

**Asia Urbs Project PHL-3-17**  
Final Report

**4 Workpackage 4 (Integrated Solid Waste Management/ISWM)**

**4.1 Members of working group**

The members of the working group “Integrated Solid Waste Management” as of the time of reporting are:

Schelklingen City:

- Michael H. Knapp, Sonja Mohn, Stefan Dongus

APT:

- Prof. Dr. Axel Drescher

Cagayan de Oro City:

- Eulogio Y. Dosdos, Josette Segne, Raul Sabuero, Engr. Hilda Guiral

XUCA:

- Dr. Robert J. Holmer, Yvette B. Guanzon

**4.2 General**

The main objective of this work package was to assist pilot areas in barangays Bugo, Gusa and Lapasan of Cagayan de Oro City in implementing Republic Act (R.A.) 9003, otherwise known as the “Ecological Solid Waste Management Act of 2000” which specifically calls for segregation of garbage at source or at the household level into three fractions: (1) biodegradable, (2) recyclable and (3) residual wastes. According to R.A. 9003, the three waste fractions shall be collected from the individual households and brought to a Materials Recovery Facility (MRF), described in the R.A. 9003 as (1) a solid waste transfer station or sorting station, (2) a drop-off center, (3) a composting facility, and (4) a recycling facility. The MRF shall be established by the barangay and this is where further processing and handling of segregated wastes shall be done.

The *Waste Segregation at Source Ordinance* of the City, which is based on the aforementioned Republic Act, was approved on November 17, 2003, by the City Council. It is hoped that the said ordinance will render the national law more enforceable as it is now generally adapted in the local context.

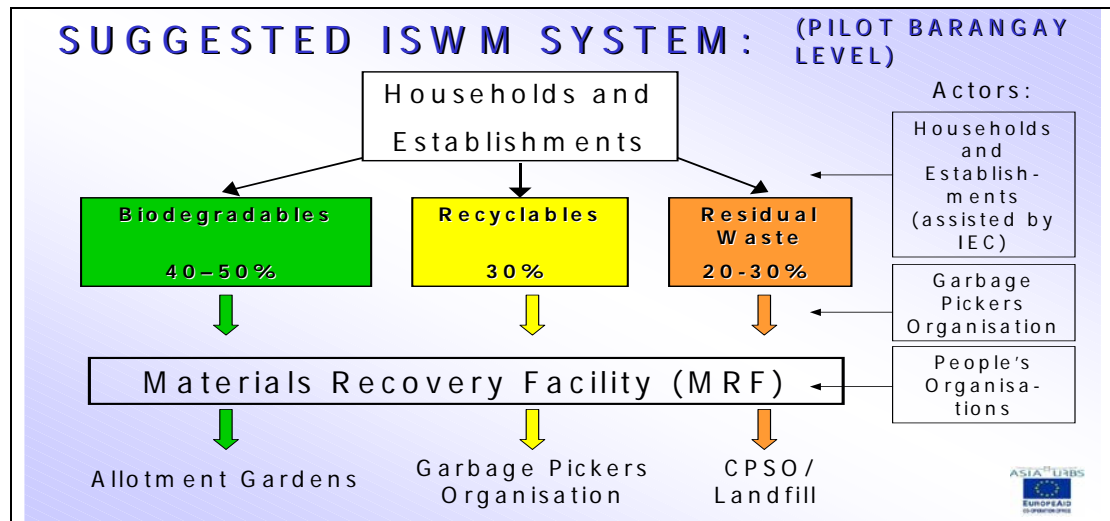
The exhaustive consultation and discussion with different stakeholder groups during the first months of the project resulted with the following integrated solid waste management system, which the project then pursued to implement in the pilot areas:

The project (ISWM working group in cooperation with IEC working group) assisted in establishing a collection system, as shown in the chart below, taking into account the City’s waste composition (data of September 1997, provided by City Public Services Office):

40-50%	-	<i>biodegradable</i>
30%	-	<i>recyclable</i>
20-30%	-	<i>residual</i>

Any organized garbage pickers group, from the city’s controlled dumpsite, is in-charge in the collection of the three waste fractions from the households. This group brings all these fractions to the MRF, which is managed by any people’s organization. The biodegradable wastes are composted and used as organic fertilizer in the allotment gardens, whereas the residual wastes are brought to the controlled

dumpsite by a dump truck of the City Public Services Office. The recyclable materials serve as the incentive for the group of garbage pickers in-charge of collection.



#### 4.3 Activity 4.1: Evaluation of previous and ongoing studies

The present Asia-Urbs Project on ISWM was built on a previous project called “Local Environmental Planning and Management Project” (LEPM), which started in 1999 and ended in 2001. The said project included an Integrated Solid Waste Management component, and the pilot areas were the same pilot areas as currently under the present project. Thus, in order to validate the waste segregation done in the 3 pilot barangays under the LEPM and to assess where the Asia Urbs Project should come in, an evaluation was conducted in the pilot areas on August 22, 2002.

The following critical points were raised by the interviewed persons during the aforesaid evaluation:

- The need to enhance IEC activities: In Lapasan, there was insufficient information dissemination regarding waste segregation. People have insufficient knowledge on how to segregate and dispose of their segregated wastes. Thus, the initial implementation of waste segregation during LEPM was stopped. In Bugo, only a few households practiced segregation.
- The need to improve the coordination and communication between stakeholders.
- In Gusa, the group in-charge during LEPM stopped the collection because most of them ran for positions in the barangay elections. In addition, the carts used to collect the materials were damaged, as they were not well fabricated.
- Complaints were raised about insufficient financial support from the barangay and the city level

Suggestions were aired in order to improve the system and these are as follows:

- there should be implementation of the law, and the barangay council should pass an ordinance mandating the households to segregate their waste at source
- conduct of a values formation seminar
- proper coordination among LGUs (Barangays), Government Agencies such as CPSO and CLENRO), and other offices in the City Hall
- constant project monitoring

- involvement of tri-media for IEC
- more support from the barangay and the city

The above shows that the objectives of the project were in line with the needs raised by representatives of the pilot areas.

An orientation seminar on R.A. 9003 and on the establishment of a Materials Recovery Facility (MRF) was conducted on December 9, 2002. The speakers were a DENR representative who talked on the salient features of R.A. 9003 and a resource person from IDEAS Inc. of Silang, Cavite, which is an NGO contracted by the Municipality of Silang to manage the municipality's solid wastes. The activity, participated in mainly by representatives of the pilot barangays and other invited guests, aimed to familiarize the participants on the provisions of the law and its Implementing Rules and Regulations (IRR). It was also a venue to inform the barangay councils that the MRF is a vital supporting structure of an ISWM system and that there is a legal basis for its establishment.

At present, Barangays Bugo and Lapasan have MRFs within their pilot areas. There is also a MRF located at the City's Controlled Dumpsite where the garbage pickers store recyclable materials from the two barangays.

#### **4.4 Activity 4.2: Identification of urban areas for resource recovery at community level**

The identified pilot barangays were Lapasan, Gusa and Bugo, since they already participated in an earlier project of CLENRO (LEPM) that aimed to capacitate Lugs in environmental planning and management, and contained a garbage segregation component. This was one of the reasons to forego the original approach to choose the project sites by GIS analysis (see also work package 2).

During the planning phase of the project, the fact that the three pilot barangays already participated in the LEPM project showed to have a positive impact. The chosen barangays had already started a system on handling waste, and there was already an existing network. Aside from that, the LEPM project capacitated the Local Government Units in local planning and management, e.g. for ISWM. As an effect, the barangay councils of the 3 pilot areas were and still are very supportive to the project. In fact, the support of the barangay councils was steadily increasing during the course of the Asia Urbs project. During the final project conference held in January 2004, the barangay captain of Bugo stated that he came to realize that the approach of the project is actually the only feasible approach, and that there is no other way to achieve a sustainable integrated solid waste management, which is according to the prevailing law.

During the implementation phase of the project, however, the previous involvement of the pilot barangays in the LEPM project also showed to be a constraint. This is mainly due to disparities in priorities of the LEPM and Asia Urbs projects. As an example, the Asia Urbs project explicitly discourages the concept of "*may pera sa basura*" (there is money in garbage). These disparities in the implementation approaches required a lot of efforts for adjustments among implementers as well as participants. A change of habit of all stakeholders is an absolute necessity for the success of the project. Achieving this was only possible because of the above mentioned support by the barangay council, going hand in hand with a massive IEC campaign by the project, mainly on a house-to-house basis.

At the end of the 1<sup>st</sup> year of the Asia Urbs project, barangay Gusa had been excluded as one of pilot barangays for the ISWM work package. The reasons for this unforeseen measure were the disparities mentioned above as well as the existing system and concept established prior to the entry of Asia Urbs, which proved to be effective to barangay Gusa. The involvement that the ISWM component of the project has with this barangay is only in the collection of biodegradable wastes and the processing of these into compost. The main difference in the approach of barangay Gusa and the one of the project is that the waste collection in Gusa is done by local 'barangay health workers', and not by garbage pickers from the landfill. The barangay captain decided to stick to this system.

#### **4.5 Activity 4.3 Survey on current waste handling and recycling practices at community level**

Two surveys on current waste handling and recycling practices at the community level were conducted. The first one was conducted prior to the start of waste segregation in the pilot areas and the second one was conducted shortly before the end of the project. The surveys consisted of a baseline study on household waste practices and an assessment of the waste stream including detailed data on the amounts and types of wastes produced from each household. They were carried out in coordination with the other working groups and thus also included data like socio economic status, anthropological background and food consumption habits. This data will be encoded in the GIS database. Thus, by comparing the results of the first and second survey, the impact of the project can be assessed (see also tables in Activity 4.4 below).

#### **4.6 Activity 4.4: Educational formation of private households regarding garbage segregation**

Intended to orient the private households and institutions of the pilot barangays on Republic Act 9003 (*The Ecological Solid Waste Management Act*) starting 3<sup>rd</sup> week of September 2002, this activity had to be postponed due to the constraints mentioned in Activity 4.2, and also to allow a thorough coordination with the IEC working group. On December 9, 2002, an orientation on R.A. 9003 and the establishment of an MRF was conducted (see Activity 4.1).

In order to disseminate information in an effective way, adequate numbers of key persons were identified for all pilot areas. These key persons represent a broad picture of the households involved (e.g. teachers, representatives from various organizations, homeowners associations, religious groups, women groups, etc.). They were given an overview of the project, R.A. 9003 and a background on the establishment of a Materials Recovery Facility (MRF) to enable them to sustain the project by disseminating its message. These key persons assisted the ISWM and IEC working groups in conducting a house-to-house campaign on waste segregation. Actual segregation only started after all households involved had been informed and trained, and the collection system was ready to be implemented (including set-up of the necessary infrastructure, collection schedules, and preparation of all groups involved in the collection procedure, e.g. garbage pickers).

In Bugo, the key persons were identified and briefed on February 8, 2003. In Lapasan, this was done on October 7, 2003.

The ISWM activities in Bugo were officially launched on February 14, 2003 by the signing of a MoA between the stakeholders, including the Cagayan de Oro Garbage Pickers Multipurpose Cooperative, which is since then responsible for the collection of segregated waste from the households in the pilot area (Villa Trinitas Phase 3), the

homeowners association of Villa Trinitas Phase 3, the Research Director of XUCA, and the City Government of Cagayan de Oro. During the launching, CPSO and CLENRO demonstrated the procedure of waste characterization. The activity showed that only a relatively small fraction of the wastes gathered are residual wastes, and the rest were all recyclable or biodegradable wastes.

A massive IEC campaign involving Inter Personal Communication (IPC) and House-to-House Campaign was done immediately after the Bugo launching to enhance awareness on waste segregation. Some project staff and representatives of different City Hall departments involved in the project as well as the key persons identified conducted the IEC campaign.

A similar activity was conducted in Lapasan, but this time with the direct involvement of two barangay community organizers hired by the council specifically for the ISWM program. These community organizers work directly with Zone leaders and key persons of the pilot area (Sitio Sto. Niño) and closely coordinate with members of “Kooperatiba sa Nagkahiusang Mangaykayay”, another garbage pickers cooperative, in-charge of the collection of segregated wastes in their pilot area. The involvement of the barangay community organizers proved to be a big advantage with regards to convincing residents to segregate their garbage.

This activity was not done in Gusa due to the constraints described in Activity 4.2.

#### **4.7 Activity 4.5 Solid Waste Management practice at community level**

This “activity” was added by the ISWM working group at the start of the second project year, in order to create a suitable heading which covers all activities related to the actual segregation of waste by the households of the pilot barangays.

In Bugo, the first among the three pilot barangays to finish the ISWM Orientation, the practice of waste segregation has already become a habit of the households in Villa Trinitas Phase 3. The residents bring out their segregated garbage only during the agreed schedule of collection, which is as follows:

Wednesdays : Biodegradables and Recyclables  
Saturdays : Biodegradables, Recyclables and Residuals

Lapasan started waste segregation, involving over a hundred households, last October 2003 in Sitio Sto. Niño. There are still a number of households who refuse to segregate their wastes but the majority of households is now segregating. This is one area where IEC must come in, even after the official ending of the project.

The schedule of collection in Lapasan is Monday (for Biodegradables and Recyclables) and Thursday (for all three waste fractions). So far the households are packing the waste fractions in plastic bags, which they put outside their houses at the scheduled time of collection. Solid containers for each household comparable to those used in Europe are no realistic option for Cagayan de Oro at the moment mainly due to the high costs, which this would involve.

In both pilot areas, segregated wastes are collected and brought to MRF by the respective garbage pickers group contracted by the barangay council. Waste characterization then follows after each collection. Collected biodegradables are now being placed in the heap for composting to produce organic fertilizers at the Allotment Gardens of Bugo and Lapasan. The recyclables remain stored in the MRF until further processing by the Garbage Pickers. The residuals are picked up by a dump truck of CPSO on the collection day. As all residuals from the pilot households

are stored at a central collection point at the MRF, the CPSO saves a considerable amount of time, which was needed for the house-to-house collection before.

At the start of waste segregation in both of the pilot areas and up to the present, a representative from the City and from the project is always present to monitor as well as to give an outright explanation to those residents who are still not convinced with this new system. This is also being done to assist the garbage pickers in handling questions and different reactions of the residents. The presence of City and project representative will have to be less frequent now as the project is ending. This is based on the assumption that the barangay is now capable in implementing the system on its own. In Lapasan, the barangay community organizers are now in-charge of monitoring although they are still being checked by the project from time to time. In Bugo, segregation is on-going even without someone from the barangay. The residents and the garbage pickers in-charge in Bugo are working well together. There is a feeling of partnership. In fact, during the Home Owners' Christmas party last December 2003, the garbage pickers were invited. A project staff does a spot/surprise monitoring in Bugo.

At present, the garbage pickers are scavenging at the landfill site:



*Garbage pickers at the Cagayan de Oro landfill site looking for recyclables*



*Children are supporting their parents in their daily struggle for survival*

The project approach leaves the waste segregation to the households and the collection to the garbage pickers:



*Organized garbage pickers collect segregated wastes in the project pilot areas Bugo (left) and Lapasan (right)*

### Waste Characterization Data:

Bugo	June 2003		July 2003		August 2003		September 2003	
	kg	%	kg	%	kg	%	kg	%
Recyclable	267.75	13.55	245	5.34	242	6.00	163.00	15.83
Biodegradable	952	48.17	2953	64.39	2209	54.79	522	50.68
Residual	756.5	38.28	1388	30.27	1581	39.21	345	33.50
<b>Total</b>	<b>1976.25</b>	<b>100</b>	<b>4586</b>	<b>100</b>	<b>4032</b>	<b>100</b>	<b>1030</b>	<b>100</b>

Bugo	October 2003		November 2003		December 2003		All 7 months	
	kg	%	kg	%	kg	%	kg	%
Recyclable	178	4.24	197.5	4.67	205	4.63	1498.25	6.1
Biodegradable	2521	60.00	2293	54.27	1820	41.14	13270.00	54.2
Residual	1503	35.77	1735	41.06	2399	54.23	9707.50	39.7
<b>Total</b>	<b>4202</b>	<b>100</b>	<b>4225.5</b>	<b>100</b>	<b>4424</b>	<b>100</b>	<b>24475.75</b>	<b>100.0</b>

Lapasan	October 2003		November 2003		December 2003		All 3 months	
	kg	%	kg	%	kg	%	kg	%
Recyclable	422.25	17.4	187	11.42	132	8.85	741.25	13.3
Biodegradable	1020	42.02	811	49.54	530	35.52	2361.00	42.5
Residual	985	40.58	639	39.03	830	55.63	2454.00	44.2
<b>Total</b>	<b>2427.25</b>	<b>100</b>	<b>1637</b>	<b>100</b>	<b>1492</b>	<b>100</b>	<b>5556.25</b>	<b>100.0</b>

The tables above show that the amount of recyclable materials collected in both Bugo and Lapasan is relatively small. One possible reason for this small turn out is that residents are now realizing that there is in fact value to some of the things that they throw away, and so they keep their recyclables. Another reason is that there are some scavengers, not connected to the project, who go to the pilot areas very early in the morning and collect these recyclables. Or it could be that the principle of reducing, re-using and recycling has finally sunk in the consciousness of the residents.

Regardless of the reasons, the above posed problems to the implementers as well as the partner garbage pickers groups since the recyclables are all they get in exchange for collecting the segregated wastes from the households. Recognizing this limitation, which is a threat to the project's sustainability, the barangay councils of Bugo and Lapasan were consulted.

Bugo Barangay Council extended an allowance of P80.00 per person per collection to augment the income of the garbage pickers<sup>1</sup>. This started last October 2003 and is now extended until March 2004 or until such time that there will be enough recyclables that can be collected. This is expected to happen once the project is replicated to the whole of barangay Bugo.

In Lapasan, the Barangay Chairman promised to extend financial assistance to the garbage pickers. The barangay is currently processing the budget for this assistance. There were already occasions that the garbage pickers group did not come to

<sup>1</sup> The official minimum wage in Cagayan de Oro is P180 per person per day. The time needed for collection is about half a day.

Lapasan to collect the waste as agreed. Asked for the reason, representatives of the group stated that the income they can get by solely marketing the recyclables collected in Lapasan cannot compensate the amount which they could earn by collecting at the landfill for the same period of time. The conflict could be settled by the above mentioned promise of the Lapasan Barangay Chairman.

Obviously, the economic situation of households has a tremendous impact on the waste handling practices. In Bugo, many citizens are employees of two big industrial enterprises (Nestlé, Del Monte). The economic situation of their families and households is generally slightly better than compared to most of the households in the pilot area of Lapasan. The tendency seems to be that the economic situation influences the household's readiness to give their recyclables away for free in a way that the poorer the household is, the lesser recyclables are provided.

The tables above also illustrate that biodegradable wastes rank first among the three waste fractions in terms of weight followed by the residual wastes. This is true both in Bugo and Lapasan. Actual observation in the pilot areas shows that food wastes or kitchen wastes are aplenty. In other parts of the country these food wastes are being fed to house pets such as dogs, cats and sometimes pigs. Since the Bugo pilot area is a middle class subdivision where residents are more critical to foul odor (which is normally emitted when pigs are raised), and since Lapasan is a low income area where there is not enough open space, the tendency of the residents is to throw away these biodegradable wastes.

The residual wastes, on the other hand, mainly consist of thin/flimsy plastic bags, diapers, napkins, batteries and excavated materials from the community's open drainage. There is a prevailing practice of using thin/flimsy plastics for just about anything bought in the market (fish, vegetables, spices etc). These flimsy plastics are easily torn and not really suitable for being re-used. There is still no available technology in Cagayan de Oro to recycle this kind of material. The open drainage surrounding the pilot area in Lapasan has to be constantly cleaned and shoveled, otherwise it would overflow. The excavated materials from these canals, which consist of soil and solid wastes, are being treated and disposed of as residual wastes, thus the very high weight of this waste fraction.

Despite the relatively heavy weight of residual wastes, the amount of garbage brought from the participating households to the landfill (in terms of weight) has decreased by 60% in Bugo and almost 56% in Lapasan since segregation in the project has started.

#### **4.8 Activity 4.6: Organic fertilizer production from bio-wastes**

The responsibility for this activity was assigned to the allotment garden working group since it is basically an agronomic task. However, since R.A. 9003 requires a composting facility as one the components of an MRF, this activity is reported under the ISWM work package.

Organic fertilizer for ornamentals is presently produced in some households in compost barrels in barangay Bugo, resulting from a private initiative. Since the focus of the project is on food security and on developing ISWM systems that can be reproduced for the city as a whole, this activity is considered to be complementary to the project, and not financially supported. Considering the relatively high per unit costs of a compost barrel, it is not realistic to make these barrels compulsory for every household through a city ordinance. The project aims to establish a central composting facility, e.g. a compost heap in the allotment garden or any other suitable

location (MRF), in order to produce organic fertilizer to be re-integrated in food production activities.

At present, there are central composting facilities/ compost heaps established and in operation in the Allotment Gardens of Bugo, Gusa, Lapasan and Carmen.

Three seminars on basic composting technologies of biodegradable household wastes were conducted:

- July 6, 2002: Department of Education, City School Division (clientele: school teachers)
- August 30, 2002: Urban Gardening Seminar, Department of Agriculture (clientele: interested public)
- February 26, 2004: TABOAN training sponsored by the German government agency GTZ for Mindanao tribal people and MNLF<sup>2</sup> rebel returnees.

Further, the allotment gardeners in the different pilot gardens are regularly trained in compost making and its safe application on vegetable crops.



*Compost heap in one of the allotment gardens*



*Lecture on composting for allotment gardeners*

#### **4.9 Activity 4.7: Market evaluation, development for recyclable & recycled products**

The “*Kooperatiba sa Nagkahiusang Mangaykayay*”, one of the two garbage pickers cooperatives involved in this project, had undergone training on crafts production from recycled products. This undertaking was in cooperation with an NGO (TESDA) and the City Public Services Office in January 2003.

Several handicrafts had been developed, but the most famous and saleable of them all are the bags and wallets made from recycled foil packs. This product is now gaining popularity not only locally but also in Europe as manifested by a number of orders coming from project partners in Belgium and Germany. At present, the bags and wallets produced by the “*Kooperatiba sa Nagkahiusang Mangaykayay*” are sold in several shops in Freiburg/Germany and Belgium. There are also plans to establish a marketing outlet in Schelklingen starting May 2004. The transport of the products from the Philippines to the shops in Europe is still privately organized. As of the time of reporting, there are efforts to establish a more effective marketing network.

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<sup>2</sup> MNLF = Moro National Liberation Front



*Bags made out of recycled foil packs*

Recognizing that one must not stop at this initial success in marketing of recycled products, the following still has to be done:

- identifying existing and potential buyers of recyclable and recycled materials,
- establishing of quality standards,
- assessment of quantities needed for these items,
- development of markets for these products,
- establishing contact, negotiating for prices and handling considerations with bulk-buyers from both domestic markets and Metro Manila,
- economic evaluation

Complementary to these activities, an anthropological study of the garbage pickers community at the Cagayan de Oro landfill site was conducted from February to June 2003 by Ms. Jana Gerold, who is M.A. student of the University of Freiburg (APT). The study, which included a socio-economic and socio-cultural survey, will be part of Ms. Gerold's master's thesis, and was carried out in very close co-operation with the Asia Urbs Project, particularly the City Public Services Office. Ms. Gerold participated at the regular project meetings (plenary and ISWM) and briefed the project team regularly on her proceedings and results. This also enabled the project team to give inputs and share ideas with her.

The general aim of this empirical study was to understand the structural and functional impact of poverty and the dynamics within the garbage picker's community. The objective was to document the socio-economic and cultural dimensions of urban poverty, not only on a macro level in terms of historically based factors or socio-economic and political conditions, but rather on a micro level, observing the individual. Furthermore, the purpose was not only to give detailed information regarding the livelihood strategies of the scavengers, but also to provide the Asia Urbs Project with baseline data of the garbage picker's community and to strengthen already established relationships and networks.

The principal research techniques were participant observation, in-depth semi-structured and unstructured as well as biographic interviews and focus group discussions. Some selected results of the study are:

- The household sizes of the scavenger families range from three up to twelve family members, with an average of eight family members, but most of them

belong to a nuclear family. As for the ethnic identity, the scavengers are a very heterogeneous group. The educational attainment is very low, with more than half of the people only finishing elementary school. Most people working at the landfill site are married and have children. Some children as young as seven years old also scavenge in order to contribute to the family's income. Several families work together in groups, but there are also women and men who scavenge on their own, being the only breadwinner in the family. A bad day's income can be as little as 60 Peso (1 Euro) and a good day's income can be as much as 300 Pesos (5 Euro).

- In order to reduce dependency on the landfill site, most people have side incomes like raising piglets, owning a sari-sari store (a little shop where one can buy daily items), breeding cocks, or working as a carpenter.
- As much as 95% of the people working as scavenger have loans from usurers, and are therefore working hard in order to pay the loan on a daily basis. Most of the collected recyclables are sold to a *suki* (a contracted buyer) either on a daily, weekly or monthly basis, depending on the family's budget and needs. The *suki* is usually the middleman who sells the items to factories or manufacturers of recyclable products. Most of the scavengers only have one *suki*, therefore there exists a very close business relationship in each case. Although the *suki* is assured of a constant supply of recyclables, lending money or giving credits is rarely the case.
- In some cases women quit scavenging in order to establish a little business; the men would rather stick to their activity as scavenger, being the constant provider for the family.

It can be concluded that the garbage picker's community is very active in finding solutions to problems related to their restrictive situation, but not in terms of sustainability, but rather on a daily basis. In order to uplift the working and living condition of the people sustainably, Ms. Gerold comes to the conclusion that it is very important to strengthen self-initiatives and to provide long-term education, for example through training as allotment gardeners, as many of the scavengers are rural-urban migrants having farming knowledge.