

## **Chapter 5**

### **5.0 ISWM PLAN COMPONENT**

In formulating the plan, the 4 E components were used as basis to define the specific strategies and activities necessary for implementing the program. These include Engineering, Education, Enforcement and Economic Enterprise. Each stage of the four elements on proper solid waste management, as defined by RA 9003, has the corresponding components appropriate for the municipal's current and future requirement of its SWM operations. Annex 5.a, shows a table for the plan components generated during a series of workshops conducted with the members of the Municipal ESWM Board, together with its Technical Working Group.

#### **5.1. Engineering**

The Engineering component of the plan serves as the backbone for the ISWM plan implementation. Basically, it covers the general hardware, physical and technical aspects of the plan. It provides the blueprint and guidelines on proper solid waste management for clean and healthy surrounding.

The component takes off from the present LGU infrastructure and equipment support for the SWM program. These have been identified, studied and analyzed to complement the present services and the needs for improving these services basing on the general status and scenario of the existing waste generation and practices. Appropriate measures shall be undertaken to augment solid waste system in the municipality to comply with the requirements of the law.

This component further involves the design of the best technique to achieve waste reduction and segregation at source, proper collection and transfer, establishment of a Material Recovery Facility, (MRF) and proper disposal facility as mandated by RA 9003. This includes infrastructure projects and acquisition of equipment needed for the ISWM improvement program of the LGU.

##### **5.1.a. Stage 1. Waste Reduction and Segregation at Source**

Waste segregation and reduction at sources shall be made mandatory to all households and establishments within the municipality of Jagna. It shall be ensured by a control mechanism, incentives and massive IEC campaign to promote the LGU's program on SWM.

In accordance with the approved general ISWM Strategy adopted by the municipal government, the estimated waste that will be generated daily will be 4.3 tons in 2004 and will increase to 11.4 tons per day in 2014. Of the 4.3 tons/day generation, 1.8 tons/days comes from the residential areas of the 8 urban barangays; 0.8 tons/day from the public market and 1.6 tons/day from other establishments including institutions & service centers. Annex 4.b shows the annual projection of wastes generated per day in kilograms including wastes from the rural barangays that will be collected beginning 2006.

For households, and other small-scale business and industrial establishments, the strategy is segregation of waste using coded garbage trash bins/cans. Residents are required to provide their own waste receptacles in any form- plastic bags, sacks, empty cans or any containers at the discretion of the owner provided these are properly labeled and secured. These containers shall be kept within the generators' areas, prior to the scheduled collection in their respective areas.

In urban areas, for medium-scale business establishments outside the public market, 2 of these receptacles are required for the following: Recyclable and residuals/special wastes. Biodegradables are required to be composted on site. However, for residents and establishment with inadequate backyard space for composting, they shall be required to provide 3 containers, to include biodegradable wastes for collection. In this case, additional collection fee for biodegradable collection shall be imposed from the generator. It is estimated that around 20% of the urban households will not be able to provide their own compost pit. From the table above, this means that about 233 kgs/day of biodegradables generated in 2004 will be collected.

On the other hand, in rural Barangays, backyard composting is compulsory to all households and small-scale business establishments. This is about 1.5 tons/day (yr. 2006) of biodegradables or 21% of total generation on the said year that will be outright diverted at source. Composting can be by different techniques - compost pit, compost pile, stacked of used tires, pots, etc. according to the choice of the owner. Two receptacles shall then be required for the segregation and collection of recyclables and special wastes. Further, households in secluded and remote areas, where bulk collection is not yet possible, residents shall be required to establish additional pit for the management of their residual and special wastes. These wastes should be secured in plastic containers before it is dumped into the pit and covered with soil. The BSWMC will see to it that the above requirements are enforced by the local residents. The barangay health workers, the school teachers and the purok leaders will do the continuing information and education campaign on segregation, composting and buying residual and special waste.

Indiscriminate burning of biodegradable waste shall be prohibited. Burning of plastics, chemical containers and other toxic and hazardous wastes shall be strictly prohibited.

In the market area, 3 containers shall be required for bio waste, recyclables and residuals/special wastes transient vendors and stall operators. Again distinctive markings shall be placed to determine the classification of waste thrown to the receptacle. About 822 kgs/day of market wastes are generated daily beginning year 2004. These shall likewise be placed inside their area before the scheduled collection. There shall be no communal receptacles to be provided by the LGU. This technique insures that proper waste segregation is followed, by controlling waste containers in the area. The market sweepers will manage to receptacles which will be locked at night to avoid indiscriminate throwing of wastes.

In common areas, receptacles shall be provided by the LGU. There shall be 3 sets of containers, portable but secured from animal activities. At the wharf area, 1 set of these 3 containers shall be provided and shall be managed by the Philippine Ports Authority, which shall be covered with an agreement with the municipal LGU. In plazas, 2 sets shall be provided. *Tanods* and War on Wastes (WOW) enforcers shall be assigned to look after the proper use and maintenance of these receptacles. In the public cemetery, another set of 3 containers shall be provided. The caretaker shall be responsible for the proper use and maintenance of the said containers.

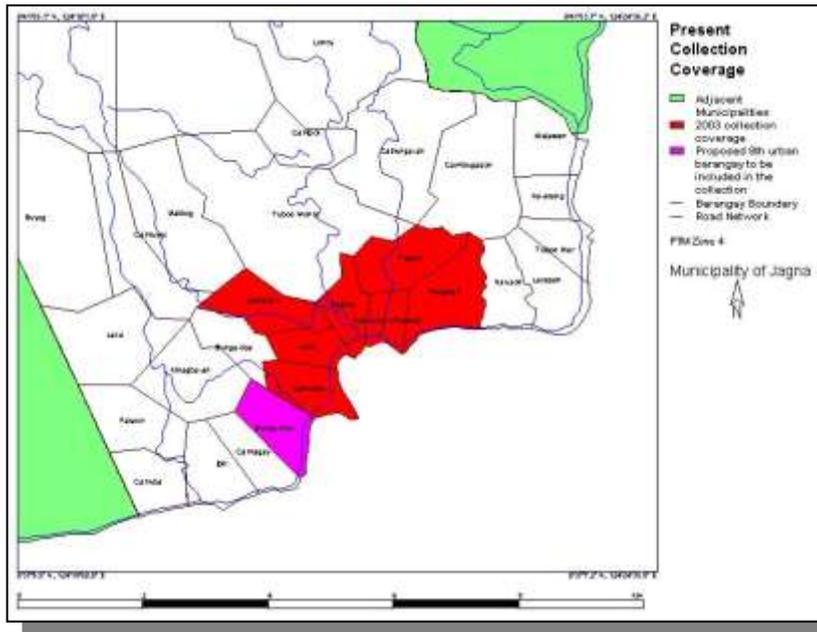
The receptacles will have a 150 liter capacity composed of 3 containers at 50 liters each. These containers shall be fabricated by local sheet metal shops. Figure 5.a shows the planned communal receptacles to be provided in public and common areas. It shall be color coded with the corresponding waste type markings for each type of waste. Each compartment shall be designed to be detachable from each other. A plastic bag liner shall be placed inside for easy collection.



**Figure 5.a. Communal Waste Receptacles**

### 5.1.b. Stage II. Collection and Transport

At present only 7 barangays are covered by the LGU collection services, as shown in Figure 5.b, shaded in red. In year 2005, the LGU plans to increase their coverage to 8, to include Barangay Bunga Mar. This shall now cover the 8 urban Barangays as proposed in their Land Use proposal under the comprehensive land use plan (CLUP), (Figure 5.b shaded pink). Further, in year 2006, the LGU shall cover 100% of its Barangays, to include rural Barangays for collection of residuals and special wastes. Annex 4.a is a table showing the proposed collection area of the LGU with the corresponding % coverage.



The LGU shall design a collection schedule consistent with the implementation of segregation at source. This shall be enforced to encourage residents and establishment owners to comply with the mandated segregation and reduction of waste at source. A proposed schedule is presented in Table 5.a below.

**Figure 5.b. Present and proposed collection coverage**

The public market which produces about 0.68 tons/day (yr 2004) of biodegradable wastes as shown in the waste flow (See Annex 4.b), collection is everyday. For other types of wastes to wit: residuals/special wastes – 0.1 tons/day and recyclable wastes 0.03 tons/day, collection is two times and once a week for residuals/special wastes and recyclable wastes, respectively. Tuesdays and Fridays are the chosen days for collection of residuals considering that these are market days of the municipality, hence residuals are expected to exceed the average generation rate.

This will certainly ease the current collection scheme of the LGU, which at present has an average of two trips in the market alone using their two (2)-m<sup>3</sup> compactor truck. When segregation is implemented, the compactor capacity will be more than enough to satisfy the collection schedule. Collection projections of about 4 cum of residuals/special waste per day in year 1 and about 10.7 cum/day in year 10 are estimated. The same trend holds true for recyclables in rural barangay which will accumulate to about 0.03 to 0.14 tons per cluster per day in year 1 and 0.07 to 0.3

tons/day by year 10. Because of the relatively small amount of these waste generated, the frequency of collection could be monthly including the residual waste. The table 1 below shows the projected amount of recyclables in rural barangays by cluster. Table 2 shows the projected residuals plus special waste in rural barangays. The present capacities of the compactor and dump truck are still adequate to handle these wastes within the 10-year period.

**Table 1:****Rural barangays recyclable by cluster**

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>cluster</b>	-	-	-	<b>326</b>	<b>338</b>	<b>425</b>	<b>434</b>	<b>532</b>	<b>542</b>	<b>645</b>	<b>667</b>	<b>670</b>
cluster 1	-	-	-	139	144	182	186	227	232	276	285	287
cluster 2	-	-	-	77	80	101	103	126	129	153	159	159
cluster 3	-	-	-	78	81	101	104	127	129	154	159	160
cluster 4	-	-	-	31	33	41	42	51	52	62	64	65

**Table 2:**

<b>Collection and Transport Analysis</b>													
Equipment Capacity	No	Cap, cum	Trips	Total Cap									
Compactor	1	3.6	2	7.2									
Dump truck	1	12	2	24.0									
				31.20									
Excess (Under capacity)			20.21	19.48	17.01	16.41	14.52	14.08	13.06	12.61	11.10	10.32	10.14
<b>Equipment Capacity</b>			<b>31.20</b>										
<b>Collection Volume, cum</b>			<b>10.99</b>	<b>11.72</b>	<b>14.19</b>	<b>14.79</b>	<b>16.68</b>	<b>17.12</b>	<b>18.14</b>	<b>18.59</b>	<b>20.10</b>	<b>20.88</b>	<b>21.06</b>
<b>Urban residential and establishments</b>			<b>7.37</b>	<b>7.98</b>	<b>8.20</b>	<b>8.54</b>	<b>9.79</b>	<b>10.04</b>	<b>10.29</b>	<b>10.54</b>	<b>11.24</b>	<b>11.67</b>	<b>11.77</b>
biodegradable			4.04	4.27	4.40	4.60	4.98	5.12	5.26	5.40	5.67	5.91	5.97
recyclable			1.28	1.43	1.47	1.53	1.89	1.93	1.97	2.01	2.19	2.27	2.28
residual/special waste			2.05	2.27	2.33	2.42	2.92	2.99	3.06	3.12	3.38	3.50	3.52
<b>Public market</b>													

			<b>3.62</b>	<b>3.74</b>	<b>3.86</b>	<b>4.04</b>	<b>4.11</b>	<b>4.23</b>	<b>4.36</b>	<b>4.49</b>	<b>4.63</b>	<b>4.83</b>	<b>4.90</b>
biodegradable			2.99	3.09	3.19	3.34	3.39	3.50	3.60	3.71	3.82	3.99	4.05
recyclable			0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.17	0.18	0.18	0.19
residual/special waste			0.49	0.51	0.52	0.55	0.56	0.58	0.59	0.61	0.63	0.66	0.67
<b>Rural barangays</b>			-	-	<b>2.14</b>	<b>2.21</b>	<b>2.79</b>	<b>2.84</b>	<b>3.48</b>	<b>3.55</b>	<b>4.23</b>	<b>4.37</b>	<b>4.39</b>
residual/special waste			-	-	2.14	2.21	2.79	2.84	3.48	3.55	4.23	4.37	4.39
<b>Volume by Waste composition</b>			<b>10.99</b>	<b>11.72</b>	<b>14.19</b>	<b>14.79</b>	<b>16.68</b>	<b>17.12</b>	<b>18.14</b>	<b>18.59</b>	<b>20.10</b>	<b>20.88</b>	<b>21.06</b>
biodegradable			7.03	7.36	7.59	7.93	8.37	8.62	8.87	9.12	9.50	9.90	10.02
recyclable			1.42	1.58	1.62	1.68	2.05	2.09	2.14	2.19	2.37	2.45	2.47
residual/special waste			2.54	2.78	4.99	5.18	6.26	6.41	7.13	7.29	8.23	8.53	8.57

The compactor shall be used to collect biodegradables, residuals and special wastes. On the other hand, the dump truck shall be used to collect recyclables. Based on the analysis of collection capacity and the geographic location of each of these Barangays, these clusters of Barangays can be accommodated by one-day collection. Figure 5.c, shows the clustering of Barangays for collection purposes.

#### **Compactor**

Day	Biodegradable	Residuals / Special Wastes	Recyclables
Monday	Market Urban Brgys: Bunga Mar, Looc, Can-upao, Canjulao, Pagina, Pangdan, Poblacion		
Tuesday	Market	Market, Bunga Mar, Looc, Can-upao, Canjulao (4.13 cu m)	
Wednesday	Market	Clustered Rural Barangays composed with 3-9 brgys / cluster (2006 implementation)	
Thursday	Market Urban Brgys: Bunga Mar, Looc, Can-upao, Canjulao, Pagina, Pangdan, Poblacion		
Friday	Market	Market, Pagina, Pangdan, Poblacion, Canjulao (4.62 cu m)	
Saturday	Market	Truck maintenance	
Sunday	Market		

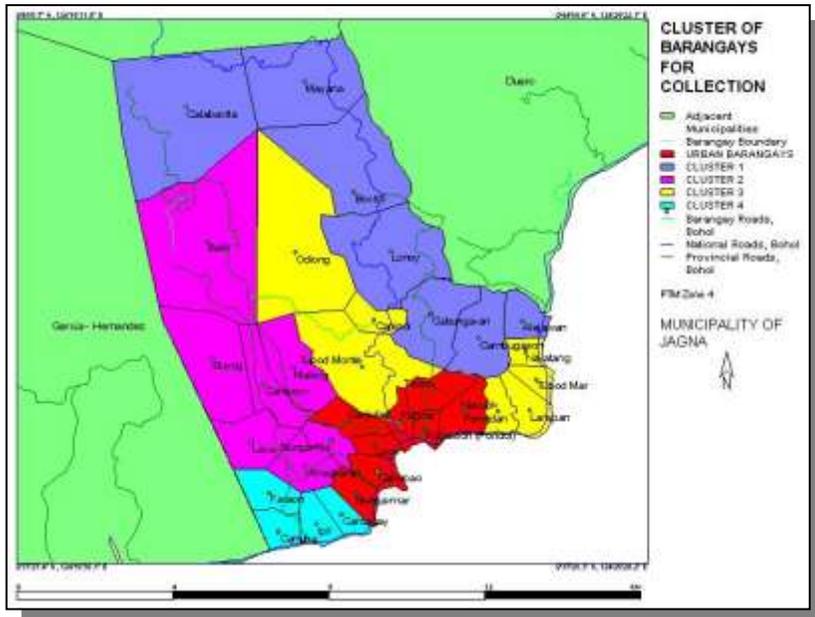
**Dump truck:**

Day	Biodegradable	Residuals / Special Wastes	Recyclables
Wednesday			Market (1.6 cu m)
Saturday			Urban Barangays: Bunga Mar, Looc, Can-upao, Canjulao, Pagina, Pangdan, Poblacion (5.67 cu m)
Sunday	Truck maintenance		

**Table 5.a. The Proposed LGU Collection Scheme**

Rural Barangays shall establish for themselves, through their Barangay Solid Waste Management Committee (BSWMC) a system for the collection of the recyclable And the residual/special wastes. The ESWM Board and its TWG shall assist these Barangays in establishing their respective systems. Due to relatively small amount of collectibles, Barangays can either use, *tristikads or push carts (kariton)* to collect their recyclables and residual/special waste. As indicated the residual/special wastes will be stored in the barangay storage area (transfer station) for pick up by the municipal collection system. The BSWMC may either purchase “kariton” or tristikad or rent them to free the barangay LGU of the repair and maintenance of the vechicle. If purchased, the BSWMC will issue “memorandum recewipt (OAR)” to the use of the vechicle for him/her to be totally accountable for the upkeep of the unit/s.

In rural barangays the barangay collects the residuals and special wastes from the sources to be deposited at the barangay pick-up (transfer) station. The municipal collection team will pick-up said waste according to schedule. Barangays are clustered for the pick-up schedule in accordance with common accessibility. The barangays will use



**Figure 5.c. Clustering of barangays for collection**

“kariton” or tristikad to collect residuals and special wastes. For

remote households, where collection is impossible, residuals and special wastes shall be treated in a special cell (separate from the composit pits for biodegradables); provided that those wastes potential to secrete toxic substance shall be wrapped to prevent them from contaminating the soil. Each remote household will be required to 2 pits e.g. for biodegradable and residual/special wastes.

Rural barangays residuals+special waste by cluster, kgs/day									
YEAR	2006	2007	2008	2009	2010	2011	2012	2013	2014
cluster	484.8	502.6	632.4	645.7	790.8	806.6	959.8	992.4	996.4
cluster 1	207.3	214.9	270.4	276.0	338.1	344.9	410.3	424.3	426.0
cluster 2	115.1	119.4	150.2	153.3	187.8	191.6	227.9	235.7	236.6
cluster 3	115.7	119.9	150.9	154.1	188.7	192.5	229.0	236.8	237.7
cluster 4	46.7	48.4	60.9	62.2	76.2	77.7	92.5	95.7	96.0

Source: waste assessment template

Definitely there will be no collection of biodegradable wastes from rural Barangays. Further, unsegregated and unsecured wastes shall not be collected with a warning to the generators for the imposition of penalties for continued violation.

To sustain the collection operation of the LGU, the LGU plans to purchase a new set of collection vehicles by year 2005. This will be for the replacement of the existing compactor and dump truck for waste collection. The plan is to purchase one (1) 2 m<sup>3</sup> capacity compactor, the same as the present compactor and a twelve (12)-m<sup>3</sup> dump truck for the recyclable wastes. This dump truck shall also be used for other purposes by the LGU. According to the projected collection volume, these trucks shall be able to handle waste volumes up to year 10.

**5.1.c. Stage III. Materials Recovery Facility.**

As required by law, every municipality should have their Materials Recovery Facility (MRF). There will be two types of MRF in the municipality as planned. One type will be the Central MRF (CMRF), while the other type is the Barangay MRF (BMRF).

**a. Central Materials Recovery Facility (CMRF)**

The Central MRF shall accept for processing recyclable and biodegradable wastes from the urban barangays, which is the collection area at present. All types of waste materials from households, commercial and institutional establishments, and the public market areas will be collected and processed. With some assistance from the provincial government of Bohol, the CMRF shall be due for construction on June 2004 while its operation shall be on the first quarter of 2005 to complement the implementation of its waste segregation and its new collection scheme. The planned CMRF is a 42 sq m facility in a lot of about 1,300 sq m, owned by the LGU. It

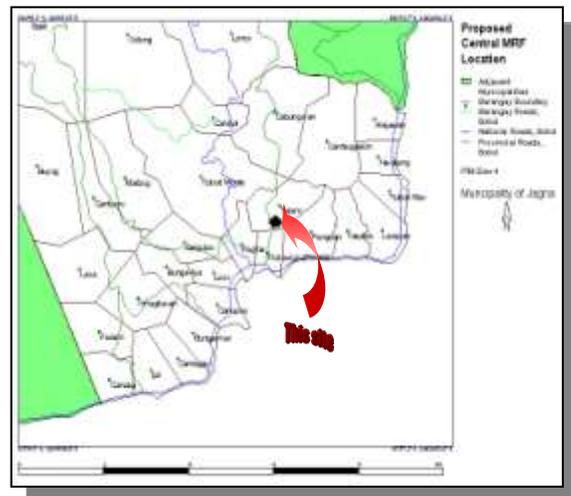


Figure 5.d. The proposed location of the CMRF

will be located in Barangay Tejero, about 400 meters away from the municipal hall with good access to road and residents. The planned location shall be adjacent to the existing abattoir owned and ran by the LGU. Figure 5.d is the proposed location of the CMRF, while figure 5.e is the schematic design of the said facility.

The facility shall include segregation of recyclable wastes, a small-scale processing, indigenous production facility, a composting facility and an administrative office. The components of the CMRF are described as follows:

**Unloading Area.** Enough space shall be available for the unloading of recyclable materials. It shall provide enough space near the entrance of the facility for the truck to move freely. This area shall be with concrete floor for easy cleaning and maintenance especially during the rainy season. In 2004, about 0.34 tons/day of wastes will be unloaded at the CMRF and will increase to 0.72 tons/day in year 2014.

**Segregation.** This section of the facility includes a sorting area adjacent to the unloading area and compartments or cells for the storage of different recyclable wastes like plastics, cartons, metals, glass, and leathers and textiles. Segregation into saleable and non-saleable items shall be done manually. The recovered materials shall be sold to junk shops in Tagbilaran city or to interested direct buyers at the LGU. Non-saleable materials and residuals from the CMRF shall be gathered and put in an specified place prior to collection.

**Small-scale processing.** This involves the cleaning and washing of recyclable materials, which normally come to the CMRF dirty and soiled. Mostly Polyethylene Terephthalate (PET) and glass bottles need cleaning before these are sold. Further, the process likewise includes the removal of labels from bottles, cans, plastics, etc. Dry papers and cartoons shall be tied with plastic straws without compaction, considering the minimal volume of the materials. Likewise, cans will be collected using sacks before transportation. With the process, access to water is vital to support its operation. Because this CMRF is adjacent to the municipal abattoir, the waste/wash water generated shall be conveyed and treated at the existing wastewater treatment plant of the abattoir. In 2004 about 88 kgs/day will undergo small scale processing at the CMRF and will increase to 327 kgs/day in year 2014.

**Indigenous production.** Once the basic recycling and composting operations are functional, the Municipal MRF may proceed into processing of salvageable recyclable into indigenous products. Some materials, even compostables are convertible to other forms of indigenous products. Floor wax production, basket weaving, production of bracelet, necklace, pots, bags, hats and many others will be included in this activity. Sale of these products can potentially generate additional revenue to the LGU. Trainings and capability building seminars shall be conducted by the LGU through its local Municipal Social Welfare and Development Office (MSWDO) to train people on production techniques. The CMRF will have a modest display area for these products. Cost-benefit analysis will be done per type of indigenous processing prior to operation to ensure return of investment and costs.

**Composting facility.** The central MRF shall have a composting facility to be situated beside the MRF building. Biodegradable waste from the public market, business/ institutional establishments and urban residential houses shall be processed in this area of the MRF. Based on the waste flow (Annex 4.c) it is estimated that the LGU shall collect about 1.9 tons of raw biodegradable wastes everyday with about 85% of these (or 1.5 tons/day in 2004) are compostable. Of the estimated collectible biodegradables 0.7 tons/day will come from public market 1.0 tons/day from establishments and only 0.2 tons/day will come from households. This would be enough volume to operate a commercial composting facility. Natural composting with ventilation tubes using bamboo is employed.

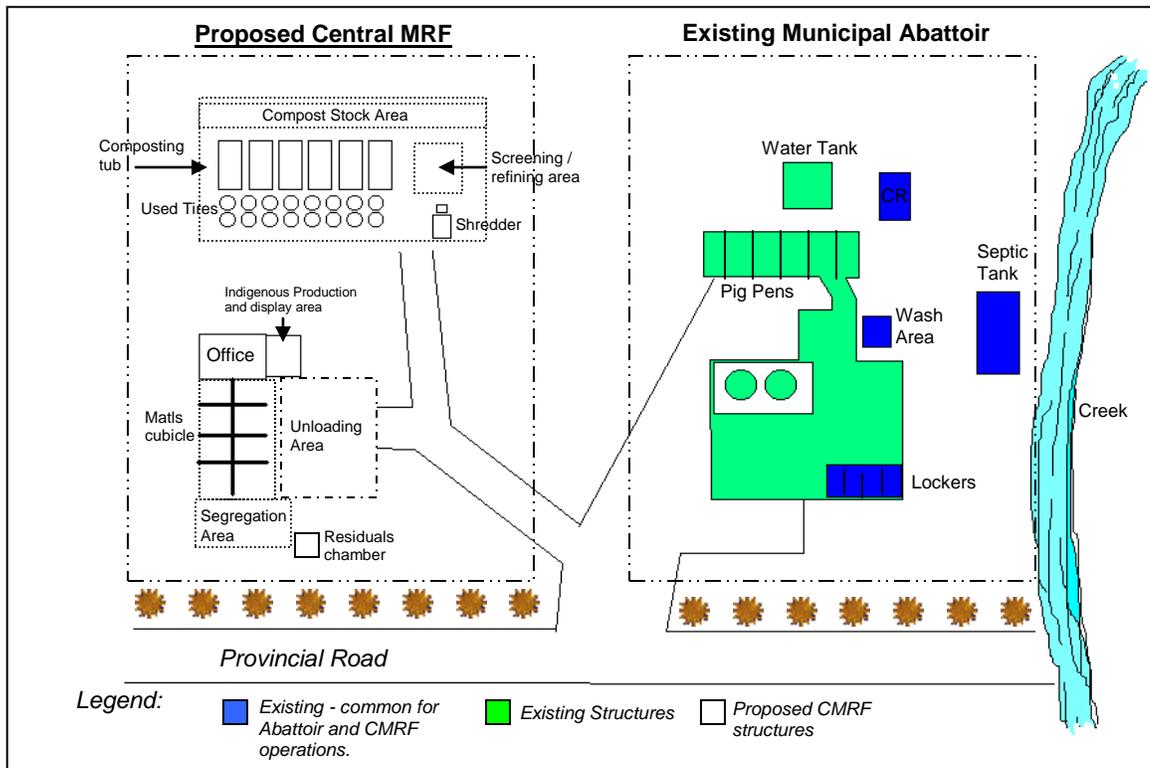
After their study tour in Negros Oriental, specifically in the municipality of Amlan, the ESWM Board decided that a vermi-composting, facility will also be established in Jagna. Equipment e.g. shredder, screen and other related composting materials shall be purchased. Composting hubs or windrows shall likewise be constructed in the area. The African “night crawlers” will be initially bought outside the province. Products of the composting facility shall be promoted and sold to farmers and other organizations through the local Agriculture Office (MAO). Portion of these compost products will however be used for the demo farm operated by the MAO and/or as garden soil for green and ornamental spaces at the Municipal hall, parks and plaza. Assuming 40% turnover including wastage, the CMRF is estimated to produce 0.6 tons of compost product per day or almost 12 sacks/day.

**Storage for Residuals.** Because the LGU projected that out of the recyclable materials collected, only about 40% are marketable and is sellable to junkshop operators within the municipality and even in the capital city of the province, 20% are salvageable or can be subjected to processing to indigenous products, and the remaining 40% shall be considered residuals. The small-scale processing shall likewise contribute additional residuals. Hence, the MRF shall have one section for the storage of non-saleable materials and process residues. This area shall be sited near the unloading area. The dumptruck, after unloading, shall take these materials and disposed these at the municipal disposal facility.

**Administrative office.** The facility shall include an administrative office, for its operation and monitoring. Inflow and outflow of raw materials as well as finished products shall be regularly monitored and recorded. Price list and list of saleable recyclables shall be posted and regularly updated. The MRF shall likewise be open to the public who wish to bring their waste personally to the facility.

The comfort rooms (CR) and lockers at the nearby abattoir shall be made available for the workers of the MRF. Hence, both personnel from these two establishments shall use the same communal facilities.

**Electricity and Water Supply.** The municipality of Jagna has its own municipal water works system and this will provide water requirements of the CMRF, especially for the washing processes. It shall likewise be provided with electric power from BOHECO II, which is the supplier of electricity in the whole district.



The plan includes the acquisition of a service vehicle for the MRF. The central MRF shall be managed by the LGU as a stand-alone facility. Personnel shall be assigned at the discretion of the municipal local chief executive upon the recommendation of the ESWMB. The facility shall only serve the municipality of Jagna with the composting component as centerpiece. However, this MRF shall be open to private organization or NGO's working on the Solid Waste Management Program, e.g. Unlad Kabayan Organization, contributing skills on indigenous production.

Since this will be the first facility to be established and operated by the municipality, the budget shall be allocated and provided for by the LGU as seed capital to start-up its operation.

There will be at least 4 personnel to manage the MRF. The team shall be composed of sorter, composter, clerk and a supervisor. However, hired skilled workers shall be reporting at the facility on their designated production schedules. All personnel

shall be provided with the appropriate orientation on proper handling of different types of waste. Likewise protective gears and first aid kit shall be provided.

The MRF shall be so designed to be self sufficient and self-liquidating hence, proceeds from the sale of recovered materials, recycled products and composts shall be used for the maintenance and operation of the facility including the salaries of the personnel.

**Figure 5.e. The title of this figure should be Schematic site Development Plan of the CMRF**

**b. Barangay Materials Recovery Facility (BMRF)**

By year 2006, collection shall commence in the rural Barangays. It is planned that by this time, every rural Barangay shall have established its own MRF following the full implementation of segregation of waste at source. This MRF shall primarily serve as a storage area

for recyclable materials collected from its residents. Unlike the CMRF, the BMRF is a compartmentalized cubicle made of cyclone wire to be placed in its central build-up area preferably beside the barangay hall. The size shall be about 1.5 m x 4 m or approximately 6 sq m. Its compartments will each have a dimension

**Figure 5.f. The proposed Barangay MRF.**



of 1.5m x 1 m. to accommodate plastic, paper/cartons, metals and bottles. The facility shall likewise serve as a transfer station for residual wastes coming from the remote areas of the Barangay where curbside collection is not yet possible Figure 5.f is the design of the proposed Barangay MRF.

The Barangay (Rural) MRF will most likely do sorting of recyclables. Items that need small-scale processing shall be kept in one place for the LGU collection. Only ready to sell materials shall be kept in the cubicle for storage and sold to junkshop buyers when enough volume is gathered. The BSWMC will enter into marketing agreement with buyers to ensure continuing buy and sell operations of the BMRF. The BSWMC will also ensure proper accounting and record keeping of Barangay MRF income. The Barangay Treasurer will be assigned to handle the accounting and bookkeeping of BMRF income.

The MRF shall however include area for residuals and special wastes and an area for recyclable materials that need processing. These materials shall be placed in

a secured container, free from human and animal interference for the LGU to pick-up on scheduled days.

The BSWMC shall be responsible for the establishment, operation and maintenance of the facility. Like the CMRF, the BMRF shall be self liquidating and self-sufficient to sustain its operation. The LGU shall likewise monitor its operation for possible support that may be deemed necessary.

#### **5.1.d. Stage IV. Disposal Management.**

At present the municipality of Jagna dumps about 1.5 tons of solid waste everyday, generated from the 7 barangays of the present collection coverage. (Refer to Annex 3.o) This waste comes from various sources including the public market. The municipality's current disposal facility is an open dump, located about 3 kms away from its central business area. It is a private property where the LGU is renting at the rate of Php 500.00 a month. However, with the mandates of RA 9003, and the implementation of the strategic measures in reducing waste at the dumpsite, only an estimated 1.4 ton a day will end up for disposal year 2004 and is projected to increase to 3.5 tons/day in year 2014. Total disposal is only 32% (yr 2004) and 30% (yr 2014) of waste generated ( Annex 4.c). The LGU plans to improve this facility by converting this into a controlled dump while looking for possible site for a sanitary landfill (SLF), which should be operational by 2007.

#### **Conversion of open dump to controlled dump**

While the municipality is sourcing for fund for the purchase of a lot for its SLF, the existing open dump shall be converted into a controlled dump to be operational by year 2005. The plan is to cover it with limestone or any appropriate alternative covering material and have the area fenced to control the entry of scavengers and other stray animals. Moreover, the LGU shall assign personnel who shall be designated to man and watch over the operation of the facility and make sure that only residuals and selected special wastes from the LGU shall be dumped. This facility shall operate until the end of year 2006, and hopefully an SLF shall be developed and ready for operation by the start of 2007.

The LGU plans to purchase a backhoe to be used for operating and maintaining the dump. Likewise, alternative soil cover shall be sourced such as rice hull coming from the existing rice mills to be used as daily cover at the facility.

By 2007, the controlled dump shall definitely be closed with the operation of the SLF. Since the proposed site for the sanitary landfill is away from the present dumpsite, closure of this area shall include rehabilitation. Final covering with soil with tree planting activity shall be conducted in coordination with the MAO. This way, the stored and decomposing garbage is separated from the rest of the environment mitigating unwanted hazards to public health and environment.

## **Establishment and Operation of a Sanitary Landfill (SLF)**

### **a) Site Identification**

RA 9003 requires that by year 2007, an LGU should operate a Sanitary Landfill (SLF) as its disposal facility. In line with this, the municipality envisions to have an SLF to be operated and managed by the LGU. The proposed site is in Barangay Larapan, about 4 kms east of Poblacion area. It is a 2-hectare privately owned lot located in a valley with dominantly sandstone as the dominant material.<sup>1</sup> The LGU has already allocated about Php 200,000.00 in 2003, for the lot acquisition. A rough estimate suggests that the LGU shall spend about 8.0 M for the development per hectare of the said facility.<sup>2</sup> This shall include the installation of 3 units observation wells, an office, perimeter fencing, energization, waste water treatment facility, drainage system, the construction of SLF cells and closure after 10-years operation. Figure 5.f shows the sketch of the proposed SLF. This area will have a useful life of about 25 years, if only the Municipality of Jagna, with about less than 1.4 tons per day generation by year 2007 (see Annex 4.c) shall use the facility. However, the LGU is open to host a common disposal facility for adjacent municipalities or cluster of municipalities provided agreements on the use of the facility with corresponding tipping fees are in placed. In which case, the life span of the facility will be reduced.

The Mines and Geosciences Bureau (MGB) of DENR, has already approved the area for SLF development in Barangay Larapan. However, during the TWG's consensus building activity, it was found that majority of the residents living in the area is against the establishment of the facility. To generate support for the community/barangay where the facility will be located, massive and innovative IEC must be conducted to soften the resistance of the community, and eventually gain their endorsement of the project.

Should the above site will not be acceptable by the neighboring community, another site being considered for SLF development is located in Barangay Tubod Mar, about 6 kms from Barangay Poblacion. However, the area has not yet been assessed by the MGB. Figure 5.h is a map showing the proposed and alternative site for the SLF.

Whichever area should materialize, a Feasibility Study (FS) and a detailed geotechnical study shall be conducted by the LGU. A consultant shall be hired to conduct the details of the study. The design should satisfy the minimum requirements for a SLF. An Environment Impact Assessment (EIA) shall also be conducted to apply for an ECC from the DENR for the SLF project to proceed.

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<sup>1</sup> Quoted during Engr. Francis Sabugal's SLF site assessment in Bohol, last September 18, 2003.

<sup>2</sup> Based on the estimate of Bais City's SLF as inflated.

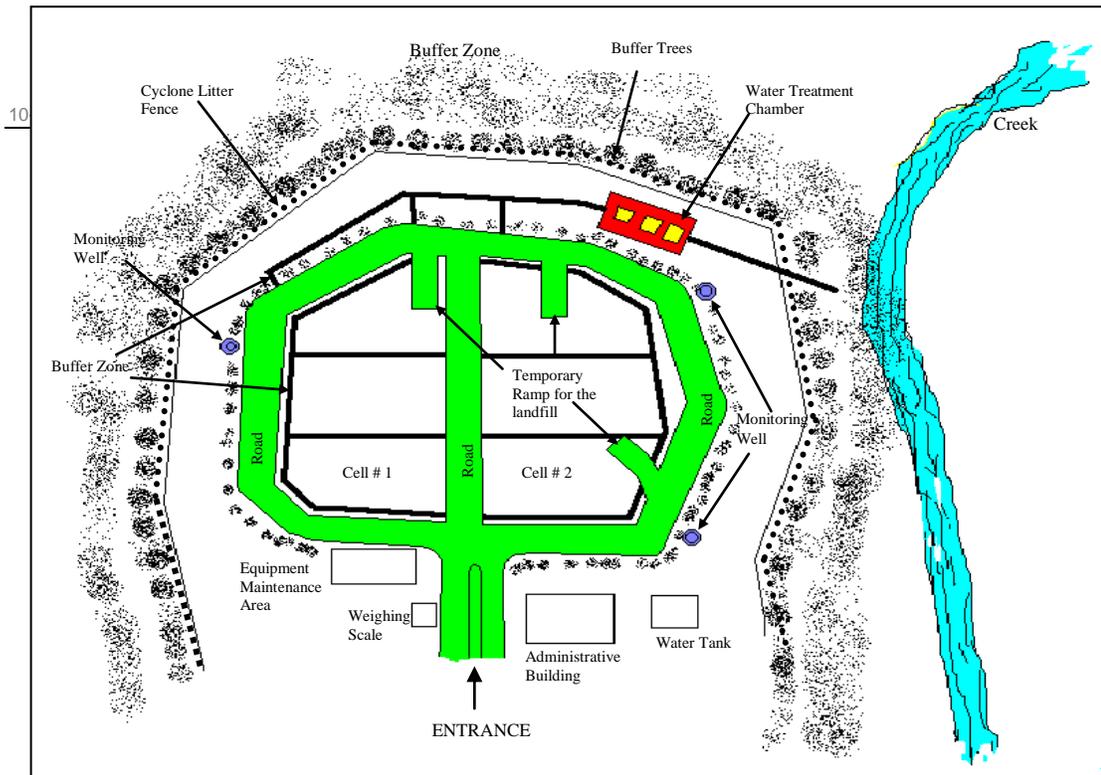


Figure 5.g. Sketch map of the proposed Sanitary Landfill.

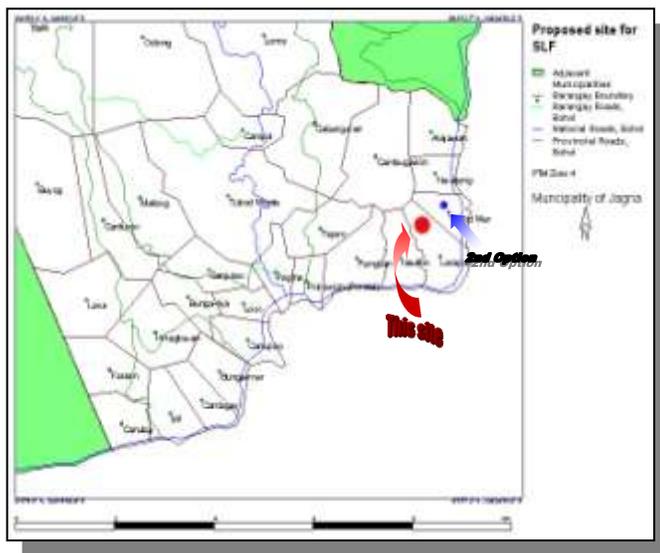


Figure 5.h. Proposed and alternative site for the SLF.

### b) Host to Cluster SLF

The Jagna cluster of LGUs for disposal management of solid wastes will compose the Municipalities of Jagna, Duero, Guindulman, Candijay, Garcia Hernandez and Anda. Estimated disposable waste of the Jagna cluster is 7.0 tons/day by year 2007 and increased to 8.1 tons/day by year 2016. Assumptions for daily waste generation for Guindulman, Candijay, Garcia H. and Anda are shown in the table 1. The estimated disposable waste of Jagna and Duero are based on their respective waste flows following their general ISWM strategy. Table 2 below shows the disposal estimates of the Jagna cluster.

**Table 1:**  
Assumptions to Estimate Daily Disposable Wastes

estimates:	unit	garcia h	Guindulman	candijay	Anda
population		21,428	29,166	30,389	17,863
ave /cap waste	kg/day	0.40	0.40	0.40	0.30
gross generation	kg/day	8,571	11,666	12,156	5,359
estimated collection rate	%	25%	25%	25%	20%
estimated collection	kg/day	2,143	2,917	3,039	1,072
assumed diversion	%	50%	50%	50%	50%
estimated disposal	kg/day	1,071	1,458	1,519	536
assumed growth rate	%	1%	1%	1%	1%

Source: technical and financial tables

The estimate of SLF size is based on the following parameters:

- 1) daily disposable wastes of 7.0 tons/day or 11,500 cu.m./annum;
- 2) minimum compacted waste fill-height of 10-meters
- 3) waste compaction factor of 2

**Table 2:**

**Disposal  
Estimates**

	LGU Cluster	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	total
	Jagna	1319	1358	1450	2145	2234	2577	2641	2884	2952	3264	3387	3412	3720	4056	
	Duero	224	785	945	1029	1114	1200	1289	1380	1397	1413	1427	1441	1580	1733	
	Guindulman	1458	1473	1488	1502	1518	1533	1548	1563	1579	1595	1611	1627	1643	1660	
	Candijay	1519	1535	1550	1565	1581	1597	1613	1629	1645	1662	1678	1695	1712	1729	
	Anda	536	541	547	552	558	563	569	575	580	586	592	598	604	610	
	Garcia Hernandez	1071	1082	1093	1104	1115	1126	1137	1149	1160	1172	1183	1195	1207	1219	
	<b>Total cluster, kg/day</b>	<b>6,128</b>	<b>6,774</b>	<b>7,072</b>	<b>7,898</b>	<b>8,118</b>	<b>8,596</b>	<b>8,798</b>	<b>9,179</b>	<b>9,314</b>	<b>9,691</b>	<b>9,878</b>	<b>9,968</b>	<b>10,467</b>	<b>11,007</b>	
	<b>Total, annual tons</b>	<b>2,237</b>	<b>2,473</b>	<b>2,581</b>	<b>2,883</b>	<b>2,963</b>	<b>3,138</b>	<b>3,211</b>	<b>3,350</b>	<b>3,400</b>	<b>3,537</b>	<b>3,606</b>	<b>3,638</b>	<b>3,820</b>	<b>4,017</b>	
	<b>Total, annual cum</b>	<b>9,853</b>	<b>10,893</b>	<b>11,372</b>	<b>12,699</b>	<b>13,054</b>	<b>13,823</b>	<b>14,146</b>	<b>14,760</b>	<b>14,976</b>	<b>15,583</b>	<b>15,883</b>	<b>16,029</b>	<b>16,830</b>	<b>17,698</b>	
<b>SLF</b>	assumed no. of layers, m	8	8	8	8	8	8	8	8	8	8	8	8	8	8	
	compaction factor	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	estimated reqd area, sqm	616	681	711	794	816	864	884	922	936	974	993	1,002	1,052	1,106	<b>0.95</b>
	area inclgd utilities,	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1				

	greens; ha												0.1	0.1	0.1	<b>1.24</b>
	soil cover thickness, m	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	
	soil cover needed, cum	1,847	2,042	2,132	2,381	2,448	2,592	2,652	2,767	2,808	2,922	2,978	3,005	3,156	3,318	
	soil cover cost, P/cum	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
	annual soil cover cost, P'000	4	4	4	5	5	6	6	6	6	6	7	7	7	7	

Given the disposable wastes of 7.0 tons/day and based on the above parameters, the Jagna cluster would need 1ha. of landfill area or 1.5ha. to include the support facilities of the SLF. The support facilities for the Jagna cluster SLF will include the following:

1. Leachate treatment plant
2. Storm drains
3. Special waste containment system
4. Ground water monitoring wells
5. Gas monitoring wells
6. Office motor pool and laboratory buildings
7. Light and water
8. Perimeter fence and tree plantations
9. Greens and aesthetics
10. Roads and open space
11. Weigh bridge

The Jagna cluster SLF will be designed to conform to the requirements of RA 9003 and it's IRR. It will have a design that will satisfy the treatment and discharge specifications of the storm drains, leachate release and gas emissions. The design will also minimize if not prevent ground water contamination. Odor and access by any life forms will also be minimized.

Figures 1 and 2 below show the cross-sections of the landfill. After excavation of the landfill area according to desired depth and grade, a 0.75m natural clay liner will be placed. The liner will conform to the allowable permeability requirement of  $1 \times 10^{-6}$  cm/sec.

Leachate and storm drains are placed on top of the natural liner. Depending on the storm drain sizes, a gravel base with a minimum thichness of 0.3m that conforms to the DPWH Base Coarse standards will be overlayed to cover the drains and protect the natural liner from tear and puncture.

Figure 1

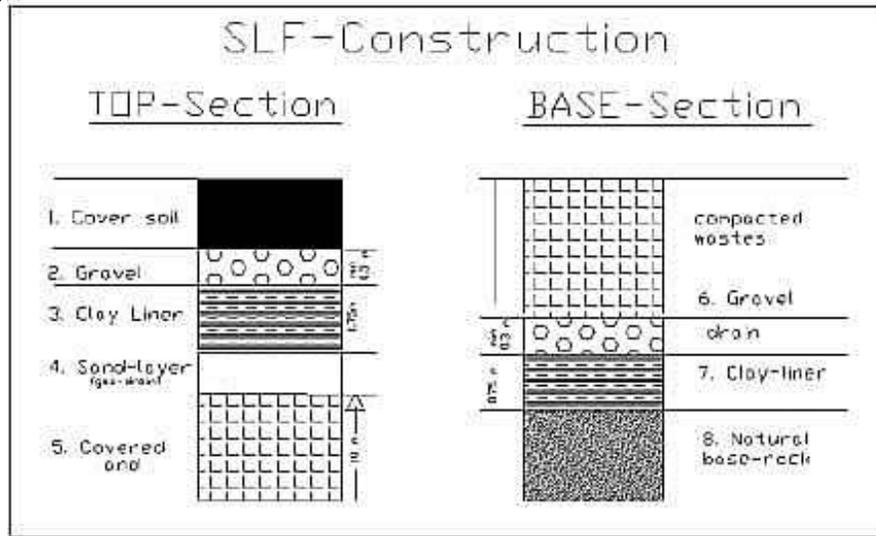
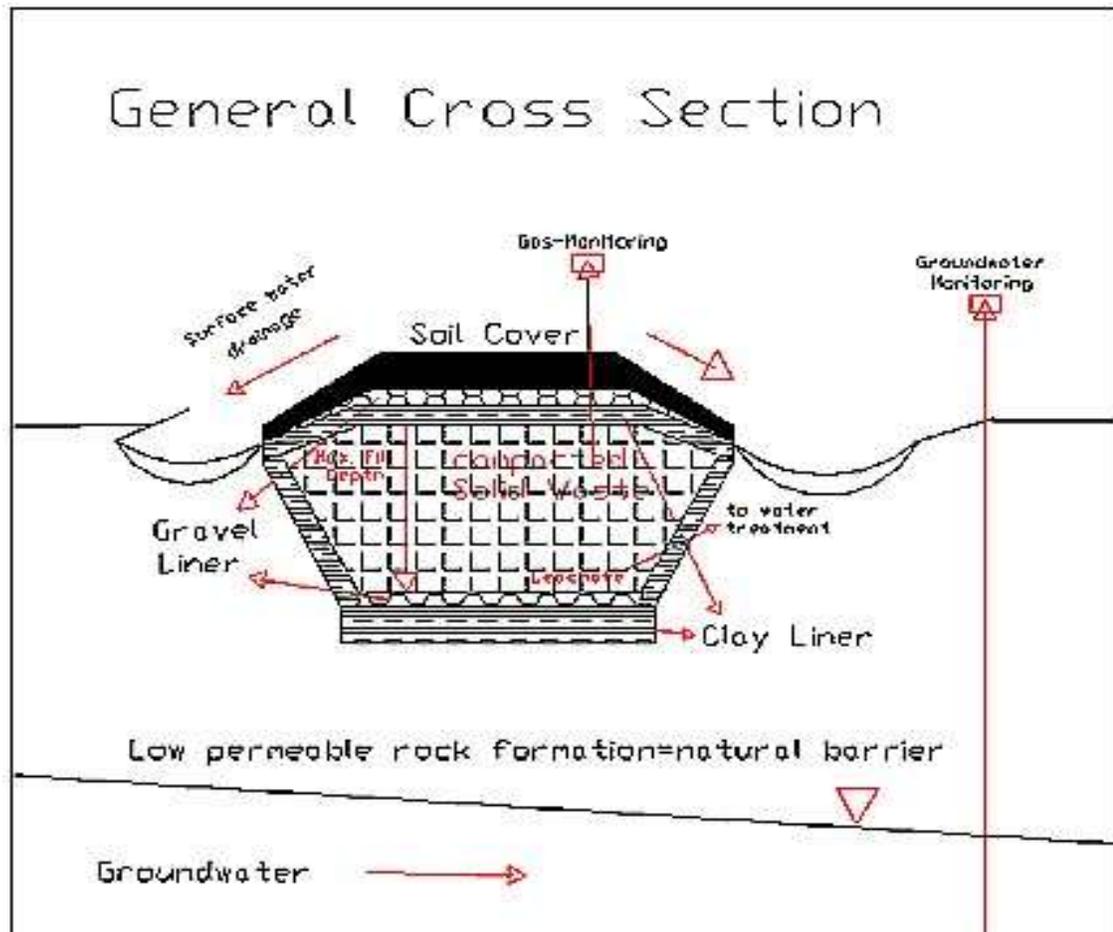


Figure 2



During the closure, the compacted wastes will be covered with sand layer (that will also serve as gas drain) the by the same natural clay liner followed by the gravel base and finally the soil covering as the “new” natural base of the landfill.

The landfill will have a leachate collection and removal system to minimized leachate buildup. The IRR allows leachate level of not more than 0.60m over the liner system. Likewise, the leachate treatment plant will be designed to eliminate spillage and migration to any water body.

Full geotechnical investigations of the site will be conducted prior to design to ensure:

- a) absence of geologic hazards, faults or any unstable natural formations;
- b) static stability of the facility and adequacy to structural & earthquake design parameters;
- c) no groundwater of less than 2.0 meters from top of clay liner (the site may satisfy the allowable depth of groundwater being located at elevated 80m asl).

The landfill operation will be by cell method with sizes conducive for ease in operation and movement of equipment. Whenever possible, the “daily-cover-at-end-of-workday” method will be applied. Otherwise technical and financial considerations may require a layer fill and cover method as long as the procedure passes the DENR requirements.

**Role of LGU in SLF Management**

The SLF may be eventually established thru another entity either via joint venture, full private ownership or a local government owned or controlled corporation (LGOCC). As such the LGU will have the oversight and monitoring role in the operations and management of the SLF which will be handled by the separate entity. The LGU will have to enter into an agreement with the SLF management that will define the operations and management responsibilities of the owner and the oversight and monitoring duties of the LGU. The oversight and monitoring role of the LGU may include the following:

- 1. establishment of SLF within the approved area and size;
- 2. construction of landfill and support facilities according to LGU approved plans, designs and specifications;
- 3. regular monitoring and inspection of the management of leachate, gas emissions and groundwater contamination;
- 4. compliance to the ECC requirements and mitigating measures; and
- 5. upkeep of overall operation and maintenance of the facility.

**5.1.e. Activities and Implementing Schedules**

Engineering Activities	10-YEAR DURATION									
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
<i>Stage I</i>										

Segregation at source																				
Backyard Composting																				
Fabrication of Communal Waste Receptacles																				
Provision of Communal Waste Receptacles																				
<b>Stage II</b>																				
Implementation of New collection scheme																				
Replacement of Collection Trucks																				
Hiring of additional collection crew																				
<b>Stage III</b>																				
Construction of CMRF																				
Operation of CMRF																				
Construction of BMRF																				
Operation of BMRF																				
Pre-MRF Operation NTP																				
Procurement of motor vehicle																				
Procurement of office equipments / tools																				
Hiring of personnel for MRF																				
Construction of composting facility including the African night crawlers																				
Operation of Composting facility																				
<b>Stage IV</b>																				
Conversion of Open dump to Control Dump and its pre-implementation NTP																				
Pre-SLF implementation Studies																				
Cluster LGU agreement for Common SLF																				
Establishment of Sanitary Landfill																				
Acquisition of Heavy Equipment for control dump and SLF																				
Operation of SLF																				
Lot Acquisition of SLF																				
Road Opening																				

Source: ESWMB and TWG

## 5.2. Education

This section of the plan will identify how the implementation of the SWM plan and its components such as engineering, policy/ enforcement and economic enterprise as well as provision of incentives and disincentives will be supported by information/education/communication (IEC) activities.

The LGU, through its ISWM Board and TWG, will carry out its IEC program over the 10-year period, with intensive IEC to be conducted during the first two (2) of implementation, to vigorously promote waste segregation and reduction as well as

orderly collection of waste and the utilization of the MRFs. All 33 barangays of Jagna are expected to be practicing waste segregation and reduction at the end of the third year of the plan implementation. Beginning with Year two (2) regular information dissemination will be conducted in support of other SWM interventions; intensity of IEC activities shall be increased as the need arises.

Taking the lead in IEC work is the Board's IEC Committee which shall provide the direction in the conduct of a sustained SWM information campaign that will involve various sectors, such as the schools, religious groups, NGOs and other community organizations. To further expand its reach, the IEC Committee will establish an implementing arm called the Speakers' Bureau composed of one member from every barangay SWM committee.

### **5.2.a. Target Audience and Key Messages**

This IEC plan will target two major audience segments:

(1) The waste generators, further segmented into residents, market and sidewalk vendors, wholesalers, common buyers, customers and passengers, business owners, employees and students/pupils and

(2) The potential allies or change agents who can help in information dissemination. These include the barangay officials, religious group leaders, media entities, school administrators or teachers, PTA officers and heads of institutions and NGOs.

Results of the waste assessment (e.g., waste generated each day, amount of bio and non-bio generated daily, amount of recyclables, etc.) will be used extensively in the development of various messages. The IEC component seeks to educate both groups on the different SWM concerns, make them aware of the interventions the municipality's SWM plan intend to introduce and, in general, make them support the implementation of the plan.

For the first group, the objective is to promote the idea and practice of segregation at source (e.g., at home, in business establishments and public market, in institutions such as schools, etc.). Thus, messages will revolve around information such as what and how to segregate, recycle and reduce; how much garbage reduction could be achieved through waste segregation; and the like. Likewise, incentives, fees, fines and penalties and other disincentives shall also be given prominence in the campaign.

For the second group, their responsibility in helping carry out the city's SWM plan and in "making Jagna a clean municipality" shall be emphasized. Specifically, the role of each sector (e.g., barangay officials, school officials, business owners, etc.) shall be clarified on how it can help in plan implementation. For instance, barangay officials would be tapped to lead the holding of barangay SWM orientations, supported by their respective IEC teams. Schools, on the other hand, shall be encouraged to conduct schoolwide SWM drive, focusing on recycling, for example.

Stages 1 (segregation and reduction at source) and 2 (storage, collection and transport) will be provided the biggest IEC support (this is because it is during these stages when new SWM ideas and practices will be introduced and initial opposition is expected, which will require a lot of IEC resources). Messages, therefore, shall not only be limited to waste segregation and reduction but also include elements of proper waste management, impacts of SW on the society, proper waste storage prior to collection, backyard composting, handling special wastes and ordinances on collection and disposal arrangements.

The information campaign shall also highlight the need for Materials Recovery Facility (MRF) and the Sanitary Landfill, and the indispensable role they play in effectively managing the municipality's solid wastes.

With a central MRF for the municipality, efforts will also focus on training workers, who are volunteers and members of NGO's and other private organizations, in the production of marketable products out of recyclable materials, such as candles, mats, rags, etc. Skills training programs shall be developed with the assistance of institutions such as the Technical Skills Development Authority (TESDA) and Municipal Social Welfare and Development Office (MSWDO).

As SWM program implementation progresses, the information campaign will include highlighting such information as extent of compliance of various waste generators, benefits derived and amount of waste reduced.

### ***5.2.b. Strategies and Key Activities***

The principal IEC strategy is to first get the support of potential allies of the SWM program before communicating with waste generators. Another major strategy is to establish a Speakers' Bureau that will extend IEC's reach into the 33 barangays of Jagna.

At the source level, part of the strategies of the LGU is to conduct information and education campaign to the people on the proper segregation, composting and recycling of waste, through barangay assemblies, "purok" meetings or in house to house system. The plan likewise includes orientation and training on the basic principles of waste management to commercial and business establishments and other institutions. This shall be channeled to Barangay Captains during their regular ABC sessions. Appointments and arrangements shall also be conducted with local church leaders, vendor's association, school administrator, PTA presidents and administrators of hospitals, clinics and other heads of special waste generators.

#### **Key activities will include:**

#### **Development/Production/Distribution of IEC Materials**

The IEC component will develop/produce/distribute print materials using the local dialect. These include leaflets, billboards, streamers, posters and press releases. In addition, radio plug and jingles shall be developed/produced, along with a TV ad.

Posters containing messages on waste segregation, composting, reuse and , and the benefits recycling shall be distributed for posting at purok centers, sari-sari stores or any area where people come together, such as lobbies of establishments. In addition, streamers and billboards containing similar messages shall be posted in strategic areas in the municipality (e.g., bus/jeepney terminals, port area, waiting sheds, public market, plaza). Flyers and leaflets on SWM shall be handed to residents during purok and barangay assemblies.

Radio plugs shall also be developed and aired regularly over the municipality's local radio station. Regular press releases shall be distributed to different local media entities, highlighting Jagna's SWM initiatives and accomplishments. Slogans and jingles urging the citizenry to "wake up and help in the SWM drive" ("Hoy Gising!" type) shall also be played and aired in the radio. They will also be played to announce the arrival of dumptrucks tasked to collect the garbage.

"*Recorda*" or public address system shall also be used from time to time, especially if there is an important message the LGU would like to communicate to the public. Since most of the people in Jagna have TV sets, a TV commercial ad shall likewise be developed. This shall be aired regularly over local cable stations.

Other IEC interventions shall include the holding of slogan and poster making contests in cooperation with teachers and local school administrators. Holding of a search for the "Most Outstanding Barangay in Solid Waste Management" is likewise contemplated.

### **Creation of a Speakers' Bureau**

The LGU shall create a Speakers' Bureau composed of one member from each Barangay SWM Committee. The Speakers bureau shall be the implementing arm of the Board's IEC Committee that shall spearhead the ISWM IEC and advocacy campaigns. The Bureau will work closely with the municipal Environmental and Natural Resources Office.

To enhance their capability in IEC, the members will be given orientation/training on ISWM concerns and on the SWM plan of the municipality. An Executive Order shall be issued by the mayor's office, officially appointing these individuals as members of the bureau. Standard presentation materials on various aspects of SWM will be produced for use of the members.

### **Conduct of school-based activities**

The LGU, through its ISWM Board, shall work with the schools in advocating for effective waste management. The plan is to incorporate discussion of SWM issues in the curriculum of local schools, to include among others, topics on impacts of poorly managed solid wastes, importance of waste segregation and reduction at sources, the whys and the hows of re-use, recycling, composting and other related matters.

Parents, Teachers Associations (PTA) shall also be tapped as allies for the SWM information campaign. They, along with the Jagna local government, shall sponsor contests like, poster making, slogan making, focusing on the impact of solid waste and its management. A recycling campaign, zeroing in on the theme “Baon Mo, Sagot Ko,” will encourage students and Pupils to segregate recyclable materials and bring them to the schools where junk shop owners can come and buy them. The involvement of the PTA will ensure that parents too will get into the act of teaching their children on the value of recycling which can help them earn school allowances.

**Coalition building activities with church, religious groups and other community organizations**

The LGU plans to tap the church in promoting and supporting the program on SWM. Topics on segregation, composting, recycling, re-use and reduction of wastes shall be suggested to be incorporated into sermons or be made part of the announcements done after the mass to serve as reminders to churchgoers. To bring to further prominence the involvement of the church in the SWM campaign, the LGU shall invite representatives from the church and other religious groups to SWM-related events, such as recognition rites, awarding ceremonies and contest activities.

Other organizations in the community, may they be private, NGOs or people’s organizations, shall also be tapped and be involved in SWM-related activities. These are the Unlad Kabayan Organization, San Miguel Cable TV, Radio Natin, Jagna Vendors Association and Jagna Market Vendors Association (JAMEVEA), Jagna Motorcab Operators & Drivers Association (JAMCODA), Jagna Officials & Employees Multi-purpose Cooperative (JOFEMCO) and Jagna Association of Municipal Employees (JAMES). Each shall be given definite roles and responsibilities in disseminating the information on proper waste management.

**5.2.c. Activities and Implementation Schedules**

IEC Activities	10-YEAR DURATION										
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
Creation of Speaker’s Bureau											
Skills training for the Speaker’s Bureau											
Preparation of IEC materials (to include the tri-media)											
IEC campaign using tri-media on segregation, composting and recycling											
Seminars and Trainings for key sectors											
Tapping of multisectoral environmental advocates											
Implementation of school-based projects											
Implementation of activities with church, religious groups and other environmental organizations											
IEC on the collection scheme											
IEC on the recycling											
IEC on indigenous production											
Tapping of skilled workers and trainers											

IEC and consensus on the operation of SLF										
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### 5.3. Policy Support and Enforcement

This component provides the necessary policy support for the implementation of the ESWM plan. The municipal LGU will need to back up the actions set out in the municipality's SWM program by enacting and enforcing ordinances that a) are compliant with the requirements and prescriptions of RA 9003 and its Implementing Rules and Regulations (IRR), and b) follow good governance principles (i.e., transparency, accountability and participatory decision-making).

As stated earlier, the Municipality of Jagna has enacted a number of SWM ordinances. However, all except one were enacted before the passage of RA 9003 and its IRR. Thus, the ordinances enacted prior to RA 9003 and its IRR are inadequate insofar as compliance with the provisions of the law and IRR is concerned. In other words, the ordinances lack the mandatory provisions or requisites of the said law. Evidently, the said ordinances cannot sufficiently support nor provide for the implementation and enforcement of the provisions of RA 9003. The SWM ordinance of the municipality that was enacted after the effectivity of RA 9003 and its IRR contains provisions that support or provide for the implementation of certain provisions of the law. However, as likewise stated earlier, not all the material aspects of the law and IRR are covered. It should be noted, however, that all the SWM ordinances of the municipality were enacted prior to the preparation of its ESWM plan. Thus, they cannot provide the necessary legislative support for the implementation of specific components of the ESWM plan.

Through this component, the identified gaps in the SWM ordinances will be addressed by the members of the ESWM Board and the legislative body of the municipality. They will also ensure that the elements of good governance are contained or manifested in the SWM ordinances that will be enacted so that the practice of good governance in enforcement can be institutionalized.

#### 5.3.a Policy/Ordinance Formulation

The analysis of current SWM ordinances vis-à-vis the ESWM plan and RA 9003 and its IRR points to the following priority needs in policy/ordinance formulation.

1. On SWM organization: Creation of a Solid Waste Management Office that will solely and fully be responsible for the management of solid waste in the municipality, including accountabilities, staffing and budget provision.
2. On segregation: Reiterating the mandatory segregation of solid waste and the development of clear guidelines on segregation requisites including the modification of the present classification of solid waste to conform to RA 9003 and its IRR.
3. On recovery of recyclable, reusable and compostable materials: Establishment and operation of Materials Recovery Facilities (MRFs)

and requiring composting as a means of processing biodegradable and some recyclable wastes.

4. On collection and transport: Clear delineation of responsibilities of the municipality and barangay LGUs in the collection of solid waste as well as clear guidelines for collection and transport
5. On disposal: Support for the closure and conversion of the open dump to a controlled dump and the subsequent establishment of a sanitary landfill, indicating as well a clear timeframe, and clear guidelines for the operation of the controlled dump and the establishment and operation of a sanitary landfill.
6. Establishment of a Solid Waste Management Trust Fund, including funding sources, fund administration and procedures for the use and accounting of the fund.
7. Imposition and collection of SW management fees and the establishment of fee rates for various sources and SWM services.
8. Definition of acts that are prohibited or restricted, including procedures for their enforcement and penalties for violations.
9. On incentives, different incentive schemes for various SWM operations and for different sectors, including criteria and procedures for the award of such incentives.
10. The development of an information, education and communication (IEC) program including the implementation thereof.
11. Clear guidelines on procurement following the Procurement Act of 2003 (RA 9183), with transparency and accountability provisions.

RA 9003 and its IRR also require LGUs to enact an ordinance on the establishment of a reclamation program and operation of buy-back centers. The IRR likewise provides that the National Ecology Center (NEC) shall conduct a study on this matter and provide assistance to LGUs in the enactment of the corresponding ordinance. In view thereof, this ordinance will be enacted upon the completion of such study by the NEC.

The specific items that will be incorporated into the policy/ordinances based on a detailed analysis of the requirements of the plan and of the law are in Annex 5.. In the process of formulating these policies/ordinances, the municipal LGU will ensure that they contain provisions on transparency, accountability and participatory decision-making and that there are clear mechanisms to carry these out.

The above policies/ordinances shall be enacted by the municipality through its Sangguniang Bayan (SB), in accordance with the implementation schedule of the ESWM plan. The SB will have the option of enacting them as individual ordinances or

as a comprehensive solid waste management ordinance of the Municipality of Jagna. It is planned that by year 2005, when this ISWM shall be fully implemented, these ordinances shall likewise be in placed. Hence starting July of 2004, the SB shall start the crafting and amendments of its existing ordinances to insure full implementation by year 2005.

The constituents of the Municipality of Jagna shall be informed of the enactment of these ordinances. On a periodic basis, they will be provided information on activities undertaken in relation to ordinance enforcement. For this purpose, notices of new ordinances and enforcement reports shall be posted regularly in a bulletin board at the entrance of the Municipal Hall, at the Solid Waste Management Office, in all barangay halls, at the public market, churches, terminals, schools and other strategic places. The SWM Office shall be responsible for the posting of the above information.

### **5.3.b Enforcement**

The mechanisms stated below will be applied in the enforcement of SWM ordinances. The mechanisms cover a) the identification of enforcers, b) the process for deputation, c) the roles and functions of enforcers, and d) the award of incentives and rewards. These enforcement mechanisms should be clearly spelled out in a SWM policy/ordinance that will be enacted as a separate ordinance or as part of a comprehensive one.

Enforcement activities will undergo periodic monitoring and evaluation. Enforcers are expected to regularly report on their performance using pre-agreed performance indicators. The extent of compliance with ordinances and regulations will then be determined from such reports and from regular “feedbacking” sessions among enforcers. The municipal LGU will also consult with various sectors to get their assessment and to identify with them areas for improvement.

- Enforcers

The enforcement of SWM ordinances will be undertaken by government law enforcement personnel, i.e., Philippine National Police (PNP) and deputized SWM enforcers. The latter will be of three groups: a) regular enforcers, b) auxiliary enforcers, and c) volunteer enforcers.

The regular enforcers will consist of the SWM enforcement personnel of the SWM Office. Among the functions to be performed by the regular enforcers are the following:

1. Coordinate the actions and activities of the auxiliary enforcers and deputized volunteers.
2. Apprehend violators of SWM Ordinances and issue citation tickets.
3. Prepare and submit weekly reports to the Enforcement Section Head of the SWM Office.
4. Perform other related functions as may be required by the Enforcement Section Head of the SWM Office from time to time.

The auxiliary enforcers will consist of Barangay Officials and Barangay Tanods. They will be tasked to enforce specific SWM regulations in their areas of jurisdiction. The functions to be performed by the auxiliary enforcers are the following:

1. Apprehend violators of SWM ordinances within their areas of jurisdiction and issue citation tickets. The Head of the SWM Office shall prescribe the specific SWM Ordinances and/or regulations of the municipality that may be enforced by the auxiliary enforcers.
2. Immediately return the copies of issued citation tickets to the nearest regular enforcer.
3. Prepare and submit weekly reports to the Enforcement Section Head of the SWM Office.

To supplement the regular and auxiliary enforcers, a corps of volunteer enforcers will be formed. Volunteers may be members of civil society organizations (NGOs, youth groups, etc.), purok officials, and other concerned citizens. The Head of the SWM Office shall prescribe the requirements or qualifications needed for volunteers and the criteria for selection. In determining such requirements or qualifications, the Head of the SWM Office shall take into account, at the very least, the apprehending, recording and reporting responsibilities of deputized volunteers. In addition, it is also important to consider that in order to be effective, those in enforcement must be able to command some respect from other members of the community.

The functions of deputized volunteers are as follows:

1. Apprehend violators of SWM ordinances and issue citation tickets. The Head of the SWM Office shall prescribe the specific SWM Ordinances and/or regulations of the municipality that may be enforced by the deputized volunteers.
2. Immediately return the copies of issued citation tickets to the nearest Regular Enforcer.
3. Prepare and submit weekly reports to the Enforcement Section Head of the SWM Office.

To initiate the process of recruitment, the Head of the SWM Office will hold an LGU-wide information dissemination and orientation regarding the need for volunteers, their roles and responsibilities, and the criteria for selection. The Head of the SWM Office will then evaluate and screen the applicants. The results of the screening will be published or posted in strategic places.

- Deputation

The process of deputation will start with the training of regular enforcers, auxiliary enforcers and the selected volunteers. The Head of the SWM Office shall organize the training/s to be conducted and may seek the assistance or engage the services of qualified persons or organizations in developing the training module/s,

training materials and evaluation criteria as well as in conducting the actual training/s. The training/s shall, at the minimum, cover the following topics:

- ❖ Key Components of the 10-Year ESWM Plan
- ❖ ISWM Ordinances
- ❖ Roles and functions of enforcers
- ❖ Procedure for apprehension and issuance of citation tickets
- ❖ Reporting requirements

For the volunteers, they will be evaluated after the training and those who pass shall go through a probationary period of one (1) month as temporary enforcers. After the probationary period, they shall again be evaluated and those who pass shall be deputized by the Municipal Mayor. The deputation shall be effective for a period of one (1) year, after which, the deputized volunteers shall again be evaluated to determine their fitness to serve as such.

- Filing of cases

The grounds for the filing of cases as well as the procedure to be followed in the filing thereof shall be incorporated in the ordinance/s to be enacted.

- Incentives/Rewards

The municipality shall provide incentives and/or rewards to deserving enforcers. Likewise, incentives and/or rewards shall be given to establishments that have no violations. The guidelines for the giving of incentives and/or rewards as well as the kinds thereof shall be incorporated in the ordinance/s to be enacted.

**5.3.c. Activities and Implementation Schedules.**

Enforcement Activities	10-YEAR DURATION									
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Review of the existing ordinances										
Identification of needed ordinances to be created										
Passing of a comprehensive ISWM ordinance										
Awards and Incentives giving										
Recruitment and training of deputized ISWM enforcers										
Continuous deployment and activation of WOW enforcers										
Hiring of personnel to man controlled dumpsite and SLF										

**5.4. Economic Enterprise**

One of the highlights in formulating the plan is its revenue generation component. This key component tries to bring back investment cost in implementing the ISWM program. This will serve as the blood stream of the project to be self-generating for its sustainable operation. Potential economic enterprise as stated in the plan focused mainly on the operation of an MRF and the operation of a Sanitary Landfill.

The necessary funds to be allocated for the whole process of ISWM in Jagna covers the following: Awards and incentives for Barangays with best practice in solid waste management, awards and incentives for individual citation like slogan contest winners, poster making winners, etc. Establishment of a central MRF, controlled dumpsite and SLF, infrastructure support facilities including acquisition of equipments and garbage conveyors and the full operational cost of the entire SWM program. Likewise included in the allocation is the budget for the mobilization and enforcement, personnel services and Maintenance Operation and Other Expenses (MOOE), and the IEC materials.

The LGU planned to have a central MRF for the whole municipality. This MRF will serve all its 33 barangays, with materials coming from urban barangays serving as the one of the core source of income for the LGU. It shall be designed that the full operation of the MRF will be self-sufficient and self-liquidating with its revenue enough to support the wages of its workers. Aside from the recyclable materials recovered from its collection operation, it shall simultaneously engage in a buy and sell operation within the vicinity while other stocks shall be sold to external buyers, like in the city of Tagbilaran, or outside the province, like Cebu and Mindanao. Compost materials likewise boost the municipality's revenue generation.

Small-scale indigenous production of recyclable materials like candles, floor wax mats, bags and other waste recovery industries shall also be encouraged by which other stakeholders and private organizations shall be influenced and get involve in the activity, thus the whole SWM implementation. It is prayed that this section of the MRF shall prosper, with the assistance from NGOs, TESDA, Local MSWDO and other entities involved in recycling. By the time, the LGU envisioned to register the said recycling industry with the Securities Exchange Commission (SEC) and the Department of Trade and Industry (DTI), seeking recognition and popularity to augment sales and support, financial or technical.

**5.4.a Activities and Implementation Schedules**

Entrepreneurship Activities	10-YEAR DURATION									
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Stage I										
Imposition of fines and penalties										
Stage II										
Collection of Garbage Fee										
Entertaining of special trips with fee										

Stage III										
Marketing of Compost Products										
Marketing of Recyclable Materials										
Marketing of Indigeneous products										
Application for SEC and DTI recognition										
Stage IV										
Collection of Tipping Fee										

Once the basic recycling and composting operations are functional, the Municipal MRF may proceed into processing of salvageable recyclable into indigenous products.