cultivation, and post harvest technologies and practices and the investment in post harvest and marketing facilities.

The involvement of fresh produce farmers in the rapidly growing organized retail and wholesale markets, however, will not happen automatically. GMED's approach is based on the conviction that government does not have the resources or the capacity to be that "someone". The market players that command the resources and have the required incentive to convince and assist smallholder farmers to adapt to market opportunities are the organized retail and export buyers.

When the GMED program first started, none of the Indian corporations involved in retail and wholesale believed that smallholder Indian FFV farmers could be successfully integrated into organized retail and wholesale supply chains. It required almost two months of meetings and discussions for GMED to convince ITC Limited—the first large market actor to agree to work with GMED—to base its new fresh produce supply chain development on smallholder farmers.<sup>4</sup>

Since then, GMED has been approached by several other retail value chain participants. Two of these, with which GMED has already reached agreement to provide assistance in fresh produce supply chain development, are Tata Chemicals and Bharti Field Fresh. The Bharti group of companies is the third largest Indian corporate group, while Tata is one of the largest, oldest and most respected business conglomerates in India. GMED is also currently in discussions with several other retail groups, including Metro Cash and Carry, Bharti/Walmart Retail, and Reliance Industries. In addition to the above, GMED will continue to work with ITC Limited.

With respect to other value chain actors, GMED has been approached by German chemical multinational BASF with a request to become involved in the program. During an initial meeting, BASF agreed to cooperate with GMED in training extension agents and lead farmers in pesticide use, and in establishing farmer demonstration plots, starting with the Nandani Cooperative. GMED has already forged alliances with Syngenta and Seminis for extension agent

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<sup>4</sup> ITC is a diversified Indian corporation with agribusiness interests that include a network of farmer service centers that are distributing production inputs (e.g., fertilizer, pesticides) and providing a variety of extension services to small-scale farmers.

and lead farmer training and provision of sample inputs. An Indian cold chain operator, Crystal Roadways, has agreed to work with the GMED program to rationalize the incorporation of cold capabilities in fresh produce value chains.

## **II.A.ii. MUNICIPAL SOLID WASTE MANAGEMENT**

The principal objective in the urban services component is to encourage municipal governments to outsource their solid waste management activities to MSEs resulting in the shift of workers from informal sector to formal sector employment. This is expected in turn to create livelihood opportunities for the urban poor and in many areas encourage development of MSEs in this sector. (MSEs in this context include NGOs working in solid waste management.) The project partners for this component are the municipalities that outsource their solid waste management. The project clients are the waste workers who are the employees of the contracting MSEs.

The Supreme Court Guidelines on Municipal Solid Waste Rule were promulgated in 2000 and are supposed to be adhered to by all municipalities starting in January 2004. While the Guidelines did not mandate the privatization of solid waste management, their successful implementation practically requires this. Outsourcing of solid waste management activities has been in practice in several Indian municipalities for as long as ten years. While a number of these programs have been successfully carried out, they tend to be isolated cases and have not been widely replicated.

Outsourcing solid waste management involves four distinct activities:

1. Door-to-door collection. Municipalities typically do not do door-to-door collection limiting their waste management services to road sweeping and drain cleaning and some secondary transportation.
2. Secondary transportation. Involves taking garbage from a transfer depot or secondary collection point to locations to a landfill.
3. Road sweeping.
4. Drain cleaning.

GMED's activities under the MSWM subsector are focused primarily on outsourcing door-to-door collection, which poses the greatest bottleneck in the waste management process. Where the opportunities exist, however, GMED is also promoting outsourcing of secondary transportation, road sweeping and drain cleaning.

GMED is taking a recipe book approach to providing assistance to local governments. In collaboration with the All India Institute for Local Self Government (AIILSG), GMED developed a tool kit for this purpose.<sup>5</sup> The tool kit consists of templates for bidding documents, contracts, monitoring and evaluation systems and other procedures that local governments can utilize to set up outsourcing programs. GMED and AIILSG introduced the toolkit to some 42 municipal governments through a workshop held in Pune and then embarked on a series of regional workshops and consultations with 22 additional local governments. GMED also engaged in information exchanges with the USAID-funded Financial Institutions Reform and Expansion Program (FIRE-D).<sup>6</sup>

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<sup>5</sup> The main objective of the AIILSG is to see that municipalities “contribute more effectively to the development process and provide the citizens with better living conditions by meeting their aspirations in terms of required amenities, infrastructure and better environmental conditions, thus contributing to social and economic development of the society as a whole by better urban management” (<http://www.aiilsg.org/centerasp/home.asp>). The AIILSG has collaborated closely with GMED in terms of developing tool kits and other resources and in promoting SWM outsourcing. The bulk of the work being carried out under the MSWM subsector is being carried out by the AIILSG with the collaboration or under the auspices of GMED for Maharashtra state.

<sup>6</sup> FIRE-D is a joint USAID-Union Ministry of Urban Development program to address urban infrastructure needs. The program, which works in seven Indian states, aims to increase urban infrastructure investment by increasing participation of municipalities, the private sector, and community organizations in the development and delivery of commercially viable urban infrastructure services; improving capacity of municipal and state governments, infrastructure agencies, and other urban professionals to manage urban growth, mobilize resources and improve infrastructure services; and supporting development of a market-based urban

GMED developed tailor made contractual models and provided technical support to help municipalities begin outsourcing their solid waste management. As part of the technical assistance, GMED helped the municipal governments to develop a monitoring and evaluation program and a management information system and trained them in their use. The municipalities in turn contracted their solid waste services, or a portion of them, to MSEs. GMED has also worked with MSEs to help them bid for outsourcing contracts.

Hiring SWM workers is expected to result in the transfer of large numbers of workers from the informal SWM sector to the formal SWM sector, where they are more likely to have access to social benefits that they presently lack<sup>7</sup> and benefit from better hygienic and other working conditions, shorter hours, higher pay and greater income stability. Formal sector SWM workers are also expected to benefit from enhanced social status relative to their informal sector counterparts.<sup>8</sup>

GMED's MSWM component has made considerable progress in achieving its original objectives. The outsourcing tool kit prepared under the component has been introduced to at least 40 municipal governments and is currently being picked up by other donors, including the World Bank. At least 12 municipalities have been assisted by GMED in the outsourcing of SWM activities to MSEs, compared with the original target of 15 municipalities by the end of 2008. At least a half-dozen more municipalities are expected to issue SWM contracts to small-scale enterprises. The MSE outsourcing model has been institutionalized through the AILSG throughout the entire state of Maharashtra and with a sizeable number of municipal governments in Madhya Pradesh and Rajasthan.

In view of the fact that the solid waste management component is already close to reaching its project targets, ACDI/VOCA has decided to close out the MSWM component effective December 31, 2007 and reallocated funds for the expansion of the FFV component. From approximately July-December 2007, GMED provided training and capacity development to selected organizations so as to provide them with the capacity to continue the GMED SWM initiative following the close-out of the component. During this period, GMED trained around 20 additional municipal governments in the use of the solid waste management outsourcing tool kit and worked with ten additional municipalities to outsource all or a portion of their solid waste management activities to MSEs.

### **II.A.iii. ORGANICALLY CERTIFIED FOOD PRODUCTS**

GMED initially began work within organically certified food products value chain. Its purpose in selecting organically-certified foods as a project subcomponent under the agribusiness component was to help support the growth of this nascent but potentially quite important segment of Indian agriculture. There were three basic reasons for focusing on organic foods: smallholder farmers account for most organic production; organic production in remote areas tends to be dominated by women farmers; and the domestic market appeared to have significant growth potential.

GMED established a partnership with the International Center for Competency in Organic Agriculture (ICCOA), the premier Indian organics association, in order to better support group activities aimed at promoting the growth of organic cultivation. GMED also assisted two large NGOs, HARC and INHERE with a combined total of some 3,800 small and marginal certified organic farmers, to establish commercial marketing subsidiaries and link them with some of the major buyers and agents for organic products. In addition, GMED helped train field extension agents employed by one of the largest Indian organic products exporters, with a production base of 1,200 smallholder farmers, and provided a consultant to design a new business model and marketing strategies that are enabling the company to expand its smallholder farmer base.

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infrastructure finance system. FIRE-D has accumulated much experience and information on municipal solid waste management, which it shares with GMED.

<sup>7</sup> Social benefits include: minimum wage, social security, and medical insurance.

<sup>8</sup> Informal SWM workers are at or near the bottom of the social hierarchy. One manifestation of this is that they are constantly under suspicion for petty or other crimes and suffer frequent harassment from the police.

Although sales of organic products, particularly fruits and vegetables, are growing, organics still constitute a niche market in India. Due to the limited domestic market for organics, GMED has been unable to identify a major market partner that has the ability to substantially accelerate market growth. For this reason, and because of the major growth opportunities for smallholder farmers represented by increasing demand for fresh produce by the organized wholesale and retail markets, GMED has closed out work in the organics value chain so as to focus its limited resources on addressing the FFV value chain, which has much larger growth opportunities.

As mentioned above, the GMED impact assessment originally collected data for the organics subsector in addition to the FFV and MSWM subsectors.<sup>9</sup> Because ACIDI/VOCA has elected to close out GMED’s work in this sector, it has elected to conclude the impact assessment work in this sector as well.

The decision to close out work in the organics subsector differs from the decision to close out work in the MSWM subsector. In the former case, the decision was based on GMED’s inability to find a major market partner (a tacit admission that the intervention was not successful). In this case, it makes little sense to invest further resources to assess GMED’s impact in this subsector. In the latter case, the decision was based on GMED’s conclusion that it had largely achieved its program objectives. In this case, it makes good sense to invest further resources to assess GMED’s impact. In particular, the impact assessment offers an excellent opportunity to assess the sustainability of GMED’s work in the MSWM subsector given that the follow-up research will take place after GMED has both exited and trained other organization to carry on its work after its departure.

## B. PROGRAM FOCUS

GMED addresses growth constraints for smallholder farmers through a demand-driven, value chain, embedded services program model.

**Demand-driven:** Instead of helping farmers sell what they produce, GMED helps farmers produce what they can sell.

**Value Chain:** GMED uses the value chain approach to analyze all the actors involved in the value chain and the factors that affect the performance of the chain to understand the constraints and opportunities for increased competitiveness. GMED looks at opportunities to increase the value added (e.g., profits) for farmers and other rural entrepreneurs at *all* points in the value chain—from crop planning through post-harvest storage to marketing.

**Embedded Services:** GMED believes that the most efficient and most sustainable services are provided by those firms and organizations that are “embedded” in the value chain, such as input suppliers, supermarkets and exporters. Firms that are embedded in the value chain through their purchases of agricultural raw materials have a vested interest in helping farmers increase productivity and profitability because that enhances their ability to satisfy their customers. Organized wholesale and retail buyers are motivated to provide technical services to farmer suppliers to ensure that they receive the proper quality and quantity at the right time. Seed suppliers are motivated to provide technical advice as well as good quality seeds as an effective means of competing in the market. Other actors, such as NGOs and universities, may provide valuable assistance to farmers, but they lack the commercial incentive for providing these types of “embedded” services.

## C. SERVICE DELIVERY MODELS

In the agribusiness sector, GMED uses two basic service delivery models following the fundamental GMED strategy of “demand-driven, value chain, embedded services:” (1) buyer-farmer and (2) buyer-intermediary-farmer. The two

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<sup>9</sup> The completion of the baseline research was, in fact, delayed for a couple of months due to severe winter weather in Uttaranchal where the sample of small-scale organic produce farmers was concentrated.

models are not mutually exclusive, and it is likely that the many of the corporations involved in organized wholesale/retail will adopt elements of both. The key differences revolve around how the organized retail and corporate buyers interact with farmers.

### **II.C.i. BUYER-FARMER MODEL**

The GMED partnership with ITC focused initially on the buyer-to-farmer model, where the corporate wholesaler or retailer interacts directly with farmers at a cluster level. The corporation buys directly from farmers, specifying quality, quantity, timing, etc. The corporation provides or coordinates the provision of post-harvest infrastructure—if not at the farm-level, then at least at an intermediary collection depot—provides or coordinates technical extension and financial services, and adopts other measures to build and maintain farmer loyalty. The buyer-to-farmer model bypasses the usual multi-level chain of middlemen found under the mandi system. It enables the buyer to exert greater control over product quality, delivery volume and timing and other key supply chain elements, while reducing the cost of intermediation and providing greater returns to farmers. Control of the product by the corporate buyer and the provision of proper post-harvest handling methods and facilities can also significantly reduce product losses.

The buyer-to-farmer model necessitates a great deal of commitment from the corporate partner, as it requires considerable capital and human resource investments in the supply chain back end. Not all wholesale/retail organizations will choose to follow this model; many would prefer not to deal directly with farmers, since that is not one of their core competencies. GMED has learned that it is more time consuming to change corporate culture than to change farmer culture. The buyer-to-farmer model also requires a relatively high level of sophistication on the part of the farmer, who must be able to understand the buyer's proposition and be able to evaluate it against other potential opportunities and then negotiate reasonable price and delivery terms and conditions.

### **II.C.ii. BUYER-INTERMEDIARY-FARMER MODEL**

Many of the corporate organized retail buyers may prefer to work with an independent intermediary that has the capability to organize groups of farmers and deliver produce that meets buyer requirements, rather than linking directly to the farmers. In this case, the intermediary provides technical and possibly financial services, coordinates crop scheduling and planning with the buyer organization, and assumes responsibility for product procurement and delivery. The intermediary offers the buyer organization a single point of contact to arrange transactions with large numbers of farmers and can take the form of a cooperative, an individual entrepreneur or organization specializing in smallholder farmer organization.

Another category of intermediary that is evolving, particularly for carrots, baby corn, sweet corn and other vegetable production in north India, is a nucleus/satellite farm approach, where the more sophisticated, larger, and more commercially-oriented farmer organizes and advises his neighboring smaller-scale outgrowers and provides the direct interface with the corporate buyer. This is also a viable model, although it gives rise to some concerns about the potential for exploitation of the outgrowers by larger farmers. GMED is not yet working with this category of intermediary, but is open to doing so provided a suitable intermediary can be identified.

The issue of the potential for exploitation of smallholder farmers by wholesale and/or retail purchasing organizations has been raised on several occasions by observers of the GMED models. While it is true that the buyer normally possesses greater control over transactions than does the small-scale producer, at the present time in India the reverse holds true. The rapidly growing demand on the part of the organized retail and export sectors for reliable supplies of better-quality fresh produce combined with the almost complete absence of organized growers capable of effectively meeting this demand means that groups of farmers that can be organized to meet demand will hold the transactional balance of power at least for the foreseeable future.

### **II.C.iii. OTHER SERVICE DELIVERY MODELS**

In addition to the above, GMED utilizes other service delivery models to incorporate additional value chain participants. These include linking with suppliers of various production and post-harvest related goods and services, financial intermediaries, domestic and international organizations and government agencies.

# III. CAUSAL MODELS

## A. KEY RESEARCH QUESTIONS

The key questions to be addressed in the impact assessment derive from the causal models, or underlying project logic, for the FFV and MSWM subsectors. The questions address whether the activities being studied have the impacts hypothesized in the causal model. The impact assessment will also focus on expected outcomes, combining information received from quantitative and qualitative impact assessment.

For the FFV and MSWM subsector, the impact assessment will try to measure impacts at three levels:

- **The subsector:** Do GMED interventions promote the growth and development of the subsector, as well as increased participation by MSEs in subsector activities and increased benefits to MSEs as a result of their participation?
- **Participating firms:** Do MSEs served by the program succeed in upgrading themselves and deriving enhanced benefit from their productive activities?
- **Associated households:** Do the households associated with participating MSEs derive benefits from the program?

## B. CAUSAL MODELS

The underlying program logic can be shown via formal causal models. A causal model details the causal (or logical) links between program activities and expected impacts. Underlying these links is a set of theorized causal relationships that program designers believe to be true. The impact assessment aims to prove the existence of these theorized relationships. Causal models for the FFV and MSWM subsectors are shown in Figures 1-2.

**Figure 1. Causal Model for Fresh Fruits and Vegetables**

Activities	Outputs	Outcomes	Impacts
<p>Assess project partners' supply chains and identify supply chain bottlenecks in the following areas:</p> <ul style="list-style-type: none"> <li>• Production technologies</li> <li>• Post-harvest practices</li> <li>• Grades and standards</li> <li>• Management information systems</li> <li>• Domestic Phytio Sanitary (e.g., EUREPGAP)</li> <li>• Good agricultural practices</li> <li>• Farmer loyalty schemes</li> <li>• Availability of information to farmers</li> </ul>	<p>Plan for value chain intervention</p>	<p>Increased number of clients linked to higher value markets</p> <p>Increased number of clients receiving higher prices for crops</p> <p>Reduced waste in the supply chain</p> <p>Adoption of new techniques and practices</p> <p>Increased productivity</p> <p>Improved produce quality</p> <p>Increased value of fruit and vegetable sales from clients to partner</p>	<p><u>Sub Sector Level</u> Industry demonstration effect leads to rapid growth in widespread small farmer involvement in new domestic market for higher quality/higher value products</p> <p>Increased sector competitiveness</p> <p>Increased partner sales through wholesale outlets</p> <p>Increased partner sales through retail outlets</p> <p><u>Firm Level</u> Increased job creation</p>
<p>Assist partners to develop viable fresh produce value chains and integrate small-scale farmers into these chains</p> <ul style="list-style-type: none"> <li>• Develop training materials for project partner and project clients</li> <li>• Develop extension agent training materials for reproduction by project partner.</li> <li>• Develop programs for improving farmer productivity and product quality.</li> <li>• Conduct survey/focus groups to determine farmer situation and attitude towards participation in corporate-sponsored fresh produce supply chains</li> </ul>	<p>Number of training materials developed for partners, clients, and extension agents</p> <p>Training materials reproduced by project partner</p> <p>Number of trainings for partners, clients, and extension agents</p> <p>Number of partners, clients, and extension agents trained</p> <p>Number of focus group discussions</p> <p>Number of persons participating in focus group discussions</p> <p>Report on farmers' situation and attitudes toward participation in corporate-sponsored supply chains</p>	<p>Increased production of crops prioritized by partner</p> <p>Increased number of clients selling fruits and vegetables to partner</p> <ul style="list-style-type: none"> <li>• 2,000-3,000 clients selling to partner</li> </ul> <p>Strengthened relationships between partner and clients</p> <ul style="list-style-type: none"> <li>• 90 percent of clients are making repeat sales to the same partner.</li> </ul> <p>Increased client access to commercial bank or other formal sources of credit</p> <p>Fresh produce value chains created.</p> <ul style="list-style-type: none"> <li>• At least nine successful fresh produce model supply chains will have been established connecting small-scale farmers to corporate buyers</li> </ul>	<p>Increased sales</p> <p>Decreased costs</p> <p>Increased profits</p> <p>Increased farm asset acquisition</p> <p><u>Household Level</u> Increased household income</p> <p>Increased household asset acquisition</p> <p>Reduced poverty</p>

**Figure 2. Causal Model for Municipal Solid Waste Management Outsourcing**

Activities	Outputs	Outcomes	Impacts
<p>Develop outsourcing templates/model for municipal governments</p> <ul style="list-style-type: none"> <li>• Document existing outsourcing models</li> <li>• Create contractual models/templates for outsourcing MSWM to municipal governments, including identification of required resources</li> <li>• Continue to analyze and document experience from existing SWM outsourcing models in order to apply lessons learned to the GMED model</li> <li>• Review and make necessary adjustments in model documents to reflect lessons learned during actual operations of SWM outsourcing programs</li> </ul>	<p>Contractual model/toolkit</p>	<p>Assisted municipalities outsource SWM to MSEs and NGOs</p> <ul style="list-style-type: none"> <li>• At least 15 GMED-assisted municipalities in at least three states are outsourcing some portion of their solid waste management activities to MSEs</li> </ul> <p>Non-assisted municipalities contact GMED for assistance in outsourcing SWM</p>	<p><u>Subsector Level</u> More effective solid waste management</p> <p><u>Firm Level</u> Increased revenues</p> <p>Increased profits</p> <p>Increased formal sector employment<sup>10</sup></p> <ul style="list-style-type: none"> <li>• At least 2,500-3,000 workers are employed in the formal sector through GMED-assisted outsourcing programs</li> <li>• Number of new MSE created</li> </ul> <p><u>Household Level</u> Improved work hours</p>
<p>Disseminate outsourcing templates/models and assist municipal governments to implement</p> <ul style="list-style-type: none"> <li>• Market MSWM models to municipalities and other stakeholders, including SWM workshops</li> <li>• Conduct post-workshop meetings with municipalities that indicate interest in GMED assistance in the establishment of SWM outsourcing programs</li> <li>• Assist municipalities develop and implement SWM outsourcing implementation plans, including budget and payment mechanisms</li> <li>• Liaise and cooperate with Ministry of Urban Development (MOUD), Ministry of Environment and Forest (MOEF), World Bank, FIRE-D and other institutional stakeholders</li> <li>• Conduct periodic surveys on acceptability of waste collection services by municipalities that establish solid waste management systems</li> </ul>	<p>Public information on MSWM contracting available (i.e. development of website and media releases of human interest and success stories)</p> <p>Number of MSE bidders documented</p> <p>Number of municipalities trained</p> <p>Provision of advisory services to municipalities</p> <p>Number of workshops conducted</p> <p>Number of surveys conducted</p>		<p>Improved hygienic and safety conditions</p> <p>Increased access to social benefits (e.g., medical insurance, minimum wage, social security)</p> <p>Increased respect and social dignity</p> <p>Increased income</p> <p>Improved work/income stability</p> <p>Increased household asset accumulation</p> <p>Reduced poverty</p> <p><u>Community Level</u> Cleaner cities</p> <p>Improved quality of life in urban areas</p>
<p>Build capacity of SWM-contracted MSEs and NGOs</p> <ul style="list-style-type: none"> <li>• Develop training materials</li> <li>• Conduct capacity building workshops for MSEs awarded solid waste management contracts</li> </ul>	<p>Number of MSEs assisted</p> <p>Number of times assistance was provided to SMEs</p>		

<sup>10</sup> Formal sector employment is defined as working for a commercial entity and receiving some degree of social benefits.

As seen in Figures 1-2, each of the two causal models begins with program activities, the first link in the causal chain, and ends with program impacts, the last link in the causal chain. In between activities and impacts are two intermediate causal links: outputs and outcomes. Note that in Figures 1-2, outputs are associated with specific activities, whereas outcomes and impacts are assumed to be the combined result of multiple project activities and outputs.

Program activities include the actual activities implemented by the program in addition to the inputs (or resources) used to implement those activities. Impacts are the intended end results that can be attributed to program activities. Outputs are the direct and tangible results of program activities. Examples of outputs include the number of trainings given, the number of people trained, the number of agreements signed, the number of business member organizations (BMOs) created, and the like. Such indicators can be easily quantified as well as aggregated.<sup>11</sup> Outcomes are observed changes among program clients, among other value chain actors, or in the enabling environment. Outcomes differ from impacts in that the former are means to achieve the latter. In the FFV sector, for example, increased productivity (outcome) is a means to achieve higher profits (impact).

## C. HYPOTHESES

The outcomes and impact columns in Figures 1-2 form the set of hypotheses to be tested in the impact assessment. If the program has its intended impact, the following results are expected in each of the three sectors.

### III.C.i. FFV SUBSECTOR HYPOTHESES

**Hypothesis 1:** Program activities will lead to increased and sustainable sector competitiveness in national retail and wholesale markets and in export markets. This means that the sector will be able to sell a growing volume of produce of improved quality to higher-end wholesale, retail, and export buyers at higher prices that cover the cost of production and that earn a profit for smallholders.<sup>12</sup>

**Hypothesis 2:** Smallholder FFV farmers will benefit from project activity by reducing wastage and increasing their productivity, sales, profits, and investment in productive assets.

**Hypothesis 3:** Improved sector and firm performance will be preceded by increased adoption of sound planting, cultivation, and post harvest technologies and practices, increased access to formal finance at better terms, and increased/strengthened linkages between value chain actors.

**Hypothesis 4:** Smallholder FFV farmers will benefit from increased job creation, increase household incomes, increased accumulation of household assets, and reduced poverty.

### III.C.ii. MSWM SUBSECTOR HYPOTHESES

**Hypothesis 1:** Program activities will lead to increased outsourcing of municipal solid waste services to formal sector solid waste management firms, including an increased number of new entrants into the SWM subsector.

**Hypothesis 2:** Outsourcing of SWM services will lead to more effective solid waste management overall as reflected by, among other things, cleaner cities and an improved quality of life in urban areas.

**Hypothesis 3:** SWM firms will benefit from increased revenues and profits.

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<sup>11</sup> Unlike outcomes and impacts, outputs are typically objectively measurable, meaning they are capable of being independently observed, measured, and verified. For this reason, they are commonly used as indicators in program monitoring systems.

<sup>12</sup> Unfortunately, it is not possible to assess the sustainability of sector-level impacts arising from the obvious fact that sustainability, if it is achieved, would have to be observed over a timeframe much longer than the life either of the impact assessment or of the project itself.

**Hypothesis 4:** SWM firms will increase employment of solid waste workers and will facilitate the transition from informal to formal sector solid waste services among solid waste workers.

**Hypothesis 5:** Solid waste workers will benefit from improved work hours, improved work stability, improved hygienic and safety conditions, increased access to social benefits, increased social status, increased asset accumulation, increased income, and reduced poverty.

# IV. FRAMEWORK OF ANALYSIS

## **A. FRAMEWORK OF ANALYSIS IN FFV AND MSWM SECTORS**

The impact assessment of the FFV and MSWM subsectors will assess outcomes and impacts at three different levels of analysis: the subsector, MSEs, and smallholder farmer/solid waste worker households. These levels of analysis are shown in Figures 3-4, along with the variables measured and the sources of information used to obtain information on each variable.

Impacts and outcomes at the MSE and household levels can be quantified and thus will be measured primarily through the longitudinal survey. In contrast, impact and outcomes at the subsector level tend to be more qualitative and discoverable through the informed perception of key informants. Consequently, they will be measured primarily with qualitative research (interviews and focus group discussions).

**Figure 3. Outcomes, Impacts, Indicators and Data Sources: Fresh Fruits and Vegetables**

Level of Analysis	Outcome/Impact	Indicator of Change	Source of Information
<b>Subsector</b>	Increased number of clients linked to higher value markets	Number of MSEs selling to partners and other institutional buyers	Secondary data Survey
	Increased number of clients receiving higher prices for crops	Average sales price per type and unit of produce Producer prices as percentage of Mandi price	Secondary data Interviews Survey FGDs
	Reduced waste in the supply chain	Number and type of new techniques and practices adopted Estimates of wastage	Survey FGDs
	Adoption of new farming techniques and practices by clients	Number and type of new techniques and practices adopted	Interviews Survey FGDs
	Improved client productivity	Crop yields	Survey
	Improved produce quality	Types of farming techniques and practices adopted	Interviews Survey FGDs
	Increased value of fruit and vegetables sales from clients to partners	Value of FFV purchases from project clients	Secondary data Interviews
	Increased partner sales through wholesale outlets	Cultivation, harvest, and sales of selected crops	Secondary data Interviews
	Increased partner sales through retail outlets	Wholesale sales	Secondary data Interviews
	Increased subsector competitiveness	Retail sales	Secondary data Interviews
	Increased number of clients selling FFV to partners	Quality of produce (standard vs. premium)	Secondary data Interviews
	Strengthened relationship between project partner and project clients	Number of clients selling to partner	Secondary data Interviews
	Improved producer price for MSEs	Percentage of total client sales to partner	Interviews Survey
	Increased access to commercial bank or other formal sources of credit	Producer price as % of <i>mandi</i> price	Secondary data Interviews
	Fresh produce value chains created	Number of clients with formal loans Value of formal loans received	Survey FGDs
<b>MSEs</b>	Increased job creation	Number of jobs created Types of jobs created	Survey FGDs
	Increased sales	Value of total sales	Survey
	Decreased costs	Operational costs Transaction costs	Survey FGDs
	Increased profits	Sales minus cash costs	Survey
	Increased farm asset ownership or use	Assets owned or with access to	Survey FGDs
<b>MSE Households</b>	Increased household income	Annual income from produce sales Household expenditure per capita	Survey
	Increased household asset acquisition	Stocks of selected household assets	Survey
	Reduced poverty	India poverty scorecard	Survey

**Figure 4. Outcomes, Impacts, Indicators and Data Sources: Municipal Solid Waste Management**

Level of Analysis	Outcome/Impact	Indicator of Change	Source of Information
<b>Subsector</b>	Assisted municipalities outsourcing SWM to MSEs and NGOs	Number of municipalities outsourcing SWM	Project records Interviews Secondary data
	Non-assisted municipalities contacting GMED for facilitation/assistance	Number of municipalities contacting GMED	Project records Interviews
	More effective solid waste management	Subjective perceptions	Interviews FGDs
<b>MSEs</b>	Increased revenues	Firm revenues	Financial statement Interviews
	Increased profits	Firm profits	Financial statement Interviews
	Increased formal sector employment	Number of SWM jobs	Survey Interviews
<b>MSE Households</b>	Improved work hours	Number of days/hours worked during the past year	Survey FGDs
	Improved hygienic and other working conditions	Workplace safety policies, implementation, and enforcement	Survey FGDs
	Increased access to social benefits	Social benefits received Quality of social benefits received	Survey FGDs
	Increased respect and social dignity	Subjective perceptions	Survey FGDs
	Increased income	Annual income from SWM salary Household expenditure per capita	Survey
	Increased work stability	Frequency and duration of joblessness Number of work stoppages and starts Variability of income	Survey FGDs
	Increased household assets	Stocks of selected household assets	Survey
	Reduced poverty	India poverty scorecard	Survey
<b>Community</b>	Cleaner cities	Subjective perceptions Statistics	Interviews Secondary data
	Increased quality of life in urban areas	Subjective perceptions	Interviews FGDs

# V. RESEARCH DESIGN

The GMED impact assessment is a mixed-method (quantitative and qualitative), quasi-experimental,<sup>13</sup> panel study that examines the same group of program participants (treatment group) and non-participants (control group) over a two-year period. It consists of two rounds of research: a baseline and a follow-up. The baseline research took place during November 2006-March 2007, and the follow-up research is scheduled to begin around November 2008.

The purpose of the baseline research is to establish the “original” conditions in the treatment and control groups in the two subsectors studied as well as at the subsector level. As such, the baseline focuses less on analysis and more on description of the two groups and sector conditions at the initiation of the assessment. The purpose of the follow-up is to determine whether and how conditions have changed among both groups and in the relevant sectors. In contrast to the baseline, the follow-up will focus more on analysis of change within and across treatment and control groups and less on description. The follow-up analysis will use a “difference-in-difference” approach meaning that changes in the values of target variables for program participants between the two surveys will be compared to similar changes for control group members to see whether impact can be inferred.

With three exceptions, smallholder farmers and solid waste workers living in treatment and control group areas speak Hindi. The exceptions are Hyderabad, where the farmers speak Dleg and Maharashtra, where they speak Marathi. The survey and qualitative research were, therefore, conducted in Hindi in all research sites and translated into English for reporting purposes, with the above exceptions where research was conducted in the relevant languages and translated into Hindi during field research and then into English for reporting purposes.

## A. QUANTITATIVE RESEARCH

The quantitative portion of the GMED impact assessment consists of a household-level survey of program participants and non-participants. The treatment group of program participants was selected randomly from lists of participants provided by GMED and its implementing partners. The control group of non-participants was selected randomly from separate districts selected using the following selection criteria:

1. They share similar characteristics as treatment group members.
2. They are engaged in the same activities as GMED clients.<sup>14</sup>
  - a. They are informal SWM workers in the MSWM subsector.
  - b. They cultivate the same types of crops as client farmers in the FFV and organic produce subsectors.
3. They live and work in similar geographical zones as treatment group members.
  - a. They come from municipalities of similar size, climate, infrastructure, etc. as client in the MSWM subsector.
  - b. They come from locations of similar climate, soil type, growing season, etc. as client farmers in the FFV and organic produce subsectors.
4. They are not working with GMED.
5. They are geographically separated from GMED treatment group sites.
6. They will not participate in GMED during the period of the study.

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<sup>13</sup> In contrast to experimental methods, quasi-experimental methods do not randomly assign persons to treatment or control groups but compare groups that already exist. Treatment group members are selected via random sampling of known program clients, while control group members are selected via random sampling of known non-clients.

<sup>14</sup> In the FFV subsector, ITC used specific screening criteria to select participants into the program. The same screening criteria were used to select farmers into the control group.

7. They are not participating in a program similar to GMED, meaning that they are not receiving extension services, production inputs, or benefits from another donor project or private sector firm.

The purpose of conditions 1-3 was to minimize selection bias among control group members. It is necessary that control group members are as similar as possible to treatment group members, or the survey runs the risk of systematic underestimation or overestimation of actual program impacts, depending on the source of the selection bias.

The purpose of conditions 4-7 was to minimize the risk of control group contamination. If knowledge, practice, and other benefits from participating in GMED filter to control group sites, it will taint the control group resulting in systematic underestimation of program impacts. Likewise, if the control group receives benefits from another program similar to GMED, the study, in effect, becomes one of the comparative effectiveness of GMED relative to the other program. This too will result in systematic bias of program impacts. Finally, if control group participants become clients of GMED during the study, there can be no counterfactual. Without a counterfactual, there can be no attribution of impact.

The follow-up survey two years hence will revisit as many of the respondents from the baseline round as possible. Accordingly, information was collected in the baseline that will facilitate finding and identifying respondents for the repeat interviews. Anticipating panel attrition (survey respondents die, move away, change their line of business, or decline to participate), the baseline survey over-sampled respondents in each sector so as to assure a sufficient number of respondents in the follow-up survey. So as obtain results at a meaningful level of significance and allow for reasonable panel attrition, it was estimated that the target sample size should include approximately 800 in the FFV subsector and 500 in the MSWM subsector. (Copies of the baseline surveys for the FFV and MSWM subsectors can be found in Annex 1.)

The specific sampling methodologies used to select the treatment and control groups in the FFV and MSWM subsectors are described below.

#### **V.A.i. SAMPLING METHODOLOGY FOR FRESH FRUITS AND VEGETABLES**

The total sample size in the FFV sector is 792 divided into 537 treatment group members and 255 control group members (Table 4). The treatment and control groups were drawn from the states of Andhra Pradesh, Maharashtra, and Punjab and from one or more villages within each state. Treatment and control groups were selected from the same regions within the three states but, for the most part, from distinct villages of sufficient distance to minimize the risk of contamination bias.

The control sites were selected from areas in which GMED had no intention to expand during the study period and where there were currently no similar projects operating. There can be no guarantee, however, similar project will not begin operations at control sites during the study period. The follow-up research will attempt to ascertain whether this has occurred and, if it does, will make appropriate adjustments to the analysis and conclusions.

Once the treatment and control states and regions were selected, the next step was to select sample villages and farmers. In doing so, relatively greater weight was given to smaller regions. Within the selected regions, the research team identified villages with at least 25 client or qualifying non-client households and from this list randomly selected the sample villages. Finally, the research team selected sample households from the sample villages using proportionate random sampling by classifying households according to the share of different land class categories households and then selecting households at random within each land class category.

Table 4. GMED Impact Survey Sampling Frame

State	Village	Treatment Group	Control Group	Total
<b>Fresh Fruits and Vegetables</b>				
<b>Andhra Pradesh</b>		<b>74</b>	<b>33</b>	<b>107</b>
	<b>Medak</b>	74	33	107
<b>Maharashtra</b>		<b>404</b>	<b>188</b>	<b>592</b>
	<b>Ahmad Nagar</b>	8	61	69
	<b>Kolapur</b>	282	3	285
	<b>Pune</b>	90	5	95
	<b>Sangli</b>	24	119	143
<b>Punjab</b>		<b>59</b>	<b>34</b>	<b>93</b>
	<b>Sang Rur</b>	59	34	93
<b>Total</b>		<b>537</b>	<b>255</b>	<b>792</b>
<b>Municipal Solid Waste Management</b>				
<b>Maharashtra</b>		<b>184</b>	<b>103</b>	<b>287</b>
	<b>Aurangabad</b>	117	5	122
	<b>Jalna</b>	0	51	51
	<b>Parbhani</b>	4	28	32
	<b>Latur</b>	63	19	82
<b>Rajasthan</b>		<b>67</b>	<b>70</b>	<b>137</b>
	<b>Churu</b>	10	61	71
	<b>Jhunjhunu</b>	66	0	66
<b>Total</b>		<b>251</b>	<b>173</b>	<b>424</b>

The treatment group of FFV farmers was drawn exclusively from FFV farmers working with ITC in collaboration with GMED. At the time of the baseline research, ITC was the only major large-scale fruit and vegetable wholesaler/retailer working with GMED. The control group was drawn from the population of small-scale FFV farmers who lived in the control villages and who possessed the characteristics satisfying the site and farmer selection criteria used by ITC (see Box 1).

### **BOX 1. ITC FARMER SELECTION REQUIREMENTS AND PREFERENCES**

ITC used a short questionnaire to administer a set of selection criteria to identify farmers possessing a set of characteristics demonstrating the appropriate attitudes and resources deemed necessary for program success. The selection criteria are divided into “selection requirements” and “selection preferences.”

#### Selection Requirements

- Farmer is aged less than 30 years in Punjab. No age requirements in Maharashtra and Andhra Pradesh.
- Farmer owns minimum of 2 acres and a maximum of 10 acres.
- Water is free from bacteria as determined by soil and water tests.
- Farmer is highly motivated to improve his farming practices and returns.
- Farmer is not actively involved in politics or does not harbor political ambitions.
- Farmer is not indebted to money lenders.

#### Selection Preferences

- Farmer owns land.
- Farmer is mechanized, as defined by ownership of, access to, or willingness to purchase of one or more of tube well, tractor, cultivator, leveler, or spray pumps.
- Farmer has invested in land or productivity improvements.
- Farmer has means of transportation, including one or more of tractor, bullock cart, push cart, or other transportation source.

### **V.A.ii. SAMPLING METHODOLOGY FOR MUNICIPAL SOLID WASTE MANAGEMENT**

The total sample size in the MSWM subsector is 424 divided into 251 treatment group members and 173 control group members. The treatment group in the MSWM subsector consists of solid waste workers employed by SWM firms contracting with municipalities for SWM services. The treatment group for the MSWM sector is spread over two states: Maharashtra and Rajasthan covering three municipalities each state. One-half of the solid waste SMEs (subcontractors) spread over these municipalities were randomly selected with due consideration to the concentration of the SMEs in each state. About 25 workers from each sample SME were then randomly selected to participate in the survey.

The MSWM control group was drawn from the population of informal SW workers in the control municipalities. To select the control group, one municipality having the similar size of population as the treatment sites but falling outside the GMED program were randomly selected within each state where GMED had MSWM activities. The research team then randomly selected two wards from the selected municipalities. From each ward selected, the research team next selected a random sample of 50 door-to-door solid waste workers. Due to a lack of information on the total number and location of informal solid waste workers in a ward or municipality, the survey team relied on the assistance of resident welfare associations, public representatives, etc., to locate them.

## **B. QUALITATIVE RESEARCH**

The impact survey was complemented by qualitative research to improve understanding the observed outcomes and impacts and the causal mechanism underlying them. In the FFV subsector, the qualitative research focused on incentives, constraints, opportunities, and risks for small-scale farmers associated with upgrading and accessing new markets. It also looked at incentives and risks for program partners and value chain members and the extent to which

GMED is helping them develop and/or improve these activities. It considered the nature of cooperation and coordination among actors within the value chain as it relates to producer participation and competitiveness.

In the MSWM subsector the qualitative research focused on the constraints and incentives for contracting out waste management services from the perspective of municipal governments and SWM firms in addition to perceived costs and benefits of the process and suggestions for scaling up the contracting model. It further explored how contracting solid waste service provision with municipal governments has (1) affected the operations of SWM firms in areas such as revenues, profits, investment, employment, training, and salaries and (2) the differences between the formal and informal SWM sector in terms of social benefits, work conditions, work and stability, social status, and household well-being.

In the FFV subsector, the research team conducted three focus group discussions (FGDs) with ITC FFV farmer groups in the states of Maharashtra and Andhra Pradesh in addition to three personal interviews with an extension agent, and ITC representative, and a lead farmer, all in Maharashtra (Table 5). The FGD participants in the village of Nandani in Maharashtra were members of the Nandani Cooperative Society.

**Table 5. Qualitative Research Conducted in FFV Subsector**

Type of Group	Research Instrument	Village	State
ITC FFV Farmers	FGD	Nandani	Maharashtra
ITC FFV Farmers	FGD	Kalwadi	Maharashtra
ITC FFV Farmers	FGD	Annasagar	Andhra Pradesh
Extension Agent	Personal Interview	Chas Kalwadi Narodi Absari	Maharashtra
ITC Representative	Personal Interview	Nandani	Maharashtra
Lead Farmer	Personal Interview	Nandani	Maharashtra

In the MSWM subsector, the research team conducted two FGDs with formal solid waste workers employed by firms subcontracted under the program for solid waste services in Maharashtra and Rajasthan; one FGD with informal solid waste workers in Rajasthan; personal interviews with a Municipal Commissioner and a representative of a SWM firm in Jhunjhunu, Rajasthan; and personal interviews with a sanitary inspector and a representative of a SWM firm in Aurangabad, Maharashtra (Table 6).

**Table 6. Qualitative Research Conducted in FFV Subsector**

Type of Group	Research Instrument	Village	State
Formal SW Workers	FGD	Aurangabad	Maharashtra
Formal SW Workers	FGD	Jhunjhunu	Rajasthan
Informal SW Workers	FGD	Churu	Rajasthan
Municipal Commissioner	Personal Interview	Jhunjhunu	Rajasthan
Sanitary Inspector	Personal Interview	Aurangabad	Maharashtra
SWM Firm	Personal Interview	Aurangabad	Maharashtra
SWM Firm	Personal Interview	Jhunjhunu	Rajasthan

Copies of the discussion and interview guides used by the research team can be found in Annex 2.

# VI. BASELINE RESEARCH FINDINGS

## A. FRESH FRUITS AND VEGETABLES

The validity of the treatment and control group comparisons depends in large part on selecting participants in each group sharing similar observable demographic and other characteristics. The more similar the observable characteristics the greater confidence we have comparing outcomes and impacts between the two groups. (It is also important to control for unobservable characteristics to the extent possible. In the FFV sector this is done by using the same farmer selection criteria used by ITC to select control group participants, as described above.)

In addition to providing clues as to the similarity (and comparability) of the treatment and control groups, certain demographic indicators (e.g., those related to quality of life, housing, access to services, expenditures, household assets, and poverty status) are also important impact indicators related to the household well-being. To the extent the treatment group’s quality of life changes favorably over time relative to the control group, the greater the evidence of program impact.

The baseline study compares treatment and control group members in both FFV and MSWM subsectors on six demographic characteristics: demographic profile, household expenditures, housing conditions, access to services, asset ownership, and poverty status. Observed differences between the two groups are tested in each case for statistical significance. Group differences that are statistically significant at a .10 level or better are indicated with an asterisk (\*).<sup>15</sup>

### VI.A.i. DEMOGRAPHIC CHARACTERISTICS

#### DEMOGRAPHIC PROFILE OF FFV FARMERS

FFV farmers in the treatment and control groups are nearly all male, averaging 47 years of age, from a household of 6.2 persons, belong to an “other” social group (not a member of a scheduled tribe or caste), married, literate, and depend primarily on farming as the major source of household income (Table 7). A majority have a middle-school education or above and from one-fifth to one-fourth have a higher secondary education or above. None of the group differences found in Table 7 is statistically significant.

**Table 7. Demographic Profile of FFV Farmers**

Demographic Characteristic	Treatment N=537	Control N=255	Total N=792
Male	98.3	98.5	98.40
Age	46.5	48.2	47.08
Household size*	6.1	6.5	6.2
Social Group			
Scheduled tribe	14.5	14.5	14.5
Scheduled caste	2.8	4.7	3.4
Other backward caste	2.6	2.4	2.5
Others	80.1	78.4	79.5

<sup>15</sup> This convention for reporting statistically significant group differences will be used throughout this report.

<b>Marital Status</b>			
Unmarried	5.7	4.2	5.2
Married	91.9	93.50	92.4
Widow/widower	2.4	2.3	2.4
Divorced/separated	0.0	0.0	0.0
<b>Education</b>			
Illiterate	16.5	23.8	18.90
Below primary or informal	4.3	3.1	3.9
Primary	14.8	16.2	15.2
Middle	15.7	19.6	17.0
Matriculate/high school/secondary	20.9	15.8	19.2
Higher secondary/pre-university/intermediate/graduate	15.0	10.8	13.6
Technical/professional diploma or certificate	12.8	10.7	12.2
<b>Major Source of Household Income</b>			
Agriculture	92.7	92.1	92.5
Financing, insurance, real estate and business services	1.7	1.2	1.6
Community, social and personal services	1.9	0.0	1.3
Wholesale, retail trade, restaurants, and hotels	0.8	1.60	1.0
Other	2.9	5.1	3.6

### HOUSEHOLD EXPENDITURES

Treatment FFV farmers spend more per month overall and per capita than control FFV farmers (Table 8). The differences, however, are not statistically significant.

**Table 8. Household Expenditures (Rs. per Month)**

<b>Expenditures</b>	<b>Treatment</b>	<b>Control</b>	<b>Total</b>
Monthly total expenditures	9,162	6,970	8,455
Monthly per capita expenditures	2,057	1,279	1,809

### HOUSING CONDITIONS

FFV farmers in the two groups share similar housing conditions for all indicators of housing quality (Table 9). Overall, the houses occupied by FFV farmers in both groups have 3.5 rooms, are 0.5 kilometers from a source of drinking water, are electrified with a separate kitchen and bathroom, and are semi-permanent or permanent. Treatment FFV farmers are moderately more likely to have electricity at 95-88 percent, and this difference is statistically significant. None of the remaining group differences found in Table 9 is statistically significant.

**Table 9. Housing Conditions**

Housing Condition	Treatment	Control	Total
Number of rooms	3.5	3.5	3.5
Kilometers to source of drinking water	0.5	0.5	0.5
Separate kitchen	70.7	71.7	71.0
Separate bathroom	77.1	72.9	75.8
House electrified*	95.0	88.4	92.9
Type of House			
Temporary (Kutchra)	15.4	12.7	14.6
Semi-permanent (Semi-Pucca)	45.5	46.6	45.9
Permanent (Pucca)	39.0	40.6	39.6

**ACCESS TO BASIC SERVICES**

A majority of FFV farmers in both groups rely predominantly on firewood as their main source of cooking fuel; another one-third and one-fourth of treatment and control FFV farmers use liquid petroleum gas as their main source of cooking fuel (Table 10).<sup>16</sup> Control FFV farmers are more likely, however, to use firewood as the main source of cooking fuel, whereas treatment FFV farmers are more likely to use liquid petroleum gas.

A majority in both groups has access to a flush latrine within their house, while another one-quarter in both groups uses an “other” type of toilet. Approximately one-half of FFV farmers in each group use a tap within the house as the primary source of drinking water. Another one-fifth to one-fourth gets its drinking water from a pump or tube well on their property.

The difference between the groups with regards to cooking fuel is statistically significant. None of the remaining group differences shown in Table 10 is statistically significant.

**Table 10. Access to Basic Services**

Basic Service	Treatment	Control	Total
Main Source of Cooking Fuel*			
Firewood	59.2	65.9	61.2
Kerosene	0.6	1.8	0.9
Electricity, coal	2.1	3.2	2.4
Liquid petroleum gas	34.0	27.3	32.0
Gobar gas	4.0	1.4	3.2
Other	0.0	0.5	0.1
Toilet			
Field	3.4	3.6	3.5
Flush latrine within home	59.6	61.4	60.2
Covered dry latrine (kutchra)	6.1	4.4	5.5
Community latrine	5.0	4.0	4.6
Other	25.9	26.7	26.2
Source of Drinking Water			
Public tap	5.3	4.8	5.2
Public hand pump/tube well	3.8	2.8	3.5

<sup>16</sup> Liquid petroleum gas (LPG) is a mixture of propane and butane.

Tap in dwelling	53.7	57.8	55.0
Own hand pump/tube well	24.4	20.3	23.1
Motorized hand pump	1.0	0.4	0.8
Pond, river, stream	5.0	2.4	4.1
Public unprotected dug well	0.8	0.4	0.6
Public protected dug well	1.5	0.8	1.3
Unprotected dug well	0.8	2.4	1.3
Other	0.8	0.0	0.5

## HOUSEHOLD ASSET OWNERSHIP

Asset ownership patterns among the two groups are broadly similar, although the percentage of group members owning a particular asset is consistently higher among treatment FFV farmers (Table 11).

Among those who own a particular asset, the average number owned and the average asset value are again similar between the two groups. Differences in terms of the number of assets owned tend to be small and none are statistically significant. Differences in terms of the average value of assets owned tend to be small to moderate. In three cases—tables, motorcycle/scooter, and cooking gas—the average value of the asset owned by control FFV farmers is significantly larger than the average value of the asset owned among treatment FFV farmers.

**Table 11. Household Asset Ownership**

Household Asset	Percentage Households Owning Asset			Average Number Owned			Average Value		
	Treatment	Control	Total	Treatment	Control	Total	Treatment	Control	Total
Own house	99.6	98.4	99.2	1.0	1.1	1.1	199,975*	182,699	194,335
Bed	60.1	48.2	56.3	1.4	1.5	1.4	4,211	4,754	4,361
Cot	72.1	78.4	74.1	1.9	1.8	1.9	1,514	1,448	1,492
Table	50.1	43.1	47.9	1.4	1.3	1.3	967	1,259*	1,052
Chair	72.1	60.0	68.2	3.0	3.4	3.1	1,061	1,117	1,077
Iron cupboard	53.6	40.0	49.2	1.2	1.3	1.3	4,243	4,297	4,257
Radio	27.0	16.9	23.7	1.1	1.0	1.1	458	481	464
Deck	7.6	5.1	6.8	1.1	1.0	1.1	1,615	1,976	1,702
Music system	14.7	9.4	13.0	1.0	1.0	1.0	2,482	3,325	2,678
Cycle	70.2	71.4	70.6	1.2	1.2	1.2	1,014	1,003	1,010
TV	86.2	71.4	81.4	1.0	1.1	1.0	5,173	5,440	5,248
Motorcycle/scooter	60.5	43.5	55.1	1.1	1.1	1.1	21,888	26,797*	23,138
Car/Jeep	4.1	4.3	4.2	1.1	1.1	1.1	112,227	103,590	109,348
Air Cooler	2.0	3.9	2.7	1.4	1.5	1.4	2,727	1,650	2,214
Fan	78.4	67.5	74.9	1.8	1.9	1.9	1,262	1,169	1,235
Cooking gas	68.3	51.4	62.9	1.0	1.1	1.0	2,251	2,651*	2,356
Electric stove	1.3	1.6	1.4	1.0	1.0	1.0	203	225	211
Kerosene stove	25.1	18.4	23.0	1.0	1.0	1.0	226	211	222
Mobile phone	36.5	30.2	34.5	1.1	1.2	1.2	3,760	3,972	3,820
Phone(land line)	39.3	36.9	38.5	1.0	1.0	1.0	1,107	1,001	1,074
Sewing machine	22.3	21.6	22.1	1.0	1.0	1.0	1,628	1,757	1,668

## POVERTY STATUS

The FFV farmers and waste worker surveys asked respondents a battery of 15 questions comprising a poverty scorecard developed by the Grameen Foundation to assess the *poverty likelihood* of individuals and groups. The indicators in the scorecard come from an analysis of 41,013 households in Schedule 1.0 of the 59th Round (2003) of India’s Social-Economic Survey. Indicators in the scorecard were selected to be:

- Inexpensive to collect, easy to answer quickly, and simple to verify
- Strongly correlated with poverty
- Liable to change over time as poverty status changes

The poverty lines used for the scorecard were derived from the India Social-Economic Survey using the international \$1/day in daily per capita expenditures (DPCEs) adjusted for purchasing power parities and state-wise and rural/urban cost-of-living using Deaton (2003).<sup>17</sup> Each question in the scorecard has two or more possible responses. Each response in turn is assigned a point value with lower points corresponding to greater poverty likelihood. The points for each question are summed up to produce a total poverty score.

The respondent’s total poverty score corresponds to a poverty likelihood defined as the probability of being very poor. In a group, the share of clients who are very poor is the average poverty likelihood. The scorecard allows respondents to be grouped into one of two poverty categories:

1. Very poor: Households living below the \$1 DPCE poverty line.
2. Not-very-poor: Households living above the \$1 DPCE poverty line.

Table 12 shows the poverty scorecard used in the survey and Table 13 shows the average poverty score for treatment and control waste workers for each of the 15 indicators and overall.

**Table 12. Poverty Scorecard**

Sl. No.	Indicator	Indicator Value (Points Assigned)					Points
1	How many children aged 0 to 17 are in the household?	>4 (0)	3 (8)	2 (13)	1 (19)	0 (27)	
2	How many electric fans does the household own?		0 (0)	1 (1)	2 (2)	>3 (4)	
3	What is the household’s primary energy source for cooking?		Firewood, cow dung, etc. (0)	Electricity, coke or coal (5)	Kerosene, gobar gas (6)	Liquid propane gas (7)	
4	In the past 12 months, did anyone in the household buy leather boots or shoes?				No (0)	Yes (7)	
5	In the past 30 days, did anyone in the household spend anything on telephone charges?				No (0)	Yes (7)	

<sup>17</sup> Deaton, Angus, (2003), “Prices and Poverty in India, 1987–2000”, *Economic and Political Weekly*. 362–368. ([www.wps.princeton.edu/rpds/downloads/deaton\\_prices\\_poverty\\_india.pdf](http://www.wps.princeton.edu/rpds/downloads/deaton_prices_poverty_india.pdf))

6	What is the principal occupation of the household?	Agricultural labor (0)	Non-agricultural labor (4)	Cultivator, farmer, fisher, hunter, logger (6)	Sales and service worker and transport equipment worker (7)	Professional, tech. clerical, admin, managerial, executive and teacher (7)	
7	In the past 30 days, did anyone in the household buy a toothbrush, toothpaste, etc.?				No (0)	Yes (5)	
8	In the past 12 months, did the household buy any bed sheets or bed covers?				No (0)	Yes (4)	
9	In the past 30 days, did the household pay for the services of a doctor or surgeon?				No (0)	Yes (4)	
10	How many children ages 6 to 17 attend school?			Not all children attend school (0)	There are no children (2)	All children attend school (4)	
11	In the past 30 days, did anyone in the household consume any milk or ghee?				No (0)	Yes (6)	
12	In the past 30 days, did anyone in the household consume an apple?				No (0)	Yes (6)	
13	How many pressure cookers or pressure pans does the household own?			Zero	1 (2)	>2 (5)	
14	In the past 30 days, did the household buy any bread from a bakery?				No (0)	Yes (3)	
15	Does the household own a television?				No (0)	Yes (3)	
							<b>Total Points</b>

**Table 13. Poverty Scores and Poverty Likelihood**

Poverty Indicator	Average Poverty Score		
	Treatment	Control	Total
How many children aged 0 to 17 are in the household?	14.1	11.5	13.3
How many electric fans does the household own?	1.57	1.4	1.5
What is the household's primary energy source for cooking?	5.5	4.2	5.1
In the past 12 months, did anyone in the household buy leather boots or shoes?	4.3	3.5	4.0
In the past 30 days, did anyone in the household spend anything on telephone charges?	6.2	5.8	6.1
What is the principle occupation of the household?	5.7	5.4	5.6
In the past 30 days, did anyone in the household buy a toothbrush, toothpaste, etc.?	4.5	4.2	4.4
In the past 12 months, did the household buy any bed sheets or bed covers?	2.9	2.7	2.9
In the past 30 days, did the household pay for the services of a doctor or surgeon?	2.9	2.5	2.8
How many children ages 6 to 17 attend school?	2.8	3.2	2.9
In the past 30 days, did anyone in the household consume any milk or ghee?	3.3	2.1	2.9
In the past 30 days, did anyone in the household consume an apple?	4.0	3.2	3.7
How many pressure cookers or pressure pans does the household own?	1.9	1.7	1.8
In the past 30 days, did the household buy any bread from a bakery?	2.6	2.5	2.6
Does the household own a television?	2.8	2.5	2.7
Average poverty score*	55.2	48.8	53.2

As seen in Table 13, control FFV farmers score consistently lower than treatment FFV farmers on the various poverty indicators. Indeed, the overall poverty score for treatment FFV farmers is significantly greater than for control FFV farmers at 55.2 to 48.8 indicating that latter are, on average, poorer than the former. Overall, 10 percent of treatment FFV farmers fall below the \$1 DPCE poverty threshold compared to around 21.1 percent of FFV farmers (Table 14).

**Table 14. Poverty Status**

Poverty Status	Treatment	Control	Total
Percentage very poor	10.0	21.1	13.3
Percentage not-very-poor	90.0	78.9	86.7

#### SUMMARY OF FFV DEMOGRAPHIC CHARACTERISTICS

Overall, treatment and control FFV farmers share similar demographic and socio-economic profiles. The notable exception is poverty status: treatment households are significantly less poor on average than control households. In terms of demographic profile, housing quality, asset ownership, and access to basic services, however, the two groups are quite similar.

On balance, the level variation between the two groups appears within the range of normal variation one might reasonably have expected ahead of time of groups selected using quasi-experimental methods. In other words, the

difference in observable characteristics between the groups is not on balance of the magnitude that would raise significant concerns about their similarity for comparison purposes.

An exception is the significant difference in the poverty status of the two groups. It will be necessary to determine whether and how this difference affects any observed impacts in the follow-up research.

## VI.A.ii. FARMING CHARACTERISTICS

### LIVESTOCK OWNERSHIP

Livestock ownership patterns among the two groups are broadly similar (Table 16). Control FFV farmers are moderately more likely overall to own livestock, including bullocks, cows, and goats/sheep. Treatment FFV farmers in turn are more likely to own she buffalos and young cattle. Among those owning livestock, the average number owned tends to be slightly higher among control FFV farmers, while the average value per livestock owned shows no consistent patterns between the two groups. None of the group differences found in Table 16, however, is statistically significant.

**Table 16. Livestock Ownership**

Livestock	Percentage Households Owning Livestock			Average Number Owned			Average Value		
	Treatment	Control	Total	Treatment	Control	Total	Treatment	Control	Total
Cow (Desi)	11.7	17.6	13.6	1.4	1.5	1.4	12,906	9,426	11,456
Cow(Hybrid/Crossbred)	25.0	29.0	26.3	1.9	2.2	2.0	30,906	38,000	33,420
She Buffalo	63.3	57.6	61.5	2.0	2.0	2.0	30,370	28,294	29,743
Goat/Sheep	6.9	12.9	8.8	2.2	2.9	2.5	3,310	2,761	3,051
Young cattle	40.2	28.6	36.5	1.6	1.7	1.6	2,542	3,108	2,685
Bullock	26.1	32.2	28.0	1.7	1.8	1.7	16,574	18,235	17,187
He-Buffer	4.1	5.9	4.7	1.4	1.6	1.5	6,154	9,780	7,642
Draught Animal	0.7	1.2	0.9	1.5	2.3	1.9	3,875	3,833	3,857
Poultry	0.4	2.4	1.0	52.0	3.0	15.3	4,500	275	1,331
Pigs	0.2	0.0	0.1	1.0	0.0	1.0	400	0	400

### LAND POSSESSION

Control FFV farmers possess moderately more land than treatment FFV farmers, including land owned, land under cultivation, cultivable waste land, and land not under cultivation (Table 15). Treatment FFV farmers in turn possess marginally or moderately more leased in land and leased out land. The same trends hold when considering irrigated land only. With the exceptions of leased out land and total land possessed (both total land and irrigated land) and cultivable waste on irrigated land, the differences are statistically significant.

**Table 15. Land Owned and Possessed**

Nature of Land Tenure	Treatment	Control	Overall
<b>Land Owned and Possessed (Acres)</b>			
Total owned land*	4.1	5.3	4.5
Under cultivation*	3.7	4.8	4.0
Cultivable waste*	2.0	3.5	2.4

Not cultivated*	1.6	4.1	2.1
Leased in land*	4.6	2.3	4.3
Leased out land	2.8	2.7	2.8
Total land possessed	4.7	5.4	4.9
<b>Irrigated Land Owned and Possessed (Acres)</b>			
Total owned land^	3.74	4.77	4.07
Under cultivation*	3.63	4.78	3.98
Cultivable waste	1.55	1.50	1.54
Not cultivated*	1.32	5.25	2.03
Leased in land*	4.68	2.00	4.33
Leased out land	2.97	1.50	2.68
Total irrigated land possessed	4.38	4.72	4.49

## PRODUCTIVE ASSETS

Patterns in productive asset ownership are quite similar between the two groups of FFV farmers in terms of ownership, number owned, average number owned, average value of assets owned, number of assets hired, and assets used on an exchange basis (Tables 17-18). None of the group differences in Tables 17-18 is statistically significant.

**Table 17. Productive Assets Owned**

Productive Asset	Owned			Average Number Owned			Average Value		
	Treat-ment	Control	Total	Treat-ment	Control	Total	Treat-ment	Control	Total
Tractor	11.9	15.3	13.0	1.0	1.1	1.1	192,430	179,871	187,721
Trolley	10.6	14.9	12.0	1.1	1.2	1.2	28,694	32,868	30,329
Harrow	8.0	12.9	9.6	1.0	1.0	1.0	15,368	17,515	16,288
Tiller	8.8	13.7	10.4	1.0	1.0	1.0	13,150	12,497	12,874
Plank	12.5	12.9	12.6	1.3	1.1	1.2	3,286	3,648	3,402
Threshing machine	2.2	5.1	3.2	1.0	1.1	1.0	12,384	15,876	14,130
Combine harvester	1.5	0.0	1.0	1.0	0.0	1.0	19,222	13,253	17,300
Pumpset diesel	6.0	6.7	6.2	1.2	1.2	1.2	11,453	13,029	12,000
Pumpset electric	75.6	66.3	72.6	1.4	1.4	1.4	17,686	15,875	17,154
Bullock cart	24.6	24.7	24.6	1.0	1.0	1.0	7,739	8,428	7,961
Chaff-cutter manual	50.8	55.7	52.4	1.0	1.0	1.0	224	234	228
Chaff-cutter power	8.6	10.2	9.1	1.0	1.0	1.0	3,479	3,900	3,621
Spray pump	65.5	54.9	62.1	1.2	1.1	1.2	1,531	1,461	1,511
Storage bin	6.0	2.4	4.8	1.3	1.5	1.4	1,540	2,941	1,761
Honey bee box	0.9	0.8	0.9	6.6	1.0	5.0	4,060	3,500	3,900

**Table 18. Productive Assets Hired and Used on Exchange Basis**

Productive Asset	Hired			Used on an Exchange Basis		
	Treatment	Control	Total	Treatment	Control	Total
Tractor	82.7	81.6	82.3	0.4	0.4	0.4
Trolley	81.0	80.0	80.7	0.6	0.0	0.4
Electric pump set	15.8	22.7	18.1	1.3	1.2	1.3
Harrow	78.8	77.3	78.3	0.6	0.0	0.4
Tiller	77.7	76.5	77.3	0.0	0.0	0.0
Spray pump	21.4	23.9	22.2	7.3	1.6	5.4
Plank	65.5	61.2	64.1	1.5	0.8	1.3
Threshing machine	64.6	67.1	65.4	0.4	0.0	0.3
Manual chaff-cutter	10.2	4.7	8.5	2.8	0.8	2.1
Bullock cart	16.6	12.5	15.3	1.3	0.8	1.1
Combine harvester	32.4	27.5	30.8	0.6	0.0	0.4
Diesel pump set	15.6	13.3	14.9	0.2	0.0	0.1
Power chaff-cutter	11.4	7.8	10.2	0.6	0.0	0.4
Storage bin	10.8	1.2	7.7	0.7	0.4	0.6
Honey bee box	9.9	0.0	6.7	0.2	0.0	0.1

**TYPES OF CROPS GROWN**

Major cereals, sugarcane, and other are the most common crop cultivated by more than one-half of FFV farmers in each of the two groups (Table 19). After this, however, treatment FFV farmers are more likely than control FFV farmers to grow each of the crops listed in Table 19 with the exception of French/soya beans, chili, grapes, and other crops.

Crops grown by more than 10 percent of treatment FFV farmers include (in order of importance), major cereals, sugarcane, tomato, cauliflower, French/soya beans, brinjal, and onion. Crops grown by more than 10 percent of control FFV farmers include (in order of importance), French/soya beans, and onion.

There are three growing seasons among the small-scale FFV farmers during the year, and a crop cycle is generally around four months. Many small-scale FFV farmers have traditionally followed mixed farming practices growing, for example, sugar cane together with vegetables and cereals.

According to farmers participating in the FGDs, there has not been much change in cropping patterns in their community during the last five years. Due to price supports for sugar cane, farmers

**Table 19. Types of Crops Grown**

Crop	Treatment	Control	Total
Sugarcane	58.3	50.6	55.8
Tomato	44.1	8.6	32.7
Cauliflower	40.0	8.2	29.8
Cabbage	6.5	2.0	5.1
Capsicum	3.7	3.5	3.7
Brinjal	15.8	2.7	11.6
Potato	6.0	2.7	4.9
Onion	14.5	11.0	13.4
Cucumber	9.3	2.0	6.9
French/Soya Beans	16.8	22.4	18.6
Chili	3.2	5.9	4.0
Bitter Gourd	1.3	0.0	0.9
Lady Finger	3.9	0.4	2.8
Banana	4.8	2.4	4.0
Grapes	2.6	5.1	3.4
Major Cereals	59.4	76.9	65.0
Others	61.6	69.4	64.1

generally devote comparatively large areas to sugar cane. This is not true, however, in the case of marginal farmers who own very small plots (up to one acre). They are largely guided by the previous season's market prices in planning their crops the upcoming season. Vegetable cropping patterns among the small and marginal farmers thus include a significant herd-based component.

Cropping decisions are not based solely on the previous season's market prices, however. The duration of the harvesting season and the time for sowing the next crop also figure in the equation. A farmer has to clear his field for the next crop even if he is not getting a remunerative price for his existing crop.

There are some progressive farmers who are well educated and who approach crop planning in a more careful or systematic manner. These farmers are shifting from sugar cane (which produces one crop during a year) and other traditional, yet slower growing crops, to vegetables and fruits that have shorter growing cycles and that allow the farmers to produce three crop cycles from a given plot of land during the year. At present, these farmers are relatively few in number, but the number is growing.

### PRODUCTION AGGREGATED BY ALL CROPS PRODUCED

Treatment and control FFV farmers exhibit similar production patterns aggregated by all types of crops produced. Control FFV farmers sow and harvest a slightly larger area and produce more physical output in terms of main crop and by product and a produce a higher market value of by product. In contrast, treatment FFV farmers produce

slightly more high-yield variety (HYV) crops and crops from irrigated land and produce a higher market value of the main products. None of the group differences shown in Table 20, however, is statistically significant.

**Table 20. Production of Major Crops**

Aggregate Production	Treatment	Control	Total
Area Sown (acres)	6.6	7.3	6.8
Area Harvested (acres)	6.0	6.4	6.1
Irrigated Area (acres)	7.2	6.3	6.9
Area Under HYV crops (acres)	7.4	6.0	6.9
Physical Output: Main (quintals)	650.7	699.2	666.3
Physical Output: By Product (quintals)	32.9	53.4	39.5
Market Value of Product (Rs)	171,338	140,781	161,515
Market Value of By-Product (Rs.)	1,976	2,693	2,207

### RAINFALL AND CLIMATIC CONDITIONS

Treatment and control FFV farmers received approximately the same amount of rainfall during the Rabi (spring harvest), Kharif (autumn harvest), and Zaid (extra harvest) growing seasons (Table 21). According to the subjective assessments of sample farmers in both groups, the rainfall was normal during the Rabi and Zaid growing seasons and worse than normal during the Kharif growing season.

**Table 21. Subjective Assessment of Rainfall during Past Growing Seasons<sup>18</sup>**

Growing Season	Treatment	Control	Total
Rabi	2.0	2.0	2.0
Kharif	1.1	1.1	1.1
Zaid	1.9	1.9	1.9
Total	1.7	1.6	1.7

Farmers in the two groups are in agreement that the climatic conditions were normal during the Rabi and Zaid growing seasons but abnormal during the Kharif growing season (Table 19). None of the group differences shown in Tables 21-22 is statistically significant indicating that growing conditions were similar among the two groups over the past growing season.

**Table 22. Subjective Comparison of Climatic Conditions to Normal Climatic Conditions**

Growing Season	Treatment		Control	
	Normal	Abnormal	Normal	Abnormal
Rabi	85.8	14.1	88.3	11.6
Kharif	12.0	87.9	7.7	92.2
Zaid	87.1	12.8	87.9	12.0
Total	60.8	39.1	60.0	39.9

### INPUT COSTS

Despite devoting slightly smaller plots of land to FFV production, treatment FFV farmers consistently spent more in the previous year overall and on selected input costs than did control FFV farmers; the exceptions being the costs for hired machines; threshing; fuel, and interest on loans, taxes, and commissions (Table 23). The difference in overall input costs between the two groups is statistically significant, as are the differences for pesticides/insecticides, spray charges for hired labor and machines, vermin/organic compost, liquid fertilizers, preparation of compost pit and cow pat pit, marketing, storage, and other.

**Table 23. Input Costs (Rs.)**

Input	Treatment	Control	Total
Rent for leased-in land	2,292	1,283	1,968
Plowing	11,902	9,606	11,164
Seed	8,127	7,448	7,909
Irrigation cost	2,354	1,838	2,188
Fertilizer	21,732	19,786	21,107
Pesticides/insecticides*	8,239	5,224	7,269
Spray charges paid for hired labor*	1,788	885	1,497
Spray charges paid for hired machine*	132	50	106
Organic inputs	70	37	60
Herbicides/liquid pesticides	192	156	181
Vermin/organic compost*	7,720	5,729	7,080

<sup>18</sup> Table shows the mean value based on the following scale: 1=worse than normal, 2=normal; 3=better than normal.

Liquid fertilizers*	460	125	352
Preparation of compost pit and cow pat pit (CPP) *	324	99	251
Harvesting	0	0	0
Hired machine	1,030	1,437	1,161
Hired labor	8,090	6,799	7,675
Threshing (if hired)	553	689	597
Total fuel cost of tractor, thresher, pump set, etc including electricity charges	6,692	7,349	6,903
Maintenance cost of tractor, thresher, pump set and other agriculture implements	1,969	2,101	2,011
Transportation cost including labor charges	2,861	2,289	2,677
Marketing fee*	5,163	1,442	3,967
Storage*	463	791	568
Interest on loans, tax, commissions, etc.	5,193	6,174	5,508
Other*	2,821	1,235	2,311
<b>Total*</b>	<b>96,402</b>	<b>80,422</b>	<b>91,265</b>

According to farmers participating in the FGDs, the market for inputs is characterized by a lack of transparency, particularly regarding input quality. Farmers will often purchase their inputs from certain shops or suppliers with whom they have developed some level of mutual trust over the years. A growing number of agents from fertilizers and seeds companies visit farmers at the farm gate. While they sometimes offer purchase incentives, they do not guarantee their products, nor do they generally provide instruction or training.

Sometimes sales representatives of new input suppliers do educate farmers about the use of farm inputs, but this is done purely for the promotion purposes. What education and training the farmers do receive in the use of inputs is provided by extension service workers from the government, ITC, and local NGOs. (These organizations also provide extension services in the preparation of land, pest management, and post harvest management techniques.)

The lack of transparency, instruction and training in the use of farm inputs, and the practice of offering purchase incentives, results in, among other things, a hesitancy to purchase large quantitative of inputs, the purchase of inferior inputs, and an excessive or otherwise inappropriate application of certain inputs, such as fertilizers and pesticides.

Farmers also complained about the high cost of inputs. There is not a great deal of price competition among input suppliers. Generally, name brand (quality) inputs sell for the same price high across the different input suppliers. To finance purchases of inputs, therefore, the small scale FFV farmers in many cases must borrow. The cost of inputs, moreover, is not always recouped in the price paid for produce, particularly if the farmer sells to the local market. Since farmers borrow heavily to pay for inputs, the end result for some is greater indebtedness with no corresponding increase in farming income.

The Nandani Cooperative Society—formed by FFV farmers working with ITC in the village of Nandani, Maharashtra—manages these problems by selling inputs directly to its members. The cooperative has established a store that supplies all types of agro-inputs that it in turn sources from reputable manufacturers and suppliers, including many of the big input manufacturers, such as Indo American and ITC. The cooperative has become, in effect, a part of the marketing channels of the manufacturers.

In association with manufacturers and other agencies, the cooperative provides training, including “education trips,” on input usage to its member farmers. The Indian Farmers Fertilizers Cooperative (IFFCO), a large parastatal

cooperative in agriculture sector, also organizes learning programs and educational trips to agricultural universities and other progressive farms. Such educational trips, however, occur infrequently, and relatively few farmers participate.

## NET FARM INCOME

Overall, treatment group members earned more from FFV farming than control group members over the past year (Table 24). The difference, however, was not statistically significant.

**Table 24. Net Farm Income (Rs.)**

Income	Treatment	Control	Total
Net farm income	67,535	53,246	62,941

## WASTAGE

Treatment FFV farmers experienced significantly higher amounts and values of wastage than control FFV farmers overall due to the lack of storage, pests/rodents, and disease and rejection by buyers (Table 25). In contrast, control FFV farmers kept a significantly higher amount and value of product for seed and diverted a significantly higher value of produce to household consumption.

**Table 25. Wastage Details**

Source of Wastage	Treatment	Control	Total
<b>Amount (kgs)</b>			
Household consumption	748	807	767
Lack of storage, pest/rodents, diseases*	7,721	1,967	5871
Recycling of waste	3.3	1.1	2.6
Kept for seed*	65	157	95
Rejected by buyers*	5.9	0.0	4.1
Total waste quantity*	8,544	2,934	6,741
<b>Value (Rs)</b>			
Household consumption*	4,998	6,169	5375
Lack of storage, pest/rodents, diseases*	2,4336	1,5413	2,1468
Recycling of waste	45.1	8.5	33.3
Kept for seed*	604	1,478	885
Rejected by buyers*	24.9	0.0	16.9
Total waste value*	30,010	23,069	27,779

## SALES/MARKETING OF CROPS

Table 26 shows the average sales quantity and average sales price for treatment and control FFV farmers aggregated across all crops grown overall and broken down by types of buyers. Overall, the amounts sold, the prices paid, the total value sold, the stored quantity, and period of storage are broadly similar across the two groups.

Among treatment FFV farmers, the local market (*mandis*) is the most important buyer followed by cooperatives, wholesale buyers, private companies, and others. Among control FFV farmers, the local market is again the most important buyer followed by the wholesale market. Villagers are the third most important buyer for control FFV farmers followed in turn by cooperatives, private companies, merchants against debt/advance, others, and government agencies.

Although control farmers are less likely to sell their produce via cooperatives, they sell a significantly higher quantity on average. They likewise sell a significantly greater quantity than treatment FFV farmers to private companies and

other buyers. Treatment FFV farmers, on the other hand, sell on average a much higher quantity to government buyers and NGOs.

**Table 26. Sales/Marketing of Crops**

<b>Sales/Marketing Aggregated across All Crops</b>	<b>Treatment</b>	<b>N</b>	<b>Control</b>	<b>N</b>	<b>Total</b>	<b>N</b>
<b>Average Quantity Sold (quintals)</b>						
Wholesale market	107.3	326	123.3	104	111.2	430
Local market ( <i>mandis</i> )	48.6	478	59.2	160	51.3	638
Villagers (Directly)	16.5	138	13.1	95	15.1	233
Cooperative	396.3	324	1,003.2	62	493.8	386
Lead farmers	83.1	7	91.6	18	89.3	25
Government agencies	189.6	55	86.8	32	151.9	87
Merchant against debt/advance	105.8	88	127.8	52	114.0	140
Pre-arranged contract	31.9	35	48.0	38	40.3	73
NGOs	111.3	23	80.0	2	108.8	25
Private company	341.6	174	964.2	55	491.2	229
Others	621.2	155	905.8	35	673.2	190
<b>Average Sales Price (Rs. per quintal)</b>						
Wholesale market	726.1	314	814.7	99	947.3	413
Local market	714.8	421	817.5	154	742.3	575
Villagers	1,061.4	126	1,067.9	86	1,064.0	212
Cooperative	498.0	324	408.7	62	483.6	386
Lead farmers	642.7	8	631.3	16	635.1	24
Government agencies	668.5	54	659.3	32	665.1	86
Merchant against debt/advance	740.1	50	658.7	26	712.3	76
Pre-arranged contract	944.1	31	878.1	30	911.6	61
NGOs	675.1	12	640.0	2	670.1	14
Private company	381.9	164	150.8	55	323.8	219
Others	248.1	153	204.0	35	239.8	188
<b>Overall Averages across Purchasers</b>						
Sold Quantity	643.2	534	691.3	253	658.7	787
Price/quintal (Rs.)	1,906	530	1,630	246	1,819	776
Sold Value (Rs.)	167,347	530	137,458	246	157,872	776
Stored Quantity (quintal)	16.5	60	14.3	44	15.6	104
Period of Storage	6.9	57	6.7	36	6.8	93

According to the FGD participants in Kalwadi village, there are three modes of selling agricultural produce: (1) direct sale by farmers to mandi/local market/merchants, (2) sales through agents of farmers, and (3) sales through ITC. The major method among Kalwadi farmers, however, is through vegetable merchants. Main *mandis* are situated at a distance of 7 to 8 kilometers from the village.

Farmers take their produce to these *mandis* for the sale. In this process, they have to bear the cost of transportation. The farmers estimate that transportation costs roughly amount to 0.5 to 1 per cent of the sales value of the crop. Transporting produce to the *mandis* also entails significant times costs for the farmers that include the time to wait for the transport vehicle (some 5-6 hours), transport the produce, sell the produce, and return home. (No buyers transact

business at the farm gate and none help cover transportation costs.) Merchants generally come along with their vehicles to the *mandis*. Generally, there are no major differences in the prices offered by these merchants/agents. In fact, they have formed a cartel to keep their purchase price low.

There also exist local brokers/merchants from among the farmers who collect vegetables of 15 to 20 farmers to whom the farmers pay a commission of up to 3 percent of the crop sales value. The broker/merchants are accompanied to the market by representatives of the village farmers. The representatives ensure that the brokers do not underreport the prices which they finally fetch up in the market.

The broker/merchants are assisted by a network of agents who collect information about the crop, its quality and its expected yield. As a result, they offer lower prices to farmers belonging to those areas that experience a bumper crop. Overall, the farmers say that the broker/merchants tend to pay lower prices, often using grading and quality as a pretext. The farmers claim that they get higher prices for their produce taking it to the *mandis* in big cities. There are no formal written contracts between buyers and sellers.

The farmers normally enjoy cordial relationships with buyers that involves in some cases established and long-term business and personal relationships. Such relationships, however, do not help the farmers realize higher produce prices. In some cases, buyers who have established close relationships with the farmers will provide short term credit to the farmers who in exchange pledge to sell their produce to the buyer. (This is the “merchant against debt/advance” category in Table 26.)

ITC has started helping farmers in marketing their vegetable crops. It procures vegetables from the farm gate or from a pre-decided spot in the village. ITC does not purchase all the production. Rather it purchases according to its demand. Thus, only a limited proportion of vegetable production is being marketed through ITC.

An ITC representative visits the farmers and informs them of the date it intends to purchase produce from the village. This information is generally provided to the farmers by the ITC person two to three days in advance. This gives the farmers sufficient time to organize the harvesting. ITC procures the produce either at the farm gate or at a pre-decided central location. This saves farmers time and reduces transportation costs significantly.

ITC makes payment to the farmers within 3-4 days compared to the same day at the *mandis* and within 8-10 days from brokers/merchants. The prices offered by the ITC range up to 10 percent higher the mandi prices on a given date. The prices offered by ITC, however, remain relatively stable for 4 to 5 days, whereas prices in mandi change on a daily basis. This way, farmers get relatively stable rates for their produce. The ITC agents provide receipts of the quantity of produce purchased along with the price paid to a farmer.

In addition to ITC, farmers are selling their produce to big companies, such as Heritage, Subiksha, Metro, and Reliance Fresh Line. These companies have entered the retail sector in major urban centers of India in recent months and have established procurement outlets in Vontimamidi—a local market as well as *mandi*.

ITC and other retail sector companies have high grading standards. The actual grading uses an electronic grading machine that increases the transparency of the process and ensures that the farmers are not cheated, as they often are at the *mandis*. In this process, however, a farmer is often left with a significant quantity rejected produce. He can sell this produce in the *mandi*, but it will not fetch any higher price. The end result is that the farmer has invested considerable amounts in upgrading production, but he ends up earning no more for his produce than he would have absent the investment. Some farmers, therefore, are reluctant to sell their farm produce to ITC and other retail buyers. Notwithstanding, many of the farmers interviewed were willing to sell their vegetables to ITC, but at the time of the baseline study, ITC had yet to undertake such a large procurement.

Market buyers do not practice contract farming. At the time of the baseline, ITC had entered into contract farm arrangement with a handful of medium-sized farmers, but that was all. There exist, however, various forms of

informal agreement between farmers and input suppliers (mainly creditors), such pledges to sell crops to the creditor (see above) and mortgages of land or crops. As seen in Table 23, these types of arrangements are relatively rare.

In general, FFV farmers who sell to the local markets as well as outside merchants and traders traditionally face a number of problems related to the sale and marketing of their crops, including improper weighing, low prices, payment delays, intermediaries who take advantage of farmers' ignorance about the market, and so forth. Some farmers have successfully joined together in cooperatives some of which have proved useful in dealing with the above plus other sales and marketing issues. The Nandani Cooperative Society is a good example of how such an organization might operate to promote upgrading of small-scale FFV production.

The Nandani Cooperative has, among things, established forward linkages with markets and buyers where members can sell their produce minus the local intermediary commission and at higher prices. Not all of the Nandani Cooperative's efforts in forging forward linkages have been successful. It attempted to establish direct marketing channels between member farmers and certain major markets, but it did not succeed in those cases. Instead, the cooperative serves as an intermediary and assists the farmers in negotiating terms of trade. For these services, the cooperative charges a 1.5 percent commission in addition to a brokerage fee, loading and unloading fee, weighing fee, and transportation costs. The Nandani Cooperative also tracks sales prices in diverse markets that enable it to plan and dispatch difference varieties of vegetables to difference markets where they can fetch the highest price.

The Nandani Cooperative offers both fixed point and farm-to-farm services to its member farmers. The former is used primarily during peak production periods, while the latter is used primarily during lean production periods. When there is a production glut, cooperative members can store their produce with the Nandani Marketing and Processing Society until they are able to fetch a higher price for it. (The Nandani Marketing and Processing Society established its own processing unit, but this did not prove successful.)

Notwithstanding the services offered by the Nandani Cooperative, member farmers are free to sell their produce via outlets and to other buyers. Extrapolating from the figures found in Table 23, it appears that a substantial number of member farmers do sell via other outlets and to different buyers, in particular *mandis*, wholesale buyers, others, private companies, and government buyers.

Females have very limited role in deciding the sale of produce; this and other decisions related to farming remain primarily the domain of the males within the household. The income from produce sale is also collected and retained by male household members.

## LABOR USE

FFV farmers in the two sample groups utilize similar amounts of labor across the different types of crops grown in each of the different labor categories and in total. These include a relatively heavy use of male family labor and female hired labor, moderate use of female family labor and male hired labor, and little to no use of child family and hired labor (Table 27). Only the difference reported in person hours of female family labor is statistically significant.

Hired labor is typically contracted on a wage basis. The practice of exchanging labor is become rare

**Table 27. Labor Use in Person Days**

Person Days of Labor Aggregated across Crops	Treatment	Control	Total
Male family labor	107.3	106.9	107.1
Female family labor*	48.2	41.0	45.9
Children family labor	2.5	2.0	2.3
Male hired labor	55.1	51.6	54.0
Female hired labor	218.2	222.9	219.7
Children hired labor	0.2	0.0	0.1
Total hired labor	273.5	274.5	273.8
Total family labor	158.0	149.9	155.4
Total Labor	431.6	424.4	429.3

with the increasing commercialization of farming.

Farming decisions are mainly in the domain of male members of a household. The females' role is limited to unpaid family work in the agricultural enterprise. The income accruing from farming activities is also generally kept by a male member (head of the household). All financial decisions, moreover, are in the males' domain.

#### **ADOPTION OF FARMING PRACTICES**

Table 28 shows the percentage of FFV farmers in the sample groups who have adopted certain "sound" farming practices. The second column in the table indicates the number of crops to which the farmers have applied the specific practice. For example, FFV farmers have adopted improved seed varieties for six crops, nursery preparation for five crops, etc.

Four of the specified sound farming practices has been adopted by more than one-half of the sample FFV farmers: improved seed varieties, land preparation, grading, and packing. Another one-third has adopted nursery preparation, and another 16 percent has adopted netting. In each case, the percentage of treatment FFV farmers adopting the practice exceeded the percentage of control FFV farmers by a significant margin. In contrast, fewer than 10 percent of sample farmers have adopted tray nursery, manual seed drilling, drip or sprinkle irrigation, mulching, or fertigation.

Overall, treatment FFV farmers have adopted sound farming practices at a consistently higher rate than control FFV farmers. The difference is statistically significant in the case of improved seed varieties, nursery preparation, land preparation, netting, grading, and packing.

Table 28. Adoption of Farming Practices

Farming Practice		Treatment N = 537		Control N = 255		Total N = 792	
Improved Seed Varieties*	1	126	23.5	62	24.3	188	23.7
	2	130	24.2	42	16.5	172	21.7
	3	80	14.9	19	7.5	99	12.5
	4	30	5.6	9	3.5	39	4.9
	5	26	4.8	1	0.4	27	3.4
	6	6	1.1	0	0.0	6	0.8
<b>Total</b>		<b>398</b>	<b>74.1</b>	<b>133</b>	<b>52.2</b>	<b>531</b>	<b>67.0</b>
Nursery Preparation*	1	97	18.1	39	15.3	136	17.2
	2	105	19.6	18	7.1	123	15.5
	3	28	5.2	5	2.0	33	4.2
	4	4	0.7	0	0.0	4	0.5
	5	1	0.2	0	0.0	1	0.1
<b>Total</b>		<b>235</b>	<b>43.8</b>	<b>62</b>	<b>24.3</b>	<b>297</b>	<b>37.5</b>
Tray Nursery	1	4	0.7	1	0.4	5	0.6
	2	5	0.9	1	0.4	6	0.8
<b>Total</b>		<b>9</b>	<b>1.7</b>	<b>2</b>	<b>0.8</b>	<b>11</b>	<b>1.4</b>
Manual Seed Drill	1	13	2.4	4	1.6	17	2.1
	2	15	2.8	4	1.6	19	2.4
	3	5	0.9	1	0.4	6	0.8
	4	1	0.2	0	0.0	1	0.1
	5	1	0.2	0	0.0	1	0.1
<b>Total</b>		<b>35</b>	<b>6.5</b>	<b>9</b>	<b>3.5</b>	<b>44</b>	<b>5.6</b>
Land Preparation*	1	118	22.0	59	23.1	177	22.3
	2	123	22.9	39	15.3	162	20.5
	3	79	14.7	18	7.1	97	12.2
	4	20	3.7	10	3.9	30	3.8
	5	10	1.9	1	0.4	11	1.4
	6	1	0.2	0	0.0	1	0.1
<b>Total</b>		<b>351</b>	<b>65.4</b>	<b>127</b>	<b>49.8</b>	<b>478</b>	<b>60.4</b>
Drip Irrigation	1	23	4.3	10	3.9	33	4.2
	2	2	0.4	2	0.8	4	0.5
	3	1	0.2	0	0.0	1	0.1
<b>Total</b>		<b>26</b>	<b>4.8</b>	<b>12</b>	<b>4.7</b>	<b>38</b>	<b>4.8</b>
Sprinkle Irrigation	1	10	1.9	1	0.4	11	1.4
<b>Total</b>		<b>10</b>	<b>1.9</b>	<b>1</b>	<b>0.4</b>	<b>11</b>	<b>1.4</b>
Netting*	1	93	17.3	23	9.0	116	14.6
	2	7	1.3	2	0.8	9	1.1
	3	1	0.2	0	0.0	1	0.1
	4	2	0.4	0	0.0	2	0.3
<b>Total</b>		<b>103</b>	<b>19.2</b>	<b>25</b>	<b>9.8</b>	<b>128</b>	<b>16.2</b>
Mulching	1	2	0.4	1	0.4	3	0.4
<b>Total</b>		<b>2</b>	<b>0.4</b>	<b>1</b>	<b>0.4</b>	<b>3</b>	<b>0.4</b>
Staking	1	3	0.6	1	0.4	4	0.5
	2	1	0.2	0	0.0	1	0.1

<b>Total</b>		<b>4</b>	<b>0.7</b>	<b>1</b>	<b>0.4</b>	<b>5</b>	<b>0.6</b>
Fertigation	1	10	1.9	11	4.3	21	2.7
	2	2	0.4	1	0.4	3	0.4
	3	4	0.7	1	0.4	5	0.6
	4	8	1.5	1	0.4	9	1.1
	5	5	0.9	0	0.0	5	0.6
	6	3	0.6	0	0.0	3	0.4
<b>Total</b>		<b>32</b>	<b>6.0</b>	<b>14</b>	<b>5.5</b>	<b>46</b>	<b>5.8</b>
Grading*	1	125	23.3	63	24.7	188	23.7
	2	101	18.8	27	10.6	128	16.2
	3	49	9.1	8	3.1	57	7.2
	4	18	3.4	5	2.0	23	2.9
	5	13	2.4	1	0.4	14	1.8
	6	4	0.7	0	0.0	4	0.5
<b>Total</b>		<b>310</b>	<b>57.7</b>	<b>104</b>	<b>40.8</b>	<b>414</b>	<b>52.3</b>
Packing*	1	134	25.0	61	23.9	195	24.6
	2	99	18.4	25	9.8	124	15.7
	3	42	7.8	9	3.5	51	6.4
	4	12	2.2	4	1.6	16	2.0
	5	9	1.7	1	0.4	10	1.3
	6	2	0.4	0	0.0	2	0.3
<b>Total</b>		<b>298</b>	<b>55.5</b>	<b>100</b>	<b>39.2</b>	<b>398</b>	<b>50.3</b>

FFV farmers have a long way to go to upgrade their production and produce quality. Aside from the of improved seed varieties, land preparation, grading, and packing, FFV farmers have yet to adopt the types of farming practices necessary to significantly boost farm productivity and quality. Farmers that participated in the FGDs listed a number of problems that impede adoption of modern farming practices and that threaten future productivity gains.

- Modern farming relies on intensive use of fertilizers and pesticides. This, coupled with intensive cropping patterns, does not allow adequate rest and organic manuring to the land. Consequently, soil salinity is increasing and soil fertility is declining. Simply to maintain current production levels, more fertilizer and pesticides are needed than the previous year. Some farmers want to return to organic farming practices, but the absence of any successful model in organic farming is discouraging them to change their present practices.
- With the adoption of modern farming practices, the cost of farming has increased substantially resulting in a significant increase in the per acre investment required. For marginal and small farmers, it is becoming increasingly difficult to meet the credit needs of such modern farming. As a result, the indebtedness among FFV farmers has been increasing rapidly over the years.
- While the investment requirements and cultivation costs have increased, the produce is not fetching commensurately higher prices. Existing market mechanisms benefit the intermediaries and not the farmers.
- The ground water level is receding fast due to excess use of tube wells. Farmers extract water from tube wells and flood their farms with water. Sugar cane, cabbage, tomato, cauliflower and brinjal, for example, are irrigated using this method. This method wastes a lot of water, but since there is no charge on water extraction, it continues. Drip irrigation or sprinkle irrigation are superior methods that enable optimum utilization of water. These methods, however, are expensive and require significant capital investment. For

this reason, these are the least prevalent methods of irrigation and their use is largely limited to bananas and grapes.

- Emergence of newer vegetable production centers near the major vegetable markets is dampening vegetable prices. The FFV farmers are at a disadvantage with regards to local suppliers in those markets. Long distance transportation increases the cost, and the quality of produce suffers in the absence of cold supply chain.

### **INTER-FIRM COOPERATION**

In a village society farmers generally exchange knowledge relating to certain aspects of the production and marketing of vegetables with their fellow farmers. Farmers, for example, generally discuss market prices in the evening after returning from their fields. The access to mobile phones has helped them access market information about prices, which they discuss among themselves. It has also helped farmers to enquire about prices of products in big *mandis*. Farmers often also jointly transport produce from the farm gate to collection centers to save money on transportation costs.

There is little concept of joint ownership of agricultural implements. Most farmers in a village want to own a productive asset. Farmers generally prefer to hire assets that they do not possess than share among themselves. Generally, farming inputs—such as labor, seeds, fertilizers, and agricultural implements—are difficult to share in a commercial mode of farming.

Farmers generally do not discuss when to harvest and when to sell their produce with their neighbors. The decision to harvest and sell is dependent on the maturity of a crop and the farmer's knowledge and experience in identifying the appropriate time to harvest and sell. The flexibility as to the sales timing is also somewhat limited. Farmers cannot hold back their produce in the anticipation of better prices as there are hardly any storage facilities in the villages.

Most of the small-scale FFV farmers are literate, and they can and will come together to create cooperative associations. Unfortunately, baseline study does not provide information to assess how general this tendency is.

The Nandani Cooperative Society has been highlighted in this report as an example of a successful farmers' cooperative. It is not, however, free of problems, some of which commonly plague other farmer cooperatives. One problem is a perception that the cooperative is becoming increasingly dominated by big farmers at the expense of the smallholder farmers. Another concern is that the success of the cooperative has drawn the attention of the unscrupulous politicians and other influential persons who are now trying to control it to serve their own vested interest.

### **VI.A.iii. ACCESS TO FINANCE**

Approximately 72 percent of FFV farmers in both groups have at least one loan outstanding, with all or almost all of them in cash rather than kind (Table 29). The loan amounts and terms for farmers in the two groups are roughly similar with an average loan size from Rs. 106,000-Rs.188,000. The value outstanding and interest rate among control FFV farmers is significantly higher than that of treatment FFV farmers.

Another 16.4 percent of treatment FFV farmers and 13.7 percent of control FFV farmers have a second loan outstanding. The average loan size is much smaller in both cases, although larger in this case among treatment FFV farmers, with an average interest rate from 13.1-13.9 percent. The value outstanding is slightly higher among treatment FFV farmers. None of these differences, however, are statistically significant.

One-hundred percent of second loans to treatment FFV farmers are in cash, while 13.1 percent of second loans to control FFV farmers are in kind. The difference is statistically significant.

**Table 29. Access to Finance**

Loan Details	First Loan			Second Loan		
	Treatment	Control	Total	Treatment	Control	Total
Percentage with loan outstanding	72.1	71.8	72.0	16.4	13.7	15.5
Average loan size (Rps)	106,166	118,133	110,008	77,227	61,200	72,666
Total debt outstanding (Rps)	59,414	81,035*	66,355	40,439	38,227	39,804
Average annual interest rate (%)	12.1	14.6*	12.9	13.1	13.9	13.3
Loans in cash (percent)	99.7	100.0	99.8	81.6	100.0*	86.9
Loans in kind (percent)	0.3	0.0	0.2	18.4	0.0	13.1

Cooperative institutions are the primary production lending source for over one-half of FFV farmers in both groups taking out first and second loans followed by commercial banks (Table 30). The former is a relatively more important lending source for control FFV farmers, while the latter is a relatively more important lending source for treatment FFV farmers. Money lenders are a third important source of first loans for control FFV farmers and a third important source of second loans for control treatment FFV farmers. The difference in lending sources for first loans between treatment and control FFV farmers (but not the second loans) is statistically significant.

**Table 30. Lending Sources (Production Purposes Only)**

Source	First Loan*			Second Loan		
	Treatment	Control	Total	Treatment	Control	Total
Microfinance institutions <sup>19</sup>	4.7	3.8	4.4	6.8	2.9	5.7
Commercial banks	32.3	17.5	27.5	23.9	14.3	21.1
Traders	0.5	0.5	0.50	1.1	0.0	0.8
Money lenders	2.3	7.10	3.9	13.6	5.7	11.4
Friends/relatives	0.8	1.1	0.9	12.5	14.3	13.0
Co-operative institutions	58.70	68.3	61.8	36.40	62.9	43.9
Landlords/employers	0.3	0.5	0.4	3.4	0.0	2.4
Others	0.4	1.2	0.6	2.3	0.0	1.7

Ninety percent of more of first loans and 100 percent of second loans made to the sample FFV farmers were unsecured by labor, land, or other real property (Table 31). The difference between the two groups is not statistically significant.

Among the other services it offers members, the Nandani Cooperative Society has created the Nandani Cooperative Bank.

<sup>19</sup> Microfinance institutions include self-help groups.

**Table 31. Type of Guarantee**

Source	First Loan			Second Loan		
	Treatment	Control	Total	Treatment	Control	Total
On interest	89.7	95.6	91.6	100.0	100.0	100.0
Labor service	1.6	0.5	1.2	0.0	0.0	0.0
Mortgage of land	5.4	3.8	4.9	0.0	0.0	0.0
Mortgage of other properties	1.3	0.0	0.9	0.0	0.0	0.0
Other	2.1	0.0	1.4	0.0	0.0	0.0

According to farmers participating in the FGDs, there are banks willing to lend to farmers, but relatively few farmers have been able to access them. The farmers attribute the cumbersome procedures to get a bank loan as one reason for the limited access. One reason is that many farmers are already indebted to their cooperative, and they are unable to get out of debt long enough to qualify for a bank loan. One loan cycle barely ends and another one begins leaving many of the farmers perpetually in debt. To obtain a bank loan, the farmers have to produce a debt clearance certificate (Form no. 7/12) from the Cooperative Societies endorsed by the local village authorities.

In lieu of bank or cooperative loans, some farmers purchase inputs on credit from local input suppliers/ moneylenders. These loans are generally paid after the harvesting. Interest rates on loans from money lenders are exorbitantly high ranging from 24-48 percent per annum! Some farmers also take loans from vegetable merchants/agents. In such cases farmers are compelled to sell their produce to these agents on relatively cheaper prices. This is a rather a recent phenomenon.

For their credit needs, farmers are largely dependent on local farming cooperatives. In the case of the Nandani cooperative, it extends credit in case or in kind (e.g., seeds, fertilizer, pesticides) with typically six month terms at a 12–17 percent per annum. The cooperative retains the farmers’ produce as collateral and deducts the loan principal from the sale proceeds. In the case of default, the Cooperative Bank seizes the produce and sells it to recoup the loan value. Typically, however, loans are repaid after the harvesting season.

#### **VI.A.iv. SUMMARY OF BASELINE FINDINGS IN THE FFV SUBSECTOR**

From the baseline survey findings, a broad portrait of treatment and control FFV farmers can be formed. On the one hand, there is no statistically significant difference between the groups in terms of productive asset ownership, crop production, rainfall and climatic conditions, net farming income, and labor use.

On the other hand, control FFV farmers own and possess larger plots of land, both irrigated and overall, while treatment FFV farmers produce a wider variety of crops, spend more on inputs, are more likely to adopt “sound” farming practices, produce more waste material (although control FFV diver more to home consumption), and are more likely to adopt certain sound farming practices.

Farmers in both groups are equally likely to take out first and second loans, while treatment FFV tend to have more outstanding, pay higher interest rates, and take out in-kind second loans. Treatment farmers are more likely to borrow from commercial banks, whereas control farmers are more likely to borrow from co-operative institutions.

Finally, the amounts sold, the prices paid, the total value sold, the stored quantity, and period of storage aggregated across all types of crops are broadly similar across the two groups. Treatment FFV farmers are most likely to sell their crops, in order of importance to *mandis*, co-operatives, wholesale buyers, private companies, and others. Control FFV

farmers are most likely to sell their crops, in order of importance, to *mandis*, wholesale buyers, villagers, co-operatives, private companies, merchants against debt advance, others, and government agencies.

There remain significant constraints to adoption of sound farming practices, upgrading FFV farmer productivity, linking FFV farmers to higher end wholesale, retail, and export markets. These include a lack of transparency regarding input quality; high input costs; lack of knowledge and training in use of inputs; reliance on costly and non-transparent distribution and sales methods; low prices for goods; uncertainty regarding returns on investment in production technologies or sound farming practices; unsound farming practices that threaten the sustainability and profitability of farming operations; over-indebtedness; herd-mentality cropping patterns; and overall weak linkages to other value chain actors.

There are examples in which FFV farmers have successfully addressed some of the above constraints through the creation and operation of farmer cooperatives. There also appear to be several successful examples of informal cooperation among FFV farmers. Not all FFV farmers have successfully organized, however, and those farmer organizations that do exist must cope with a set of internal and external pressures that may adversely affect their operations.

# VII. MUNICIPAL SOLID WASTE MANAGEMENT

## A. SOLID WASTE MANAGEMENT FIRMS

### VII.A.i. CHARACTERISTICS OF SWM FIRMS

The treatment waste workers were drawn from five SWM firms (Table 32). Each of the firms is formally registered, operates as a sole proprietorship, is male-owned, and engages in a variety of activities. The owners average 45 years of age. With one exception, the firms operated for 10-12 months during the previous year.

**Table 32. Characteristics of SWM Firms**

MSW Firm	Age Owner	Sex Owner	Registration Status	Ownership	# Months Operated Last year	Types of Activities
1	40	M	Registered	Proprietary	12	<ul style="list-style-type: none"> <li>• Door to Door Collection</li> <li>• Street Sweeping and Drain Cleaning</li> <li>• Segregation</li> <li>• Transportation to Dump</li> </ul>
2	45	M	Registered	Proprietary	12	<ul style="list-style-type: none"> <li>• Door to Door Collection</li> <li>• Street Sweeping and Drain Cleaning</li> <li>• Transportation to Dump</li> </ul>
3	32	M	Registered	Proprietary	4	<ul style="list-style-type: none"> <li>• Street Sweeping and Drain Cleaning</li> <li>• Transportation to Dump</li> </ul>
4	65	M	Registered	Proprietary	10	<ul style="list-style-type: none"> <li>• Door to Door Collection</li> <li>• Street Sweeping and Drain Cleaning</li> <li>• Transportation to Dump</li> </ul>
5	45	M	Registered	Proprietary	12	<ul style="list-style-type: none"> <li>• Street Sweeping and Drain Cleaning</li> <li>• Transportation to Dump</li> </ul>

### VII.A.ii. NUMBER AND TYPE OF WORKERS AT SWM FIRMS

The SWM firms have from 35-64 workers with an average of 46.4 total workers, including 26.6 males, 16.4 females, and 3.2 children (Table 33). Each of the firms hires male and female workers and two of the five uses child labor.

**Table 33. Number of Workers at SWM Firms**

Firm	Male	Female	Child	Total
1	30	15	0	45
2	22	13	0	35
3	22	20	7	49
4	22	17	0	39
5	37	17	9	64
Average	26.6	16.4	3.2	46.4

Approximately 92 percent of workers in SWM firms are waste collectors of which all are non-household workers (Table 34). Two of the five firms use household workers. Three of the five firms have a single manager, one has two managers, and one has no manager. All the firms have two or more supervisors, including three firms with two supervisors, one firm with three and one firm with four.

**Table 34. Number and Type of Workers at SWM Firms**

Type of Worker	Firm 1	Firm 2	Firm 3	Firm 4	Firm 5	Average
Household workers	0	0	2	0	3	1.0
Non-household workers	45	35	47	39	60	45.2
Managers/ Supervisors	4	3	2	3	6	1.0
Waste collectors	41	32	47	36	57	42.6

**VII.A.ii. WAGES PAID BY SWM FIRMS**

The sample SWM firms paid on average Rs. 1,106,160 in wages to workers during the previous year ranging from a low of Rs. 720,000 to a high of Rs. 1,504,800 (Table 35). Wages to workers accounted for 90 percent of the total on average followed by supervisors at 7.1 percent and managers at 2.9 percent.

**Table 35. Wages Paid by SWM Firms during Last Year (Rs.)**

Firm	Managers	Supervisors	Workers	Total
1	50,400	126,000	1,328,400	1,504,800
2	46,800	84,000	1,036,800	1,167,600
3	0	72,000	810,000	882,000
4	24,000	48,000	648,000	720,000
5	30,000	60,000	1,166,400	1,256,400
Average	31,800	78,000	997,920	1,106,160

**VII.A.iii. RECEIPTS FROM MUNICIPALITIES DURING LAST YEAR**

Receipts from municipalities for solid waste services over the last year varied widely across the five MSWM firms from a low of Rs. 65,000 to a high of Rs. 1,766,000 and an average of Rs. 917,680 (Table 36). The low receipts for firms 3 and 4 in Table 36 are explained by their recent entry into the solid waste sector.

**Table 36. Receipts from Municipalities during Last Year (Rs.)**

Firm	Receipts Last Year (Rs.)
1	1,766,000
2	1,378,000
3	73,000
4	65,000
5	1,306,400
Average	917,680

**VII.A.iv. CASE STUDIES OF SWM FIRMS**

This section provides case studies of two SWM firms subcontracting for solid waste services under the GMED program. One is located in the city of Aurangabad, Maharashtra, and the other is located in the city of Jhunjhunu, Rajasthan.

## **SWM FIRM IN AURANGABAD**

The city of Aurangabad is divided into 98 municipal electoral wards with a population of more than one million inhabitants. The Aurangabad Municipal Council (AMC) is the government authority that manages the sanitation work of the city. As an experiment, the AMC has contracted out the work of municipal solid waste management to private firms in 10 sanitation zones. Out of these 10 sanitation zones, seven are located in Ward B and three are located in Ward D.

The City and Industrial Development Corporation (CIDCO) is located in Ward B of the city. The work related to solid waste management in Ward B was being maintained CIDCO until March 2006. At that time, AMC took over the solid waste services from CIDCO, and it subcontracted them to private contractors. All SW workers who have previously worked for CIDCO thus became employees of the private contractors. Under the arrangement, the private contractors are legally bound retain these workers in their firms. If it needs to hire additional workers, the firm can easily find them in the informal sector.

The case study firm was one of those selected by the AMC to take over SW services in the city after April 1, 2006. The firm is registered as a labor supplying firm under the Shops and Establishment Act. It is engaged in door-to-door garbage collection, street cleaning and sewerage cleaning. It began door-to-door collection in April 2006.

The firm employs 35 workers, including one supervisor, a tractor driver, sweepers, and door-to-door collectors. It has in addition one tractor and 15 hand driven carts. It also provides brooms and baskets to workers. The work of street cleaning is mainly done by female workers.

All workers are employed on a daily wage rate basis. The daily wage rate for workers is Rs.105 or Rs. 3,150 per month. The Supervisor is paid a salary of Rs. 4,500 per month. All workers are covered under the Provident Fund (PF) and Employees Insurance Scheme (ESI). A worker has to contribute 12 per cent and 1.7 per cent of his salary towards PF and ESI respectively. This amount is deducted from the employee's monthly wage. Contributions for these benefits from both employers and employees are mandatory. In fact, the municipality has already made provisions for such payments by employers in the contract itself in the form of a higher daily wage of Rs.105.

Apart from these two benefits, the owner claims that it is very difficult to pay other benefits, such as paid leave, training, uniforms, or safety equipments like shoes, gloves, etc. Since the workers are covered under the ESI provisions, they, and their families, are covered should a work-related health problem arise.

Workers work under the close supervision of a Supervisor. Apart from maintaining an attendance register, the firm has provided every worker a small dairy in which his or her attendance is marked by the Supervisor. This nullifies the chances of manoeuvring by a supervisor.

While the owner claims that the workers are the firm's most valuable asset, it is easy to hire new workers should the need arise. The firm does not pay any bonuses. According to the owner, the terms of the contract leave the firm little extra money to sustain itself let alone provide additional benefits or worker bonuses. The firm is also not selling any of the garbage it collects, which otherwise would have provided additional income.

The firm is working under the close supervision of city. The city has allocated one Sanitary Inspector to supervise the work of the firm. In fact, the attendance of workers is cross checked by the Sanitary Inspector every day. There is a mutual relationship between the Inspector and the owner of the firm. There is little interference in the functioning of firm by the city officials, as almost the entire amount of the contract is to be paid as wages to workers. Officials from other departments, such as labor, are also cooperative.

Asked to describe the market for private SWM services, the firm's owner observed the following. With the growing urbanization, population density is increasing in the cities. The consumption of goods and services is increasing correspondingly as is the amount of garbage being generated. Apart from this, urban residents are becoming

increasingly aware about the importance of sanitation, and they demand the services for which they pay taxes to civil authorities. Since local civic authorities have failed miserably in maintaining cleanliness through its existing workforce, the emphasis is now on privatizing the services of municipalities. In this context, the demand for garbage disposal and sanitation services is bound to increase in the long run.

With the advent of solid waste service outsourcing, many firms are entering the market for the private provision of SW services under the expectation that the city will subcontract more of its solid waste services to private firms. With this kind of scenario, it is not unlikely that many of the sanitary workers who are presently working with the municipality as its regular employee may join the subcontracting firms.

### **SWM FIRM IN JHUNJHUNU**

The case study firm is one of the three sub-contractors that have been awarded a contract of two wards for waste collection, road cleaning, sewer cleaning, and garbage dumping in two wards of Jhunjhunu. Before securing the contract for SWM, the firm's worked as a Supervisor in Jhunjhunu on a temporary basis. The Sanitary Inspector and other city officials persuaded him to become a contractor for municipal solid waste management.

The firm has no problem finding workers; many are the owner's relatives. Overall, the firm has hired 45 workers. The owner serves as supervisor (and sometimes as worker as well). Each worker is assigned an area, and he can use whomever he wants (including his family members) to complete the tasks. This flexibility suits many workers who are engaged in multiple activities.

The firm pays workers a minimum wage of Rs. 70 per day without any gender discrimination. These wages are fixed by the contract with the city. The firm is unable to provide any benefits to the workers as the city did not make any provision for such benefits in the contract. The firm only provides workers brooms and small wooden bins for waste collection.

The owner is very happy with the city officials who have so far been very helpful. He does not see a good future for the door-to-door waste collection unless it is fully funded by the municipality. Most of the residents are unwilling to pay for garbage collection from their doors; rather, they expect the municipality to bear such costs. On the other hand, the municipality is gradually withdrawing from such services in the name of public-private partnership and shrinking budgetary allocations.

The owner has no firm opinion about the future market for solid waste management. Nor does he have any knowledge about the value of the garbage that is disposed from his wards to the dumping ground. His main concern is his low profit margins. Given the terms of his current contract, the owner does not believe it is not feasible for him to renew his contract once it has concluded.

## **B. DEMOGRAPHIC PROFILE OF SOLID WASTE MANAGEMENT WORKERS**

### **VII.B.i. DEMOGRAPHIC PROFILE**

Waste workers in the treatment and control groups are predominantly male, approximately 44 years of age, from a household of 5.6 persons, a member of a scheduled caste, married, and illiterate (Table 37). Community, social and personal services comprises the major source of household income for approximately 80 percent of waste workers in both groups.

Notwithstanding the broad similarities between the two groups, treatment waste workers are significantly less likely to be male, significantly less likely to be married, significantly more likely to have a high school or above education, and significantly more likely to derive the major household income from sources other than waste work.

**Table 37. Demographic Profile of Solid Waste Workers**

Demographic Characteristic	Treatment	Control	Total
	N = 251	N = 173	N = 424
Male*	78.3	86.7	81.8
Age	43.3	45.9	44.4
Household size	5.5	5.8	5.6
Social Group			
Scheduled tribe	3.2	0.6	2.1
Scheduled caste	92.4	96.0	93.9
Other backward caste	0.8	3.5	1.9
Others	3.6	0.0	2.1
Marital Status*			
Unmarried	5.6	2.3	4.3
Married	75.9	87.3	80.6
Widow/widower	17.7	9.8	14.5
Divorced/separated	0.8	0.6	0.7
Education*			
Illiterate	67.1	64.2	65.9
Below primary or informal	6.4	11.6	8.5
Primary	4.4	4.0	4.3
Middle	8.4	13.9	10.7
Matriculate/high school/secondary	9.2	2.9	6.6
Higher secondary/pre-university/intermediate/graduate	2.0	0.6	1.4
Technical/professional diploma or certificate	2.4	3.0	2.6
Major Source of Household Income*			
Community, social, and personal services	78.2	84.6	80.9
Construction	10.9	1.4	7.0
Transport, storage, and communication	2.0	8.4	4.6
Agriculture	4.5	1.4	3.2
Wholesale and retail trade, restaurants, and hotels	2.5	2.1	2.3
Other	1.9	2.1	2.0

## VII.B.ii. HOUSEHOLD EXPENDITURES

Waste workers in both groups spend around Rs. 3,800 in total per month and between Rs. 740–Rs. 800 in per capita terms each month (Table 38). The differences in household spending are not statistically significant.

**Table 38. Household Expenditures (Rs. per Month)**

Expenditures	Treatment	Control	Total
Total Monthly Expenditures	3,856	3,802	3,834
Monthly Per Capita Expenditures	803	738	777

### VII.B.iii. HOUSING CONDITIONS

Waste workers in the two groups share similar housing conditions for all indicators of housing quality (Table 39). Overall, the houses occupied by waster workers in both groups have 1.8 rooms, are 72 meters from a source of drinking, are electrified, and are temporary or semi-permanent. Nearly one-quarter of homes in each group has a separate kitchen, and from 30-39 percent of treatment and control waste have a separate bathroom. The difference with regards to the percentage with a separate bathroom is statistically significant. The remaining group differences are not statistically significant.

**Table 39. Housing Conditions**

Housing Condition	Treatment	Control	Total
Number of rooms	1.7	1.9	1.8
Meters to source of drinking water	71.4	73.4	72.2
Separate kitchen	24.5	27.3	25.7
Separate bathroom*	29.7	39.3	33.6
House electrified	81.1	86.1	83.2
Type of House			
Temporary (Kutcha)	55.0	56.1	55.5
Semi-Permanent (Semi-Pucca)	21.3	18.5	20.1
Permanent (Pucca)	23.7	25.4	24.4

### VII.B.iv. ACCESS TO BASIC SERVICES

Approximately 85 percent of waste workers in both groups rely on firewood as their main source of cooking fuel (Table 40). After firewood, treatment waster workers are more likely to rely on kerosene as the major cooking fuel, while control waste workers are more likely to rely on other sources of cooking fuel. The difference is statistically significant.

Approximately one-half of treatment waste workers and two-thirds of control waste workers use “other” facilities as their primary toilet. After this, waste workers within each group are most likely to use an open field or a flush latrine within the home, although treatment waste workers rely on open fields and flush toilets at a higher rate. The difference in this last case is statistically significant.

Finally, around 45 percent in each group use a public tap as their main source of drinking water. After this, treatment waste workers are most likely to use a public hand pump or tube well, while control waste workers are most likely to use a water tap within their dwelling. The difference is statistically significant.

**Table 40. Access to Basic Services**

Basic Service	Treatment	Control	Total
<b>Main Source of Cooking Fuel*</b>			
Firewood	85.9	85.0	85.5
Kerosene	7.6	1.2	0.9
Agriculture Waste (stalks)	3.6	2.3	3.1
Other	2.9	11.5	10.5
<b>Toilet*</b>			
Field	20.1	12.1	16.8
Flush latrine within home	18.1	11.6	15.4
Covered dry latrine (kutcha)	6.4	4.6	5.7
Community latrine	1.6	4.6	2.8
Other	53.8	67.1	59.2
<b>Source of Drinking Water*</b>			
Public tap	42.8	45.7	47.2
Public hand pump/Tube well	29.7	12.1	22.5
Tap in dwelling	9.2	20.8	14.0
Own hand pump/Tube well	6.0	16.2	10.2
Motorized hand pump	3.2	2.9	3.1
Other			

#### **VII.B.v. HOUSEHOLD ASSET OWNERSHIP**

Patterns in household asset ownership, the number of assets owned, and the value of assets owned is broadly similar across the two solid waste worker groups (Table 41). Approximately 70-80 percent in each group owns an electric stove and their house; from 40-60 percent own a deck, bed, and cot; around one-third own a cycle or chair, and another 20-30 percent own a sewing machine, cooking gas, and radio (Table 41). Overall, a higher percentage of control waste workers tend to own a particular asset than treatment waste workers, although with several exceptions.

Among sample solid waste workers who own a particular asset, the difference in the number of assets owned is statistically significant in the case of chairs, while the difference in the value of the assets owned is statistically significant in the case of homes, beds, cots, sewing machines, and cars/jeeps. In each case, the average value is higher among control solid waste workers than among treatment solid waste workers. Overall, however, patterns in terms of the number and value of assets owned are similar across the two groups.

**Table 41. Household Asset Ownership**

Household Asset	Percentage Households Owning Asset			Average Number Owned			Average Value		
	Treat-ment	Control	Total	Treat-ment	Control	Total	Treat-ment	Control	Total
Electric Stove	87.3	79.8	84.2	1.1	1.0	1.1	39	55	46
Own house	77.3	87.9	81.6	1.0	1.0	1.0	56,257	70,361*	62,436
Deck	55.4	63.6	58.7	1.0	1.0	1.0	2,228	2,619	2,401
Bed	47.4	40.5	44.6	1.0	1.0	1.3	2,228	2,619*	1,191
Cot	40.2	45.7	42.5	1.7	1.8	1.8	400	493*	442
Cycle	33.1	38.7	35.4	1.1	1.1	1.1	773	748	762
Chair	29.1	34.1	31.1	1.6	2.2*	1.8	246	366*	300
Sewing machine	19.1	28.9	23.1	1.1	1.5	1.3	380	511*	447
Cooking Gas	26.3	16.8	22.4	1.0	1.1	1.0	125	145	131
Radio	20.3	23.7	21.7	1.1	1.0	1.0	232	232	232
Air Cooler	8.8	24.3	15.1	1.1	1.2	1.2	1,818	2,111	2,010
Table	11.2	15.0	12.7	1.3	1.4	1.3	327	439	381
Kerosene Stove	8.4	16.2	11.6	1.0	1.0	1.0	1,795	1,985	1,488
Iron Cupboard	8.0	15.0	10.8	1.3	1.0	1.1	1,710	1,773	1,745
Car/Jeep	6.0	9.2	7.3	1.3	2.3	1.3	686	1,453*	1,082
Music System	5.2	3.5	4.5	1.0	1.0	1.0	1,319	800	1,155
TV	1.6	0.0	0.9	1.3	1.0	1.1	26,375	21,600	22,964
Mobile Phone	2.0	2.3	2.1	1.0	1.0	1.0	980	2,125*	1,488
Phone(land line)	2.4	1.2	1.9	1.0	1.0	1.0	2,666	1,500	2,375
Fan	1.2	0.6	0.9	1.0	1.0	1.0	400	250	362
Motorcycle/scooter	0.4	0.0	0.2	1.0	0.0	1.0	30,000	0.0	30,000

### VII.B.vi. POVERTY STATUS

As seen in Table 42, control solid waste workers score slightly higher than treatment solid waste workers on the 15 poverty indicators; however, the overall poverty profile of the two groups is identical as seen in Table 40. A total of 32.9 percent of waste workers in both groups fall below the \$1 DPCE poverty line in both groups.

**Table 42. Poverty Scores and Poverty Likelihood**

Indicator	Average Poverty Score		
	Treatment	Control	Total
How many children aged 0 to 17 are in the household?	13.1	13.1	13.1
How many electric fans does the household own?	0.2	0.5	0.3
What is the household's primary energy source for cooking?	1.5	2.1	1.7
In the past 12 months, did anyone in the household buy leather boots or shoes?	2.4	3.0	2.7
In the past 30 days, did anyone in the household spend anything on telephone charges?	1.6	1.3	1.5
What is the principle occupation of the household?	4.6	5.1	4.8
In the past 30 days, did anyone in the household buy a toothbrush, toothpaste, etc.?	3.5	2.9	3.3
In the past 12 months, did the household buy any bed sheets or bed covers?	1.4	1.7	1.5
In the past 30 days, did the household pay for the services of a doctor or surgeon?	1.6	1.0	1.4
How many children ages 6 to 17 attend school?	2.3	2.2	2.3
In the past 30 days, did anyone in the household consume any milk or ghee?	2.0	3.3	2.6
In the past 30 days, did anyone in the household consume an apple?	1.9	2.9	2.3
How many pressure cookers or pressure pans does the household own?	0.8	1.5	1.1
In the past 30 days, did the household buy any bread from a bakery?	2.4	1.9	2.2
Does the household own a television?	1.9	1.7	1.7
Average poverty score	40.8	44.3	42.2

**Table 43. Poverty Scores and Poverty Likelihood**

Poverty Status	Treatment	Control	Total
Percentage very poor	32.9	32.9	32.9
Percentage not-very-poor	67.1	67.1	67.1

### VII.B.vii. SUMMARY OF DEMOGRAPHIC CHARACTERISTICS

Treatment and control solid waste workers share broadly similar demographic characteristics. Within this general trend, there are a number of significant differences in terms of gender, marital status, education level, major sources of income, and access to basic services, even though the absolute differences in some of these cases are not necessarily large. No or few statistically significant differences exist between the two groups in terms of housing quality, household expenditures, asset ownership, and poverty status.

The differences that do exist between the two groups raise some concerns about the direct comparability between the two groups. It will be necessary to control for these differences in the follow-up research and analysis.

## C. WORKING CONDITIONS OF SOLID WASTE MANAGEMENT WORKERS

One projected outcome of formalizing solid waste management is the creation of formal sector employment for solid waste workers. Workers employed in formal sector solid waste management firms are hypothesized to enjoy better and safer working conditions than workers employed in the informal solid waste sector. Improved working conditions are expected to be manifested by favorable changes in the treatment of workers by supervisors and co-workers, job benefits, workers' access to productive assets, days and hours worked, work stability, earnings, health and safety, and subjective assessments of their economic and social status.

### VII.C.i. WORK HISTORY

Control waste workers have been in their present occupation and with the current employer for a slightly longer period of time than treatment waste workers, and the difference is statistically significant (Table 44). Over 90 percent in both groups previously worked in the same sector as their current job, while 90 percent of treatment waste workers work under a fixed contract arrangement compared to nearly 50 percent of control waste workers. Nearly 45 percent of control waste workers operate within the *jajmani/brit* system.<sup>20</sup> This difference in the latter case is statistically significant.

**Table 44. Work History**

Work History	Treatment	Control	Total
Length in present occupation*	7.2	8.4	7.7
Length with present employer*	3.2	5.9	4.4
<b>Previous Occupation</b>			
Production and Related Workers, Transport Equipment Operator	90.8	96.6	93.4
Service Workers	5.7	1.9	4.0
Other	3.5	1.5	2.6
<b>Type of Current Employment*</b>			
Fixed contract	91.1	48.3	71.6
Jajmani/Brit	8.3	44.5	24.7
Other	0.7	7.2	3.7

Each of the SW workers employed in Aurangbad that participated in the FGDs worked for CIDCO on a salary basis where they hoped to become regular workers prior to the privatization of SW services. They are now employees of private SWM firms. Prior to outsourcing, some even switched from construction to solid waste management with the hope of becoming regular city employee at a later date. Since switching to work for the private SWM firm, this hope has dimmed, although

some have not given up hope and continue to stick with the work for this reason. They feel overburdened since coming to work for the private SWM firm. In this situation, their main concern now is for job security.

In contrast, most formal SW workers in Jhunjhunu worked as informal street sweepers or door-to-door collectors prior to being hired by the SWM firm. Several of them, in fact, have worked in the informal solid waste sector for generations as a primary or secondary occupation.

The informal door-to-door waste collectors in Churu have a definite boundary of work called *Brit* (a given territory). Nobody can enter into the *Brit* of another person. This system has been in operation for generations. There are reportedly some very old written documents bestowing rights over a given area/territory of the city. In case of new

<sup>20</sup> The *jajmani/brit* system consists of reciprocal social and economic arrangements between families of different castes within a village community in India, by which one family exclusively performs certain services for the other, such as ministering to the ritual or providing agricultural labor, in return for pay, protection, and employment security.

colonies in the city, there are frequent quarrels among informal SW workers over territorial rights. When this happens, the community’s leaders (*panchayat*) play important role in mediating the dispute.

### VII.C.ii. WORK BENEFITS AND TREATMENT BY SUPERVISORS

Treatment waste workers are far more likely than control waste workers to receive social security benefits, medical benefits, and work incentives/bonuses (Table 45). In certain cases, SWM firms are required by the terms of their contracts to provide social security and medical benefits to workers. The contract terms can limit the earnings potential of the SWM firms making it difficult for them to pay for additional benefits and performance bonuses.

In contrast, control waste workers are significantly more likely to receive pay on time, receive pay for the hours worked, and to receive rights for recyclable material. Control waste workers are also more likely to be treated decently in the workplace and less likely to be the victim of verbal abuse from supervisor. Relatively few workers in both groups are victims of physical violence in the workplace. The difference between the two groups is statistically significant in each case.

**Table 45. Work Benefits and Treatment by Supervisors**

Benefit	Treatment	Control	Total
Covered by social security benefits (e.g., PPF) *	28.3	2.3	16.4
Covered by medical benefits under ESI and/or other scheme*	50.2	8.7	31.3
Receives wages on time*	49.5	73.0	60.2
Receives full wage payment for days worked*	52.7	75.7	63.1
Employer provides incentives (e.g., bonus, award) for good work*	20.3	9.1	15.2
Employer grants rights over recyclable items*	19.0	30.4	24.2
<b>Treatment by Supervisors*</b>			
Sometimes beats	4.1	6.8	5.4
Uses abusive language	30.2	11.4	21.6
Behaves decently	39.7	56.7	47.7

### VII.C.iii. PRODUCTIVE ASSETS

The percentage of waste workers in either group owning or with access to productive assets is small. With one exception, fewer than 10 percent of waste workers own a particular asset, and with three exceptions, fewer than 20 percent of workers have access to a particular asset. According SWM firm owners, narrow profit margins, caused in part by restrictive contractual terms, limit their ability to provide both productive assets and safety equipment to their workers.

On balance, treatment waste workers appear to enjoy greater access to productive assets than control waste workers (Table 46). The difference, however, tends not to be large in most cases, and in some cases, control waste workers actually enjoy greater access (hand driven carts and caps).

Among those owning a particular asset, the number and value of the assets owned is similar between the two groups. The only difference that is statistically significant is the value of spade owned.

**Table 46. Access to Productive Assets**

Productive Asset	Percentage Households Owning Asset			Average Number Owned			Average Value of Owned Asset		
	Treatment	Control	Total	Treatment	Control	Total	Treatment	Control	Total
Hand-driven carts	3.6	13.9	7.8	2.2	1.0	1.4	923	429	564
Gloves	1.6	4.6	2.8	1.3	1.4	1.3	200	287	258
Caps	0.8	1.2	0.9	1.0	1.0	1.0	175	200	188
Leather Boots	1.2	4.0	2.4	1.3	1.4	1.4	250	307	290
Spade	8.4	15.6	11.3	1.1	1.4	1.3	87	129*	111
Belcha	5.2	11.6	7.8	1.2	1.1	1.1	135	128	131
Rickshaw	6.8	6.4	6.6	1.0	1.0	1.0	2,905	2,127	2,600
Tractor	0.8	0.0	0.0	2.0	0.0	2.0	250,000	0	250,000
Truck	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Basket	3.6	8.7	5.7	1.0	1.5	1.3	51	90	76

A higher percentage of solid waste workers in both groups hire productive assets than own them (Table 47). As before, the percentage hiring an asset is consistently higher among treatment solid waste workers than control solid waste workers.

**Table 47. Access to Productive Assets**

Productive Asset	Percentage Households Hiring Asset			Average Number Hired		
	Treatment	Control	Total	Treatment	Control	Total
Hand driven carts	20.3	15.0	18.2	1.0	1.0	1.0
Gloves	10.0	3.5	7.3	1.0	1.0	1.0
Caps	2.8	4.0	3.3	1.0	1.0	1.0
Leather Boots	5.2	0.0	4.2	1.0	0.0	1.0
Spade	27.9	19.1	24.3	1.0	1.0	1.0
Belcha	14.3	2.9	9.7	1.0	1.0	1.0
Rickshaw	8.8	1.2	5.7	1.0	1.0	1.0
Tractor	0.8	0.0	0.1	1.0	0.0	1.0
Truck	1.6	0.0	0.1	1.0	0.0	1.0
Basket	27.5	13.9	21.9	1.0	1.0	1.0

#### VII.C.iv. HOURS AND DAYS WORKED

Treatment waste workers work on average more hours per day and more days per month than control waste workers, and the difference is statistically significant (Table 48).

Among FGD participants in Aurangabad, their main duties include door-to-door collection of garbage, cleaning of roads and sewers, etc. They work for eight hours each day in one of three shifts: 6 am to 2 pm, 2 pm. to 10 pm, and 10 pm to 6

**Table 48. Hours and Days Worked**

Hours and Days Worked	Treatment	Control	Total
Average hours of work per day*	8.5	6.7	7.7
Normal working hours in a day*	8.9	7.1	8.1
Average number of days in first month*	23.5	22.6	23.1
Average number of days in second month*	24.1	23.0	23.6
Average number of days in third month*	24.1	23.0	23.6

am. Work relating to door-to door collection is generally performed in the first shift. In the second shift, sewer cleaning is generally done, whereas in the third shift street cleaning is done.

With the present sub-contracting system, workers in SWM firms in Jhunjhunu work as casual wage laborers. They work daily from 6 am to 10 pm and 2 pm to 5 pm. On an average the workers work for 24 days a month. Most of the workers believe that under the present sub-contracting system, they have managed to work for a relatively for more days a month than before. Earlier they had to toil in search of work; sometime, they were able to get employment for only about 10-12 days in month. Overall, their work frequency has improved since joining the SWM firm.

Informal SW workers in Churu work from 6 am to 2 pm in door-to-door waste collection and house cleaning (e.g. doors, staircases, galleries, sides, and latrines). After completing their work for the day, they are totally exhausted. There are no holidays for informal solid waste workers. In case of illness or social occasions, they have to hire the services of other fellow workers to attend their clients.

### VII.C.v. WORK STABILITY

Treatment waste workers experienced slightly fewer days without work than control waste workers over the past three months (Table 49). Nearly three-quarters of treatment waste workers characterized their work as “regular” compared to 41 percent of control waste workers. An additional 40 percent of waste workers characterize their work as “piece rate.” The difference in each case is statistically significant.

**Table 49. Work Stability**

Stability Indicator	Treatment	Control	Total
Days without work in last three months*	8.04	9.42	8.67
<b>Nature of Employment*</b>			
Regular	74.0	41.4	59.2
Temporary	21.3	18.6	20.1
Piece Rate	4.8	39.9	20.8

### VII.C.vi. SOLID WASTE EARNINGS

Treatment waste workers earn more on average than control waste workers in both their current and previous job (Table 50). Control waste workers, however, earn more from selling recyclable waste than treatment waste workers, although the amount earned from selling recyclable waste is not large in either case. The difference in each case is statistically significant.

**Table 50. Solid Waste Earnings (Rs.)**

Earnings	Treatment	Control	Total
Earnings first month*	1,683	1,355	1,534
Earnings second month*	1,719	1,382	1,565
Earnings third month*	1,717	1,386	1,566
Average monthly earnings in previous job*	1,498	1,068	1,302
Money earned from selling recyclable waste in during month*	37	56	46

### VII.C.vii. WORKER HEALTH AND SAFETY

Treatment and control waste workers were equally likely to fall ill or miss work days over the last six months, whereas treatment waste workers were significantly more likely to fall sick more frequently than other persons in their locality not working in solid waste management (Table 51). Treatment waste workers are significantly more likely to receive safety equipment at work. The percentage actually receive safety equipment at work, however, is small in both groups.

**Table 51. Worker Health and Safety**

Health and Safety Indicator	Treatment	Control	Total
Number of times fell ill during last six months	1.4	1.4	1.4
Number of work days missed due to illness during last six months	1.4	1.4	1.4
Fall sick more frequently than other persons in locality not involved in solid waste management*	44.8	28.5	37.4
Employer provides safety equipment (masks, gloves, aprons, rubber boots, helmets) *	13.7	8.4	11.2

### VII.C.ix. WORKERS' SUBJECTIVE ASSESSMENTS OF ECONOMIC AND SOCIAL STATUS

Approximately one-half of control solid waste workers reported an improvement in their economic and social status since joining their present employer (Table 52). The corresponding percentages for treatment waste workers were 40 percent and 25 percent. The difference in each case is statistically significant.

**Table 52. Workers' Subjective Assessments of Economic and Social Status**

Indicator of Economic and Social Status	Treatment	Control	Total
Economic status has improved since joining present employer*	40.3	52.9	46.0
Social status has improved since joining present employer*	25.4	47.5	35.5

## D. ACCESS TO FINANCE

### VII.D.i. ACCESS TO FINANCE

Relatively few waste workers in either group have loans outstanding, including 22.3 percent of treatment waste workers and 24.3 percent of control waste workers (Table 53). A single member of the treatment group has a second loan outstanding compared to none in the control group. All but two of the loans received by treatment waste workers were in cash, whereas approximately 12 percent of loan received by control waste workers were in kind. The difference in the latter case is statistically significant.

The average loan size among control waste workers was over Rs. 14,000, five times the average loan size of treatment waste workers of Rs. 2,700. The difference is statistically significant.

**Table 53. Access to Finance**

Access Dimension	Treatment	Control	Total
Percentage with loan outstanding	22.3	24.3	23.1
Average loan size (Rs.)*	2,7000	14,302	21,558
Average annual interest rate	27.6	26.9	27.3
Loans in cash*	96.4	88.1	92.9
Loans in kind*	3.6	11.9	7.1

Money lenders were the primary lending source for both groups accounting for over one-half of loans to treatment waste workers and one-third of control waste workers (Table 54). Friends and relatives were the second most important lending source for both groups. Commercial banks accounted for nearly 20 percent of loans to control waste workers and traders another 12 percent. No other source accounted for 10 percent or more of loans to treatment waste workers. The differences between the two groups in terms of lending sources are not statistically significant.

**Table 54. Lending Sources**

Source	Treatment	Control	Total
Micro finance institutions	5.4	7.1	6.1
Commercial banks	7.1	19.0	12.2
Traders	3.6	11.9	7.1
Money lenders	51.8	33.3	43.9
Friends/relatives	28.6	28.6	28.6
Co-operative institutions	1.8	0.0	1.0
Others	1.8	0.0	1.0

The large majority of loans made to sample solid waste workers were unsecured by labor, land, or other real property (Table 55), although at a higher rate to treatment solid waste workers than control solid waste workers. The difference between the two groups is not statistically significant.

**Table 55. Type of Guarantee**

Source	Treatment	Control	Total
On interest	85.7	73.8	80.6
Labor service	0.0	4.8	2.0
Mortgage of land	1.8	2.4	2.0
Mortgage of other properties	1.8	2.4	2.0
Other	10.7	9.5	10.2

## **E. RESULTS OF FOCUS GROUP DISCUSSIONS WITH FORMAL AND INFORMAL SOLID WASTE WORKERS**

In addition to the survey of formal and informal solid waste workers, researcher carried out FGDs with formal SW workers in Aurangabad, Maharashtra and Jhunjhunu, Rajasthan and with informal SW workers in Churu, Rajasthan. The main findings of these FGDs are presented below.

### **VII.E.i. FGD OF FORMAL SOLID WASTE WORKERS IN AURANGABAD**

Each of SW workers employed in Aurangabad that participated in the FGDs worked for CIDCO on a regular salary basis prior to the privatization of SW services. They are now employees of private SWM firms.

Among FGD participants in Aurangabad, their main duties include door-to-door collection of garbage, cleaning of roads and sewers, etc. The workers work daily for eight hours in one of three shifts: 6 am to 2 pm, 2 pm. to 10 pm, and 10 pm to 6 am. Work relating to door-to door collection is generally performed in the first shift. In the second shift, sewer cleaning is generally done, whereas in the third shift street cleaning is done.

The monthly salary is Rs. 3,150 (or Rs. 105 per day) and it paid on a monthly basis. An amount of Rs. 440 is deducted from their monthly wages towards their contribution to public provident fund (Rs. 228), ESI (Rs. 56), Bonus (Rs. 100), and Tax (Rs. 60). On average, Rs 14 are deducted for each day of work. This way, a worker gets a wage of Rs. 91 per day. Minimum wage, on the other hand, is Rs. 76 per day. This is less money than they were making at CIDCO.

The working conditions are very harsh. Workers are not provided any safety equipments such as gloves, boots, hat, goggles, dress, etc. They are not given the safe drinking water facility at their working sites. The current working conditions are no better than the previous employer. The supervisors do not treat them well and occasionally use abusive language. There is no provision for paid holidays. On the contrary, they are forced to rest for four days in a month for which their wages are deducted by the firm.

All of the workers previously worked for CIDCO where they hoped to becoming regular workers. Some even switched from construction to solid waste management with the hope of becoming regular city employee at a later date. Since switching to work for the private SWM firm, this hope has dimmed, although some have not given up hope and continue to stick with the work for this reason. They feel overburdened since coming to work for the private SWM firm. In this situation, their main concern now is for job security.

Workers are assigned an area of the city in which they live. There is very good cooperation among the workers, but they are not organized and thus have no means by which to advocate for their rights.

### **VII.E.ii. FGD OF FORMAL SOLID WASTE WORKERS IN JHUNJHUNU**

Most formal SW workers in Jhunjhunu worked as informal street sweepers or door-to-door collectors prior to being hired by the SWM firm. Several of them, in fact, have worked in the informal SW sector for generations as a primary or secondary occupation.

With the present sub-contracting system, they are working as casual wage labour. They work daily from 6 am to 10 pm and 2 pm to 5 pm. In principal, their daily wage is fixed at Rs. 70 by the municipality in their contract (a minimum wage) for a standard 8 hours of work. In practice, however, they are paid different wage rates ranging from Rs. 50 for males to Rs. 40 for females. Their working hours also vary from six to nine hours.

On an average the workers work for 24 days a month. Work is on a strict 'no work no pay' basis with no paid holidays, sick days, etc. Most of the workers believe that under present sub-contracting system, they have been able to get work for a relatively for more days a month than before. Earlier they had to toil in search of work; sometime, they were able to get employment for only about 10-12 days in month. Overall, their work stability has improved since joining the SWM firm.

The SWM firm does not provide safety equipments to the workers. Almost all workers work with their bare hands. The working conditions remain unchanged from their previous work. FGD participants all agreed that they get relatively better treatment from their current supervisors, who are sub-contractors and belong to their community, than their past supervisors (unlike the FGD participants in Aurangabad).

Workers have not received any training in their new job. They understand that their job is not secure and that they can be dismissed at any point in time. They do not receive benefits, including social security benefits (such as a contribution to provident fund), health insurance, maternity leave, etc. They are technically covered by the Minimum Wage Act, but in practice, they receive less than minimum wage. Due to the low wages, there is a very high work participation rate among the households of solid waste management workers. Many of them are engaged in multiple activities to augment their income.

The present system of working for a sub-contractor is highly unstable. There is no formal contract for work between the SWM firm and the workers. The firm can dismiss any worker at any time without any notice and also without any valid reason. Consequently, there exists a constant a sense of insecurity among the workers.

Almost all workers agreed that their wage earnings from door-to-door collection formed a significant portion of their household income. This income is used primarily to meet the consumption requirements of the household.

### **VII.E.iii. FGD OF FORMAL SOLID WASTE WORKERS IN CHURU**

Like their formal sector counterparts, informal SW workers in Churu belong to a Scheduled Caste. The informal door-to-door waste collectors in Churu have a definite boundary of work. This is generally called *Brit* (a given territory). Nobody can enter into the *Brit* of another person. This system has been in operation for generations. There are reportedly some very old written documents bestowing rights over a given area/territory of the city. In case of new colonies in the city, there are frequent quarrels among informal SW workers over territorial rights. When this happens, the community's (*panchayat*) leaders play important role in mediating the dispute.

Their tasks include door-to-door waste collection and house cleaning (e.g. doors, staircases, galleries, sides, and latrines). They earn around Rs. 15- 25 per day depending on the location of the household. Apart from this, they are given leftover food by households, which they sell to households owning cattle. Every household gives them a token honorarium, both cash and in-kind (e.g., sweets, clothes), during the festivals of Diwali and Holi.

Their work schedule is between 6 am to 2 pm. After completing their work for the day, they are totally exhausted. There are no holidays for informal solid waste workers. In case of illness or social occasions, they have to hire the services of other fellow workers to attend their clients.

## **F. RESULTS OF KEY INFORMANT INTERVIEWS**

Researchers conducted separate interviews with a Municipal Commissioner in Jhunjhunu and a Chief Sanitary Inspector in Aurangabad. The main findings of these interviews are presented below.

### **VII.F.i. INTERVIEW WITH MUNICIPAL COMMISSIONER**

At the time of the baseline study, the municipality had undertaken a number of important steps in outsourcing solid waste management.

- Provisioned financial resources in the municipal budget for sub-contracting works relating to solid waste management.
- Subcontracted sanitation work in 19 wards out of 35 to private contractors. Subcontracted services include garbage collection from local garbage bins, street cleaning, sewer cleaning, and transportation of garbage to filling sites.
- Subcontracted door-to-door collection in market areas with a local NGO.
- Subcontracted door-to-door collection of garbage on a pilot basis in three wards through private contractors.

The sustainability of the private SWM provision model faces a number of constraints and opportunities. The constraints are as follows.

- The current financial resources available at the municipality are not sufficient for sanitation requirements of the city.
- The lethargic attitude of regular municipal workers makes it difficult to take any punitive actions for non-compliance.
- Private contractors are barely able to make any profit under the current contract terms.
- There is no contractual provision for the social security of SW workers (such as provident fund, medical benefit, etc.) except ensuring a minimum wage. There is also no contractual provision for the use of safety equipments at the work site.
- In many cases contractors belong to well-off groups of the society. They are, consequently, not concerned about the welfare of their workers.

The opportunities are as follows.

- People are willing to pay for solid waste services provided they get quality service.
- If constraints can be overcoming, there does appear to be potential for subcontracting solid waste services on a much larger scale.
- There is good potential to generate additional revenue generation from waste recycling.
- The potential for large-scale organization of SW workers via self-help groups with the proper monitoring by various stakeholders, such as the municipality, elected officials, and RWAs.

#### **VII.F.ii. INTERVIEW WITH CHIEF SANITARY INSPECTOR**

In the present system of waste disposal, all waste is dumped in local dustbins and from there transported to filling sites. The waste is segregated by informal workers at these filling sites.

Municipal solid waste management is facing a financial crunch amidst growing pace of urbanization. The government is promoting public-private partnership in solid waste management, but it has yet to become a major initiative. This may take another few years. Presently, municipalities are sub-contracting their garbage collection work to private firms in order to save on the high cost of labor.

Urban households, on the other hand, consider solid waste management the responsibility of the municipality. They are unwilling to pay for public garbage collection. At the same time, however, they are willing to pay for door-to-door garbage collection provided they get good services. Given this, a number of private firms are trying to enter the market for private solid waste service provision. These private firms are lobbying the municipal government to gain control over garbage collection, disposal and recycling, etc., along with financial assistance from municipality for their services. Informal workers in solid waste management will continue to play a major role, but in the long run they are likely to lose control over the free garbage collection from the garbage dumping sites with the entry of large private firms.

GMED has played an important role in generating awareness among municipal officials about ways and means of improving urban services, including solid waste management. GMED helped the municipality to draft contracts for private sector companies interested in solid waste management. The results would probably have been better had the GMED visited different stakeholder—such as workers, resident welfare associations (RWAs), municipal officers, NGOs, etc.—more frequently.

### **VII.F.iii. SUMMARY OF BASELINE FINDINGS IN THE MSWM SUBSECTOR**

The baseline survey results yield no consistent patterns with regards to the baseline similarities or differences between the treatment and control solid waste workers. On the one hand, treatment solid waste workers enjoy greater work benefits, enjoy a higher (although not materially so) access to productive assets, enjoy moderately better health and safety conditions, work more hours and days during the week (but well below anything that might be considered exploitative), enjoy greater job stability, and earn significantly more.

On the other hand, control solid waste workers have been in the same occupation and with the same employer for a longer period of time, receive better treatment in the workplace, are sick less often relative than non-waste worker peer group members, and perceive themselves to enjoy greater economic and social status.

Finally, there is no difference between the two groups in terms of the frequency of illness and access to finance. In the latter case, both groups enjoy limited access to finance, and the bulk of loans they do receive tend to come from moneylenders and friends/family.

Overall, neither formal nor informal solid waste workers enjoy necessarily “good” working conditions. Working conditions are described as “harsh,” and access to productive assets and safety equipment is low in each group. Few receive benefits in the form of paid work days, paid sick days, maternity leave, bonuses, etc., and the salary is routinely low, effectively below minimum wage for some formal SW workers. Some formal SW workers have even had to accept worse working conditions and at lower pay on transferring from municipal payroll to the private firm payroll.

Whereas formal SW workers do enjoy greater job stability, their positions are far from secure. Firms are free to hire and fire as they see fit, and there is no shortage of job candidates. Formal workers, consequently, live in constant fear for their jobs. So, whereas treatment SW workers do enjoy some improved working conditions relative to the control SW workers, they do so only marginally in most cases, and in some cases, actually appear at a disadvantage to informal SW workers. (As noted above, areas in which formal SW workers do appear to enjoy clear advantages over informal SW workers include pay, job security, and access to medical and social security benefits, though these advantages are not necessarily universal among formal SW workers.)

Part of the explanation for the poor working conditions among treatment SW workers are restrictive terms in the SWM service contracts with the municipalities. Apparently, the terms of the contracts severely limit the profitability of the SWM firms making it difficult in turn for them to provide training, equipment, benefits, and higher wages to their workers. According to one key informant, had GMED made an effort to include more stakeholders in the contractual process, this might have been avoided to a degree.

Another possible explanation stems from the large class differences between some firm owners and SW workers. Almost all SW workers in both treatment and control groups belong to a Scheduled Caste, while firm owners belong to a higher class. The class difference may induce a lack of empathy on the part of owners in terms of their workers’ safety and welfare.

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## ANNEX I. FFV AND MSWM SURVEYS

### PROJECT ON

### IMPACT ASSESSMENT OF GROWTH ORIENTED MICRO-ENTERPRISE DEVELOPMENT (GMED) INDIA (Baseline Survey)

#### Household Schedule for Organically Certified Food Products and Fresh Fruits & Vegetables

*(The respondent must be the person who is mainly engaged in farm business of the sample household)*

1. State  2. District
3. Block  4. Village
5. HH No.
6. Complete address of the household \_\_\_\_\_

7. Social group (Scheduled Tribe-1, Scheduled Caste-2,  
Other Backward Caste-3, Others-4)
8. Type of household (Beneficiary-1, Control group -2)
9. Major occupation of household (Use NCO one digit code)
10. Respondent's Name \_\_\_\_\_

Investigator's Name: \_\_\_\_\_

Investigator's Signature and Date: \_\_\_\_\_

Supervisor's Name: \_\_\_\_\_

Supervisor's Signature and Date: \_\_\_\_\_



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## **LOCATION MAP**

A notional location map (written and graphic) showing land marks facilitating the location of the household at the time of follow up survey after two years.

## 1. DEMOGRAPHIC CHARACTERISTICS

S. no. (ID No.)	Name	Relation with the head*	Sex@	Age (years)	Marital status **	Educational level #	Employment status \$	Main occupat ion (Use code) ##	Second ary occupat ion (Use code) ##	Main industry (Use code)\$\$	How long in the main occupat ion?(in yrs)	Migrant status \$\$\$
1	2	3	4	5	6	7	8	9	10	11	12	13
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												

### Codes

\* Relation with head of the household: Self-1; husband/wife-2; son/daughter-3; daughter/ son in-laws-4; grand son/daughter-5; father/mother-6; brother/sister-7; mother/father in-law-8; sister/Brother- in-law-9; nephew/niece-10; uncle/aunty-11; other relatives-12; servant/employee/others-13

@ Male-1; Female-2

\*\* Unmarried-1; married-2; widow/widower-3; divorced/separated-4; others-5

# Illiterate-1; below primary or informal education-2; primary-3; middle-4; matric/high school/secondary-5; higher secondary/pre-university/intermediate-6; management/commercial school course-7; technical diploma or certificate below degree-8; technical/professional degree-9; graduate and above (other than technical) -10.

## Use NCO one-digit code (See NCO one digit code given with the instruction sheet).

\$ Self employed -1; unpaid family worker-2; regular salaried-3; temporary salaried-4; adhoc salaried-5; casual wage labour -6., unemployed -7; domestic work-8; student-9; too young-10; too old-11; disabled-12

\$\$ Industry code at one digit level (See NIC code given with the instruction sheet).

\$\$\$ Resident-1; temporary migrant (less than 3 months)-2; short term migrant (approx. 3 to 8 months out)-3; long term migrant (out for 9 or more months)-4.

### 1A. TECHNICAL TRAINING

ID No.	Name/type of training	Duration	Whether certificate given? (Yes-1, No-2)	Usefulness* (Use code)

\* Very useful-1, useful to some extent-2, not useful-3

### 2. LAND HOLDINGS

Nature of tenure	Area (in acres)	Area irrigated (in acres)
1	2	3
1.Total owned land: (2+3+4+6)		
2. Under cultivation		
3. Cultivable waste		
4. Not-cultivated (kept fallow till next crop cycle)		
5. Leased-in land		
6. Leased-out land		
7. Total land possessed (1+5)		

### 3. ASSETS

#### 3A. PRODUCTIVE ASSETS

Sl. No.	Assets	Owned		Hired (No.)	Whether used on exchange basis? Yes-1, No-2
		Number	Current value (Rs.)		
1	2	3	4	5	6
1	Tractor				
2	Trolley				
3	Harrow				
4.	Tiller				
5	Plank				
6.	Threshing machine				
7.	Combine harvester				
8.	Pumpset diesel				
9.	Pumpset electric				
10.	Bullock cart				
11.	Chaff-cutter manual				
12.	Chaff-cutter power driven				
13.	Spray pump				
14.	Storage bin				
15.	Honey bee box				
16.	Any other				
17.	Any other				

**3B. OTHER HOUSEHOLD ASSETS**

S.No	Assets	No.	Current value (Rs)	S.No	Assets	No.	Current value (Rs)
1	2	3	4	1	2	3	4
1	Own house			13	Car/jeep		
2	Bed (Palang)			14	Air cooler		
3	Cot			15	Fan		
4.	Table			16	Coking gas		
5	Chair/sofa set			17	Electric stove		
6.	Iron cupboard (Almirah)			18	Kerosene stove		
7	Radio			19	Mobile phone		
8	Deck			20	Phone (land line)		
9	Music system			21	Sewing machine		
10	Cycle			22	Any other (specify)		
11	TV			23.	Any other (specify)		
12	Motorcycle/scooter			24	Any other (specify)		

**3C. LIVESTOCK (OWNED)**

Type of animal	Number	Present value of stock (Rs.)
	3	4
1.Cow (Desi)		
2. Cow (Hybrid/Crossbred)		
3. She-buffalo		
4. Goat/sheep		
5. Cattle		
6. Bullocks		
7. He-Bufferalos		
8. Draught animal		
9. Poultry		
10. Pigs		
11. Camel		
12. Others (Please specify)		

#### 4. HOUSING STATUS

Item	Current status
a. Ownership # (Use code)	
b. Type of house (kutcha-1, pucca-2, semi-pucca-3)	
c. Number of rooms	
d. Whether HH has separate kitchen (Yes-1, No-2)	
e. Whether HH has separate bathroom (Yes-1, No-2)	
f. Whether house electrified (Yes-1, No-2)	
g. If not, then source of light in the house*	
h. Main source of cooking ** (Use code)	
i. Source of drinking water***	
j. Distance (in kilometres) of the source of drinking water	
k. Place of defecation #	

# Owned but inherited – 1; Owned but bought –2; provided by govt. –3; *gair majarua* (govt. land without allotment) – 4; rented – 5; others (specify) –6

\* Lantern -1; Dhigri -2; Kerosene petromax -3; Gas petromax -4; others (specify) -5

\*\* Firewood, cow dung, etc. -1, electricity, coal, etc.-2, kerosene-3, LPG-4, gobar gas-5, others (Pl. specify)-6

\*\*\* Own hand pump/tube well – 1; motorised hand pump -2; public hand pump/tube well – 3; tap in dwelling – 4; own protected dug well – 5; unprotected dug well – 6; public unprotected dug well – 7; public protected dug well – 8; public tap – 9; pond, river, stream – 10; shared hand pump -11; others –12.

# Flush latrine within the home – 1; covered dry latrine (*kutcha*) – 3; community latrine – 4; in the field – 5; others – 6.

## 5. EXPENDITURE PATTERN OF HOUSEHOLD

Items	Average monthly expenditure <sup>§</sup> (Rs.)	Items	Average monthly expenditure <sup>§</sup> (Rs.)
	1		2
1. Food grains*		11. Medical expenses	
2. Non-food grains**		12. Clothing	
3. Bakery items and other readymade foods		13. Footwear	
4. Intoxicants		14. Beddings	
5. Toiletries		15. Furniture	
6. Fuel & electricity		16. Loan repayment	
7. Rent of house		17. Recreation***	
8. Transport including fuel and maintenance on own vehicle		18. Marriage/ social ceremony, etc.	
9. Phone		19. Others (specify)	
10. Education		20. Others (specify)	

<sup>§</sup> For question no. 1 to 7 collect the expenditure data for the last 30 days only. For rest of the item collect the expenditure data for last 12 months and then calculate it for an average of one month.

\* Expenditure on cereals and pulses only

\*\* Expenditure on vegetables, milk, meat, fish, eggs, fruits (dry & fresh) etc.

\*\*\* on cultural activities, festivals etc.

## 6. PRODUCTION DETAILS

### 6A. PRODUCTION OF MAJOR ORGANIC CROPS (DURING LAST ONE YEAR EXCLUDING FRUITS)

(Area in acres, output in quintals and value in Rs.)

Sl. No.	Major crops*	Area sown	Area harvested	Irrigated area	Area under HYV crops	Physical output		Market value of main product	Market value of by-product
						Main	By-product		
1	2	4	5	6	7	8	9	10	11
Rabi									
1.									
2.									
3.									
4.									
Khariff									
5									
6.									
7.									
8.									
Jaid									
9									
10.									

Note: \* Begin with the recent cycle of crop; HYV= High yielding variety crops \$ Rabi-1, Khariff-2, Jaid-3

### 6B. PRODUCTION OF MAJOR INORGANIC CROPS (DURING LAST ONE YEAR EXCLUDING FRUITS)

(Area in acres, output in quintals and value in Rs.)

Sl. No.	Major crops*	Area sown	Area harvested	Irrigated area	Area under HYV crops	Physical output		Market value of main product	Market value of by-product
						Main	By-product		
1	2	4	5	6	7	8	9	10	11
Rabi									
1.									
2.									
3.									
4.									
Khariff									
5									
6.									
7.									
8.									
Jaid									
9									
10.									

Note: \* Begin with the recent cycle of crop; HYV= High yielding variety crops

\$ Rabi-1, Khariff-2, Jaid-3

### 6C. PRODUCTION OF FRUITS (DURING LAST ONE YEAR)

Sl. No.	Name of fruit	Number of trees	Production (in quintals)	Value (Rs.)
1.	Orange/Malta			
2.	Apple			
3.	Peach/Khumani			
4.	Walnut			
5.	Lemon			
6.	Papaya			
7.	Pear (Nashpati)			
8.	Cardamom			
9.	Litchi			
10.	Mango			
11.	Guava			
12.	Others (please specify)			
13.	Others (please specify)			
14.	Others (please specify)			

### 6D. RAINFALL AND CLIMATIC CONDITIONS (DURING LAST YEAR)

Crop season	Rainfall*	Climatic condition**
1	2	3
Summer		
Rainy		
Winter		

\*worse than normal-1, normal-2, better than normal-3

\*\* normal-1, abnormal-2

**6E. INPUT COSTS IN CULTIVATION (RS.) (FOR MAJOR CROPS GROWN DURING LAST ONE YEAR)**

Input costs	Name of crop							
	Rabi			Khariff			Jaid	
	2	3	4	5	6	7	8	9
1. Rent for leased-in land								
2. Ploughing charges, if hired (including labour charges, rent for tractor, bullocks, etc.)								
3. Seed (if purchased)								
4. Irrigation cost								
5. Fertiliser (Purchase cost)								
6. Purchase cost of pesticides/insecticides								
7. Spray charges paid for hired labour								
8. Spray charges paid for hired machine								
9. Organic inputs								
9.1 Purchase cost of herbicides/liquid pesticides								
9.2 Purchase cost of vermin compost/organic compost								
9.3 Purchase cost of liquid fertilisers								
9.4 Labour and material cost in preparation of compost pit and cow pat pit (CPP)								
10. Harvesting								
10.1 Hired machine								
10.2 Hired labour								
11. Threshing (if hired)								
12. Total fuel cost of tractor, thresher, pumpset etc including electricity charges								
13. Maintenance cost of tractor, thresher, pumpset and other agri.implements								
14. Transportation cost including labour charges								
15. Marketing fee								

16. Cost of storage									
17. Interest on loans, tax, commissions, etc.									
18. Other cost (pl specify)									
19. Other cost (pl specify)									

**6E. WASTAGE DETAILS (ONLY FOR OCFP AND FFV)--(QUANTITY IN KG. AND VALUE IN RS.)**

Sl. No.	Name of crop	Household consumption		Spoilage due to lack of storage, pest/rodents/diseases etc.		Recycling of waste		Kept for seed		Rejected by buyers	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1	2	3	4	5	6	7	8	9	10	11	12
1.											
2.											
3.											
4.											
5.											
6.											
7.											
8.											
9.											
10.											

**7. SALE/MARKETING OF THE CROP DURING LAST YEAR (FOR MAJOR CROPS ONLY)**

Sl. No.	Sale/marketing	Organic				Inorganic			
		3	4	5	6	7	8	9	10
1	2	3	4	5	6	7	8	9	10
1.	Quantity sold (quintals)								
1.1	Purchaser 1 (Use code)*								

1.2	Purchaser 2 (Use code)*								
1.3	Purchaser 3 (Use code)*								
2.	Price/ qtl (or unit specify)								
2.1	Purchaser 1 (Use code)*								
2.2	Purchaser 2 (Use code)*								
2.3	Purchaser 3 (Use code)*								
3.	Total income from sale (Rs.)								
4.	If stored, quantity (in qtls)								
5.	Period of storage (in months)								

\* Wholesale market -1; local market -2; villagers (directly) -3; co-operative -4; lead farmers -5; government agencies- 6; sold to merchant against debt/advance -7; free selling at farm gate -8; pre-arranged contract -9; NGOs-10; private company-11; others (specify)- 12.

**8. NEW FARM PRACTICES ADOPTED DURING LAST YEAR (TO BE FILLED UP ONLY IF A PARTICULAR PRACTICE IS BEING ADOPTED)**

**8A. FRESH FRUITS AND VEGETABLES**

Sl. No.	Farm practice	Name of crops					
1	Improved seed varieties						
2	Nursery preparation						
3	Tray nursery						
4	Manual seed drill						
5	Land preparation (bed farming, rotor vator, etc.)						
6	Drip irrigation						
7	Sprinkle irrigation						
8	Netting						
9	Mulching						
10	Staking						
11	Fertigation						
12	Grading						
13	Packing						
14	Others (specify)						
15	Others (specify)						

## 8B. ORGANIC FOOD PRODUCTS

Sl. No.	Farm practice	Name of crops					
1	Improved seed varieties						
2	Nursery preparation						
3	Tray nursery						
4	New composting technique (like vemi compost/cow pat pit)						
5	Land preparation (bed farming, rotor vator, etc.)						
6	Drip irrigation						
7	Sprinkle irrigation						
8	Crop protection techniques (light trap)						
9	Crop management techniques						
10	Tree plasting						
11	Fertigation						
12	Use of organic fertilizers/pesticides						
13	Grading						
14	Packing						
15	Others (specify)						

## 9. LOAN (ONLY FOR PRODUCTION PURPOSES)

Details of debt	Debt 1	Debt 2
1	2	3
1. Cash or Kind*		
2. Source**		
3. Amount of loan taken (in Rs.)		
4. Rate of interest (per annum)		
5. Condition of loan#		
6. Total debt outstanding (Rs.)		

\* Cash-1; kind-2.

\*\* Micro finance institutions including SHGs -1, commercial banks- 2; traders-3; money lenders-4; (*Abartia*) commission agent -5; landlords/employers -6; friends/relatives-7; co-operative institutions-8; Govt. programme - 9; others (specify)- 10.

# On interest- 1, labour service- 2, mortgage of land- 3, mortgage of other properties - 4; others (specify)- 5.

## 10. LABOR USE IN AGRICULTURE (DURING LAST ONE YEAR)

Crop season	Name of activity	Family labor (Persondays)			Hired labor (Persondays)		
		Male	Female	Children	Male	Female	Children
1	2	3	4	5	6	7	8
Rabi							
1	Ploughing/land preparation						
2	Sowing						
3	Weeding						
4	Harvesting						
Khariff							
5	Ploughing/land preparation						
6	Sowing						
7	Weeding						
8	Harvesting						
Jaid							
9	Ploughing/land preparation						
10	Sowing						
11	Weeding						
12	Harvesting						

## 11. INCOME OF HOUSEHOLD (OTHER THAN CULTIVATION)

### 11A. INCOME FROM LIVESTOCK (DURING LAST ONE MONTH)

Sl. No.	Name of product	Quantity sold	Value (Rs.)
1.	Milk (Lits)		
2.	Milk products (ghee, paneer, etc.) (Kgs.)		
3.	Meat (Kgs.)		
4.	Eggs (Nos.)		
5.	Hide and skins		
6.	Manure		
7.	Sale of animals		
8.	Others		
9.	Less input cost on fodder, transport and wages to hired labor)		

**11B. INCOME FROM ALLIED ACTIVITIES (AGRICULTURAL) DURING LAST ONE YEAR**

Sl. No.	Name of product	Quantity sold	Value (Rs.)	Input cost* (Rs.)
1	Forestry			
2	Fisheries			
3	Others			

*Note:* Input cost includes wages paid to hired labor, transportation, fodder for fisheries, etc.

**11C. INCOME FROM SELF-EMPLOYED NON-FARM ACTIVITIES (TO BE FILLED-IN ONLY IF SOME PERSON OF THE HOUSEHOLD IS EMPLOYED IN NON-FARM ACTIVITY)**

Name of activity (use NCO one digit)	No. of persons engaged	No. of persondays	Gross income (Rs.)	Input cost excluding labour (Rs.)	Hired labour cost, if any (Rs.)

**11D. AVERAGE MONTHLY INCOME FROM WAGES AND SALARY (RS.) (ONLY FOR REGULAR WORKERS)**

ID No.	Monthly salary (Rs.)

**11E. AVERAGE ANNUAL INCOME FROM CASUAL WAGE EMPLOYMENT (RS.)**

ID No.	Average number of days worked during last one year		Total wage earnings (Rs)	
	Agriculture	Non-agriculture	Agriculture	Non-agriculture

## 11F. INCOME FROM OTHER SOURCES DURING LAST ONE YEAR

Source of income	Income during last year (Rs.)
1. Remittances	
2. Rent from agricultural implements	
3. Rent from house	
4. Rent from leased out land	
5. Rent from leased out livestock	
6. Pensions including old age pension	
7. Interest	
8. Income from other sources (Please specify)	

## 12. POVERTY SCORE CARD

Sl. No.	Indicator	Values					Points
1	How many children aged 0 to 17 are in the household?	>4	3	2	1	Zero	
		0	8	13	19	27	
2	How many electric fans do the household own?		0	1	2	>3	
			0	1	2	4	
3	What is the household's primary energy source for cooking*?		Firewood, cow dung, etc	Electricity, coke or coal	Kerosene gobar gas	LPG	
			0	5	6	7	
4	In the past 12 months, did anyone in the household buy leather boots or shoes?				No	Yes	
					0	7	
5	In the past 30 days, did anyone in the household spend anything on telephone charges?				No	Yes	
					0	7	

6	What is the principle occupation of the household?	Agri lab	Non-agri lab	Cultivators, farmers, fishers, hunters, loggers	Sales and service workers and transport equipment workers	Professional, tech. clerical, adm, managerial and executive and teachers	
		0	4	6	7	7	
7	In the past 30 days, did anyone in the household buy a toothbrush, toothpaste, etc.?				No	Yes	
					0	5	
8	In the past 12 months, did the household buy any bed sheets or bed covers?				No	Yes	
					0	4	
9	In the past 30 days, did the household pay for the services of a doctor or surgeon?				No	Yes	
					0	4	
10	How many children ages 6 to 17 attend school?			Not all children attend school	There are no children	All children attend school	
				0	2	4	
11	In the past 30 days, did anyone in the household consume any milk or ghee?				No	Yes	
					0	6	
12	In the past 30 days, did anyone in the household consume an apple/fruit?				No	Yes	
					0	6	
13	How many pressure cookers or pressure pans does the household own?			Zero	1	>2	
					2	5	

14	In the past 30 days, did the household buy any bread from a bakery?				No	Yes	
					0	3	
15	Does the household own a television?				No	Yes	
					0	3	
						<b>Total</b>	

### 13. PERCEPTIONS OF BENEFICIARY FARMERS (TREATMENT GROUP) ON THE PERFORMANCE OF THE PROGRAM

Sl. No.	Item	Level of satisfaction				
		Very high (1)	High (2)	Average (3)	Less than average (4)	Not satisfactory (5)
1.	Nature of programme/intervention					
2.	Quality of programme					
3.	Services/cooperation of partner organisations of the value chain					
4.	Extension services					
5.	New marketing methods					
6.	New technology know-how/new farm practices					
7.	Improved awareness					
8.	Risk mitigation (feel more secured in sale of product)					
9.	Group/team building and cohesiveness					
10.	Benefited from prices offered by partner organization					

### OBSERVATIONS BY FIELD INVESTIGATORS/SUPERVISORS

**PROJECT ON**

**IMPACT ASSESSMENT OF GROWTH ORIENTED MICRO-ENTERPRISE  
DEVELOPMENT (GMED) INDIA**

**(Baseline Survey)**

**Schedule for Municipal Solid Waste Management Sector**

*(The respondent must be the person who is mainly engaged in solid waste management activity)*

**Identification Particulars**

1. State  2. District   
3. Block  4. Village   
5. HH No.

6. Complete address of the household-----  
-----

7. Social group (Scheduled Tribe-1, Scheduled Caste-2,  
Other Backward Caste-3, Others-4)   
8. Type of household (Beneficiary-1, Control group -2)   
9. Major occupation of household (Use NCO one digit code)

10. Respondent's Name \_\_\_\_\_

*Investigator's Name:* \_\_\_\_\_

*Investigator's Signature and Date:* \_\_\_\_\_

*Supervisor's Name:* \_\_\_\_\_

*Supervisor's Signature and Date:* \_\_\_\_\_



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## **LOCATION MAP**

A notional location map (written and graphic) showing land marks facilitating the location of the enterprise/worker at the time of follow up survey after two years.

**Part A**  
**Schedule for Small & Medium Enterprises in Municipal Solid Waste Management**

**1. CHARACTERISTICS OF THE FIRM/ENTERPRISE**

Sl no	Characteristic	Details
1.	Name of the firm/enterprise	
2.	Name of owner	
3.	Age of the owner (in years)	
4.	Sex of the owner (Male-1, Female-2)	
5.	Registration status (Registered-1, Unregistered-2)	
6.	Ownership (Proprietary-1, Partnership-2)	
7.	Number of months operated during the last year	
8.	Types of activities undertaken* (Use codes)	
9.	Waste disposal**	

\* Door to door collection of garbage – 1, street sweeping and drain cleaning- 2; segregation -3, Transportation to dumping -4; Post dumping activities: Composting -5; segregating/ recyclable waste -6; incineration -7; land filling -8, construction and maintenance of toilets-9, training on hygiene promotion-10 Others (pl. specify) -11.

\*\* Community bin/transfer station-1; dumpsite-2; empty place-3; others (pl. specify)-4

**2. NUMBER OF WORKERS**

Sl. No.	Workers	Male	Female	Child	Person
1.	Household workers				
2.	Other than household workers				
3.	Number of workers by their hierarchy (including household workers)				
4.	Managers				
5.	Supervisors				
6.	Waste collectors				

**3. QUANTITY OF GARBAGE COLLECTED**

Sl. no	Type of garbage	Quantity (Tonnes)
1.	Compostable	
2.	Recyclable	
3.	Non-recyclable/rejects	
4.	Total	

**4. RECEIPTS**

**4A. RECEIPTS FROM INDIVIDUAL HOUSEHOLDS/SHOPS/HOTELS DURING LAST MONTH (APPLICABLE BOTH FOR ENTREPRENEURS ENGAGED IN MUNICIPAL SOLID WASTE MANAGEMENT AND INFORMAL SECTOR WORKERS ENGAGED IN DOOR TO DOOR GARBAGE COLLECTION)**

Number of households/shops/hotels covered	Charges per household (Rs.)	Charges per Shop/hotel (Rs.)	Total receipts during last month (Rs.)
1	2	3	4

**4B. RECEIPTS FROM SALE OF SOLID WASTE DURING LAST ONE MONTH**

Sl. No.	Item sold	Unit	Quantity (in quintal)	Value (Rs)
1	2	3	4	5
1.	Plastic			
2.	Paper			
3.	Glass			
4.	Metals			
6.	Others (Pl. specify)			
7.	Others (Pl. specify)			
8.	Others (Pl. specify)			
9.	Total			

**4C. RECEIPTS FROM MUNICIPALITIES (APPLICABLE ONLY FOR ENTREPRENEURS/CONTRACTORS ENGAGED IN MUNICIPAL SOLID WASTE MANAGEMENT)**

Sl. No.	Activity	Rate per unit/per household (Rs.)	Total units	Amount (Rs)
1.	Door-to door garbage collection			
2.	Street cleaning, and drain cleaning			
3.	Transportation to dumping ground			
4.	Others (please specify)			
5.	Others (please specify)			
6.	Total			

**5. WAGE/EMOLUMENTS PAYMENT DURING LAST YEAR**

Sl. No.	Category of worker	Wage paid (Rs.)
1.	Managers	
2.	Supervisor	
3.	Workers	
4.	Total	

**Part B**

**Household Schedule (Both for Entrepreneurs and Workers)**

**1. DEMOGRAPHIC CHARACTERISTICS**

S. no. (ID No.)	Name	Relation with the head*	Sex@	Age (in years)	Marit al status **	Educ ation level #	Employ ment status \$	Main occupa tion (Use code) ##	Second ary occupat ion (Use code) ##	Main industry (Use code)\$\$	How long in the main occupati on?(in yrs)	Migrant status \$\$\$
1	2	3	4	5	6	7	8	9	10	11	12	13
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												

**Codes**

\* Relation with head of the household: Self-1; husband/wife-2; son/daughter-3; daughter/ son in-laws-4; grand son/daughter-5; father/mother-6; brother/sister-7; mother/father in-law-8; sister/Brother- in-law-9; nephew/niece-10; uncle/aunty-11; other relatives-12; servant/employee/others-13

@ Male-1; Female-2

\*\* Unmarried-1; married-2; widow/widower-3; divorced/separated-4; others-5

# Illiterate-1; below primary or informal education-2; primary-3; middle-4; matric/high school/secondary-5; higher secondary/pre-university/intermediate-6; management/commercial school course-7; technical diploma or certificate below degree-8; technical/professional degree-9; graduate and above (other than technical) -10.

## Use NCO one-digit code (See NCO one digit code given with the instruction sheet).

\$ Self employed –1; unpaid family worker-2; regular salaried-3; temporary salaried-4; adhoc salaried-5; casual wage labour -6., unemployed – 7; domestic work-8; student-9; too young-10; too old-11; disabled-12

\$\$ Industry code at one digit level (See NIC code given with the instruction sheet).

\$\$\$ Resident-1; temporary migrant (less than 3 months)-2; short term migrant (approx. 3 to 8 months out)-3; long term migrant (out for 9 or more months)-4.

**1A. TECHNICAL TRAINING**

ID No.	Name/type of training	Duration	Agency *	Whether certificate given? (Yes-1, No-2)	Usefulness**(Use code)

\* Government-1, private training institute-2, on-the-job training (informal only) -3

\*\* Very useful-1, useful to some extent-2, not useful-3

## 2. ASSETS

### 2A. PRODUCTIVE ASSETS

Sl.no	Assets	Owned		Hired (No.)
		Number	Current value (Rs.)	
1	2	3	4	5
1.	Hand driven carts			
2.	Gloves			
3.	Caps			
4.	Leather boots ( bought within the last 12 months)			
5.	Spade			
6.	<i>Belcha</i>			
7.	Rickshaw			
8.	Tractor			
9.	Truck			
10.	Jeep			
11.	Basket			
12.	Others (please specify)			

## 2B. OTHER HOUSEHOLD ASSETS

S.No	Assets	No	Current value (Rs)	S.No	Assets	No.	Current value (Rs)
1	2	3	4	1	2	3	4
	House				Car/jeep		
	Bed (Palang)				Air cooler		
	Cot				Coking gas		
	Table				Electric Stove		
	Chair/sofa set				Kerosene stove		
6	Iron cupboard (Almirah)			17	Fire hearth (Chullah)		
7	Radio			18	Mobile phone		
	TV				Phone (land		
	Music system				Sewing machine		
	Cycle				Any other		
	Motorcycle/scoot						

## 3. HOUSING STATUS

Item	Current status
a. Ownership *	
b. Type of house (Kutchi-1, pucca-2, semi-pucca-3)	
c. Number of rooms	
d. Whether HH has separate kitchen (Yes-1, No-2)	
e. Whether HH has separate bathroom (Yes-1, No-2)	
f. Whether house electrified (Yes-1, No-2)	
g. If not, then source of light in the house**	
h. Primary source of energy#	
i. Source of drinking water***	
j. Distance of the source of drinking water	
k. Place of defecation ##	

\* Owned but inherited – 1; Owned but bought –2; provided by govt. –3; gair majarua (govt. land without allotment) – 4; landlord's land – 5; others (specify) –6

\*\* Lantern -1; Dhigri -2; Kerosene Petromax -3; Gas Petromax -4; others (specify) -5

\*\*\* Own hand pump/tube well – 1; motorised hand pump -2; public hand pump/tube well – 3; tap in dwelling – 4; own protected dug well – 5; unprotected dug well – 6; public unprotected dug well – 7; public protected dug well – 8; public tap – 9; pond, river, stream – 10; shared hand pump -11; others –12.

# Wood – 1; coal – 2; kerosene oil – 3; hay/leaves – 4; cow dung cake – 5; agricultural waste (stalks)– 6; gobar gas plant – 7; liquid petroleum gas – 8; electricity - 9; others – 10.

## Septic tank – 1; pit latrine – 2; covered dry latrine – 3; community latrine – 4; in the field – 5; others – 6.

#### 4. EXPENDITURE PATTERN OF HOUSEHOLD

Items	Average monthly expenditure <sup>§</sup> (Rs.)	Items	Average Monthly Expenditure <sup>§</sup> (Rs.)
1.	2	1	2
11. Food grains*		12. Clothing	
12. Non-food grains**		13. Footwear	
13. Bakery items and other readymade foods		14. Beddings	
14.		15. Furniture	
15. Intoxicants		16. Recreation***	
16. Toiletries		17. Loan repayment	
17. Fuel & electricity		18. Savings / lending	
18. Rent of house		18. Marraige/ social ceremonies	
19. Transport including fuel and maintenance expenditure on own vehicle		19. Others (specify)	
20. Phone		20. Others (specify)	
21. Education			
22. Medical expenses			

<sup>§</sup> For question no. 1 to 7 collect the expenditure data for the last 30 days only. For rest of the item collect the expenditure data for last 12 months and commute it for average of one month.

\* Expenditure on cereals and pulses only

\*\* Expenditure on vegetables, milk, meat, fish, eggs, fruits (dry & fresh) etc.

\*\*\* on cultural activities, festivals etc.

#### 5. INDEBTEDNESS

Details of debt	Debt 1	Debt 2
1	2	3
Cash or Kind*		
Source**		
Purpose of loan***		
Amount of loan taken (in Rs.)		
Condition of loan#		
Rate of interest (per annum)		
Total debt outstanding (Rs.)		

\* Cash-1; kind-2.

\*\* Micro finance institutions including SHGs -1, commercial banks- 2; traders-3; money lenders-4; (*Abartia*) commission agent -5; landlords/employers -6; friends/relatives-7; co-operative institutions-8; Govt. programme - 9; others (specify)-10.

# On interest- 1, labour service- 2, mortgage of land- 3, mortgage of other properties - 4; others (specify)- 5.

## 6. HOUSEHOLD INCOME

### 6A. INCOME FROM AGRICULTURE AND ALLIED ACTIVITIES DURING LAST ONE YEAR

Sl. No.	Name of product	Quantity sold	Value (Rs.)	Input cost* (Rs.)
1	Agriculture@			
2	Livestock#			
3	Forestry			
4	Fisheries			
3	Others			

Note: @ Quantity of agricultural crops produced and market value thereof.

# Only mention market value of income from livestock, such as milk and milk products, sale of animals such as pigs, poultry, goats, etc.

\* Input cost includes wages paid to hired labour, purchase value of seeds, fertilisers, transportation, fodder, etc.

### 6B. INCOME FROM SELF-EMPLOYED NON-FARM ACTIVITIES (TO BE FILLED-IN ONLY IF SOME PERSON OF A HOUSEHOLD IS EMPLOYED IN NON-FARM ACTIVITY)

Name of activity (use NCO one digit)	No. of persons engaged	No. of persondays	Gross income (Rs.)	Input cost excluding labor (Rs.)	Hired labor cost, if any (Rs.)

### 6C. AVERAGE MONTHLY INCOME FROM WAGES AND SALARY (RS.) (ONLY FOR REGULAR WORKERS)

ID No.	Monthly salary (Rs.)

### 6D. AVERAGE ANNUAL INCOME FROM CASUAL WAGE EMPLOYMENT (RS.)

ID No.	Average number of days worked during last one year		Total wage earnings (Rs)	
	Agriculture	Non-agriculture	Agriculture	Non-agriculture

**6E. INCOME FROM OTHER SOURCES DURING LAST ONE YEAR**

Source of income	Income during last year (Rs.)
1. Remittances	
2. Rent from productive assets like cycle rickshaw	
3. Rent from house	
4. Rent from leased out land	
5. Rent from leased out livestock	
6. Pensions including old age pension	
7. Interest	
8. Income from other sources (Please specify)	

**7. EMPLOYMENT AND WORKING CONDITIONS OF WORKERS/EMPLOYERS ENGAGED IN MUNICIPAL SOLID WASTE MANAGEMENT**

Sl. No.	Characteristic	ID. No	ID. No	ID. No
1.	Nature of employment (Regular-1, Temporary-2, Casual-3, Piece rate)			
2.	Type of contract of employment (fixed contract-1, <i>jajmani/brit</i> -2, Other (footloose worker)-3)			
3.	Average hours of work per day			
4.	Number of days worked during last three working months			
4.a	First month.			
4.b	Second month			
4.c	Third month			
5.	For how many days in last three months you were without work?			
6.	Income during last three working months (Rs.)			
6.a	First month.			
6.b	Second month			
6.c	Third month			
7.	Since how long you have been working in your present occupation?			
8.	Since how long you have been			

	working with your present employer?			
9.	What was your previous occupation* (Use code as given in Part B.1)			
10.	What was your average monthly earning (Rs.) in the previous job?			
11.	Normal working hours in a day			
12.	How many times you fell ill during last six months?			
13.	How many days you missed work due to illness during last six months?			
14.	Do you fall sick more frequently than other persons in your locality who are not involved in solid waste management (Yes-1, No-2)			
15.	Are you covered by social security benefits such as PPF? (Yes-1, No-2)			
16.	Are you covered by medical benefits under ESI and /or any other scheme? (Yes-1, No-2)			
17.	Do you have rights over recyclable items? (Yes-1, No-2)			
18.	How much you earn from selling recyclable waste in a month? (Rs.)			
19.	Behaviour of your seniors/supervisors/employers (sometime beat-1, uses abusive language-2, sexual harassment-3, behaves decently- 4, any other (pl. mention)-5			
	<b><i>The following questions to be asked only to workers employed by contractors (Treatment Group)</i></b>			
20.	Do you get your salary/wage on time (Yes-1, No-2)			
21.	Do you get full wage payment for your days of work (Yes-1, No-2)			
22.	Does your employer provide you safety equipments like masks/aprons/gloves, rubber boots, helmets, etc. (Yes-1, No-2)			
23.	Does your employer give you any incentive such as bonus/award/cash boucher for your good work? (Yes-1, No-2)			
24.	Whether your economic status has improved after joining your present employer? (Improved-1, Almost same-2, Deteriorated-3)			

25.	Whether your social status has improved after joining your present employer? (Improved-1, Almost same-2, Deteriorated-3)			
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## 8. POVERTY SCORE CARD

Sl. No.	Indicator	Values					Points
1	How many children aged 0 to 17 are in the household?	>4	3	2	1	Zero	
		0	8	13	19	27	
2	How many electric fans does the household own?		Zero	1	2	>3	
			0	1	2	4	
3	What is the household's primary energy source for cooking*?		Firewood, cow dung, etc	Electricity, coke or coal	Kerosene, gobar gas	LPG	
			0	5	6	7	
4	In the past 12 months, did anyone in the household buy leather boots or shoes?				No	Yes	
					0	7	
5	In the past 30 days, did anyone in the household spend anything on telephone charges?				No	Yes	
					0	7	
6	What is the principle occupation of the household?	Agri lab	Non-agri lab	Cultivators, farmers, fishers, hunters, loggers	Sales and service workers and transport equipment workers	Professional, tech. clerical, adm, managerial and executive and teachers	
		0	4	6	7	7	

7	In the past 30 days, did anyone in the household buy a toothbrush, toothpaste, etc.?				No	Yes	
8	In the past 12 months, did the household buy any bed sheets or bed covers?				No	Yes	
					0	4	
9	In the past 30 days, did the household pay for the services of a doctor or surgeon?				No	Yes	
					0	4	
10	How many children ages 6 to 17 attend school?			Not all children attend school	There are no children	All children attend school	
				0	2	4	
11	In the past 30 days, did anyone in the household consume any milk or ghee?				No	Yes	
					0	6	
12	In the past 30 days, did anyone in the household consume an apple or fruit?				No	Yes	
					0	6	
13	How many pressure cookers or pressure pans does the household own?			Zero	1	>2	
					2	5	
14	In the past 30 days, did the household buy any bread from a bakery?				No	Yes	
					0	3	
15	Does the household own a television?				No	Yes	
					0	3	
						<b>Total</b>	

**OBSERVATIONS BY FIELD INVESTIGATORS/SUPERVISORS**

## **ANNEX 2. INTERVIEW GUIDES**

### **DISCUSSION GUIDE FOR EXTENSION AGENTS IN FRESH FRUITS AND VEGETABLES SUBSECTOR**

#### **Introduction**

Introduce yourself and briefly describe the purpose of the interview/focus group discussion.

#### **Background**

1. What extension services do you provide?
  - Why?
  - What are your objectives?
2. How would you describe the features that distinguish the small-scale vegetable farmers you work with?
3. What are the primary challenges and opportunities you face in providing these services?

#### **Market Needs and Program Success**

1. Describe markets for fresh vegetables. The description should include information on sellers, buyers, service and input providers, processors, producer associations, etc.
  - Where do small-scale farmers fit within this market?
  - What are the opportunities in short, medium, and long term for small-scale farmers to upgrade and access higher value markets?
  - What are the obstacles for small-scale to upgrade and access higher value markets?
2. What are the most important needs of the farmers in terms of upgrading production and accessing higher value markets?
  - How are you addressing these particular needs?
3. What is the nature of your relationship with the farmers? For example, how do the farmers respond to you and the services you provide? What is the level of trust between you and the farmers?
4. How successful have you been so far compared to your objectives and in terms of upgrading production and accessing new markets? (Provide examples of successes and failure).
  - Why?
5. Overall, what changes have you observed since you started working with the farmers? (Probe for information in terms of farming practices, productivity, quality, price, volume sold, investment in equipment and machinery, attitudes, costs, job creation, etc.)
  - Why?
  - What was the impact of the ITC program on these changes?
6. What changes have not occurred that should have?
  - Why?

## **Future Prospects**

1. Are the observed changes likely to be sustained over time?
  - Why or why not?
2. What are your future plans for working with the farmers?
3. What are the future prospects for the farmers in terms of achieving your objectives, upgrading production, and accessing new markets?
  - What features of the ITC program, farmers, or the surrounding environment make it more likely you will achieve your objectives?
  - What features of the ITC program, farmers, or the surrounding environment make it less likely you will achieve your objectives?
4. What do you see as the strengths and weaknesses of the ITC extension agent program?
  - What changes would you recommend?
  - Why?

## **DISCUSSION GUIDE FOR SMALL-SCALE VEGETABLE FARMERS IN FRESH FRUITS AND VEGETABLES SUBSECTOR**

### **Introduction**

Introduce yourself and briefly describe the purpose of the interview/focus group discussion.

### **Background Information**

1. Describe the type of vegetables that you produce?
2. How much did you harvest last season (give dates)?
3. How much did you sell last season (give dates)?
4. Approximately how much did you earn from vegetables sales (profits net of expenses)?

### **Market Linkages**

#### *Buyers*

1. What are the different ways that vegetable farmers can sell their produce?
2. How do these different buyers differ in terms of:
  - Price and profitability?
  - Risk (e.g., risk of not getting paid full value, risk of low prices, risk of fraud or dishonest practices, risk of theft, etc.)?
  - Transaction costs (e.g., the time it takes to gather information about the buyers, travel to the place of sale, time spent meeting with buyers, time it takes to collect payment, etc.)?
3. To whom do you sell?

4. What is the nature of your relationship with the buyers? (For example: Do you have a close relationship with the buyers? Do you have repeat transactions?)
  - Are you confident that the buyers will uphold their agreements with you? (Specify what those agreements are.) Why or why not?
  - In general, what is the level of trust you have with each of the different types of buyers and they with you?
5. How are the terms or agreements with different types of buyers negotiated? (Includes either individual agreements or agreements made through producer groups.)
6. How do these agreements affect your flexibility to sell produce through other outlets?
7. How are disputes with buyers handled?

#### *Input and Service Providers*

8. What are the different ways that vegetable farmers can purchase inputs or services?
9. How do these different input and services differ in terms of:
  - Cost? (Includes both cash cost and transaction cost.)
  - Reliability?
  - Quality?
  - Customer service?
10. What inputs and services do you purchase and from whom?
11. What is the nature of your relationship with the input and service providers? (For example: Do you have a close relationship with them? Do you have repeat transactions?)
  - Are you confident that the buyers will uphold their agreements with you? (Specify what those agreements are.) Why or why not?
  - In general, what is the level of trust you have with each of the different types of input and service provider and they with you?

#### *Embedded Services*

12. What are the different kinds of support or assistance (services) you receive from your buyers or input suppliers? (Ask separately for each buyer or input supplier. Ask specifically about inputs, finance, training or technical assistance, adoption of new or improved products, group organization support, access to markets and market information, and tools/equipment.)
13. What is the quality of this support or assistance?
14. How has this kind of support or assistance benefited you? (Probe to determine how the support may have affected things such as practices adopted, productivity, sales, profits, investment in equipment and machinery, costs, loss/wastage, etc.)
15. How does it benefit those who provide it to you?
16. From whom else could you get this kind of support or assistance other than your buyer or input supplier?
  - Do you receive support or assistance from these sources?

- Why or why not?
- What is the quality of this support or assistance?

### *Cooperation*

17. Give other examples of how you have cooperated (recently or in the past) with a buyer or input supplier.
18. Give examples of ‘missed opportunities’ for cooperation with buyers, input suppliers, or service providers.
19. Give examples of any problems you have experienced through lack of cooperation with buyers, input suppliers, or service providers.

### **Upgrading**

#### *Changes in Production and Sale of Vegetables*

1. Please describe any changes you have made in the past year [or appropriate reference period] in the production or sale of vegetables.
  - Describe the main reasons motivating you to make these changes.
  - Describe any disadvantages or risks that you faced in making these changes.
  - How successful were you in implementing the change?
  - What impact have the changes had on your farming operations? (For example, in terms of practices adopted, productivity, production costs, investment in equipment and machinery, transaction costs, produce loss/wastage, quality, type of buyers, price, etc.)
2. Did you make the changes on your own or did you make them with the support or assistance of someone else?
  - If with the support or assistance of someone else, who? (For example, ITC, buyers, input suppliers, NGOs, government extension agents, etc.)
  - How did they help you?
  - How important were they in (a) convincing you to make the change and (b) helping you to implement the change?
3. Are the changes you made permanent or temporary?
  - Why?
  - What are the obstacles to making the changes permanent?
4. Please describe the disadvantages or risks of NOT making changes in the production and sale of vegetables.
5. What changes would you like to have made but did not?
  - Why?
  - In general, what are the obstacles or disincentives to making changes in the production and sale of vegetables?
  - What is needed to overcome the obstacles or disincentives?

### *Participation with ITC*

6. What information or services have you received via your participation with ITC (including ITC itself, extension agents, or lead farmers)? (Some of these may have been mentioned already in Question 2. If so, probe for further information.)
7. How has the information or services provided by ITC (including ITC itself, extension agents, or lead farmers) affected your farming operations? (For example, in terms of practices adopted, productivity, production costs, investment in equipment and machinery, transaction costs, production loss/wastage, quality, type of buyers, price, etc.)
8. What are the strengths and weaknesses of information and services received from ITC (including ITC itself, extension agents, or lead farmers)?
  - What recommendations for change would you make?
9. What more do you need to upgrade/improve your farming operations?

### **Inter-Firm Cooperation/Coordination**

#### *Nature of Cooperation*

1. Do you sell to the same buyers as your neighbors who sell similar products?
2. Do you discuss prices with your neighbors?
3. Do you discuss when to harvest and sell the vegetables with your neighbors?
4. Do you share transport of produce with your neighbors?
5. Do you share labor related to vegetable production with your neighbors?
6. Do you share information about vegetable cultivation with your neighbors?
7. Do you jointly own equipment, machinery, or other farming assets with your neighbors (e.g., via a cooperative sharing agreement or outright communal ownership)?
  - What assets?
  - How does joint ownership work?
  - How well does joint ownership of farm assets work?
8. What other collective or collaborative arrangements exist among vegetable farmers either among themselves or with other persons or organizations? (For example, farmer groups, savings and credit associations, self-help groups, political associations, etc.)
  - Which of these do you participate in?
  - Why? What benefits do they offer you?
  - What is your level of participation?
  - What is the level of participation of your neighbors?
  - How do they function?
  - How well do they function? What impact have they had on your farming operations or on your household?

### *Role of Farmer Groups*

*If the respondents mentioned being members of a farmer group in Question 8, follow up with additional questions.*

9. What is the role of the farmer group or groups?
10. In what economic activities does it participate? (For example, joint procurement of inputs, joint collection/transportation/sale of products, joint access to finance, or policy advocacy.)
11. How does this group differ from other farmers' or women's groups?
12. What are similarities and differences among members of the group?
13. How much time do you spend attending meetings?
14. How do you travel to the meeting place and how long does it take you?
15. How would you describe differences between members and non-members?
16. How do you feel about communication within the group (e.g., transparency and information flows)?
17. How are decisions made within the group (e.g., on prices or payment systems)? Give examples.
18. How are disputes resolved within the group? Give examples.
19. Does the group deal (as a common entity) directly with buyers, input suppliers, financial institutions, and/or government? Do leaders negotiate contracts and make agreements on behalf of the group?
  - If not, why not?
  - If so, how do you know you can trust your leaders?
20. What problems has the group had?
21. What are the main benefits of being a member of this group?

### **Household Income and Decision Making**

1. How important is income from vegetable production as a source of cash income for the household? (Probe to determine what other economic activities family members are engaged in and how important these are as sources of cash income relative to vegetable production.)
2. How has this income changed as a result of your participation with ITC?
  - Why?
3. How do you expect this income to change as a result of your participation with ITC?
  - Why?
4. Who in the household gets paid? Who keeps the income?
5. How is the income used? Who decides how to use the income?
6. Do you ever discuss with other members of the household the following:

- How much to harvest?
  - Who will work in this activity?
  - Who to sell to?
  - What price to charge?
  - If so, who do you discuss this with? Do you ever disagree? How are disagreements are resolved? Give examples.
7. Please describe who works on each of the following activities related to vegetable production? (Probe for gender issues and probe on gender roles. Probe for information on paid employment.)
- Preparation and planting?
  - Tending (e.g., weeding, fertilizing, applying pesticides and herbicides, etc.)?
  - Harvesting?
  - Post harvest activities?
  - Transportation?
  - Selling?

## **DISCUSSION GUIDE FOR LEAD FARMERS IN FRESH FRUITS AND VEGETABLES SUBSECTOR**

### **Introduction**

Introduce yourself and briefly describe the purpose of the interview/focus group discussion.

### **Background**

1. What is your role (what do you do) as a lead farmer?
2. How and why were you selected for this role?
3. What services do you provide?
  - Why?
  - What are your objectives?
4. What are the primary challenges and opportunities you face in providing these services?

### **Market Needs and Program Services**

1. What are the most important needs of yourself and other small-scale vegetable farmers in terms of upgrading production and accessing higher value markets?
2. How are you addressing these particular needs?
3. What is the nature of your relationship with ITC and its extension agents? For example, what is the level of trust and cooperation? How well do you get along? Is the relationship productive and harmonious or disruptive and contentious?
4. What is the nature of your relationship with the vegetable farmers? For example, how do the farmers respond to you and the services you provide? What is the level of trust and cooperation?

5. How successful have you been so far compared to your objectives and in terms of upgrading production and accessing new markets? (Provide examples of successes and failure).
  - Why?
6. Overall, what changes have you observed since you started working with the farmers? (Probe for information in terms of farming practices, productivity, quality, price, volume sold, investment in equipment and machinery, attitudes, costs, job creation, etc.)
  - Why?
7. How has being a lead farmer changed your own farming practices and your productivity, sales, income, etc.?
8. What changes have not occurred that should have?
  - Why?

### **Future Prospects**

1. Please assess the whether observed changes are likely to be sustained over time?
  - Why or why not?
2. What are the future prospects for the farmers in terms of achieving your objectives, upgrading production, and accessing new markets?
  - What features of the ITC program, farmers, or the surrounding environment make it more likely you will achieve your objectives?
  - What features of the ITC program, farmers, or the surrounding environment make it less likely you will achieve your objectives?
3. What do you see as the strengths and weaknesses of the ITC extension agent/lead farmer program?
  - What changes would you recommend?
  - Why?

## **DISCUSSION GUIDE FOR ITC IN FRESH FRUITS AND VEGETABLES SUBSECTOR**

*Get or review of copy of ITC's documents and records describing its work with small-scale vegetable farmers, including records of all purchases, sales, loans, investments, or other transactions. ITC intends to maintain a record on each sale that includes (1) crop, (2) total volume produced, (3) total volume sold to ITC, and (4) average price per kilo sold.*

### **Introduction**

Introduce yourself and briefly describe the purpose of the interview.

### **Background**

1. Describe markets for fresh vegetables. (Probe for information on sellers, buyers, service and input providers, processors, producer associations, etc.)
  - Where do small-scale farmers fit within this market?
  - What are the opportunities in short, medium, and long term for small-scale farmers to upgrade and access higher value markets?
  - What are the obstacles for small-scale farmers to upgrade and access higher value markets?

2. How would you describe the features that distinguish small-scale vegetable farmers?
  - How do these features affect their prospects (for good or bad) to upgrade and access higher value markets?
3. What kind of information and services do you provide to farmers and how are these addressing the opportunities and obstacles to upgrading and accessing higher value markets?
  - What other objectives do you have in working with small-scale vegetable farmers?
4. What are the primary challenges and opportunities you face in providing these services?
5. What is the nature of your relationship with the farmers? For example, how do the farmers respond to you and the services you provide? What is the level of trust and cooperation between you (and your agents) and the farmers?

### **Program Operation**

1. ITC recently completed its first purchase of produce from client farmers. Describe how and how well this process worked.
  - What prices did you pay? What determines the prices you paid?
  - How high was the quality in general? Did it fall below, meet, or exceed expectations? How much variety in terms of product quality was there? How did ITC reward farmers for higher quality?
  - What did you learn from this experience? What, anything, will you do differently next time?
2. Where did ITC sell the produce it purchased? Describe how and how well this process worked.
  - To whom did you sell the produce?
  - What prices did you sell the produce for? What variation existed in prices and what factors accounted for the variation?
  - How easy/difficult was it to sell the produce? What, if any, obstacles did you encounter?
  - What is the market perception among buyers about the produce sold?
  - What did you learn from this experience? What, anything, will you do differently next time?
3. What factors most influence:
  - Your demand for produce from small-scale farmers?
  - The market's demand for produce from small-scale farmers?

### **Program Effectiveness**

1. What changes have you observed since you started working with the farmers? (Probe for information in terms of farming practices, productivity, quality, price, volume sold, investment in equipment and machinery, attitudes, costs, job creation, etc.)
  - What have been the causes of these changes?
  - More specifically, what role did ITC play in these changes?
2. What changes have not occurred that should have?
  - Why have these changes not occurred?
3. Please assess the whether observed changes are likely to be sustained over time?
  - Why or why not?

4. Overall, how successful have you been so far in upgrading small-scale vegetable farmers, linking them to higher value markets, and in achieving your other objectives? (Provide examples of successes and failure).
  - Why?
  - What remains yet to be done?
5. What impacts have your activities had on job creation in the fresh vegetables sector? (Probe for gender impacts.)
6. What impacts have your activities had on the entry of other value chain members (e.g., retailers, wholesalers, extension service providers, processors, etc.) into the fresh vegetables sector?

### **Future Prospects**

1. What will it take for other wholesalers/retailers to purchase vegetables in quantity from small-scale farmers?
  - What is their motivation?
  - What are the major obstacles to this happening?
  - What are the prospects for this happening?
  - What needs to be done first?
2. What have been the strengths and weaknesses of your approach so far?
  - What, if any, changes do you plan on implementing?
3. What are the future prospects for the farmers in terms of achieving your objectives?
  - What features of the ITC program, farmers, other market participants, or the surrounding environment make it more likely you will achieve your objectives?
  - What features of the ITC program, farmers, other market participants, or the surrounding environment make it less likely you will achieve your objectives?

## **DISCUSSION GUIDE FOR INFORMAL SECTOR DOOR-TO-DOOR TRASH COLLECTORS**

### **Introduction**

Introduce yourself and briefly describe the purpose of the focus group discussion.

### **Background Information**

1. Describe your job. (Probe for information on how the informal door-to-door trash collection business works, who its main players are, what its major features are, etc.)
2. How are you paid? (For example, salary, hourly, piece work, per house, etc. Probe to get a description of how the payment process works.)
3. How is the price for service determined and by who?
4. How much do you earn (per week or month, whichever is more relevant)?
5. How many hours a week do you work? From when to when do your work during the day?

6. How long have you been working at this occupation?
7. What did you do before you worked in this occupation?
8. Why are you doing this job (as opposed to other job options)?
9. Aside from door-to-door trash collection, what other waste management activities are you involved in?

### **Working Conditions**

1. Describe your working conditions. (Probe for information on safety; equipment including gloves, boots, hat, overalls, goggles, etc.; sanitation, cleanliness, etc.)
2. How secure do you feel in your current job? (Job stability not personal safety.)
  - What threats do you see in terms of job security?
3. Are you satisfied with your current job?
  - Why or why not?
4. What do you wish was different about your current job?
5. How does your current job compare overall to your other job options? (Probe to find out what the other job options are.)
6. If you could find a job doing door-to-door trash collection in the formal sector, would you take it?
  - Why or why not?
  - If not willing to take job in formal sector, what would it take to get you to accept a job with a formal sector trash collection firm?
7. How long do you intend to stay with your current job?
  - Why?

### **Treatment**

1. How are you treated by your clients? (Probe for level of respect shown, honesty, fairness, consideration, etc.)
2. Do clients pay you on a timely basis? How do you resolve payment disputes?
3. What other disputes commonly arise with clients? How do you resolve them?
4. How are you treated by authority figures, such as police, municipal officials, community leaders, etc.? (Probe for level of respect shown, honesty, fairness, consideration, etc.)
5. What prospects do you see for yourself?

### **Market Conditions**

1. Describe the competitive environment of door-to-door trash collectors. (Probe to find out who the main competitors are both informal and formal, how they cooperate or compete with each other, how they determine collection routes, how they control or try to control market entry, etc.)

2. Describe your relationship with other door-to-door trash collectors. (Probe to find out, for example, what the level of interaction is, what the level of trust and cooperation is, whether the relationship is friendly or antagonistic, what disputes arise and how they are resolved, etc.)

### **Household Income and Decision Making**

1. How important is income from door-to-door trash collection as a source of cash income for the household? (Probe to determine what other economic activities family members are engaged in and how important these are as sources of cash income relative to the solid waste management job.)
2. Who in the household gets paid? Who keeps the income?
3. How is the income used? Who decides how to use the income?
4. Do you ever discuss business matters with other members of the household? (Probe to find out which business matters are discussed.)
5. If so, who do you discuss this with? Do you ever disagree? How are disagreements resolved (provide examples)?
6. Please describe who works with you in door-to-door trash collection? (Probe to determine what distinct tasks are and who participates in each task. Make note of paid employment and probe on job creation and the type of job creation. Make note of gender and probe on gender roles.)
7. Please describe who works with you in other waste management activities? (Probe to determine what distinct tasks are and who participates in each task. Make note of paid employment and probe on job creation and the type of job creation. Make note of gender and probe on gender roles.)

## **DISCUSSION GUIDE FOR INTERVIEWS WITH THE ALL INDIA INSTITUTE FOR LOCAL SELF-GOVERNMENT (AIILSG)**

### **Introduction**

Introduce yourself and briefly describe the purpose of the interview.

### **Background Information**

1. What is your official position within the AIILSG? Describe the responsibility or oversight you have over solid waste management in your [municipality, state, etc.]?
2. What have you done to date in terms of outsourcing solid waste management to private firms?
3. Why are you interested in outsourcing solid waste management to private firms? Why should state and municipal governments be interested in outsourcing solid waste management?
  - What are important issues to consider in outsourcing solid waste management?
  - What opportunities exist in outsourcing solid waste management?
  - What obstacles exist in outsourcing solid waste management?
4. What do you see as the major issues in outsourcing solid waste management to private firms?

- What are your views on these issues?
5. What do you see as the primary benefits in outsourcing solid waste management to private firms? The primary costs?
  6. What are your goals in terms of outsourcing solid waste management to private firms?
    - What conditions will be necessary to achieve these goals?

### **Market for Outsourcing Solid Waste Management**

1. Describe the market for solid waste management. (Probe for information on demand structure, service providers, government role, legal issues, etc.)
2. Who are the primary players in the solid waste management sector? How is each affecting, or likely to affect, the demand for outsourcing and the outsourcing process?
3. What do you see as the major issues facing the solid waste management sector?
  - What are your views on these issues?
4. Over the long term, what do you believe will be the relative roles of the following service providers in solid waste management? What should be your government's role in promoting these roles?
  - Government?
  - Private firms?
  - Informal sector?
5. To the extent formal sector services displaces informal collection informal services, are informal workers likely to find their way into formal sector solid waste management or will they need to find employment or sources of income elsewhere?
  - Why?

### **GMED**

1. How effective has GMED been in promoting outsourcing of solid waste management to private firms?
2. What are the strengths and weaknesses of GMED's approach?
3. What impact has GMED had on the sector to this point?
  - What do you think its impact will be over the long run?
  - Why?
4. What recommendations would you make to GMED?

## **DISCUSSION GUIDE FOR DOOR-TO-DOOR TRASH COLLECTORS EMPLOYED BY MUNICIPAL SOLID WASTE MANAGEMENT FIRMS**

### **Introduction**

Note to focus group facilitators: Introduce yourself and briefly describe the purpose of the focus group discussion.

## Background Information

1. Describe your job.
2. How are you paid? (For example, salary, hourly, piece work, etc. Probe to find out form of payment—e.g., cash—and regularity, consistency of payment.)
3. How much do you earn (per week or month, whichever is more relevant)? If paid by the hour, what is your hourly pay rate?
4. How many hours a week do you work? From when to when do you work during the day?
5. How long have you been working for [firm]?
6. What did you do before you worked for [firm]?
7. How much did you earn (per week or month, whichever is more relevant) before you started working for [firm]?
8. How many hours a week did you work before you started working for [firm]?
9. How regularly did you work before you started working for [firm]?
10. Why are you doing this job (as opposed to other job options)?

## Working Conditions

8. Describe your working conditions. (Probe for information on safety; equipment provided including gloves, boots, hat, overalls, goggles, etc.; sanitation, cleanliness, etc. If they use safety equipment, probe to find out whether it is provided or whether workers must pay for it and what burden this imposes.)
9. How do your current working conditions compare with your previous job (including self-employment activities)?
10. How do your current working conditions compare with what you know about informal door-to-door trash collection?
11. How are you treated by your supervisors? (Probe for information on level of respect and trust shown and on general treatment. For example, do supervisors show concern for them as persons or for their needs, do supervisors treat them fairly and honestly, do they treat them as valued members of the firm or like replaceable commodities, etc.)
12. How does this compare with your previous job?
13. How are you treated by your fellow workers?
14. How do you resolve job, personal, payment, and other disputes when they arise? Give example.
15. What kind of training have you received?
16. How secure do you feel in your current job? (Job stability, not personal safety.)

- What threats do you see in terms of job security?
17. Are you satisfied with your current job?
    - Why or why not?
  18. What do you wish was different about your current job?
  19. How does your current job compare overall to your other previous job?
  20. How does your current job compare overall to your other job options?
  21. How long do you intend to stay with your current job?
    - Why?
  22. What is your worker turnover?
    - Do you consider this low, average, or high?
    - Why is worker turnover this level?

### **Benefits**

1. What benefits does your current job provide you? (Probe for information on health insurance, pension, sick days, vacation days, promotion opportunities, etc. Also probe to determine whether the firm provides promised benefits in timely and consistent manner.)
2. How do these benefits compare to your previous job?
3. How do these benefits compare to other jobs in the formal sector that you know about?
4. How would you rate the benefits you receive?
  - What other benefits would you like to receive?

### **Treatment**

1. How are you treated by your clients? (Probe for level of respect shown, honesty, fairness, consideration, etc.)
2. How does this compare to your previous job (if relevant)?
3. How are you treated by authority figures, such as police, municipal officials, community leaders, etc.? (Probe for level of respect shown, honesty, fairness, consideration, etc.)
4. How does this compare with your previous job?
5. What prospects do you see for yourself?
6. How does this compare with your previous job?

## **Household Income**

1. How important is income from solid waste management job as a source of cash income for the household? (Probe to determine what other economic activities family members are engaged in and how important these are as sources of cash income relative to the solid waste management job.)
2. Do you personally need to work at other jobs (including self employment), or is your job in solid waste management satisfactory?
3. Who keeps the income from your solid waste management job?
4. How is the income used? Who decides how to use the income?
5. Do you ever discuss your job with other members of the household? (Probe to find out which business matters are discussed.)
6. How stable or reliable a source of income is employment with the solid waste management firm?
  - How does this compare with your previous job?

## **DISCUSSION GUIDE FOR DOOR-TO-DOOR TRASH COLLECTORS EMPLOYED BY MUNICIPAL SOLID WASTE MANAGEMENT FIRMS**

### **Introduction**

Note to focus group facilitators: Introduce yourself and briefly describe the purpose of the focus group discussion.

### **Background Information**

11. Describe your job.
12. How are you paid? (For example, salary, hourly, piece work, etc. Probe to find out form of payment—e.g., cash—and regularity, consistency of payment.)
13. How much do you earn (per week or month, whichever is more relevant)? If paid by the hour, what is your hourly pay rate?
14. How many hours a week do you work? From when to when do you work during the day?
15. How long have you been working for [firm]?
16. What did you do before you worked for [firm]?
17. How much did you earn (per week or month, whichever is more relevant) before you started working for [firm]?

18. How many hours a week did you work before you started working for [firm]?
19. How regularly did you work before you started working for [firm]?
20. Why are you doing this job (as opposed to other job options)?

### **Working Conditions**

23. Describe your working conditions. (Probe for information on safety; equipment provided including gloves, boots, hat, overalls, goggles, etc.; sanitation, cleanliness, etc. If they use safety equipment, probe to find out whether it is provided or whether workers must pay for it and what burden this imposes.)
24. How do your current working conditions compare with your previous job (including self-employment activities)?
25. How do your current working conditions compare with what you know about informal door-to-door trash collection?
26. How are you treated by your supervisors? (Probe for information on level of respect and trust shown and on general treatment. For example, do supervisors show concern for them as persons or for their needs, do supervisors treat them fairly and honestly, do they treat them as valued members of the firm or like replaceable commodities, etc.)
27. How does this compare with your previous job?
28. How are you treated by your fellow workers?
29. How do you resolve job, personal, payment, and other disputes when they arise? Give example.
30. What kind of training have you received?
31. How secure do you feel in your current job? (Job stability, not personal safety.)
  - What threats do you see in terms of job security?
32. Are you satisfied with your current job?
  - Why or why not?
33. What do you wish was different about your current job?
34. How does your current job compare overall to your other previous job?
35. How does your current job compare overall to your other job options?
36. How long do you intend to stay with your current job?
  - Why?
37. What is your worker turnover?
  - Do you consider this low, average, or high?
  - Why is worker turnover this level?

## **Benefits**

5. What benefits does your current job provide you? (Probe for information on health insurance, pension, sick days, vacation days, promotion opportunities, etc. Also probe to determine whether the firm provides promised benefits in timely and consistent manner.)
6. How do these benefits compare to your previous job?
7. How do these benefits compare to other jobs in the formal sector that you know about?
8. How would you rate the benefits you receive?
  - What other benefits would you like to receive?

## **Treatment**

7. How are you treated by your clients? (Probe for level of respect shown, honesty, fairness, consideration, etc.)
8. How does this compare to your previous job (if relevant)?
9. How are you treated by authority figures, such as police, municipal officials, community leaders, etc.? (Probe for level of respect shown, honesty, fairness, consideration, etc.)
10. How does this compare with your previous job?
11. What prospects do you see for yourself?
12. How does this compare with your previous job?

## **Household Income**

7. How important is income from solid waste management job as a source of cash income for the household? (Probe to determine what other economic activities family members are engaged in and how important these are as sources of cash income relative to the solid waste management job.)
8. Do you personally need to work at other jobs (including self employment), or is your job in solid waste management satisfactory?
9. Who keeps the income from your solid waste management job?
10. How is the income used? Who decides how to use the income?
11. Do you ever discuss your job with other members of the household? (Probe to find out which business matters are discussed.)
12. How stable or reliable a source of income is employment with the solid waste management firm?
  - How does this compare with your previous job?

## **DISCUSSION GUIDE FOR INTERVIEWS WITH GOVERNMENT OFFICIALS IN MSWM SECTOR**

### **Introduction**

Introduce yourself and briefly describe the purpose of the interview.

### **Background Information**

1. What is your official position? Describe the responsibility or oversight you have over solid waste management in your [municipality, state, etc.]?
2. What has your government done to date in terms of outsourcing solid waste management to private firms?
3. Why is your government interested in outsourcing solid waste management to private firms?
  - What are important issues to consider in outsourcing solid waste management?
  - What opportunities exist in outsourcing solid waste management?
  - What obstacles exist in outsourcing solid waste management, both within your government and outside in the market or general environment?
4. What do you see as the major issues in outsourcing solid waste management to private firms?
  - What are your views on these issues?
5. What do you see as the primary benefits in outsourcing solid waste management to private firms? The primary costs?
6. What are your goals in terms of outsourcing solid waste management to private firms?
  - What conditions will be necessary to achieve these goals?

### **Market for Outsourcing Solid Waste Management**

1. Describe the market for solid waste management. (Probe for information on demand structure, service providers, government role, legal issues, etc.)
2. What do you see as the major issues facing the solid waste management sector?
  - What are your views on these issues?
3. Over the long term, what do you believe will be the relative roles of the following service providers in solid waste management? What should be your government's role in promoting these roles?
  - Government?
  - Private firms?
  - Informal sector?
4. Who are other important players in the solid waste management sector? What is your relationship with each one of them? (Probe to find out, for example, what the level of trust and cooperation is, whether the relationship is friendly or antagonistic, and what role and the importance of the role each plays in the sector, etc.)

## **Assessment of GMED Program**

1. Are you familiar with the GMED program to promote outsourcing of solid waste management to private firms?
2. What is your opinion of this program?
  - How effective do you think it has been? Why?
  - What are its strengths and weaknesses?
  - What are its long-term prospects?
3. What changes would you recommend to GMED?
4. What do you think are the long-term prospects for shifting solid waste management to the private sector?
  - Why?

## **DISCUSSION GUIDE FOR INTERVIEWS WITH THE RESIDENT WELFARE ASSOCIATIONS**

### **Introduction**

Introduce yourself and briefly describe the purpose of the interview.

### **Background Information**

1. What are Resident Welfare Associations?
2. Describe the membership of your RWA.
  - How are members selected?
  - How long do they serve?
  - To whom are they accountable and how? (Probe to find out the geographic coverage of the RWA and the mechanisms by which they are accountable to community members.)
3. What does your RWA do? Give examples.
  - How are decisions made?
4. What impacts does your RWA have in improving the welfare of community residents? Give examples.

### **Solid Waste Management Sector**

1. How important is solid waste management to the welfare of community residents? Give specific examples of how they affect the welfare of community residents.
2. What has your RWA done in the area of solid waste management? (This includes door-to-door trash collection, trash transportation, street sweeping, and drain cleaning, but particularly door-to-door trash collection.)
  - Why?
  - What have you been able to accomplish?
  - If you have not done anything as of yet, why?

3. What are the important issues as you see them municipal solid waste management?
  - What your views on these issues?
4. What is the current status of solid waste management in your community? (Probe to find out how effective and extensive the current service is; the relative cleanliness or filthiness of the community; the implications for health and other quality of life considerations; the problems involved in improving service coverage and quality; etc.)
  - How has this changed over the past 1 year and past 5 years?
  - If it has changed, why has it changed?
5. Who are the major service providers and what is the quality of service for each type of provider?
6. Is the current status in solid waste management satisfactory?
  - If not, what can or should be done to improve it?
  - What can the RWA do to promote do to improve it?
7. Is there a demand among community members to improve solid waste management?
  - If so, how strong is this demand?
  - How do you know about this demand? Are residents vocal about it, or do you know by other means?
8. Have you been asked by community residents to do anything about solid waste management?
  - If yes, what have they asked?
  - What have you done in response?
9. What recommendations would you give to municipal or state officials about how to improve solid waste management in your community?
10. In what ways would improvements in solid waste services improve the welfare of community residents?

### **Privatization of Solid Waste Management**

1. What are your views on the privatization of door-to-door collection and other solid waste management services (transportation, street sweeping, and drain cleaning)?
  - Do you favor it? Do you oppose it? Why?
2. What do community residents think about privatization of door-to-door collection and other solid waste management services?
  - Do they favor it? Do they oppose it? Why?
3. Overall, what impact would privatization have on the welfare of local community residents?
4. What would you do if your municipality proposed to privatize door-to-door collection or other solid waste services?
5. What are the primary obstacles to the privatization of door-to-door collection and other solid waste services?



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