CHAPTER 2 PRESENT ISSUES

2.1 Impact to the Wetland

2.1.1 Solid Waste in the Wetland

Solid waste is often seen in the Wetland as shown in Figure 2.1.1. This can be addressed first as the most important issue from the viewpoint to conserve the Wetland. Solid waste gives negative impacts to the Wetland not only to its scenery but also to its ecology, as shown in Table 2.1.1.

Figure 2.1.1 Solid Waste observed in the Wetland

Table 2.1.1 Negative Impact to the Wetland by Solid Waste

No.	Kind of Waste	Impact to the Wetland
1	Food Waste	May cause a bad odor and pollute water.
2	Small Pieces such as Cigarettes	Birds may eat them.
3	Plastic film	May cover the bottom of the Wetland and damage the aquatic insects. May be wound onto the plants in the Wetland.
4	Plastic String	May damage birds by winding to their legs.
5	Plastic bottles	May float in the Wetland.
6	Plastic	May generate hazardous substances.
7	Batteries	May provide hazardous substances. (Mercury, Zink, Lead, …)
8	Fluorescent Lumps	May provide hazardous substances. (Mercury)
9	Food Oil	May cause bad orders and pollute water. May cover the surface water.
10	Hazardous Waste	May pollute water by the hazardous substances.

2.1.2 Source of Solid Waste in the Wetland

The sources of solid waste seen in the Wetland are the rivers. In fact, wastes in rivers and on their banks are quite familiar scenes, as shown in Figure 2.1.2. People living along

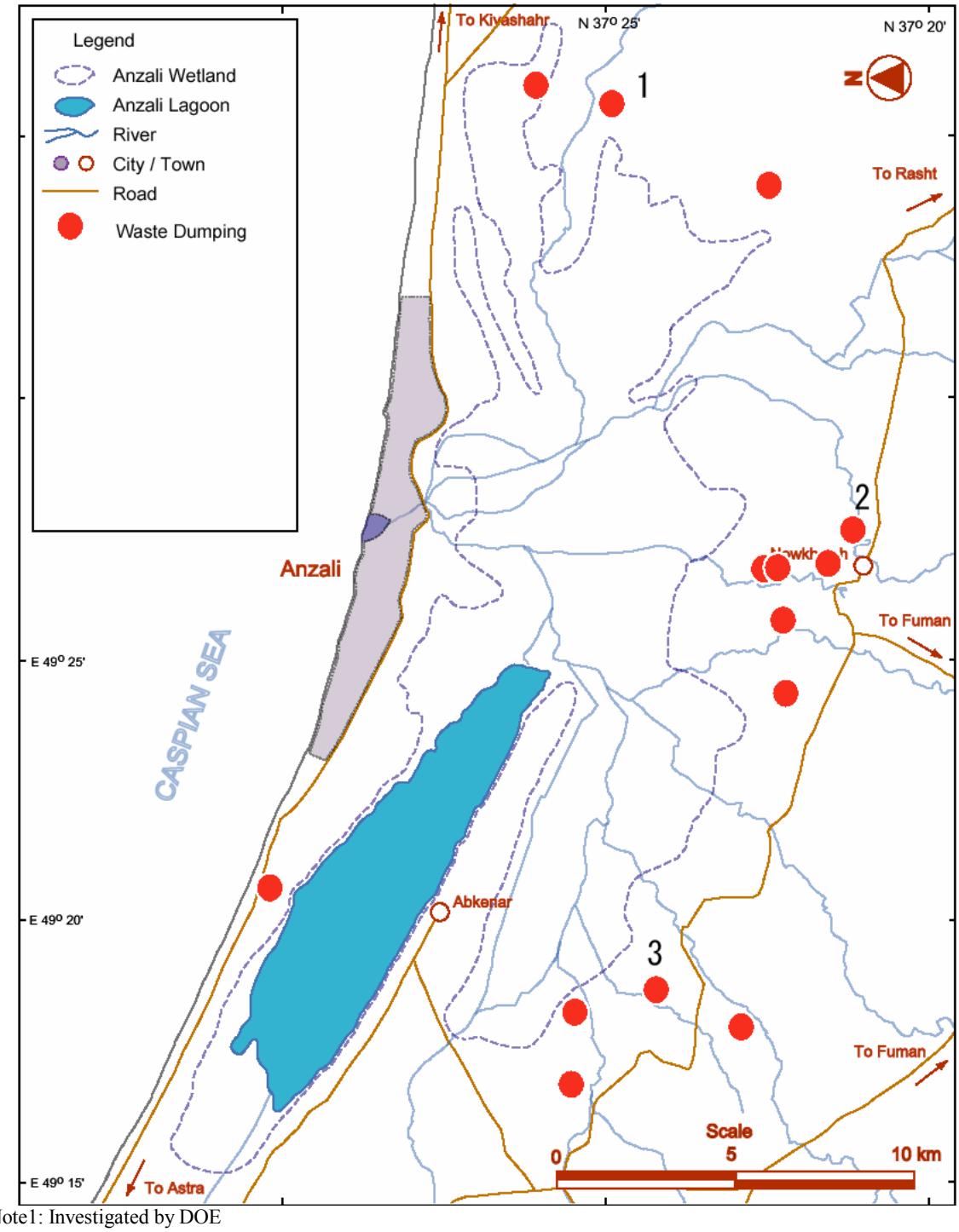
rivers throw their wastes into rivers. DOE with the Study Team studied the locations of waste dumping into rivers near the Wetland and found 14 serious dumping places in the area of 44 km^2, shown in Figure 2.1.3.

1

2

3

Figure 2.1.2 Scenes of Waste Dumping to Rivers



Note1: Investigated by DOE
Note2: The numbers in the figure correspond to the photograph number in Figure 2.1.2.

Figure 2.1.3 Distribution Map of Waste Dumping to Rivers

2.1.3 Reason of Illegal Dumping

The reason why people throw their wastes into rivers is different from area to area, as shown in Figure 2.1.4.

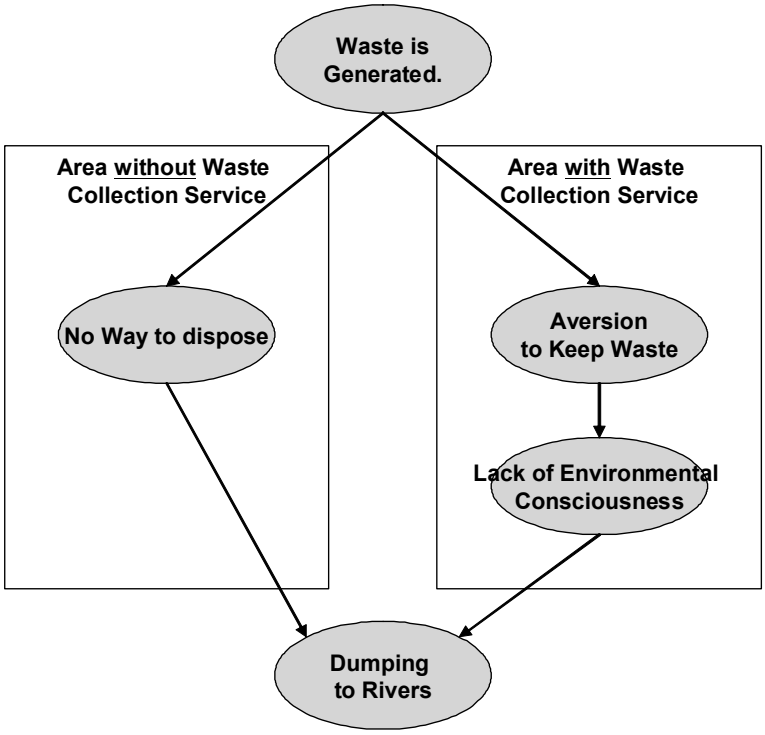


Figure 2.1.4 Reasons for Waste Dumping into Rivers

(1) Villages

One major reason why people throw their wastes into rivers is no provision of waste collection services by local governments. Wastes are easily thrown into rivers, because it is the most convenient and easiest way to remove their wastes to outside of the communities. As mentioned in Chapter 1, the responsibility for solid wastes became mandatory by a new SWM law. Based on the law, provision of waste collection service will be started.

(2) Municipalities

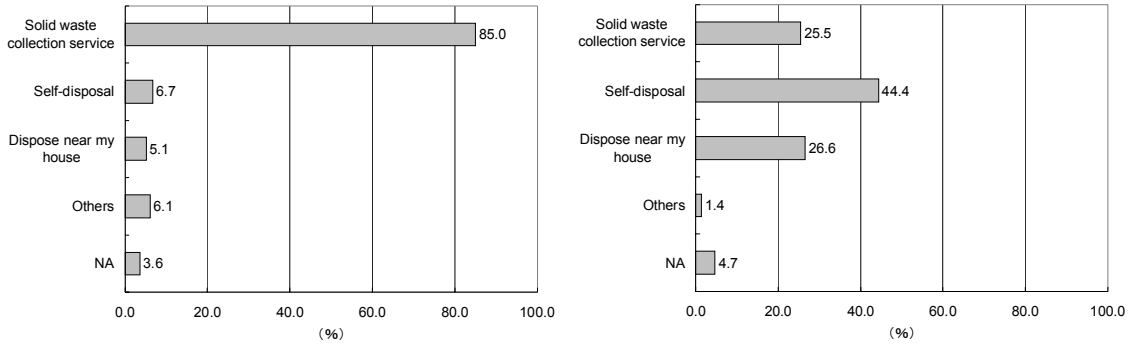
Different from villages, waste collection services are provided in municipalities ("Shahr"). However, even so, some people throw their waste into rivers. It seems preferable for them to walk to rivers and throw the waste than to put waste in front of their houses. This is caused by lack of environmental awareness. To raise environmental awareness is very important.

2.1.4 Amount of Dumped Waste

The daily amount of waste generated is 791 tons including villages according to DOE. Out of this, 670 tons of waste generated in urban areas are collected by municipalities.

The remaining 121 tons of waste are disposed by some other way around the communities. Some of them are thought to be dumped into rivers.

According to the questionnaire survey conducted by the Study Team, 5.1% of respondents answered that they dispose of their waste near their houses in municipalities where solid waste collection services are provided (Figure 2.1.5). In villages, 26.6% respondents answered they dispose of their waste near their houses (Figure 2.1.6). To dispose of the waste near houses can be interpreted to mean that the wastes were thrown into rivers, as the choice of "Self-disposal" was given in the questionnaire.



Note: The total is not 100%, because of a question for Multiple Answers.
Source: Questionnaire Survey by the Study Team

Figure 2.1.5 Disposal Method of Solid Waste (Left in Municipality, Right in Village)

By using these data, the amount of waste thrown into rivers can be estimated by:

670 t/d*5.1% + 121 t/d*26.6%=66t/d

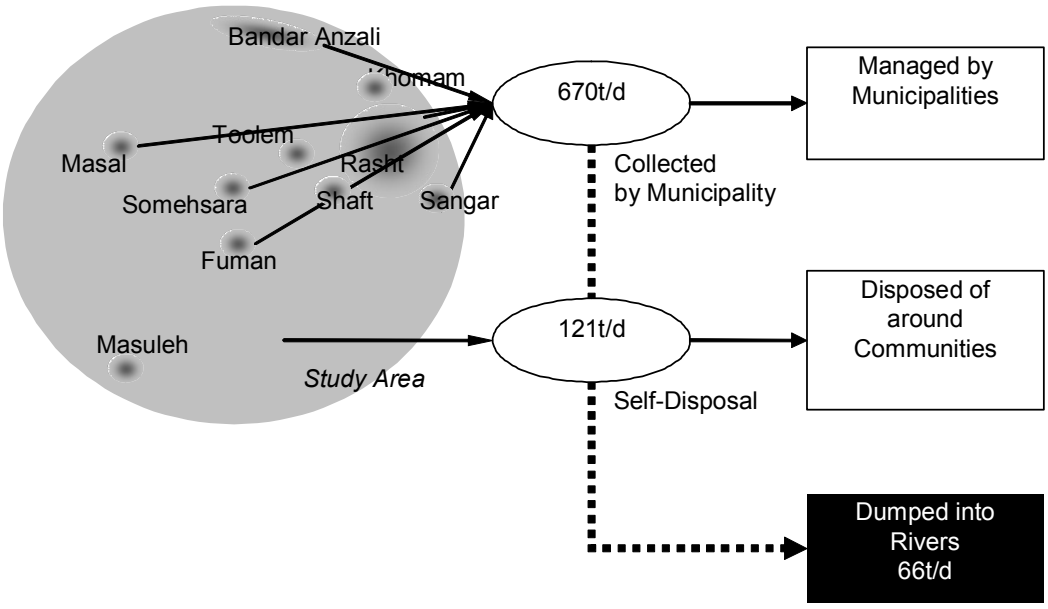


Figure 2.1.6 Amount of Wastes Dumped into Rivers

2.2 Present Issues

2.2.1 Issues Related to the Conservation of the Wetland

Based on the analysis in Section 2.1, the present issues related to the Wetland from the viewpoint to conserve it can be described below.

(1) Issue A: Low Rate of Collection Coverage

The coverage rate of solid waste collection is 65% on a population basis. In fact, no collection service is provided in villages at present, while the service is provided over the whole area of municipalities. This causes waste dumping into rivers in/around villages. It is necessary to provide waste collection service to villages.

(2) Issue B: Low level of environmental awareness

Scenes of waste dumping into rivers are often seen, even if residents in municipalities have a regular collection service. This behavior is rooted in the long-term habit of throwing waste anywhere, and the priority is to raise public environmental awareness by environmental education of householders.

2.2.2 Issues for Municipal Solid Waste

As discussed in Section 2.1, the inflow of solid waste to the Wetland is a significant environmental concern. Other issues to raise the sanitary level with regard to municipal SWM can be described below.

(1) Issue C: Recycling by Residents

At present, waste reduction activities, such as recycling, still remain at a low level. Only some NGOs are active in promoting recycling activates. Waste reduction, especially recycling, is very important and effective to extend the lifetime of landfill sites. It is also very effective to educate people.

(2) Issue D: Inefficient Waste Collection

Wastes are collected 6 or 7 times a week. The residents just put their wastes in front of their houses. Residents can discharge their waste at any time to any place. This convenient waste discharge leads, not only to low environmental awareness, but also inefficient collection service. If residents are obliged to discharge their wastes in designated places on designated days under a certain waste discharge rule, it will raise the environmental awareness and can reduce the collection cost.

(3) Issue E: Unsanitary Disposal of Municipal Solid Waste

Currently, the collected wastes are dumped in dumping sites in an unsanitary way. Leachate from open dumping places is one of the pollution sources. This situation should be changed urgently by constructing some sanitary landfill sites. Among them, the Anzali dumping site needs urgent measures from the viewpoint to conserve the Wetland, because it is located adjacent to the Wetland.

(4) Issue F: Composting for Municipal Solid Waste

There is one composting plant, whose capacity is 250t/d of waste, in the study area. An average of 200t/d of wastes are carried 6 days a week at present. In order to use the landfills as long as possible, composting is one of the possible technologies. It might be necessary to construct another composting plant.

2.2.3 Issues of Industrial and Medical Solid Waste

(1) Issue G: Non-hazardous Industrial Solid Waste Management

There is no serious problem related to non-hazardous ISW at present, mainly because industrial activities in the area are still limited. But in the future, the amount of waste will increase, according to the growth of industrial activity. It will result in lack of landfills and the reduction of non-hazardous ISW will be important as MSW. This is a potential problem.

(2) Issue H: Hazardous Industrial Solid Waste Management

The quantity of HISW is very small at present. Though it is very small, to manage HISW is very important to conserve the environment. In terms of control of HISW, DOE is quite willing to monitor the factories. However, this activity is not done systematically. Furthermore, there is no disposal plant for HISW.

(3) Issue I: Infectious Solid Waste Management

There are some incinerators inside and outside hospitals. Rasht municipality just replaced the old incinerator for hospital wastes. Hospitals can afford to bring their wastes to the incinerator, but there is still the problem of how to cover the small clinics.

CHAPTER 3 SOLUTIONS AND ALTERNATIVES

3.1 Seeking Solutions for Each Issue

Figure 3.1.1 is a list of the present issues and solutions to issues.

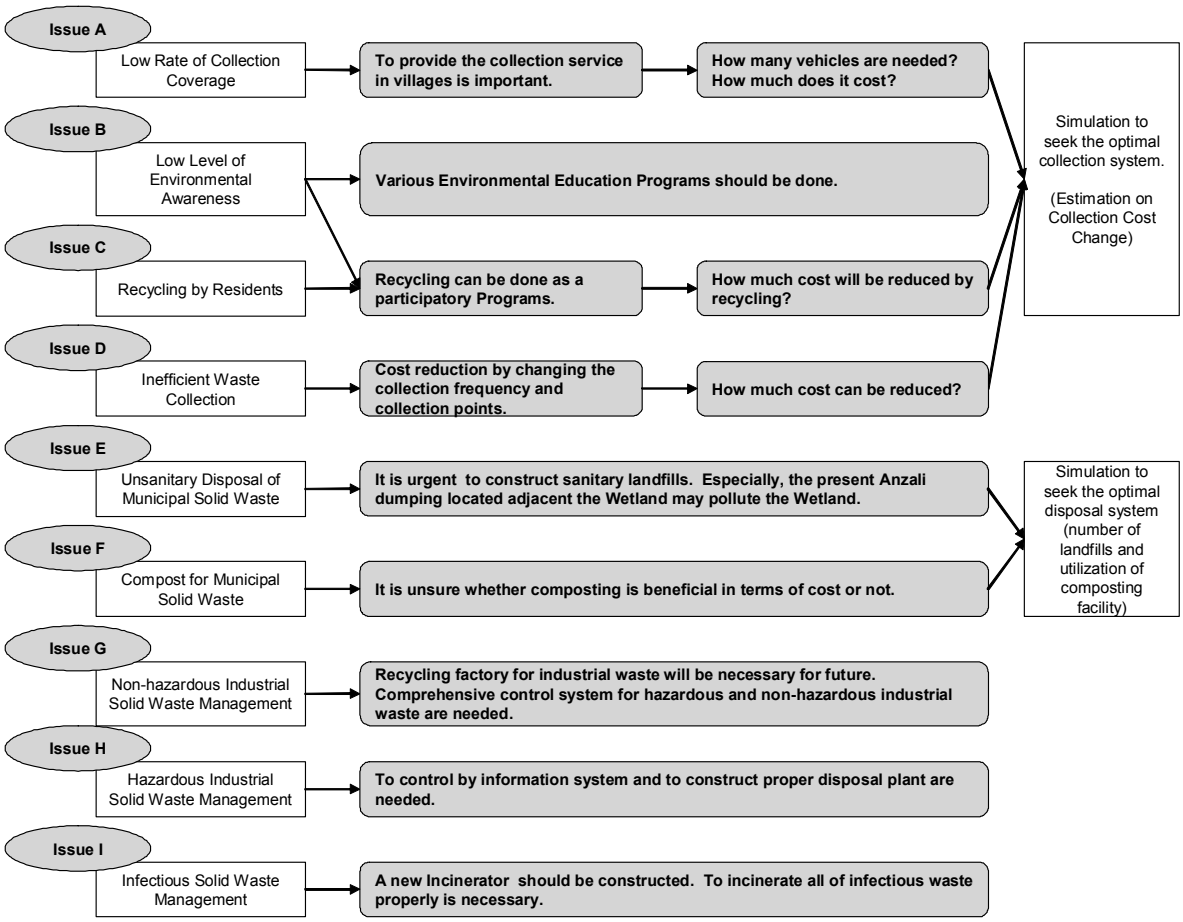


Figure 3.1.1 Seeking Solutions for Each Issue

(1) Issue A: Low Rate of Collection Coverage

The new solid waste management law provides that the governors of counties should take responsibility for SWM in villages. Provision of solid waste management service will be discussed and tried in villages soon. A simulation in Section 3.3 will make clear how much cost should be expected.

(2) Issue B: Low level of environmental awareness

It takes a long time to educate people and raise their environmental awareness. Various educational programs can be used. Table 3.1.1 shows an example of environmental

education programs in a municipality in Japan. These are effective to raise environmental awareness in the long run.

Apart from these educational programs, Japanese municipalities provide participatory programs to communities, such as organic waste recycling, community-based recycling and source separation system for recyclables. Those education programs are expected to make people act in these actual recycling programs. Japanese experiences indicate that participatory programs work the most effectively and the fastest in raising people's environmental awareness. It is because environmental knowledge obtained by seminars or paper media is firmly fixed to people's mind by action. It can be proposed to start some actual participatory programs together with some educational programs.

Table 3.1.1 Environmental Education Programs in a Municipality in Japan

No	Kind of Program	Name of Program	Explanation
1	Seminar	Lectures in Schools	To send lecturers on waste problems to schools.
2	Seminar	Lectures in Communities	To send lecturers on waste problems to communities
3	Video	Video on Recycling "Reduction, Separation, Recycling - What can be done by us"	To distribute the video tapes to primary schools and junior high schools
4	Paper Media	Handbook for Waste Reduction and Recycling	This handbook was distributed to all residents. The contents are 1) how to separate and 2) information on waste reduction and recycling.
5	Paper Media	Educational booklet: "Let's think together - Waste and Us", "Let's start from what you can do"	The booklets targets primary school children.
6	Internet	Web Site on Waste	The web site explains how to discharge and separate wastes.
7	Event	Flea Market	To promote flea markets produced by private entities and to have a festival on the environment once a year.
8	Promotion by Products	"Setagaya Roll", "Setagaya Tissue"	To produce toilet paper and tissue paper from recycled paper.
9	Seminar	Lecture on organic waste recycling	Lecture on organic waste reduction/recycling such as composting and eco-cooking
10	Paper Media	Pamphlet on organic waste reduction/recycling	-
11	Direct Instruction	Direct instruction by collection crew	Direct instruction by collection crew on how to discharge wastes
12	Facility	Education Center	Education center for waste reduction and recycling. Also used goods can be bought.

Note: Setagaya Municipality (population 800,000)

(3) Issue C: Recycling by Residents

As explained in 3.1.2, recycling is effective to raise environmental awareness. At the same time, it can actually reduce the amount of waste and SWM cost. The additional cost for recycling is very small, as the recycling will be done by the communities. What

communities should do for recycling is to determine the time and place for discharge, to call a recycler to come and sell him/her recyclables. A simulation in Section 3.3 will make clear how much amount of money can be saved by recycling.

(4) Issue D: Inefficient Waste Collection

The collection cost will be reduced drastically by changing the collection frequency and/or the collection points. In Japan, which has a similar climate to Iran, collection twice in a week for combustible waste containing organic waste is common. Sometimes in summer, there are some complaints about bad odors from organic waste, but they can generally manage it. As for the collection points, it is very common in Japan to share one collection point with 20 households. They discharge their waste only on the designated days of the week. It can be proposed from a practical point of view to reduce the collection frequency and the collection points. A simulation in Section 3.3 will show how much cost will be reduced.

(5) Issue E: Unsanitary Disposal of Municipal Solid Waste

It is very urgent to construct some sanitary landfills in the study area. Even if recycling and composting are done at the maximum, it is still necessary to construct landfills for the residues. It is not easy to find a proper site in the study area, compared with other areas surrounded by deserts. However, if wastes are brought to other regions conflicts will occur. It is strongly recommended to find out some proper sites within the region.

How many and how large landfills should be constructed is the important question. If many municipalities share a common landfill, the landfill cost can be kept low. However, the transportation cost may become very expensive if waste has to be transported to a distant common landfill. On the other hand, if several local landfills are constructed, the transportation cost will be less, but total landfill construction and operation costs will be higher. In order to explore the optimal combination, a simulation will be made in Section 3.3.

Even once a new sanitary landfill is opened, it should not be forgotten to keep monitoring the environmental impact from the old dumping site. It should be considered as one of the important projects

(6) Issue F: Composting for Municipal Solid Waste

Composting needs a certain amount of money to construct and operate the facility, but it can reduce the landfill cost by reducing the amount of landfilled waste. To decide whether composting should be introduced or not needs an evaluation considering required

cost for composting. The simulation mentioned in Section 3.4 will address the composting costs.

(7) Issue G: Non-hazardous Industrial Solid Waste Management

There is no problem with non-hazardous ISW in the study area. They can be disposed of with municipal wastes. Municipal landfill sites are available. However, the increase of non-hazardous ISW will put pressure on the capacity of municipal landfill sites. Reduction and recycling of non-hazardous ISW will be very important in the future. For this, some facilities for reduction/recycling should be promoted.

Also a comprehensive system to control non-hazardous and hazardous industrial solid wastes is very important.

(8) Issue H: Hazardous Industrial Solid Waste Management

The first step to deal with hazardous ISW is proper separation and storage by considering the physical/chemical characteristics of the various target wastes. As there is no proper management system for hazardous ISW at present, a proper disposal system should be established urgently. Also, it is very important to control the generation and disposal stream of HISWs by monitoring.

(9) Issue I: Infectious Solid Waste Management

It is proposed to construct a new incinerator with a proper gas treatment system for infectious wastes. Not only infectious waste from hospitals but also from small clinics should be collected and disposed of properly.

3.2 Development of Simulation Model to Estimate SWM Cost[2]

3.2.1 Collection Cost for Municipal Solid Waste

(1) Structure of Model

Collection cost can be estimated by using a simulation model. The "GRID CITY MODEL" [3] developed by Dr. Ishikawa was used. The calculation procedure of this model is shown in Figure 3.2.1.

[2] The economic values used in this report are from June 2004.

[3] "Grid City Model" developed by Dr. Masanobu Ishikawa was used to simulate. ("A Logistic Model for Post-Consumer Waste Recycling", 1996, J.Pack. Sci. Technol. Vol.5 No.2")

The counted expense items are

- Depreciation of Collection Trucks,
- Labor Cost,
- Fuel Consumption Cost,
- Repair Cost, and
- Indirect Cost.

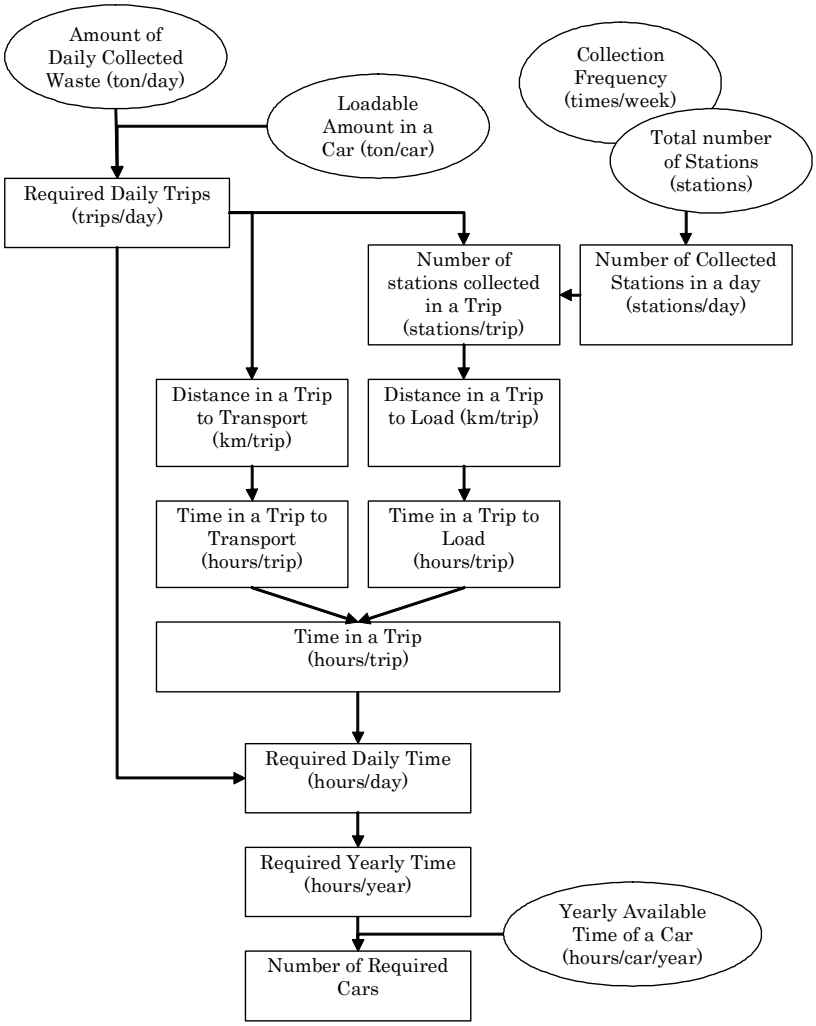


Figure 3.2.1 Structure of Simulation Model for Collection; "GRID CITY MODEL"

(2) Basic Parameters

Data used for simulations are shown in Tables 3.2.1 and 3.2.2.

Table 3.2.1 Data for Simulation of Municipal Waste (Each Municipality)

Township	Shahr/Dehstan	Area(km2)	Population	Daily Waste (ton/day)	Estimated Number of Household
Anzali	Bandar Anzali	32	109,459	100	24,636
	Dehestans	42	21,274	10	5,482
	Subtotal	74	130,733	110	30,118
Rasht	Rasht	41	506,592	450	104,436
	Khomam	3	10,411	15	2,146
	Sangar	4	8,420	9	1735.75
	Dehestans	920	107,089	32	70,160
	Subtotal	968	632,511	506	178,478
Shaft	Shaft	6	7,673	5	1,585
	Dehestans	498	67,097	20	15,988
	Subtotal	504	74,770	25	17,573
Somehsara	Somehsara	8	38,841	50	7,350
	Tolam	3	8,133	6	2,033
	Dehestans	405	91,133	27	25,289
	Subtotal	415	138,107	83	34,178
Fuman	Fuman	28	35,214	20	7,835
	Masuleh	1	687	0	166
	Dehestans	790	73,715	22	17,797
	Subtotal	819	109,616	42	25,798
Masal	Masal	22	18,076	15	3,926
	Dehestans	769	33,305	10	7,718
	Subtotal	791	51,381	25	11,643
Whole Area		3,572	1,137,118	791	297,788

Note: Areas of each municipality (Shahr) were calculated from population density in Census 1996 and total populations.

Table 3.2.2 Transport Distance from Each Municipality (Present)

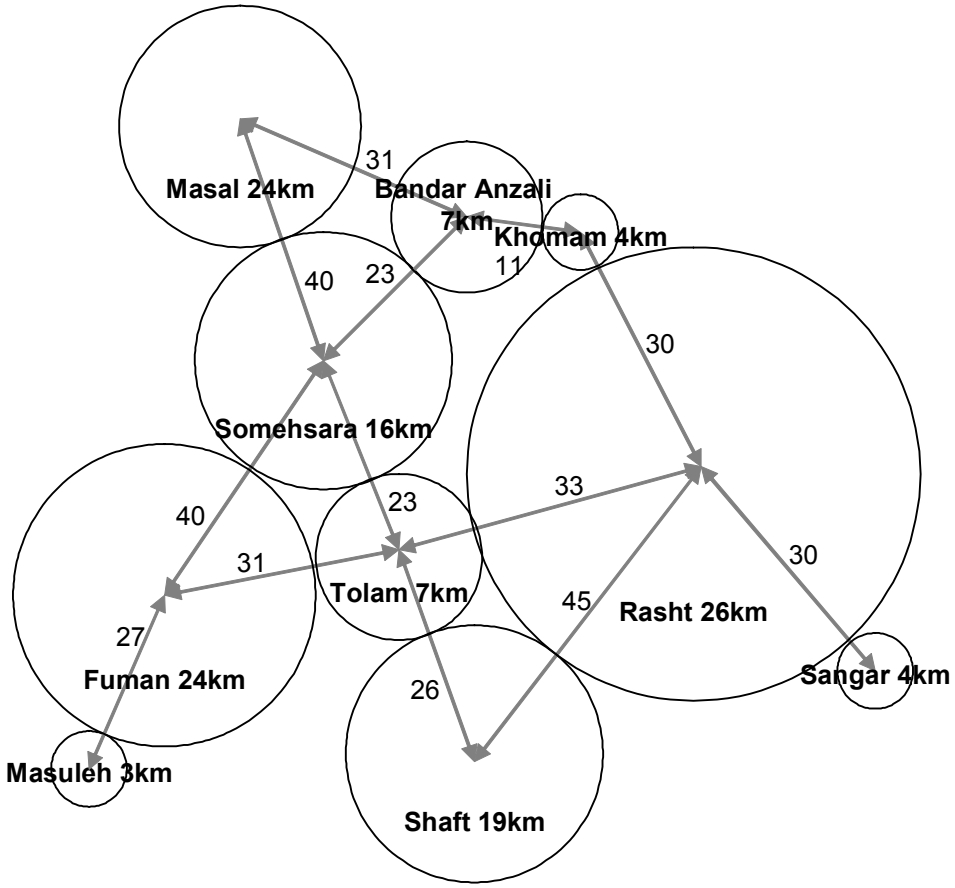
Shahrestan	Transport Distance (km)
Bandar Anzali	for Landfill: 7 for Composting: 41
Rasht	26
Khomam	30
Sangar	30
Shaft	45
Somehsara	56
Toolem	33
Fuman	64
Masuleh	3
Masal	24

Note: For Bandar Anzali, 7km and 41km were set to 66% and 34% of the total amount of waste respectively.

Table 3.2.3 Data for Simulation of Municipal Waste (Common to Municipalities)

Category	Parameter	ID	Unit	Value
Waste	Waste Generation Rate (incl. IR, OR)	wpc	g/person/day	900
	Industrial Recyclables(IR) Generation Rate	wpc-IR	g/person/day	117
	Bulk Density when Loaded	rho	ton/m3	0.35
Car	Capacity of Car	vcar	m3/car	8.0
Collection	Collection Frequency	freqwk	times/week	7
Distance & Time	Loading Speed	vpick	sec/kg	0.6
	Unloading Hours in Site	tcrrytrip	hour/trip	0.5
	Average Running Speed while Collection	vcoll	km/h	20
	Average Running Speed while Transportation	vtrns	km/h	60
Labor	Number of Annual Working Day	dy	day	365
	Daily Working Hours	td	hour/day	8
	Number of Clues for a Car	mancar	person/car	3
	Number of Driver in a Clue	ndriver	person/car	1
Economic	Price of a Car	pricecar	1000Rial/car	570,000
	Lifetime of a Car	ltcar	year	15
	Repair Cost Rate vs. Car Price	Rr	%	2
	Fuel Efficiency	kfuel	km/liter	4.0
	Price of Fuel	pricefuel	Rial/liter	170
	Normal Salary for Driver	s_driver	Rial/month	2,500,000
	Normal Salary for Collector	s_wrkr	Rial/month	2,500,000
Others	Contingent Rate for Cars	rateaffd	%	0
	Calibration for Distance	k	-	1.52
	Indirect Cost Rate	idc	%	25

The distance of routes between two municipalities is set as shown in Figure 3.2.2. In this figure, the municipalities whose boundaries touch each other mean that they are accessible from each other. By using these values, the route distance between two municipalities is calculated. For example, there two routes from Bandar Anzali to Tolam, i.e., the route via Rasht and via Somehsara. Their distances are 11km+30km+33km and 23km+23km.

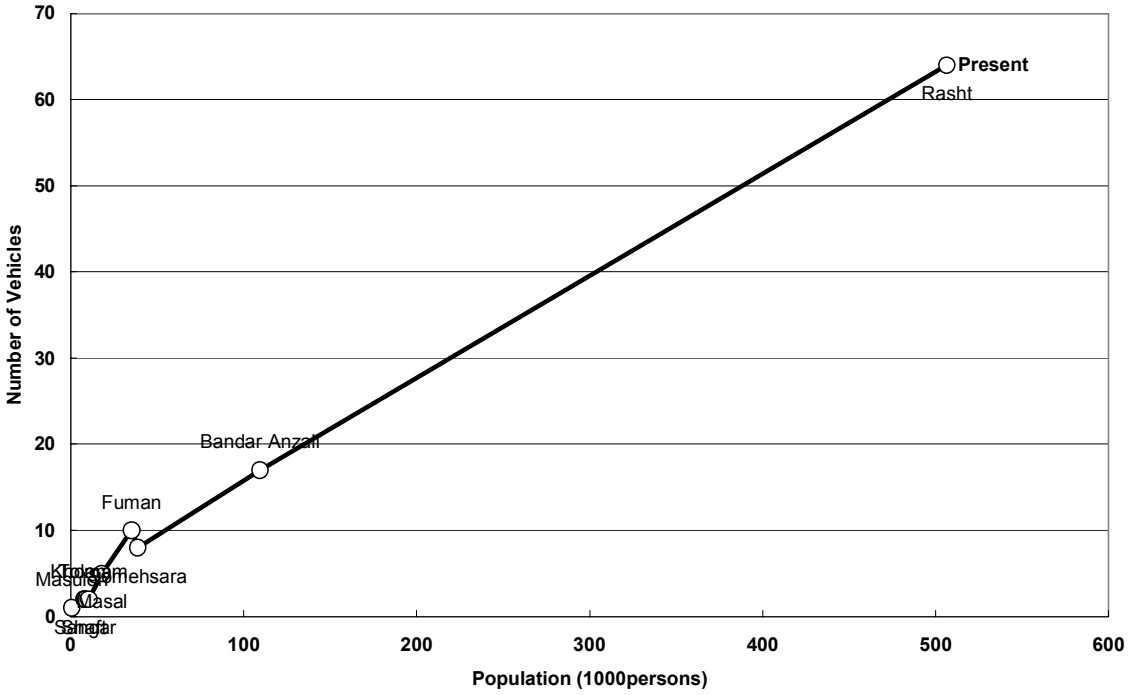


Note: The distance for Bandar Anzali was set to 7km to the landfill site and 41km to the composting plant.

Figure 3.2.2 Road Network Model Considering Size of Municipalities

(3) Confirmation of Model Fitting

By using the present number of collection trucks, the model fitting can be proved. The simulated numbers of collection trucks are 64 for Rasht Municipality and 17 for Bandar Anzali Municipality, as shown in Figure 3.2.3. Actual numbers of collection trucks are 65 for Rasht Municipality and 21 for Bandar Anzali, as shown in Table 3.2.4 Thus the simulation model can simulate the collection system of each municipality well.



Note: About Anzali, 66% of the amount of waste is transported for 7km to the landfill inside the municipality and 34% of the amount of waste is transported for 41km to the composting plant.

Figure 3.2.3 Number of Required Collection Vehicles for Each Alternative

Table 3.2.4 Actual Number of Collection Vehicles in Each Municipality

Name of Municpality	Number of Collection Vehicles	Number of Calculated Required Vehicles
Rasht	65	64
Bandar Anzali	21	17
Somehsara	4	8
Fuman	3	10
Masal	4	5
Khomam	4	2
Toolem	2	2
Sangar	2	2
Shaft	2	2
Masuleh	0	1
Total	107	113

3.2.2 Composting for Municipal Solid Waste

The cost for composting was modeled based on the existing composting plant in the study area as shown in Table 3.2.5. The considered items of cost were:

- Depreciation Cost
- Personnel Cost

- Utility Cost (Electricity, Fuel and Water)
- Other Cost

Table 3.2.5 Composting Data for Simulations

Parameter	Equation or Value
Capacity	CP(t/d)=W/6*7 Where: W=Amount of Daily Waste on 365 days basis
Rate of Residue	k=0.25
Construction Cost	CC(Mil. Rial)=11723*(CP/CP0)$^{0.7}$ CP=Capacity CP0=Standard Capacity=250t/d (The existing composting plant)
Depreciation Cost	DE(Rial)=CC/YI*0.9 YI=Years for Depreciation=15 years
Personnel Cost	EP(Rial)=(int(a1*(CP/CP0)$^{0.7}$))*SO*12+(int(a2*(CP/CP0)$^{0.7}$))*SM*12 *) Where: a1=Number of Required Workers in CP0=38(persons) a2=Number of Required Managers in CP0=10(persons) SO(Rial)=Monthly Salary of Worker = 2,000,000Rial/m SM(Rial)=Monthly Salary of Managers= 3,500,000Rial/m
Utility Cost (Electricity)	EE(Rial)=b*(CP/CP0)$^{0.7}$*AR*HOP*DOP*PE Where: b=Electricity Capacity in CP0=1600kW AR=Average Load Percentage=50% HOP=Daily Operation Hours=8hr DOP=Annual Operation Days=313days PE=Price of Electricity=500Rial/kWh
Utility Cost (Diesel Oil)	EL(Rial)=CD*PD*W*365 Where: CD=Unit of Consumption=0.0064liter/waste ton PD=Price of Diesel Oil=170Rial/liter
Utility Cost (Water)	EW(Rial)=CW*PW*W*365 Where: CW=Unit of Consumption=0.04m^3/waste ton PW=Price of Water=1000Rial/m^3
Other Cost	25% of Total Cost

Note*:"int" means omission of a fraction.

3.2.3 Landfill for Municipal Solid Waste

The Landfill cost was calculated by the equations in Table 3.2.6. The considered items of cost were:

- Depreciation Cost,
- Utility Cost (Electricity and Fuel),
- Personnel Cost,
- Repair Cost and
- Indirect Cost.

The construction cost was modeled as shown in Figure 3.2.4 by considering the construction costs in other regions. The number of workers was modeled based on the number of workers in Sarawan. Parameters used to calculate the landfill cost are shown in Table 3.2.7.

Table 3.2.6 Landfill Data for Simulations

Parameter	Equation or Value
Required Area for Landfill	RA(m2)=LY/d*(1+k)*LT/HT*RT where: LY=Amount of Landfilled Waste (ton/year) d=Bulk Density after Compaction =1.0t/m^3 k=Rate of Daily Covers to Waste Volume=0.25 LT=Lifetime Year of Landfill=15year HT=Final Height of Landfill=15m RT=Rate of Total Area to Landfill Area=1.2
Construction Cost	EC(Mil. Rial)=1.282*Area $(m2)^{0.614}$ (See Figure *.*.*)
Cost for Bulldozer Purchase	EB(Rial)=(int(LY/UB)+1)*PB *) where: UB=80000t/y PB=Price of Bulldozer=1,500Mil. Rial/bulldozer
Depreciation	DE(Rial)=(EC+EB)/YI*0.9 YI=Years for Depreciation=15 years
Personnel Cost	EP(Rial)=(int(b*$(LY/LY0)^{0.7}$))*SO*12+SM*1*12 LY0=Standard Waste for Landfill=180000t/year b=Number of Required persons in LY0=12(persons)) SO(Rial)=Monthly Salary of Operators = 2,500,000Rial/m SM(Rial)=Monthly Salary of Managers= 4,000,000Rial/m (See Figure *.*.*)
Utility Cost (Electricity)	EE(Rial)=S*UE*PE Where: S=Volume of Leachate=Volume of Rainfall =1.271(m/year)*(Required Area:m^3) UE=Unit of Consumption to Leachate=0.26kWh/m^3 PE=Price of Electricity=500Rial/kWh
Utility Cost (Diesel Oil)	EL(Rial)=LY*UC*PL UC=Unit of Consumption=0.62liter/waste ton PL=Price of Diesel Oil=170Rial/liter
Repair Cost	2% of Construction Cost
Rate of Indirect Cost	10% of Total Cost

Note*:"int" means omission of a fraction.

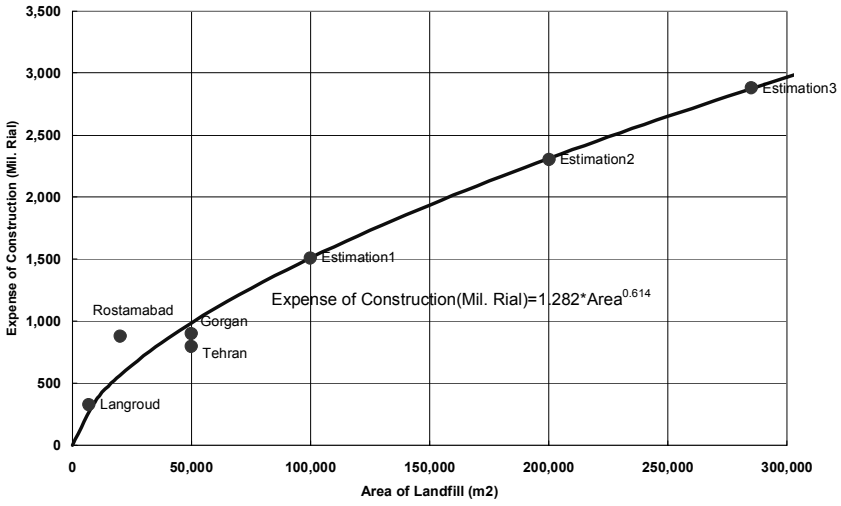
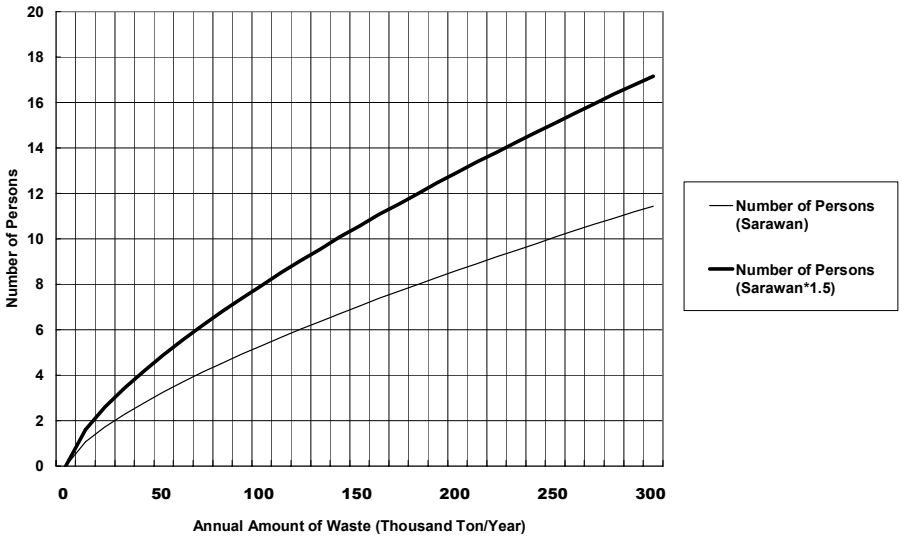


Figure 3.2.4 Expense for Landfill Construction



Note: In Sarawan, 180,000 tons of waste are landfilled annually. The number of workers is 8 persons. Based on these two data, parameter k in the equation $EP = k * (\frac{LY}{LY_0})^{0.7}$ was determined.

Figure 3.2.5 Required Number of Persons to Landfill

3.3 Estimation of Solid Waste Collection Service

3.3.1 Estimated Cases

Two estimations were conducted by using the simulation model. One is to calculate the required collection cost to provide collection service to villages, and another is to evaluate the change in the collection cost when recycling is done in municipalities. The estimated cases are:

1) Present cost
2) The collection cost when waste collection will provide to the villages (Provision to villages)
3) The collection cost when recycling will be done fully in municipalities in addition to above (Provision to villages + Recycling in Municipalities)
4) The collection cost when the collection frequency and collection points will be changed in municipality in addition to the case above (Provision to villages + Recycling in Municipalities+ Freq. and Point Change in Municipalities)

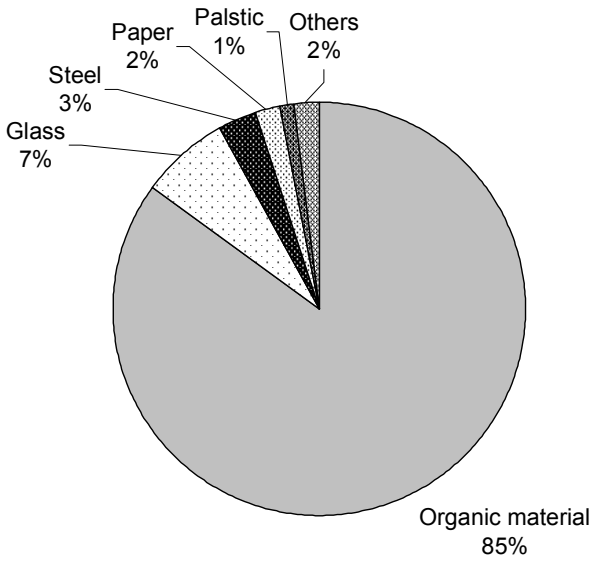
3.3.2 Conditions of Estimations

The conditions of calculations for villages are:

- The values of transporting distance for villages are the same as the distance from the nearby municipality. The area and population of the villages are allocated to municipalities according to the area and population of municipalities in a Township.
- The collection service level for villages can be lower than municipalities, because the waste generation rate in villages is only 300 g/capita/day and self-disposal methods are available in villages. Frequency of collection in villages is set to 3 times a week. The waste discharging points are assumed to be provided for every 10 households.

The conditions of calculations for municipalities are:

- The component rate of recyclables is set to 13% of the total amount of the waste, based on composition analysis shown in Figure 3.3.1.
- In the case where the frequency and collection points change, the frequency was assumed to be 3 times a week and the collection points were assumed to be placed every 10 households.



Source: Rasht Municipality

Figure 3.3.1 Average Waste Composition

3.3.3 Results

The results are shown in Figures 3.3.2, 3.3.3 and 3.3.4. Based on these results, the following can be considered:

- In order to provide collection service to villages, an additional 43 vehicles are necessary and the total collection cost will be increased to 138% of the present cost, unless no recycling is done in municipalities.
- If municipalities start recycling, the total cost will be reduced from 138% of the present cost to 131% of the present cost by the reduction of wastes.
- If municipalities can reduce the frequency to 3 times a week and the number of collection points to one for every 10 households, the collection cost will be reduced to 93% of the present cost

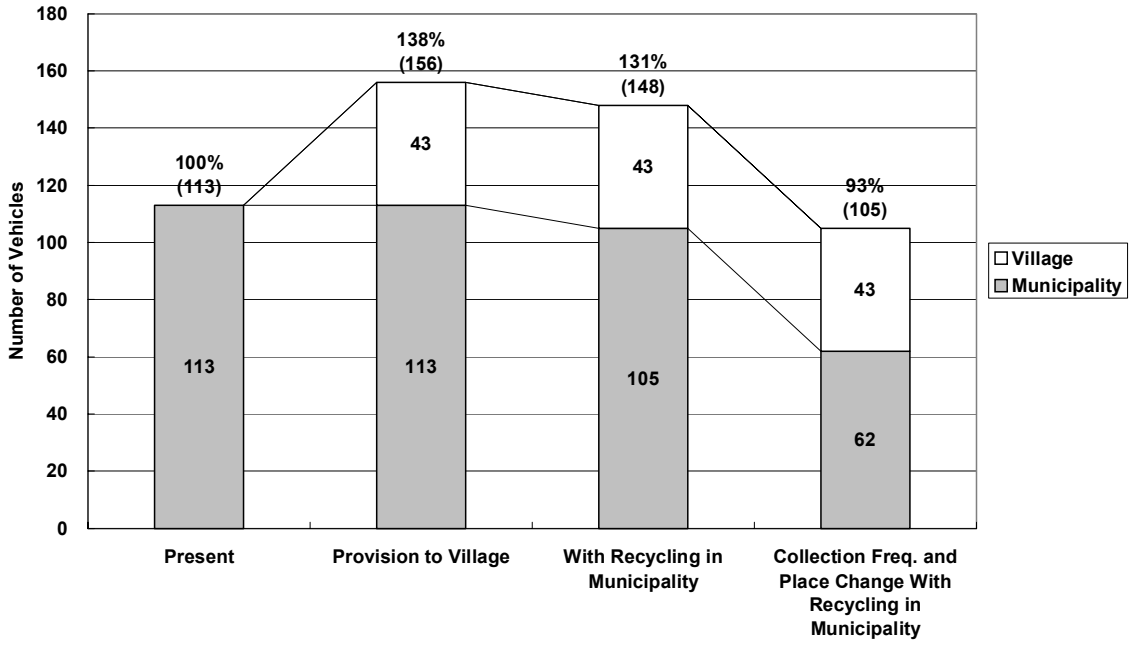


Figure 3.3.2 Required Number of Collection Vehicles to Provide Collection Service to Villages

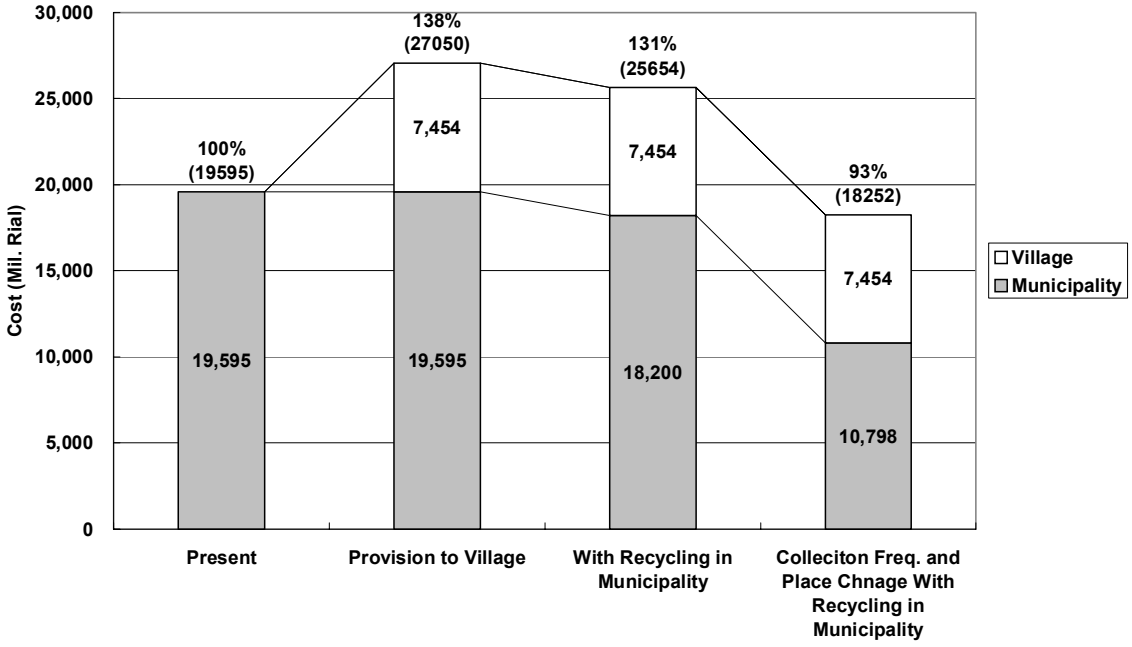
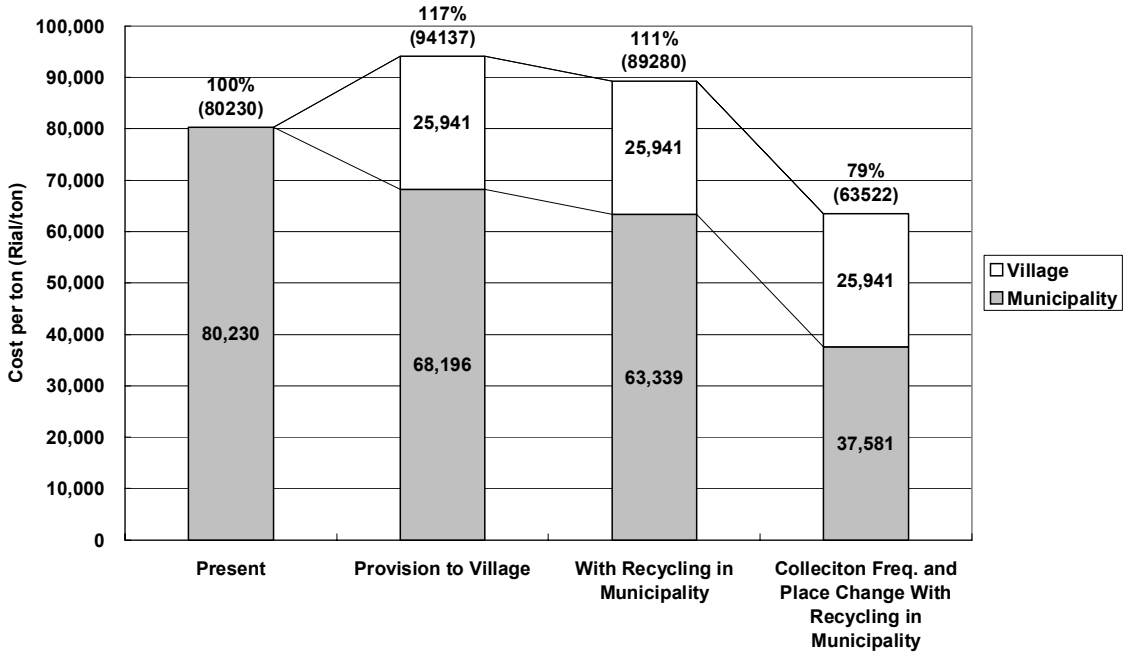


Figure 3.3.3 Required Collection Costs to Provide the Collection Service to Villages



Note: The reason why the cost of Alternative 1 is higher than "Present" is that the cost reduction in Alternative 1 is smaller than the amount of waste reduction by recycling.

Figure 3.3.4 Required Collection Costs per Ton to Provide Collection Service to Villages

3.3.4 Conclusion

In order to start to provide the collection service to villages, an additional 43 vehicles should be acquired. These will cost 7.5 billion Rials per year, including the vehicle purchase cost as depreciation. These shall be furnished by the Governors of counties (Bakshes). The recycling can be considered as an environmental education program, as the cost reduction effect is not so much.

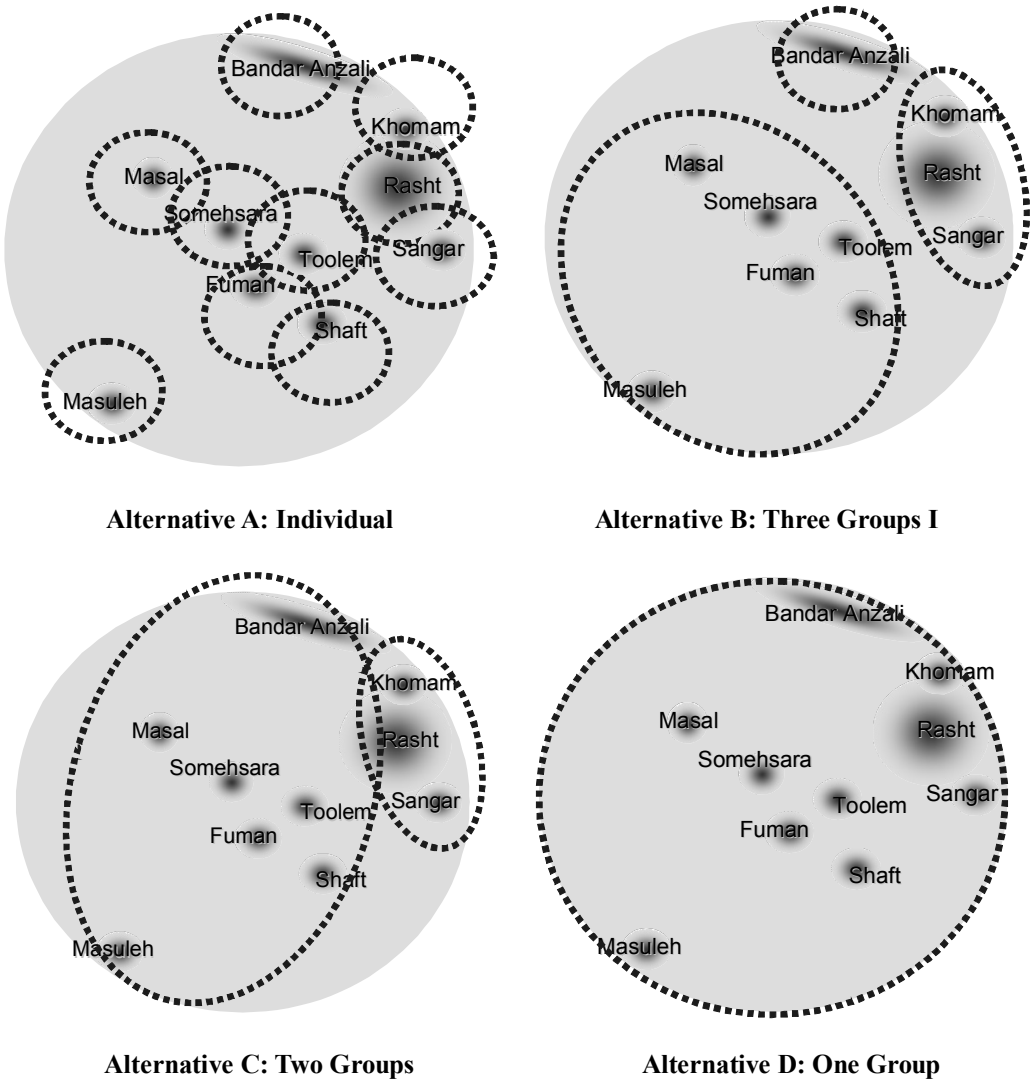
The cost reduction by frequency and collection point change is attractive for municipalities. However, it is very difficult to introduce this change quickly because it will face opposition from people who are used to discharge in a very convenient way. This can be introduced after people's environmental awareness is raised enough.

3.4 Evaluation on Grouping of Municipalities for Municipal Solid Waste Disposal

3.4.1 Alternatives

Alternatives are impacted by two factors. One is the number of landfills, and another one is whether composting is introduced or not. It is important to consider the road network, when the combinations of municipalities are proposed, so that the proposed combinations are efficient enough. Considering the road network, the practical combinations of

municipalities to share landfill sites are shown in Figure 3.4.1. In each combination of municipalities, the cases of "with" and "without" composting are proposed as options.



Note: Each alternative has an option of "With" and "without" composting.

Figure 3.4.1 Alternatives Configurations for the Sharing of Landfill Sites or Composting Plants

3.4.2 Conditions

The conditions to estimate the SWM costs of alternatives are:

- The values of distance between municipalities and disposal sites are shown in Table 3.4.1 This table was prepared based on the road network model.
- The distance from villages to disposal sites are assumed to be the same as 3.3.

Table 3.4.1 Transportation Distance between Municipalities and Disposal Sites in Each Alternative

Shahrestan	Present	[Alternative A] Individual	[Alternative B] Three Groups	[Alternative C] Two Groups	[Alternative D] One Group
Bandar Anzali	Landfill: 7 Composting: 41	7 *	7 *	7	41
Rasht	26 *	26 *	26*	26*	26 *
Khomam	30	4 *	30	30	30
Sangar	30	4 *	30	30	30
Shaft	45	19 *	26	72	45
Somehsara	56	16 *	23	23 *	56
Toolem	33	7 *	7 *	46	33
Fuman	64	24 *	31	63	64
Masuleh	3	3 *	85	90	91
Masal	24	24 *	63	31	72

Note: 1. Based on the road network model (Figure 3.2.2)
2. The municipalities with "*" means the plants are located in the municipalities. The location of a landfill site and a composting plant is assumed to be in the same place.

3.4.3 Result of Cost Simulation

(1) Without Composting

Based on the result of simulations in Figure 3.4.1, the following can be concluded.

- The cost of collection is dominant in every alternative.
- The total costs of any alternatives are lower than the present system.
- Any alternative can be proposed from the viewpoint of cost, as the total costs are not much different.

Figure 3.4.2 shows the cost per ton.

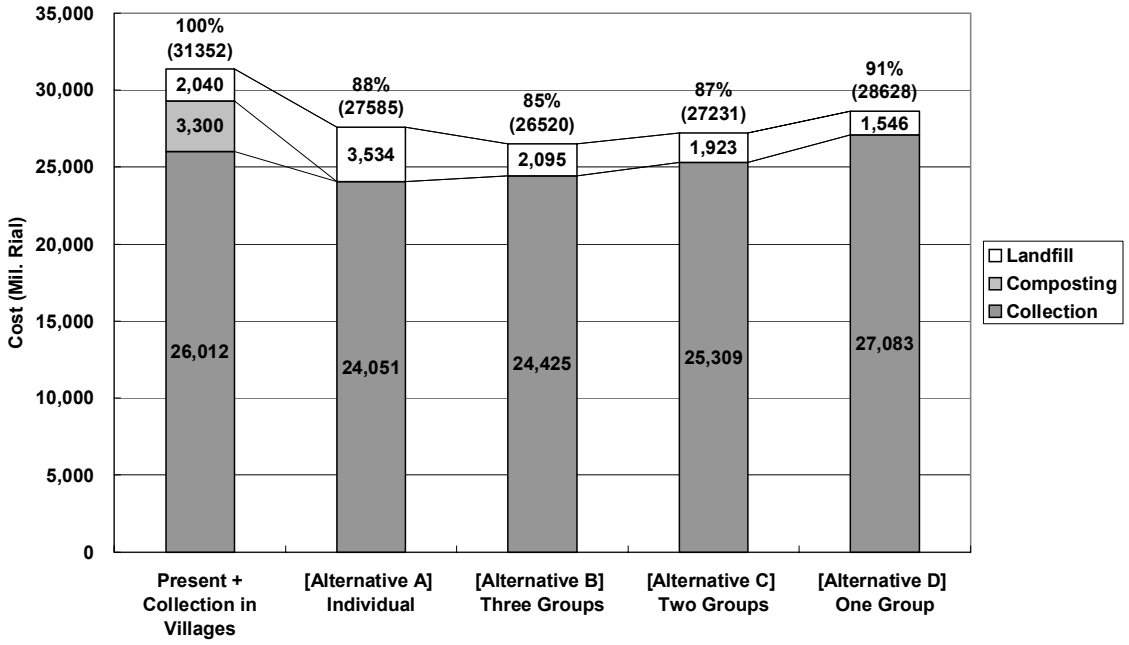


Figure 3.4.2 Total Cost of Alternatives (Without Composting)

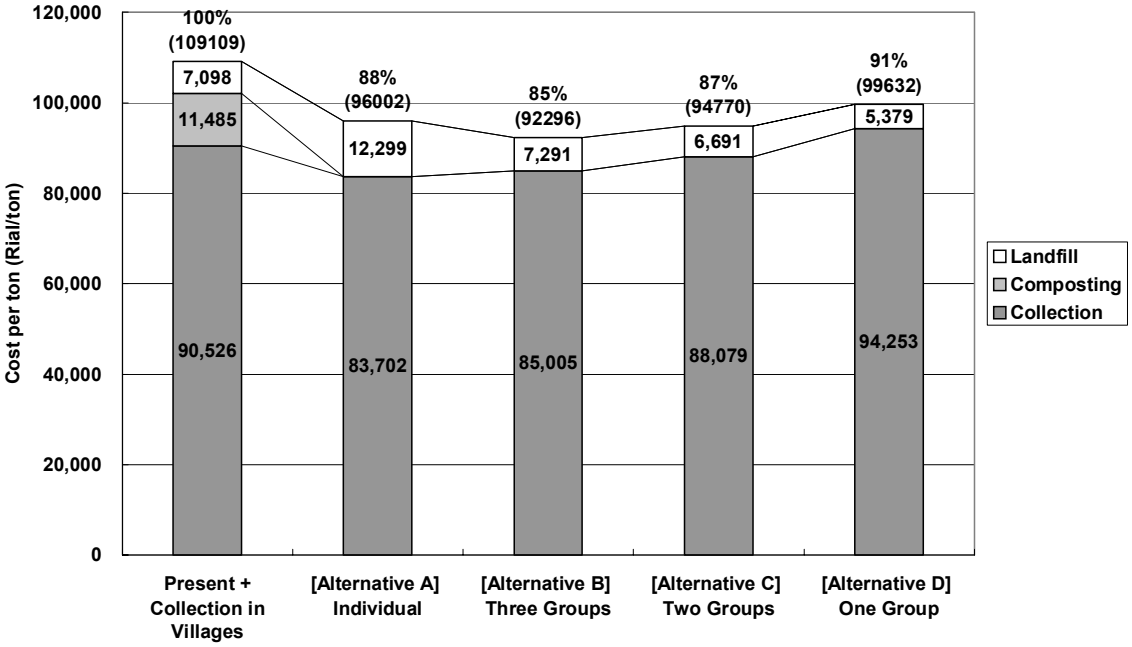


Figure 3.4.3 Total Cost per ton of Alternatives (Without Composting)

(2) With Composting

Based on the result of simulations in Figure 3.4.3, the following can be concluded.

- The cost will be increased at the rate of 20-35% compared with the present case.
- The costs are not so different from alternatives, because the collection cost and the disposal cost compensate each other, according to the scale economics of disposal facilities.

Figure 3.4.4 shows the cost per ton.

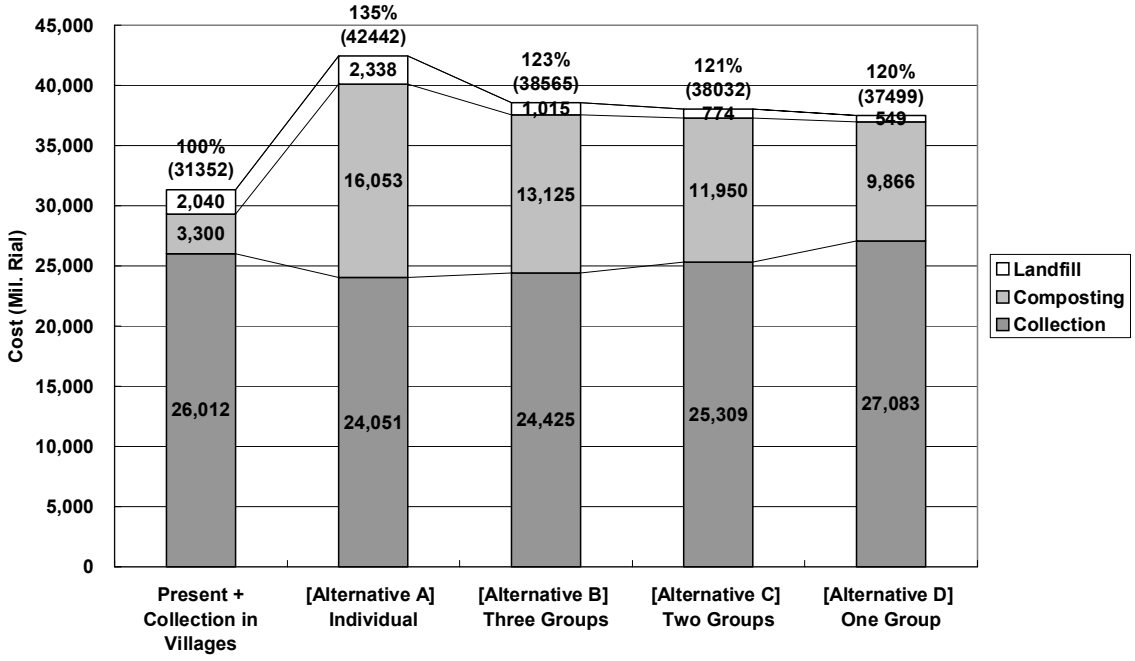


Figure 3.4.4 Total Cost of Alternatives (With Composting)

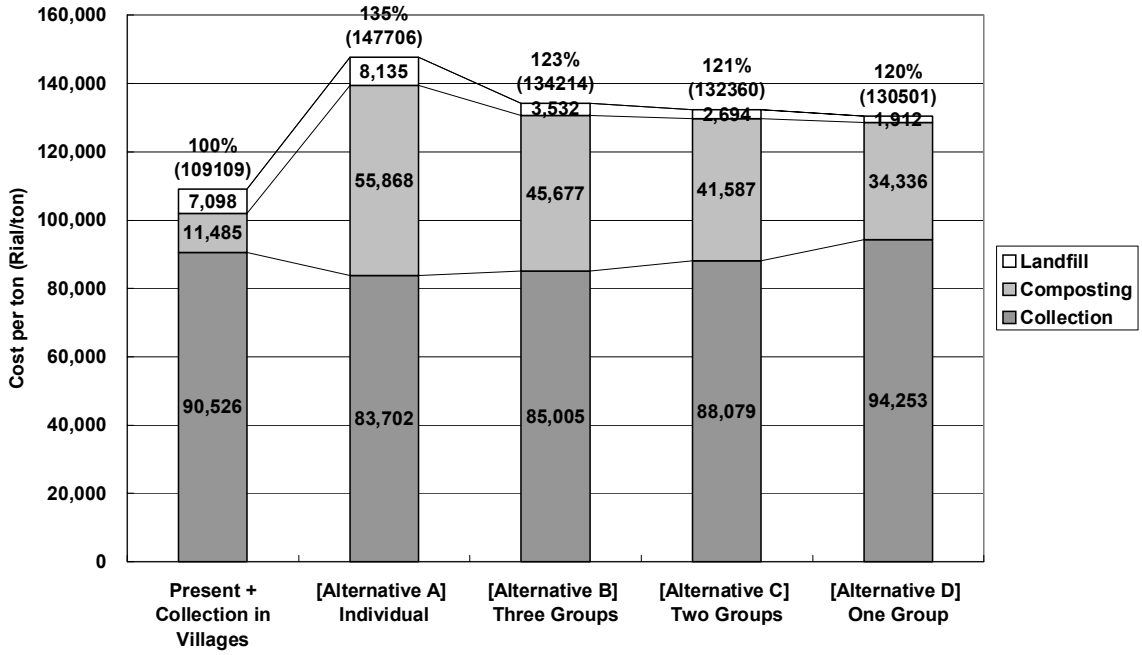


Figure 3.4.5 Total Cost per ton of Alternatives (With Composting)

3.4.4 Conclusion

(1) Composting

Table 3.4.2 shows the comparison of alternatives with regard to composting. Through talking with DOE, some members of the local steering committee and NGOs in meetings, the attendants insisted that it is very difficult in the Guilan Province to construct landfill sites. Also they suggested that the construction of composting plants should be prioritized. In fact, Bandar Anzali municipality has just started to construct a composting plant in Ab Kenar. Based on the results of the comparison of alternatives and opinions of stakeholders, the master plan proposes systems with composting.

Table3.4.2 Evaluation on Alternatives of "without" or "with" Composting

	Without Composting	With Composting	Score
Possibility of Site Selection	***Low*** A larger area is required for the land fill site, and it makes the site selection difficult.	***High*** The required areas for landfills are reduced.	*Low= -2* *High= +2*
Extension of Landfill Lifetime	***Low*** No reduction.	***High*** The amount of landfilled wastes will be reduced to about 20% of the total wastes.	*Low= -1* *High= +1*
Resource Utilization	***No*** Some recyclable materials will be landfilled.	***Yes*** Compositing of organic wastes and separation of recylclables will be possible.	*Yes= +1* *No= -1*
Stability	***Good*** The landfill system is not strongly affected by any change in the waste composition.	***Bad*** Unless composts will be used, the system becomes unsustainable.	*Good= +1* *Bad= -1*
Total SWM Cost	***Good*** The cost will be lower than the alternatives of "with" composting cases.	***Bad*** The cost will be increased at the rate of 40-60% compared with the "without "composting case.	*Good= +1* *Bad= -1*
Total Score	***-2***	***+2***	-

(2) Grouping of Municipalities

The Table 3.4.3 shows the evaluation of the alternatives related to the combinations of municipalities. Alternative B or Alternative C can be proposed according to the scores. However, Alternative C can be selected by considering the on-going construction of a composting facility for Anzali.

Table 3.4.3 Evaluation on Alternatives of Combinations of Municipalities (with Composting)

	[Alternative A] Individual	[Alternative B] Three Groups	[Alternative C] Two Groups	[Alternative D] One Group	Score
Burden for Municipalities to construct facilities (Number of facilities to be constructed)	***Very High*** 10 sets of facilities	***Low*** 3	***Low*** 2	***Low*** 1	*Low= +2* *High= -2* *Very High=-4*
Compatibility to the present plan	***Low*** The municipalities already collaborate with each other.	***Low***	***High*** Anzali is now constructing a new composting plant. Somehsara and Fuman will use it.	***Low***	*Low= -1* *High= +1*
Robustness against accidents	***Very High*** The facility in the next municipality is available.	***High*** Another facility is available.	***High*** Another facility is available.	***Low*** There is no facility, if the facility cannot be used.	*Low=-1* *High=+1* *Very High=+2*
Total SWM Cost	- (Not so different)				-
Total Score	*-3*	*+2*	*+4*	*+0*	-

Note: The evaluation was made by considering opinions of the stakeholders.

CHAPTER 4 SOLID WASTE MANAGEMENT PLAN

4.1 General

As discussed in Chapter 2, the waste collection coverage is only 65% on a population basis, and no collection service is provided in rural areas. Consequently, illegal dumping is ubiquitous and a large amount of solid waste is dumped into the tributaries of the Anzali Wetland. Even in urban areas where a door-to-door collection service is provided almost everyday, dumping into rivers and open spaces is common due to the low environmental awareness of the residents. Environmental contamination around the existing dumping sites is also a concern as no leachate control is practiced at any of the dumping sites, including the Anzali dumping site located adjacent to the Wetland. There is no established system to manage the hazardous wastes, and management of non-hazardous waste is a potential issue in the future. Given these situations, drastic improvement of solid waste management is needed.

4.2 Objectives and Strategies

4.2.1 Objectives

Solid waste management problems in the area are the manifestations of poor environmental management in the area, and the resulting scattering of uncollected waste is both a public health concern and the main reason for the downstream contamination of Anzali Wetland by solid waste. Thus, the informal disposal of uncollected solid waste and open dumping should be controlled urgently. In addition, industrial waste, especially hazardous wastes, must be controlled carefully, as their environmental impact can be significant. The objectives of the Solid Waste Plan are thus:

1) To reduce uncontrolled disposal of municipal solid waste by proper management, including the prevention of its flowing to the Wetland, and
2) To implement proper control of industrial solid waste.

4.2.2 Strategies

(1) Targets for Solid Waste Management

1) Municipal Solid Waste Management

There is no waste collection service to residents living in villages. Wastes are easily dumped into rivers. Even in municipalities where waste collection service is provided, wastes in rivers are often seen. Also, collected wastes are disposed of in an unsanitary way, which may pollute the environment including the Wetland. Based on these observations, the targets for MSW can be set as follows.

- Rise in environmental awareness to a certain level
- Provision of efficient waste collection to the whole area
- Proper disposal of all municipal solid waste

2) Industrial Solid Waste Management

At present, only infectious waste from hospitals and wastes containing heavy metals needs to be controlled. In the future, non-hazardous industrial waste will be a problem according to the economic growth. The targets for ISW can be set as follows.

- Proper treatment of hazardous industrial solid waste
- Reduction/Recycling of non-hazardous industrial solid waste
- Comprehensive Control of industrial solid waste

(2) Environmental Awareness Raising

Environmental awareness raising is one of the most crucial strategies, because the problems of solid waste management in the area are rooted, not only in technical and financial issues, but deeply in the behavior of people, as is evident from illegal dumping even in areas where daily and door-to-door waste collection service is provided. The environmental awareness is expected to become more important in the future, as the residents would face increasingly difficult waste management issues, such as reduction of the amount of waste, construction of landfills, reduction in excessive solid waste management cost by reducing collection frequencies and points, etc. These measures require people's understanding about the needs, and people's cooperation and active participation in these measures.

Target: Raising environmental awareness to the level that enables relevant solid waste management measures.

(3) Provision of Efficient Municipal Solid Waste Collection Service to the Whole Area

Limited waste collection coverage is another major cause of improper waste management in the study area, especially in rural areas where there had been no waste collection service at all. However, the new solid waste law promulgated recently finally made it mandatory to provide solid waste management in rural areas. Thus, the main strategy is to develop a system of waste collection systems in rural areas. In the urban area, where rather excessive collection service has been provided, the improvement of service efficiency is the primary direction.

Target: Provision of efficient waste collection services to the whole area in accordance with the new solid waste law.

(4) Proper Disposal of Municipal Solid Waste

The government is pursuing a strategy to construct composting plants to separate, recycle and stabilize waste before final disposal so that the amount of waste brought to final disposal sites can be reduced. There is already a composting plant in Rash, and another composting plant will open in 2006 in Abkenar. Thus, waste reduction using these facilities is considered in the plan. In addition, new sanitary landfills should be constructed as the existing dumping sites were not properly designed or constructed.

Target: Establishment of composting and sanitary landfills to minimize long-term social and environmental impacts of waste disposal.

(5) Possible Measures to Achieve the Targets of Industrial Solid Waste Management

The amount of hazardous industrial solid waste containing toxic substances, such as heavy metals, is limited, but it could pose significant environmental threat to the wetland located downstream. Thus, some urgent measures to control hazardous waste should be implemented. The same can be said about infectious waste. Then, more comprehensive measures, such as information management systems, waste reduction, licensing systems or possible regulatory measures to control industrial waste should be introduced to control the growing quantities of industrial waste in the future.

Target: Safe disposal of hazardous industrial waste.

4.3 Municipal Solid Waste Management

4.3.1 Environmental Awareness Raising

(1) Introduction

The problem of illegal dumping in the study area is rooted in the long-term habit of throwing waste anywhere, and the priority is to raise environmental awareness of the local residents. This is to be achieved in two steps. First, a simple participatory recycling activity similar to the one implemented as a pilot activity, 'community-based recycling activity', is introduced. This activity is then expanded to broader environmental education and participation activities.

(2) Participatory Recycling Activity

It is not sufficient to just tell people not to throw waste into rivers. Environmental awareness is raised most effectively by encouraging people to participate in solid waste management projects. Recycling is a good project in which people can participate, and the study has already piloted 'community-based recycling activity', which can be used as the prototype of future activities. Activity participation of residents is the key for successful recycling activity; time, place and target recyclables (e.g., glass bottles, PET bottles, steel and paper) can be discussed between recyclers and local groups, such as communities, schools, private offices and municipal offices. The proposed frequency is once per month. Separated recyclables can be sold and residents can make money. This can be used as an incentive for residents to start recycling. In order to implement successful, long-lasting activities, collaboration with NGOs is recommended.

(3) Linkage to Environmental Education

The participatory recycling activity will be a good start for raising environmental awareness among people. However, this alone is not sufficient to prepare people to broader solid waste management issues anticipated in the future, such as further reduction of the volume of waste, construction of landfills, cut down in excessive solid waste management cost by reducing collection frequencies and points, and balancing the level of service provision and solid waste management fee. It is thus proposed to implement structured environmental education programs that are specifically programmed to boost the knowledge and participation of local residents in such solid waste management issues. The environmental education programs become the most effective when they are done with action based programs like recycling. The following ways to educate people should be mixed.

- Media to mention how and why to separate waste
- Seminars/Workshops to mention how and why to separate waste
- Site visits to some waste management facilities, such as composting plants and landfill sites, to impress the importance of recycling

4.3.2 Provision of Efficient Municipal Waste Collection Service to the Whole Area

(1) Introduction

Limited collection coverage has been a primary cause of improper waste management in the study area. This was particularly true in rural areas, where no waste collection service had been provided because there was no law requiring such services. However, this is about to change with the promulgation of the new solid waste management law, which mandates the Governor of the counties to be responsible for solid waste management even in rural areas. In the urban areas, the collection service is provided 6 or 7 days in a week for every household. This is considered excessive, and is becoming a major financial burden to the municipalities. Thus, optimization of collection frequency and collection points was considered here.

(2) Provision of Waste Collection Services to Villages

1) Collection and Disposal Systems in the Village

In order to meet the requirements of the new solid waste management law, it is necessary to prepare collection vehicles and disposal facilities. New collection vehicles should be purchased by counties (Bakshes). On the other hand, disposal facilities may be shared among municipalities by paying tipping fees, as it is not realistic to construct disposal facilities in each county.

2) Number of collection vehicles required

Figure 4.3.1 compares the required numbers of waste collection vehicles by alternatives[4]. The number of collection vehicles required to provide the collection service to villages is 30-40 vehicles on condition that the wastes are collected three times a week from every 20 household. This will cost villages 7,454 million Rials.

[4] The alternatives are as follows: (i) "present" is the present service level, (ii) "provision to villages" is to expand the collection service to villages (3 days/week), (iii) "with recycling in municipality" is "provision to village" + recycling activities as proposed in Section 4.3.1, and (iv)"collection freq. and place change with recycling in municipality" is "with recycling in municipality" + change in the collection frequency and locations as proposed in Section 4.3.2 (3) below.

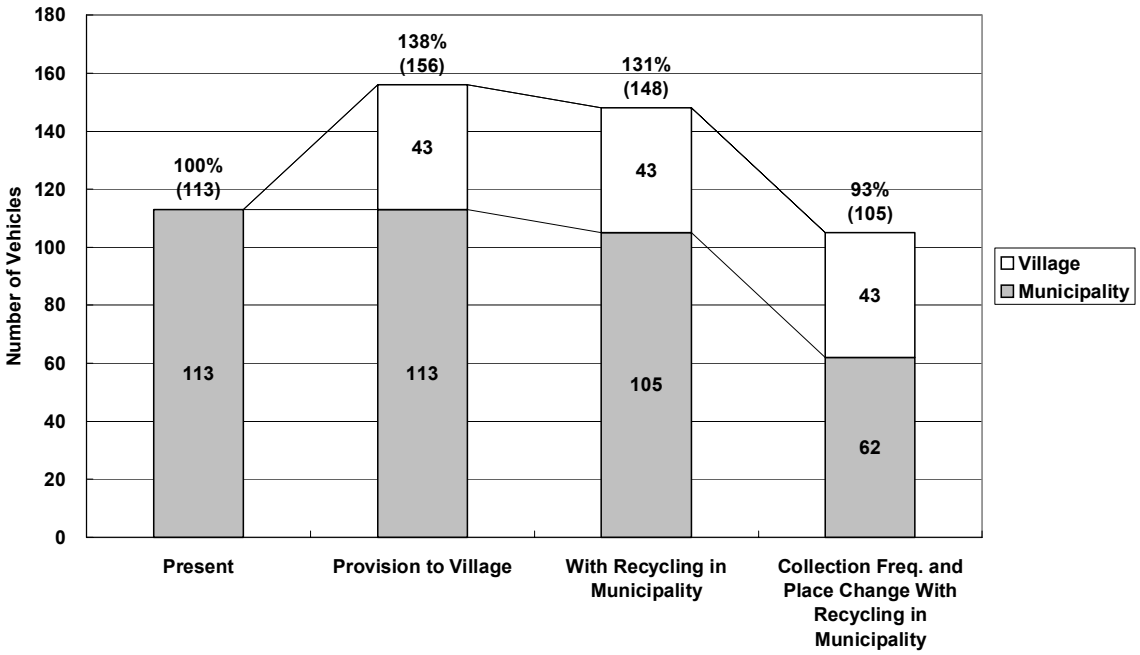


Figure 4.3.1 Number of Required Vehicles

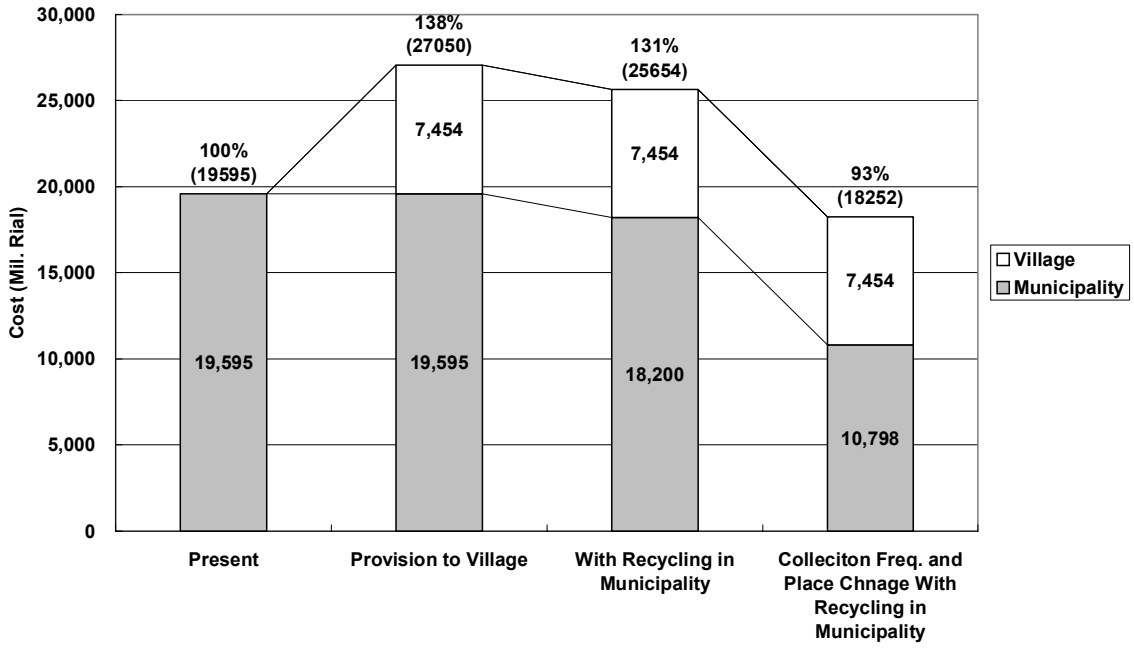


Figure 4.3.2 Required Collection Costs

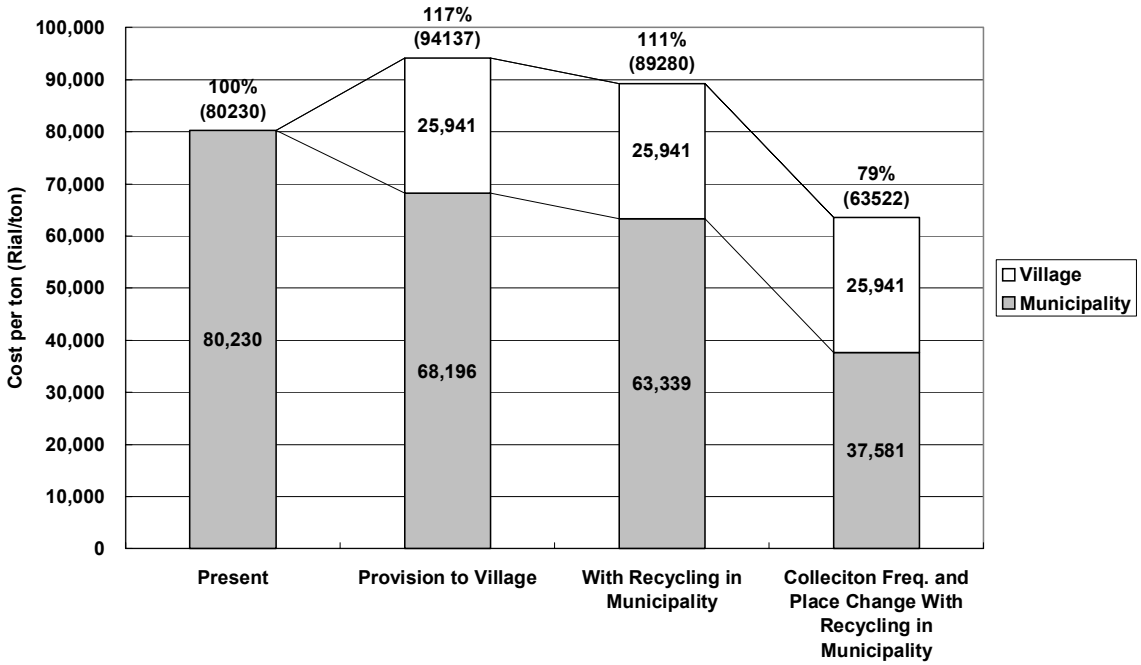


Figure 4.3.3 Required Collection Costs per Ton

(3) Change of Collection Frequency and Collection Point in Urban Area

1) Rules for Waste Discharge

At present, people in urban areas discharge their waste in front of their houses, as illustrated in the left figure in Figure 7.3.4. This system may be convenient, but is expensive as collection vehicles have to go all houses[5]. Moreover, some residents do not seem to appreciate this system as they have to put their garbage in front of their houses[6]. The suggested future rule requests people to bring their wastes to the nearest waste stations, which are located every 10-20 houses. Proper places for waste stations are public open area from the practical point of view.

Also, at present, people can discharge their waste everyday. In the proposed system, people cannot discharge everyday, but only 3 or 4 times a week.

[5] For the results of cost simulation, see Part 6, Solid Waste Management, Supporting Report
[6] See the result of a pilot activity, waste drop-off center, in Chapter 12

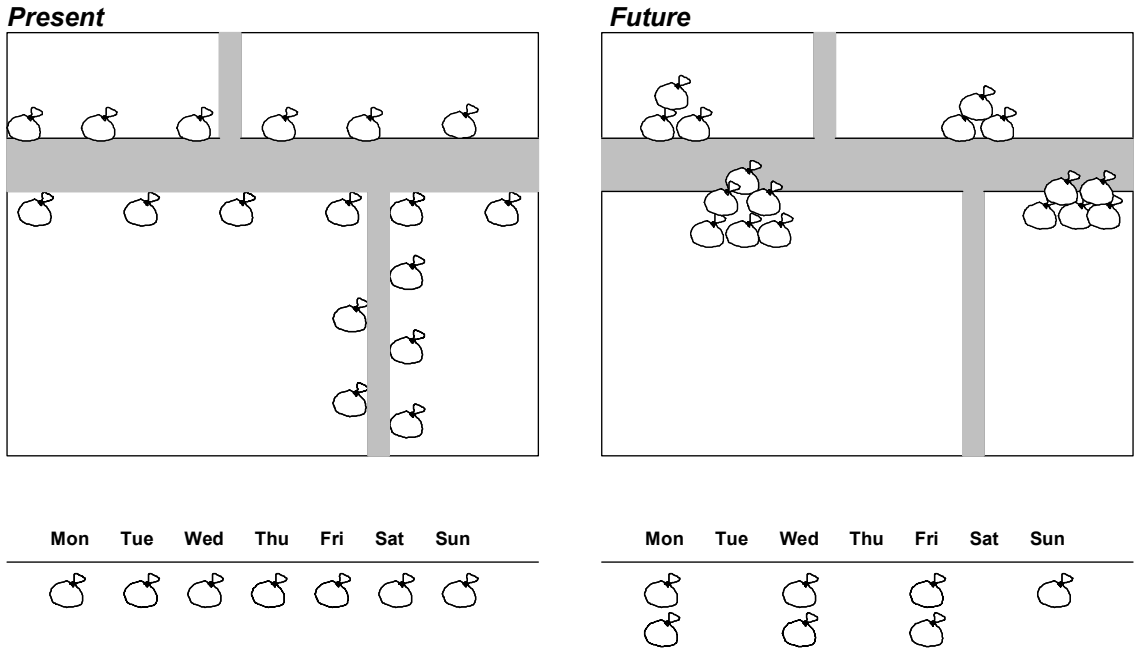


Figure 4.3.4 Illustration of Change of Collection Frequency and Collection Points

2) Collection Cost Reduction

According to the results of the cost simulation, the combination of changes in collection frequency and points and introduction of recycling in Section 4.3.1 can reduce the overall collection cost in the urban areas by 45%, from about 20,000 million Rials/year to about 11,000 million Rials/year (see Figure 4.3.2).

3) Implementation Steps

The proposed change in the collection frequency and points will result in a significant reduction in collection cost, and the team had suggested this change at an early stage of solid waste management plan. However, many residents seem reluctant to give up the privilege of daily collection. Thus, the introduction of the new system has to wait until more discussions among stakeholders are held, and environmental awareness is raised as suggested in Section 4.3.1.

4.3.3 Proper Disposal of Municipal Solid Waste

(1) Introduction

None of the waste dumping sites in the study area have leachate collection/treatment systems. In order to minimize further environmental damage, these open dumping sites should be closed soon, and sanitary landfills that are equipped with adequate pollution

control be constructed. However, there is a strong concern against construction of a waste disposal site that accepts raw waste because the groundwater table in the plain area is high, and the risk of groundwater pollution is not negligible

A solution that has been pursued by the Iranian government is construction of composting plants in order to separate and stabilize waste before dumping. Based on this policy, the government has already constructed a composting plant in Rash (capacity 250 ton/day). Another plant is going to be constructed by the Anzali municipality soon (capacity 300 ton/day). The downside of composting is a 40-60% increase in waste management cost. Nevertheless, the introduction of composting facilities has many positive aspects as analyzed in Part 8, Solid Waste Management, Supporting Report, and the decision has already been made. Thus, the study adopted introduction of composting systems as a given condition, and proposed a waste disposal system based on composting plants and sanitary landfills as explained below. Table 4.3.1 shows that the case of "with" should be prioritized.

Table 4.3.1 Evaluation on Alternatives of "without" or "with" Composting

Item	Without Composting	With Composting	Score
Possibility of Site Selection	***Low*** Some landfill sites are too big to seek the sites.	***High*** The required areas for landfills are reduced.	*Low= -2* *High= +2*
Extension of Landfill Lifetime	***Low*** No reduction.	***High*** The amount of landfilled wastes will be reduced to about 20% of the total wastes.	*Low= -1* *High= +1*
Resource Utilization	***No*** The cost will be lower than the alternatives of "with" composting cases.	***Yes*** The cost will be increased at the rate of 40-60% compared with the "without "composting case.	*Yes= +1* *No= -1*
Stability	***Good*** The landfill system is strong to the change in the waste composition.	***Bad*** Unless composts will be used, the system will be unstable.	*Good= +1* *Bad= -1*
Total SWM Cost	***Good*** The cost will be lower than the alternatives of "with" composting cases.	***Bad*** The cost will be increased at the rate of 40-60% compared with the "without "composting case.	*Good= +1* *Bad= -1*
Total Score	*-2*	*+2*	-

(2) Composting of Municipal Solid Waste

1) Composting Process

The composting plant should be equipped with a sorting process as a front end processor, shown in Figure 4.3.5, because it deals with the mixed wastes. The organic components for composting can be sorted out. There is one composting plant in Rasht. Anzali municipality is now planning to construct a new composting plant, whose construction site has been selected in Abkenar.

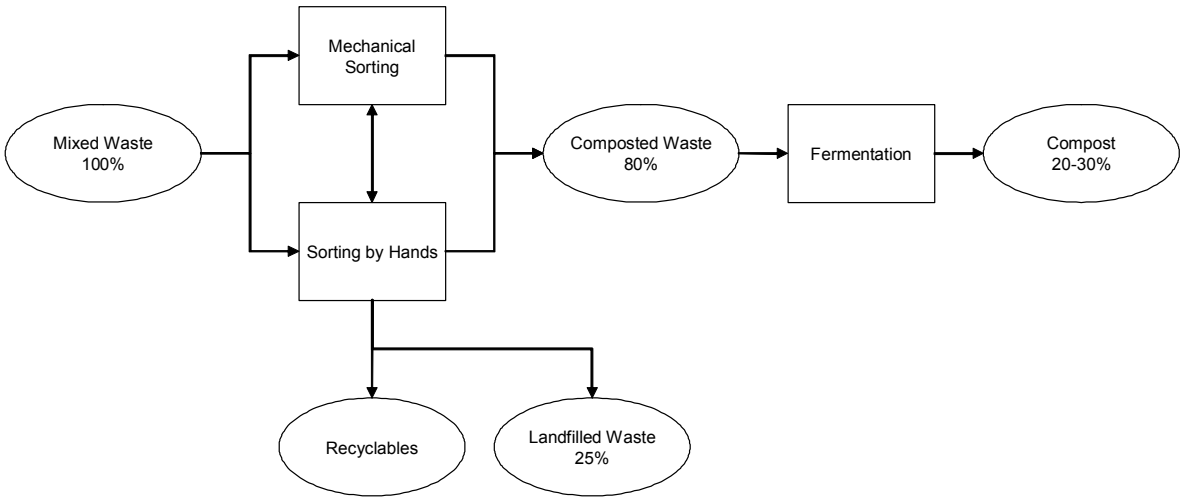


Figure 4.3.5 Composting Process

2) Combination of Municipalities

Table 4.3.2 shows the evaluation on alternatives related to the combinations of municipalities. Alternative B or Alternative C can be proposed according to the scores. However, Alternative C can be selected by considering the on-going construction of a composting facility for Anzali.

Table 4.3.2 Evaluation on Alternatives of Combinations of Municipalities (with Composting)

Item	[Alternative A] Individual	[Alternative B] Three Groups	[Alternative C] Two Groups	[Alternative D] One Group	Score
Burden for Municipalities to construct facilities (Number of facilities to be constructed)	***Very High*** 10 sets of facilities	***Low*** 3	***Low*** 2	***Low*** 1	*Low= +2* *High= -2* *Very High=-4*
Compatibility to the present plan	***Low*** The municipalities already collaborate with each other.	***Low***	***High*** Anzali is now construction a new composting plant. Somehsara and Fuman will use it.	***Low***	*Low= -1* *High= +1*
Robustness against accidents	***Very High*** The facility in the next municipality is available.	***High*** Another facility is available.	***High*** Another facility is available.	***Low*** There is no facility, if the facility cannot be used.	*Low=-1* *High=+1* *Very High=+2*
Total SWM Cost	- (Not so different)				-
Total Score	*-3*	*+2*	*+4*	*+0*	-

Note: The evaluation was made by considering the talking with stakeholders.

3) Number of Facilities and Required Capacities

There are four alternatives with regard to the number of composting plants/final disposal sites and how they are shared among municipalities. The results suggested waste disposal systems based on two composting plants and two disposal sites, and there is no immediate need to construct additional composting plants. The composting plant in Rash is to be shared by Rasht, Khomam and Sangar, and the one in Anzali is shared by Bandar Anzali, Shaft, Somehsara, Tolam, Fuman, Masuleh and Masal.

In order to meet the future demands, the capacity of the plan in Rasht has to be extended from the current 250 tons/day to 759 tons per day, and the capacity of the new plant in Anzali has to be expanded from 300 tons/day to 384 tons per day in the future.

Table 4.3.3 Three Composting Plants required in the Study Area

No	Members	Capacity (t/d)	Remarks
1	Rasht, Khomam, Sangar	759	The operation shift should be added.
2	Bandar Anzali, Shaft, Somehsara, Tolam, Fuman, Masuleh, Masal	384	Now under construction

4) Required Cost

Figure 4.3.6 compares the estimated total costs for collection, composting and landfilling. Alternative C is the proposed system with two composting plants, one each in Rash and Anzali. The composting costs approximately 12 billion Rials per year.

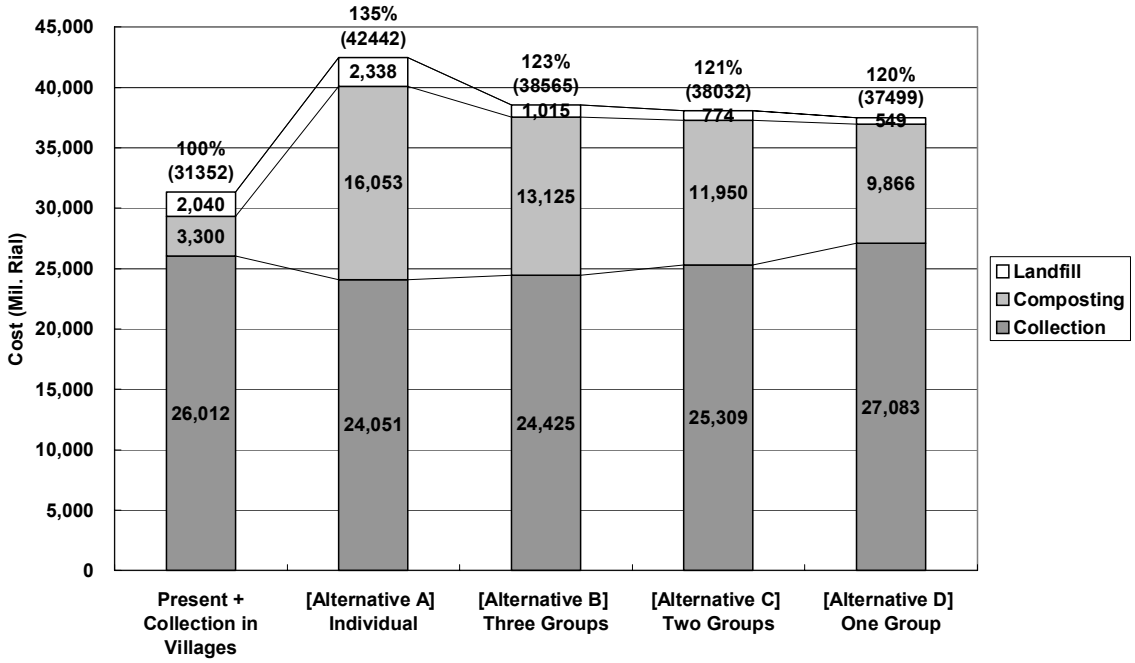


Figure 4.3.6 Required Cost for Composting and Landfill

5) Compost Users

In order to ensure sustainable operation of compositing plants, it is very important to have enough compost users. At present, the existing composting plant in Rasht produces a good quality compost, but even so, there are not enough users. As the amount of compost will increase, the compost market will be more competitive. Thus, it is essential to promote the use of compost in the area.

(3) Sanitary Landfill Construction

1) Structure of Sanitary Landfill

The Fukuoka Method from Japan is common and available in Iran, since Fukuoka University had a technical workshop in Tehran in 1998. This has embankments to contain waste within 'cells', a methane gas collection and venting system, leachate collection pipes and leachate sedimentation/treatment pond, as shown in Figure 4.3.7. This Fukuoka Method is well known for its low construction cost, which makes SWM financially sustainable. A bulldozer will be needed to distribute and compact the wastes, and to place the daily surface covering of soil and/or construction waste. A photo of a newly constructed landfill with the Fukuoka method in Rostamabad near the study area is shown in Figure 4.3.8.

A sanitary landfill does not have to be a big dumping site, but it has to be properly designed. The embankment should be constructed strong enough so as not to be broken, when the waste is compressed to the embankment in making cells, and the second embankment should be constructed after the first layer was finished. Gas releasing pipes and leachate collection pipes are also very important to keep the interior semi-aerobic. They should not be clogged with wastes or soils. Daily soil covering should be done to prevent flies.

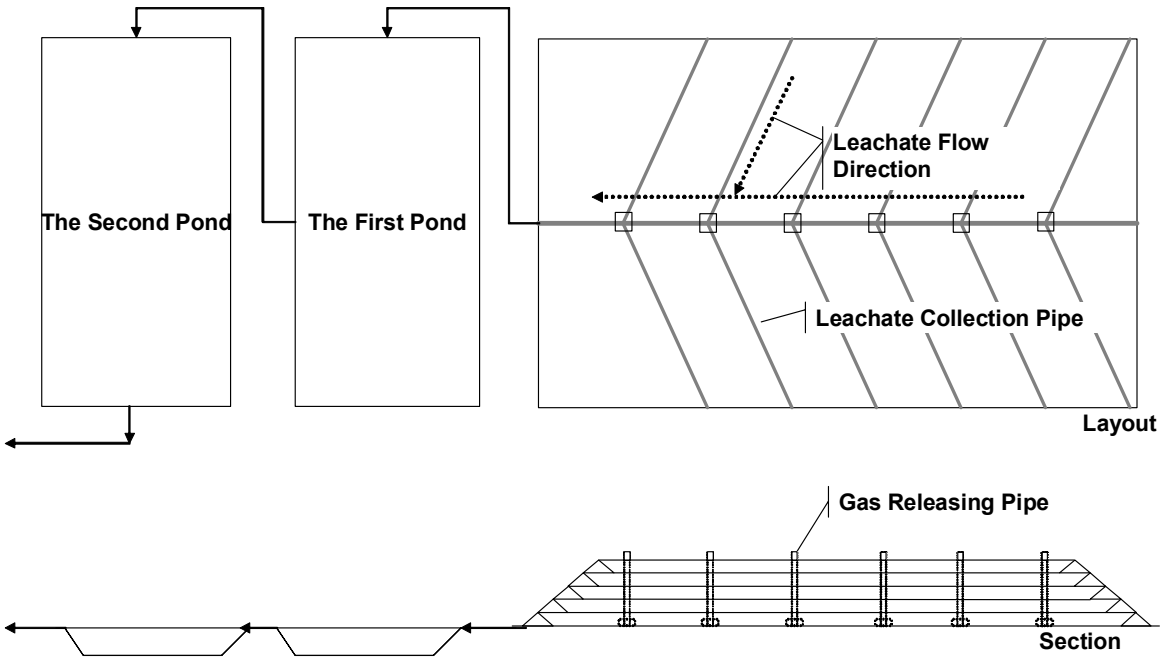


Figure 4.3.7 Conceptual Illustration of Fukuoka Method

Note: Rostamabad is located outside of the Study area.

Figure 4.3.8 Sanitary Landfill by Fukuoka Method at Rostamabad

2) Number of Landfill sites and Required Capacities

There are two required landfill sites corresponding to the composting plants. The required areas are shown in Table 4.3.3. The total area required for the two landfill sites is 18 ha, assuming that wastes will be placed to a height of 15m in the landfills. The constructions of landfill sites should be started as soon as possible to keep the composting plants operational.

Table 4.3.4 Capacities of Landfill Sites to be Constructed

No	Members	Location	Amount of Landfilled Waste in 15 years (thousand ton)	Required Area (ha)
1	Rasht, Khomam, Sangar	Rasht	1,195	12.0
2	Bandar Anzali, Shaft, Somehsara, Tolam, Fuman, Masuleh, Masal	Anzali/ Somesara	382	5.8

3) Proposed Site

The proposed sites are shown in Figure 4.3.9. Though it is not easy to find proper sites for landfills in the study area, and detailed studies and EIAs are necessary, one of the practical sites is near the existing landfill site in Sarawan.

As for another landfill for Anzali and other municipalities, Anzali municipality is planning to construct a landfill site on the proposed site for the composting plant. It should be pointed out this site is located near the Anzali Wetland, and is not an ideal site for wetland conservation. However, apparently finding a location in other areas has been difficult and DOE Guilan has already agreed on this site. Thus, it was assumed that the composting plant and a landfill are constructed at this site. Adequate pollution control measures would be essential to prevent environmental pollution.

Considering the impacts to the wetland, the Study Team recommended an alternative area in the low mountains near Masal or Fuman. If this option is to be considered, a third composting plant may be constructed at the site to minimize the transportation cost between the compositing plant and the landfill.

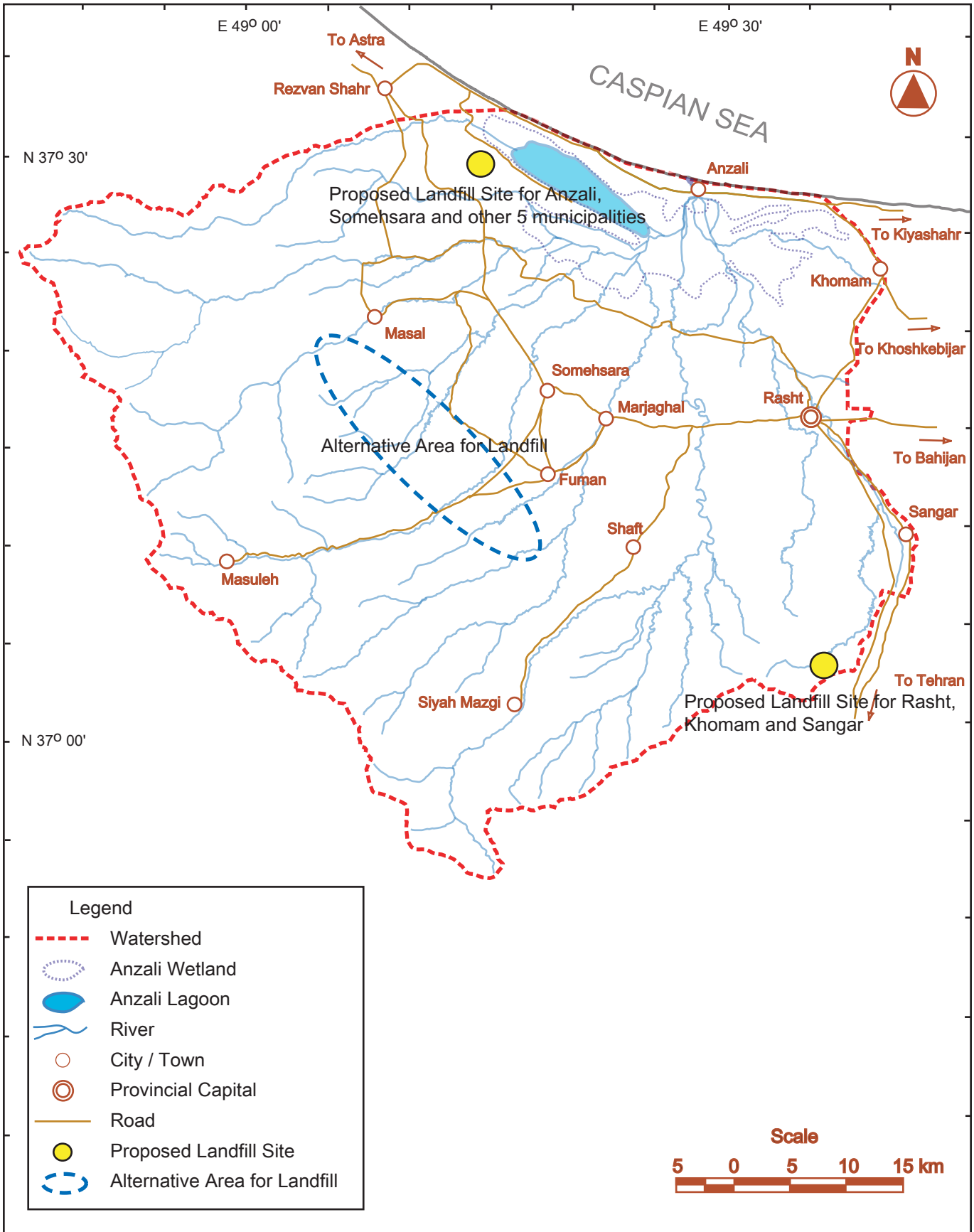


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Figure 4.3.9

Proposed Landfill Sites

Figure 4.3.10 Planned Construction Site in Anzali for Composting and Landfill

(4) Closure of Present Open Dumping Site

The present open dumping sites in Sarawan and Anzali are closed. It is very important to close the open dumping site carefully. They should be covered with soil firmly and be vegetated in order to avoid collapse. Also, it is better to install gas releasing pipes from the surface of the dumping sites. Even after closure, long-term monitoring of the leachate and underground water around the closed sites will be necessary.

4.4 Industrial and Medical Solid Waste Management

4.4.1 Proper Treatment of Hazardous Solid Waste

(1) Construction of Pretreatment Facility for Solid Waste Containing Heavy Metals

1) Generated Hazardous Industrial Waste

Though there are three industrial areas, referred to as “Industrial Cities”, the amount of hazardous wastes generated is only 50 ton/year at present. Plating processes are the major sources of hazardous waste. Almost all of the waste is sludge containing chromium.

2) Preliminary Pretreatment Facility Structure

It is possible to dispose of hazardous wastes in the municipal landfills by ‘co-disposal’. However, if hazardous wastes are dumped in the landfills directly, pollution may occur. Some pre-treatment to mix with concrete cement is therefore necessary. The structure of the facilities can be very simple as short term urgent measures.

3) Capacity

Only one facility is required, because the amount of HISW at present is very small. The required capacity is 300 kg/day, which will be sufficient to treat the 104 kg/day of hazardous waste estimated to be generated in year 2019.

4) Required Cost

To construct one solidification facility in one Industrial City costs 100 million Rials. There are 6 Industrial Cities in the Study Area. This amounts to 600 million Rials for construction. Operational costs up to 2019 will be about 1,800 million Rials total for the 15 years.

(2) Establishment of Separation and Collection System for Infectious Waste

Another urgent issue is infectious wastes. The existing incinerator for infectious waste is too old to continue using and is not equipped with an adequate gas treatment system. To improve the present situation, Rasht municipality has constructed an incinerator for infectious wastes with a capacity of 400kg per hour. This can cover the all infectious wastes from hospitals in the area, which is expected to amount to 1.8 ton per day in 2019 and infectious wastes from private clinics could also be incinerated. A separation system at hospitals and collection system from hospitals is a prerequisite for proper management of medical waste (see Chapter 2).

4.4.2 Non-hazardous Industrial Solid Waste Management

(1) Promotion of Reduction/Recycling for Industrial Solid Waste

1) Necessity of Industrial Solid Waste Treatment

The problems of non-hazardous industrial waste are not obvious at present. However, the amount of non-hazardous industrial waste will increase according to the economic growth. However, unlike municipal solid waste, industrial solid waste is generally uniform and is easily recycled both physically and economically. Thus, recycling industries targeted to the factories in the area should be promoted. Also, incinerators are effective to reduce the amount of industrial wastes and can produce electricity.

2) Basic Processes

Various technologies are available to recycle industrial wastes as shown below:

- Particle board factory recycling waste woods discharged from wood factories
- Recycled plastic pellet factory recycling waste plastics discharged from factories
- Composting factory recycling organic waste from food factories

- Waste steel dealer equipped with a shredder
- Crusher plant for bulky waste
- Asphalt and cement concrete recycling factory
- Waste concrete recycling factory for crushing and classification
- Incinerator with electricity generator for all kinds of ISWs, especially used tires and waste oil
- Solidification plant for sludge containing heavy metals
- Neutralization plant for acid and alkali waste

3) First Step to Implementation

There is no information on non-hazardous ISW. Even DOE does not monitor the kinds of ISWs or the amount of each waste. The first step is to establish a system to monitor the amount of ISWs regularly. After data on ISWs are obtained, target wastes, capacities and applicable technologies can be discussed.

4) Promoting Organization

The plants should be planned, constructed and operated by private companies. The Industrial and Mining Organization and Rasht Industrial City are the proper responsible bodies. Their role is to promote waste reduction and recycling plants.

(2) Establishment of Regulations for Industrial Solid Waste

1) Information Management System

Any ISW, especially HISW, should be monitored strictly. Annual report submission should be required of factory managers and waste management companies. The following items should be reported in the specified format by the specified date every year.

- Company name, Location, Responsible person, Products and basic processes
- Kinds of wastes discharged
- Self-disposal facility
- Amount of each discharged waste
- Disposal methods
- Waste management company contracted, if any

2) Licensing System

A licensing system is needed in order to regulate and control the activities by private solid waste management companies. A license will be issued after the following items are cleared and renewed at a certain interval, for instance every 5 years.

- Company name, Location, Responsible person
- Number of employees
- Number of waste collection vehicles and types
- Capacity of each waste management facility
- Process of waste management
- Material balance and energy balance of the process
- Other related items to prove the safety of the facility

3) Disposal Standards

Disposal standards should be prepared for each kind of hazardous waste. For example, for infectious waste, the following contents can be proposed.

- Any infectious waste should be separated at the source.
- Infectious waste should be packed in adequately robust containers, so that sharps do not pierce them.
- Infectious waste containers should be stored separately inside a room in a building with the door locked.
- When infectious wastes are handed over to a licensed private company to transport, it should be done in the presence of the responsible person of the hospital
- Any infectious waste should be incinerated in a controlled incinerator equipped with a proper gas treatment system

4.5 Environmental Monitoring

Lack of information is one of the major obstacles to effective solid waste management in the area. Thus, a series of monitoring programs were proposed here. Considering the current capacities of the municipalities and DOE, the proposed monitoring programs are minimal. However, the information required to optimize solid waste management evolves as the solid waste management becomes sophisticated. Thus, periodic review of required information is necessary.

4.5.1 Monitoring of Municipal Waste Management in Urban Areas

As urban areas already have established waste management systems, the monitoring system should focus on the flow of waste, i.e., generation, collection, operation of composting plants, and disposal. Once the flow of waste is identified, efficiencies of the service should be analyzed. It is strongly recommended that the collected information be shared among the municipalities in the area, so that the municipalities can compare their performances.

Table 4.5.1 Monitoring of Municipal Waste Management in Urban Areas

Objective	To monitor of solid waste management practices in urban area.
Organization	Municipalities, DOE
Monitoring Program - Amount of Waste - Collection - Disposal - Management	 Amount of solid waste Collection frequency, collection places Operation of composting plants, construction and operation of disposal site, remaining capacity Fee collection, budget and expenditure, satisfaction of residents and other management issues
Analysis and Storage of Information	Every year, municipalities compile the findings into reports.
Dissemination of information	The report is to be distributed among municipalities, NGOs, DOE and other interested parties.

4.5.2 Monitoring of Municipal Waste Management in Rural Areas

For rural areas, a system is yet to be established. Thus, the monitoring should first focus on the effectiveness of the collection service, i.e., how to optimize the locations and frequency of collection service to achieve high collection efficiency. Again the experiences should be shared among the villages.

Table 4.5.2 Monitoring of Municipal Waste Management in Rural Areas

Objective	To monitor solid waste management practices in rural areas.
Organization	Communities, local NGOs
Monitoring Program - Collection	 Collection frequency, collection places
- Disposal	Construction and operation of disposal sites
- Other	Satisfaction of community members
Analysis and Storage of Information	Every year, municipalities compile the finding into short reports.
Dissemination of information	The report is to be distributed among municipalities, village councils, NGOs, DOE and other interested parties.

4.5.3 Monitoring of Recycling Activities

Recycling activities have two objectives, i.e., reduction of waste volume and awareness raising. It is suggested that relevant information, such as the amount recycled and the life

of disposal sites should be widely disseminated, so that the participants can understand the meaning of their activities.

Table 4.5.3 Monitoring of Recycling Activity

Objective	To analyze the composition of the wastes.
Organization	DOE, municipalities
Monitoring Program - Waste composition	Waste composition
- Recycling activity	Amount of solid waste recycled, Number of people receiving regular solid waste collection, Number of recycling activities coordinated
Analysis and Storage of Information	Every year, municipalities compile the finding into reports.
Dissemination of information	The report is to be distributed among municipalities, DOE and other interested parties. Also, the results should be disseminated to local residents.

4.5.4 Monitoring of Leachate

This program is designed to check the extent of environmental pollution around the existing disposal sites.

Table 4.5.4 Monitoring of Leachate

Objective	To monitor the water quality of leachates, treated leachate and groundwater at solid waste disposal sites.
Organization	DOE and Municipalities
Monitoring Program - Leachate and treated leachate	General Parameters (Flow rate, Temp., BOD, COD, T-N, T-P, SS, transparency), 5 locations, 4 times (spring, summer, fall, winter) Toxic Parameters (heavy metals, pesticides); 5 locations; 4 times/year
- Groundwater	General Parameters (Temp., BOD, COD, NO_3, NH_4, T-P, turbidity, TDS, others), 10 locations, 4 times (spring, summer, fall, winter) Toxic Parameters (heavy metals, pesticides); 10 locations; 4 times/year
Analysis and Storage of Information	Every year, municipalities compile the findings into reports.
Dissemination of information	The report is to be distributed among municipalities, Provincial government, DOE and other interested parties.

4.5.5 Monitoring of Industrial and Medical Waste

It is important to control toxic substances, such as heavy metals, as the environmental consequence of pollution is detrimental. Chemical analysis is needed, but even interviewing those handling industrial and medical wastes would help understand the situation. The program should first focus on potentially significant pollution sources. Then, more general programs should be developed.

Table 4.5.5 Monitoring of Industrial Solid Waste Management

Objective	To monitor industrial waste.
Organization	Industries, IMO, DOE
Monitoring Program - Amount of Waste	Amount of industrial solid waste
- Collection	Collection method, handling of hazardous waste
- Disposal	Solidification, construction of disposal sites, operation of disposal site
- Toxic Substances	General parameters (depth, texture, organic carbon, water content, ignition loss), Toxic parameters (heavy metals, pesticides); 20 locations; 1 time/year
- Management	Fee collection, other management issues
Analysis and Storage of Information	Every year, each industry reports relevant information to DOE.
Dissemination of information	The report is to be distributed among IMO, factories and DOE.

Table 4.5.6 Monitoring of Medical Waste Management

Objective	To monitor practice of waste disposal from hospitals, clinics, dentists and labs.
Organization	Hospitals, Ministry of Health, DOE
Monitoring Program - Amount of Waste	Amount of medical solid waste
- Collection	Collection method, handling of infectious waste
- Disposal	Amount of waste incinerated, other disposal methods used
- Management	Cost sharing, other management issues
Analysis and Storage of Information	Every year, each hospital reports relevant information to DOE.
Dissemination of information	The report is to be distributed among hospitals, Ministry of Health and DOE.

4.6 Institutional and Organizational Arrangements

4.6.1 Implication to Charging Fee

The solid waste management cost is expected to increase after the new system is introduced. In order to ease the budget pressures on the local governments, it is recommended to charge a SWM fee to the residents, because even now, the municipalities are not able to come up with enough budget. This can be achieved by adding the solid waste management cost to the municipal tax, which is currently charged based on the area of a house. For example, the rate in Rasht municipality is 100,000 Rial per household per year to a resident living in a house of 80 m^2.

It is desirable to fully-recover solid waste management cost by municipal tax. However, the full cost recovery requires a household with 4 members to pay 165,000 Rial in urban areas and 352,000 Rial in rural areas. Though the amount is within the affordable level, it would be difficult to raise the tax at once, especially in rural areas. Thus, support from the local and central governments may be necessary in the beginning. See Table 4.6.1 for a sample calculation of shares between municipality and residents.

Table 4.6.1 Alternative Charging Fee Rate per Household with 4 Persons

(Rial/Household/year)

Case		Municipality	Village
Case 1	Full Cost Recovery	150,357	352,130
Case 2	Full Cost Recovery in 2019 (increased rate year by year)	86,263	231,961
Case 3	50% Recovery	75,178	176,065
Case 4	Collection Cost Recovery	93,567	282,149
Case 5	Operation Cost Recovery	79,481	154,946

Note: Average charging fee for 15 years.

4.6.2 Proposed Organization

While all municipalities provide municipal solid waste management services, there seems to be little coordination among them. Similarly, the co-ordination among industries and hospitals is limited. Thus, it is proposed that stakeholder meetings should be held. These "Solid Waste Improvement Meetings (SWIM)" should have the following sub-meetings: "SWIM-M" for municipal wastes, "SWIM-H" for hospital wastes, and "SWIM-I" for industrial hazardous wastes. "SWIM-I" should include discussions on industrial wastewater problems because wastewater treatment will generate solid waste. "SWIM-M" has already started as part of this Anzali Wetland Conservation Study, coordinated by DOE. Guilan Physician & Science University is in a position to co-ordinate "SWIM-H". A joint "SWIM" should be held once or twice a year to exchange opinions and to share experience of progress. The sub-meetings can be held when appropriate. The proposed organization is shown in Figure 4.6.1.

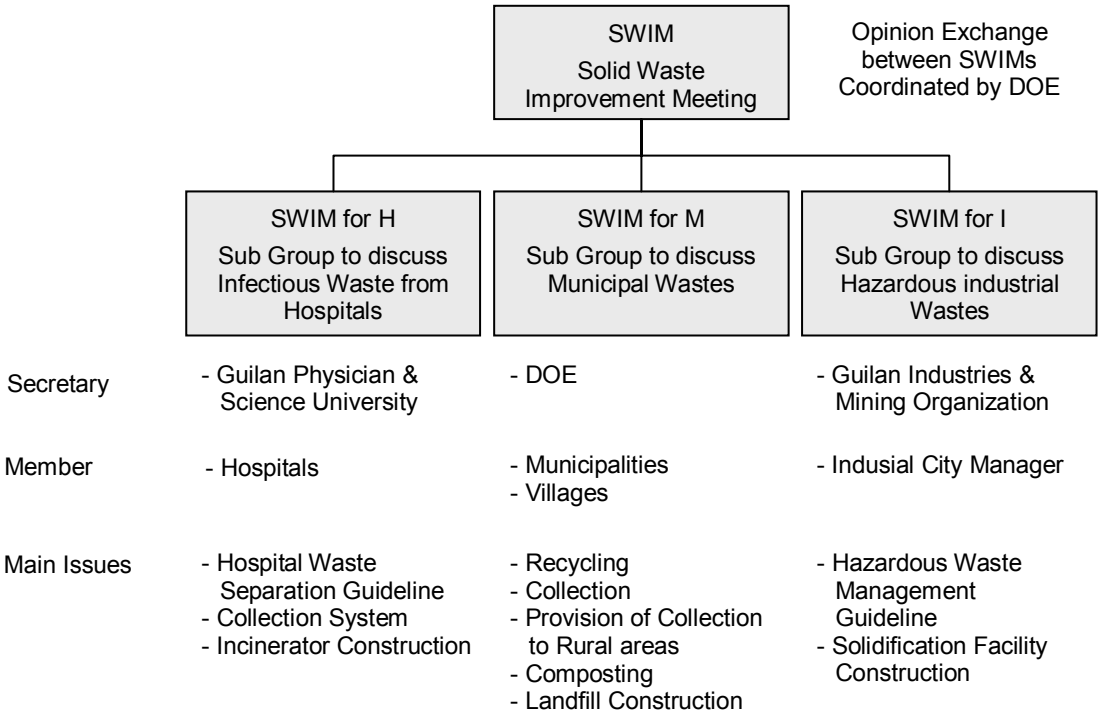


Figure 4.6.1 Framework of Executing Organizations for Solid Waste Management

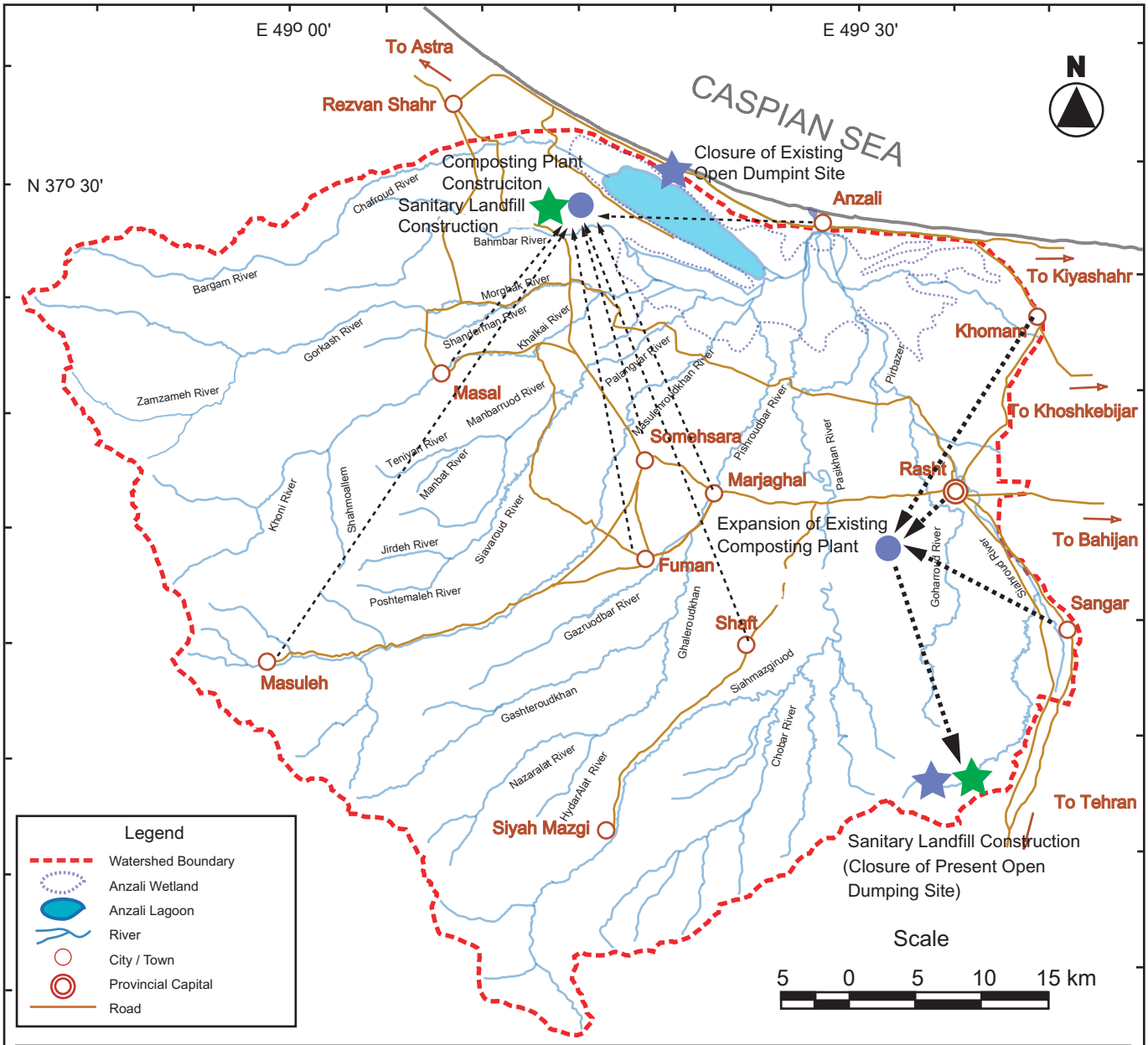
4.7 Summary of Proposed Solid Waste Management Plan

The proposed projects in the Solid Waste Management Plan are summarized as follows.

Table 4.7.1 Summary of Proposed Solid Waste Management Plan

Sub-components	Proposed Projects/Measures	Executing Organizations
Municipal Solid Waste Management	(1) Environmental awareness raising 1) Participatory recycling activity 2) Linkage to environmental education (2) Provision of efficient municipal waste collection service to the whole area 1) Provision of waste collection to villages 2) Change of collection frequency and collection point in urban areas (3) Proper disposal of municipal solid waste 1) Composting of municipal solid waste 2) Sanitary landfill construction (Rasht, Anzali) 3) Closure of present open dumping sites	Municipalities
Industrial and Medical Solid Waste Management	(1) Proper treatment of hazardous solid waste 1) Construction of pretreatment facility for solid waste containing heavy metals 2) Establishment of separation and collection system for infectious waste (2) Non-hazardous industrial solid waste management 1) Promotion of reduction and recycling of industrial solid waste 2) Establishment of regulations for industrial and medical solid waste	 IMO MOH IMO DOE
Environmental Monitoring	Monitoring of municipal waste management in urban areas Monitoring of municipal waste management in rural areas Monitoring of recycling activities Monitoring of leachate Monitoring of industrial and medical waste	Municipalities Municipalities Municipalities DOE IMO/MOH

Note: * : Municipality in this table means Baksh (county), but coordination at the Shahr (City) and Dehstan (Rural District) level will be needed. Large projects, such as construction of landfills may be carried out at the Ostan (province) or Shahrestan (township) level.



Proposed Projects/Measures

1. Municipal Solid Waste Management

(1) Environmental Awareness Raising
- 1) Participatory Recycling Activity
- 2) Linkage to Environmental Education

(2) Provision of Efficient Waste Collection Service to the Whole Area
- 1) Provision of Waste Collection to Villages
- 2) Change of Collection Frequency and Collection Point in Urban Areas

(3) Proper Disposal of Municipal Solid Waste (▬▬►)
- 1) Composting of Municipal Solid Waste (●)
- 2) Sanitary Landfill Construction (Rash, Anzali) (★)
- 3) Closure of Present Open Dumping Site (★)

2. Industrial and Medical Solid Waste Management

(1) Proper Treatment of Hazardous Solid Waste
- 1) Pretreatment Facility for Solid Waste Containing Heavy Metals
- 2) Establishment of Separation and Collection Sytem for Infectious Waste

(2) Non-hazardous Industrial Solid Waste Management
- 1) Promotion of Reduction/Recycling for Industrial Solid Waste
- 2) Establishment of Regulations to Control Industrial Solid Waste

3. Environmental Monitoring for Solid Waste Management

Monitoring of municipal waste in urban and rural areas, recycling activities, leachate from landfills, industrial waste management, and medical waste management

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Figure 4.7.1
Solid Waste Management Plan

4.8 Cost Estimation

4.8.1 Conditions for Estimation

The models and parameters used are the same as in Chapter 3. Values addressed here are the values necessary to calculate the future disbursement.

(1) Future Population

The future population forecast was made based on the Statistics Unit of MPO Guilan taking account of only the past 20-year trend of the census data from 1976 to 1996 and without consideration of other factors such as birthrate, mortality and social increase/decrease.

(2) Future Waste Generation Rate of Municipal Waste

The waste generation rate in year 2003 is 900 g/person/day in municipalities. It is rational to assume that this value will rise to the level of fully industrialized countries. That is around 1000 g/person/day. Therefore, the trend of waste generation rates was set to rise gradually toward 1000 g/person/day in 2019, starting from 900 g/person/day in 2003. The waste generation rate in villages was set to be proportional to the waste generation rate in municipalities, starting from 300 g/person/day in 2003. Figure 4.6.1 shows the waste generation rate calculated in this way.

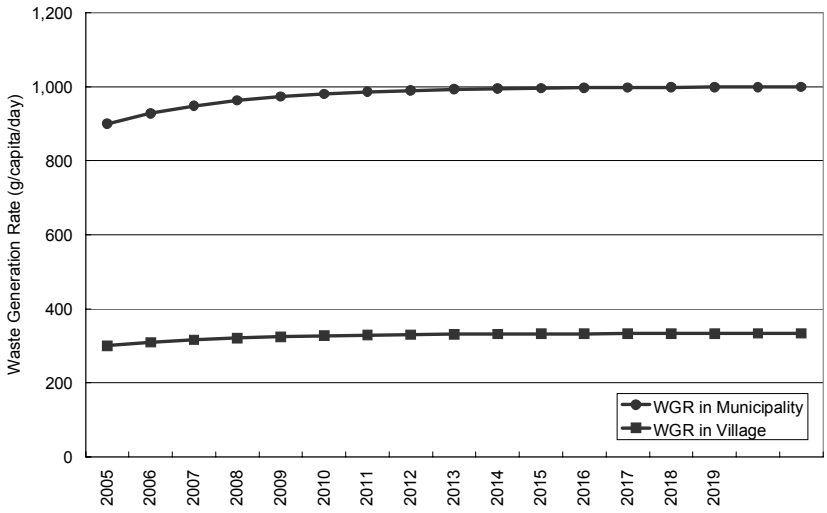


Figure 4.8.1 Future Trend of Waste Generation Rate

(3) Future Amount of Hazardous Industrial Solid Waste

The amount of waste in year 2019 can be calculated assuming that the amount of generated waste will increase according to the real economic growth. Based on the economic

investigation, the real economic growth in the study area can be assumed as 5% annually. As the present amount of HISW is 5ton/y, the amount in year 2019 can be calculated as

- $50t/y*(1+0.05)^{15}=104$ t/y

By using this value, the construction and operation costs can be calculated.

(4) Future Amount of Infectious Waste

The amount of waste in year 2019 can be calculated assuming that the amount of generated waste will increase according to the population increase. The future population is 1.3 times as much as the present. As the present amount of infectious waste is 1,400kg per day, the amount of infectious waste in year 2019 can be calculated as

- 1.4 ton/d * 1.3 = 1.8t/d.

By using this value, the construction and operation costs can be calculated.

(5) Solidification Facility

The cost for solidification for hazardous industrial solid waste was calculated by the model in Table 4.8.1.

Table 4.8.1 Solidification Data for Hazardous Industrial Solid Waste

Parameter	Equation or Value
Cost for Construction	100 million Rials/plant
Cost for Persons	EP(Rial)=2(persons)*SO*12 where: SO(Rial)=Monthly Salary of Operators = 2,500,000Rial/m
Cost for Cement	EP(Rial)=PP*W*365 where: PP=Price of Cement = 550 (Rial/kg)
Rate of Indirect Cost	25% of Total Cost

(6) Incineration Plant

The cost for an incinerator for infectious waste was calculated by the model in Table 4.8.2.

Table 4.8.2 Incineration Data for Infectious Solid Waste

Parameter	Equation or Value
Cost for Persons	EP(Rial)=(int(2*(W/LY0)$^{0.7}$))*SO*12 where: LY0=Standard Waste for Landfill=400kg/day SO(Rial)=Monthly Salary of Operators = 2,500,000Rial/m
Cost for Electricity	EE(Rial)=W*365/1000*CE*PE where: CE=110kWh/ton PE=Price of Electricity=500Rial/kWh UC=Unit of Consumption=110kWh/ton
Rate of Indirect Cost	25% of Total Cost

4.8.2 Project Cost

Table 4.8.3 summarizes the total project and operation and maintenance (O&M) costs of the proposed projects. The total project cost in SWM between 2005 and 2019 is 146 billion Rial.

Table 4.8.3 Total Project Cost and Operation and Maintenance Cost between 2005 and 2019

Proposed Projects/Measures	Project Cost (million Rials)	O&M Cost	
		Overall (million Rials)	Average Annual (million Rials/year)
1. Municipal Solid Waste Management			
(1) Environmental awareness raising			
1) Participatory recycling activity	0	0	0
2) Linkage to environmental education	0	0	0
(2) Provision of efficient municipal waste collection service to the whole area			
1) Provision of waste collection to villages	22,471	61,717	5,740
2) Change of collection frequency and collection point in urban areas	99,180	284,044	16,633
(3) Proper disposal of municipal solid waste			
1) Composting of municipal solid waste	17,083	178,557	11,904
2) Sanitary landfill construction (Rasht)	3,817	8,372	558
3) Sanitary landfill construction (Anzali)	3,089	3,892	259
4) Closure of present open dumping sites	0	0	0
2. Industrial and Medical Solid Waste Management			
(1) Proper treatment of hazardous industrial solid waste			
1) Construction of pretreatment facility for solid waste containing heavy metals	600	1,793	119
2) Establishment of separation and collection system for infectious waste	0	6,459	428
(2) Non-hazardous industrial solid waste management			
1) Promotion of reduction/recycling of industrial solid waste	0	0	0
2) Establishment of regulations for industrial and medical solid waste	0	0	0
3. Environmental Monitoring	0	3,494	233
Total	146,240	548,328	35,874

Source: JICA Study Team

Note: The project and O&M costs in this table account for the increase in the amount of waste in the future, while the simulation results in the previous sections consider the project cost as depreciation, and are based on the present amount of waste.

4.8.3 Operation and Maintenance Cost

The total O&M cost is estimated at 548 billion Rials as shown in Table 4.8.3.

4.9 Implementation Program

4.9.1 Implementing Organizations

The organizations responsible for implementation of the proposed projects were summarized in Table 4.7.1 above. Municipal solid waste management will be carried out by Shahrs (cities) or Dehestans (rural districts) under the responsibility of Bakhshes (counties). However, construction of sanitary landfills may be carried out by the Ostan (province) or Shahrestans (Townships) because the facilities are shared by many Bakhshes. The management of industrial waste is carried out by each factory under the supervision of IMO and DOE. Similarly, the management of medical waste is the responsibility of each hospitals/clinics under the supervision of MOH.

4.9.2 Criteria for Prioritization

The proposed projects were prioritized with respect to the following criteria:

Table 4.9.1 Criteria for Prioritization of Proposed Measures of the Solid Waste Management Plan

Criteria	Implication in Solid Waste Management
Effectiveness	Whether the proposed measure reduces the inflow of solid waste into the Anzali Wetland or contributes to reducing pollution by leachate.
Efficiency	Whether the proposed measure could contribute to significant improvement of the environmental conditions of the Anzali Wetland.
Urgency	Whether the proposed measure should be implemented urgently to control immediate problems.
Cost	Whether the cost required to implement the proposed measure is reasonable compared with the current level of expenditure as estimated by the cost simulation model.
Capacity of executing organization	Whether the stakeholders involved in solid waste management, such as communities, municipalities, factories, hospitals and NGOs, have enough technical/management capacity to implement the proposed measure.
Conformity with relevant policies	Whether the proposed measure is in conformance with relevant solid waste management policies and plans, including the new solid waste management law.
Environmental Impact	Whether the proposed measure would result in significant environmental impacts, such as pollution of water bodies around a waste disposal site.
Social Impact	Whether the proposed measure would bring significant negative social impacts, in particular to the local residents around the solid waste management facilities to be constructed, and whether the measure contributes to improving sanitary conditions.

4.9.3 Evaluation of Proposed Projects

(1) Evaluation Criteria to Prioritize Projects

The proposed projects were evaluated by the following criteria to prioritize the projects. Each criterion was scored by using “A”, “B” and “C” (Ranked as A is the superior), as shown in Table 4.9.2 The ranking of “A”, “B” and “C” was given scores of 1, 2 and 3, and the scores were totaled considering criterion weights.

1) Bad Effects without the Project

The more and larger the bad effects are, which may happen, if the project is not done, the higher the ranking is. The bad effects were divided to two aspects.

- Conservation of the Wetland
- Public Health

2) Response of Improvement after the Project

The faster the response, the higher the score.

3) Policy Needs

The projects are preferable if they are in line with current or proposed policies. Two levels of policies were considered. One is the policy of the central government, and another one is the local policy. The local policy needs were evaluated from the viewpoint of the attitude of the major executing organization. If the project conforms to the national policy, a high score will be awarded to the project. If the executing organization will approach the project in a highly supportive manner, the project will get a high score.

- Conformity to National Strategy
- Degree of support of Major Executing Organization

4) Required Level of Public Environmental Awareness

Some projects need a high level of public environmental awareness. However, at present, people's environmental awareness is low. The projects that need a high level of environmental awareness have a low probability of success. Such projects were given a low score.

5) Project Maturity

There are some projects already planned or that have made some progress. The on-going projects were evaluated as "A" and plans about which no one is concerned were evaluated as "C".

6) Required Ability of Concerned Organization

The ability of concerned organizations was evaluated.

7) Cost

The low cost projects were evaluated as "A".

(2) Results of the Evaluation

The results are shown in Table 4.9.2. The project can be assigned to three terms in the total duration of the Master Plan by their total scores. The 12 projects were prioritized so that the numbers of projects in each term is the same as much as possible.

Table 4.9.2 Evaluation of Proposed Projects

Criteria / Project			Bad Effect without the Project		Efficiency	Policy Needs		Required Level of Public Environmental Awareness	Project Maturity	Required Ability of Concerning Organization	Investment Cost	Total Score
			Conservation of the Wetland	Public Health		Conformity to National Strategy	Positiveness of Major Executing Organization					
1	Environmental Awareness Raising											
(1)	Participatory Recycling Activity		A	A	C	B	B	A	B	B	A	20
(2)	Linkage to Environmental Education		A	A	C	B	C	B	C	C	A	13
2	Provision of Efficient Waste Collection Service to the Whole Area											
(1)	Provision of Waste Collection Services to Villages		A	A	A	A	A	A	C	C	B	21
(2)	Change of Collection Frequency and Collection Point in Urban Areas		C	C	A	B	C	C	C	C	A	5
3	Proper Disposal of Municipal Solid Waste											
(1)	Composting of Municpal Solid Waste		A	A	A	B	A	A	A	B	C	24
(2)	Sanitary Landfill Construction	(1) Rasht	B	B	A	B	C	A	C	C	B	12
		(2) Anzali	B	B	A	B	C	A	C	C	B	12
(3)	Closure of Present Open Dumping Site		A	A	B	C	C	A	C	C	A	15
4	Proper Treatment of Hazardous Solid Waste											
(1)	Construction of Pre-treatment Facility for Solid Waste Containing Heavy Metals		C	A	A	A	A	A	C	C	A	18
(2)	Establishment of Separation and Collection System for Infectious Waste		C	A	A	A	A	A	A	B	A	23
5	Non-hazardous Industrial Solid Waste Management											
(1)	Promotion of Reduction and Recycling of Industrial Solid Waste		C	C	B	C	C	C	C	C	A	3
(2)	Establishment of Regulations for Industrial and Medical Solid Waste		A	A	A	B	C	B	C	C	A	15
Weight			2	2	1	1	2	2	2	1	1	-

4.9.4 Implementation Schedule

Based on the results of prioritization, the schedule of the proposed measures is proposed as shown in Table 4.9.3.

1) Participatory Recycling Activity

To raise public awareness on solid waste management is very important and essential to prevent people from throwing their waste into the rivers. This participatory recycling program will work well in raising public awareness. However, the response to the project is slow. Therefore, this should be carried out first by voluntary groups from the fourth 5-year plan period. Fuman and Somehsara municipalities can be proposed as the target municipalities, as the pilot activity in the Study has been tried in Fuman and Somehsara municipalities. This trial can be extended in the fifth plan period toward full practice in the sixth plan period.

2) Provision of Waste Collection Services to Villages

Waste collection service should be provided to villages also. The new law on solid waste management provides that the Governors of counties should be responsible for wastes in villages. The provision of collection service to villages is an urgent task for counties. However, it will take a certain period to extend the service area to all the villages. From the viewpoint to conserve the Wetland, villages along the rivers should be prioritized in the fourth plan period. The villages around the Wetland should be prioritized in the fifth plan period.

3) Change of Collection Frequency and Collection Point in Urban Areas

This project is very effective in reducing the collection cost. However, it needs people's cooperation in discharging wastes. It is not easy to change their daily behavior. Furthermore, this project will bring them inconvenience, although the present service level is excessive. In order to introduce this project, a deep understanding of residents is necessary. This should be introduced after people's environmental consciousness has been raised enough. Also the practice should be started as trials in some target municipalities in the fifth plan period and be extended in the municipalities in the sixth period.

4) Composting of Municipal Solid Waste

In addition to the composting plant in Rasht, Anzali municipality is planning to construct a composting plant which would deal with wastes from Somehsara and Fuman. When this plant is constructed, the situation in dumping sites will be improved. This project is ongoing and also urgent.

5) Sanitary Landfill Construction

Composting plants will stabilize the quality of waste. However, they still generate residues whose major component is plastics. To dispose of these residues properly, landfill sites are very important. In fact, the present dumping sites need urgent improvement. Landfill construction should be started as soon as possible. However, the municipalities, DOE and NGOs insisted to start a composting plant. Landfill construction should be done after the composting plants have been constructed and are operating well.

6) Closure of Present Open Dumping Sites

This should be done at the same time as the "Sanitary Landfill Construction".

7) Construction of Pretreatment Facility for Solid Waste Containing Heavy Metals

Simple hazardous waste pre-treatment plants, such as solidification plants, can be constructed relatively easily compared with landfill sites so it would be preferable to construct them as soon as possible.

8) Establishment of Separation and Collection System for Infectious Waste

Construction of an incinerator for infectious waste is relatively easy because a complete system can be bought from manufacturers 'off the shelf'. Rasht municipality has constructed an incinerator on the site of the composting plant. Separation and collection systems in hospitals should be established. Considering these situations and the urgency, this project should be started as soon as possible.

9) Promotion of Reduction and Recycling for Industrial Solid Waste

In 15 years, the amount of industrial solid waste will be double staying in step with the economic growth. The non-hazardous industrial problem will be obvious in the future, while at present, it is not recognized as a problem. It is proposed that this project will be scheduled during the fifth plan period.

10) Establishment of Regulations for Industrial and Medical Solid Waste

There is no strict system to control ISW, such as an information management system, licensing system or technical standards. After finishing the most urgent issues of hazardous waste, this control system should be established in the fifth plan period.

11) Environmental Monitoring

The monitoring of solid waste should be started as soon as possible.

Table 4.9.3 Implementation Schedule

Proposed Measures		Fourth 5-year Plan Period					Fifth 5-year Plan Period					Sixth 5-year Plan Period				
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
SOLID WASTE MANAGEMENT PLAN																
1. Municipal Solid Waste Management																
(1) Environmental Awareness Raising																
1)	Participatory Recycling Activity															
a)	Pilot Activities by Volantary Groups	■	■	■	■	■										
b)	Extention of Target Groups						■	■	■	■	■					
c)	Full Activity											■	■	■	■	■
(2) Provision of efficient municipal waste collection service to the whole area																
1)	Provision of waste collection services to villages															
a)	Phase 1 (Villages along the rivers)	■	■	■	■	■										
b)	Phase 2 (Villages near the Anzali wetland)						■	■	■	■	■					
c)	Phase 3 (Villages away from the Anzali wetland)											■	■	■	■	■
2)	Change of collection frequency and collection point in urban areas															
1)	Trial Operation in selected cities						■	■	■	■	■					
2)	Extension of Target cities											■	■	■	■	■
3)	Full Operation in selected cities											■	■	■	■	■
(3) Proper disposal of municipal solid waste																
1)	Composting of municipal solid waste	■	■	■	■	■										
2)	Sanitary landfill construction															
1)	Rasht						■	■	■							
2)	Anzali						■	■	■							
3)	Closure of present open dumping sites									■						
2. Industrial and Medical Solid Waste Management																
(1) Proper treatment of hazardous solid waste																
1)	Construction of pretreatment facility for solid waste containing heavy metals	■														
2)	Establishment of separation and collection system for infectious waste	■														
(2) Non-hazardous industrial solid waste management																
1)	Promotion of reduction and recycling of industrial solid waste						■	■	■							
2)	Establishment of regulations for industrial and medical solid waste								■	■	■	■	■	■	■	■
3. Environmental monitoring																
(1)	Monitoring of Municipal Waste Management in Urban Areas	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
(2)	Monitoring of Municipal Waste Management in Rural Areas	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
(3)	Monitoring of Recycling Activities	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
(4)	Monitoring of Leachate	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
(5)	Monitoring of Industrial Waste Management	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
(6)	Monitoring of Medical Waste Management	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

4.10 Anticipated Environmental Benefit of the Plan

4.10.1 Factors to be Considered

Anticipated environmental benefits are evaluated considering the following factors.

- Environmental impact to the wetland
- Economic value as a sightseeing resource
- Public health improvement
- Living environment improvement
- Pollution prevention from dumping/landfill sites
- Air pollution prevention from collection vehicles
- Saving of energy and natural resources

4.10.2 Evaluation

Firstly, the proposed projects will improve many aspects of the environment, such as the ecosystem in the Wetland, living environment, public health, and pollution from dumping sites. Secondly, the construction of landfills will separate waste from cities and reduce the total transportation distance for collection vehicles, with some small improvement in air quality. Thirdly, the recycling programs will save energy, natural resources, collection costs and landfill space.

Table 4.10.1 Anticipated Benefits of Solid Waste Management Plan

Evaluation Factor	Features of Proposed Projects		Anticipated Benefits
Environmental Impact to the Wetland	No one throws wastes into rivers.	No waste in rivers	Hazardous substances extracted from wastes will be reduced. Fishes or birds eating some plastics by mistakes will be reduced.
Economic Value as a Sightseeing Resource	No one will throw wastes into rivers.	No waste in rivers	No one will throw their waste into rivers, this reduces the amount of waste to flow into the Wetland. Consequently economic values of the Wetland as a sightseeing resource will rise.
Public Health Improvement	All of wastes will be collected and disposed of properly.	No waste left in communities.	Public health will be improved by reducing harmful insects.
Living Environment Improvement	All of wastes will be collected and disposed of properly.	No waste left in communities.	Living environment will be improved by reducing bad odors from wastes.
Pollution Prevention from Dumping/Landfill Sites	Sanitary landfill sites treat leachate before release. All infectious wastes and hazardous industrial wastes are properly managed.	Leachate landfills will be treated before release.	Ground water around landfill site will not be polluted.
Saving of Energy and Natural Resources	Recycling is done in both urban and rural areas.	Recyclables will be recovered and used in manufacturing.	Recyclables used as industrial resources will save energy consumption in factories and natural resources substituted by recyclables will be saved.

CHAPTER 5 PRIORITY PROJECTS

5.1 Priority Projects

Priority projects are projects that should be implemented urgently in the first term of the first 5 years. They are the following 5 projects.

- Participatory Recycling Activity
- Provision of Waste Collection to Villages
- Composting of Municipal Solid Waste
- Construction of Pre-treatment Facility for Solid Waste Containing Heavy Metals
- Establishment of Separation and Collection System for Infectious Waste

5.2 Participatory Recycling Activity

(1) Objective

The objective of this project is to reduce the amount of waste and to raise participants' environmental awareness.

(2) Executing Entities

1) Local Groups

All of the following residential groups can be targets of this project. All residents should raise their environmental awareness.

- Communities
- Schools
- Private offices
- Municipal offices

2) Municipalities

The municipalities should play a role to promote environmental awareness amongst residential groups by providing know-how and information.

3) NGO

NGOs should help municipalities to promote environmental awareness amongst residents.

(4) Systems to be established

1) Target Recyclables

- Glass bottles
- PET bottles
- Cans and Metals
- Paper
- Others the recycler can accept

2) Collection System

Time, place and target recyclables should be fixed by consultation with resident groups and recyclers. The proposed frequency is once per month. Separated recyclables can be sold and residents can make money. This can be used as an incentive for residents to start recycling.

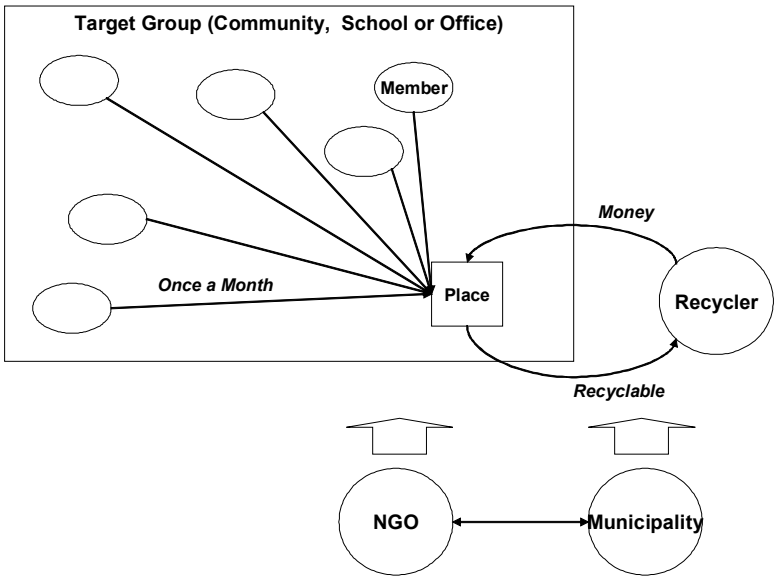


Figure 5.2.1 Illustration of Participatory Recycling Activity

(5) Implementation Steps

1) Pilot Activity

As many people are not familiar with recycling activities, it is better to start the activity with a small project. A target area should be selected. A recycler should be identified. Municipalities should play a role to support the target groups in starting the recycling project by providing know-how and other information. Collaboration with NGOs is recommended. In order to start with a success, the most active target groups should be selected as the target areas of pilot projects. The target groups can be selected from the following sources.

- Communities
- Schools
- Private offices
- Municipal offices

In this Study, the municipalities of Somehsara and Fuman have already started the pilot projects. Somehsara set three primary schools as target groups and Fuman selected three communities. The trials could be a good example for other municipalities.

2) Target Group Extension

After some pilot projects have been run, the know-how and information to install recycling activities will be acquired and shared with municipalities and NGOs. The pilot projects can be upgraded to regular practices. Participants can be called openly. The local Islamic Councils could play an important role, with the close collaboration of NGOs. A registration system for recyclers may be helpful to extend the target areas in a comprehensive way.

(6) Cost

This project does not need any special facilities. The activities can be done as systematic collection and sales activities between recyclers and local groups. Further, the local groups can obtain a little money from selling their recyclable. This project does not need any funding in particular.

5.3 Provision of Waste Collection Service to Villages

(1) Objective

The objective of this project is to improve the public health situation in villages where people throw their wastes into rivers very frequently because of no provision of waste collection.

(2) Executing Entities

The Governors of counties are the responsible organizations for the provision of waste collection to villages according to the new solid waste management law.

(3) System to be established

1) Collection Frequency

Three or four times per week is the proper frequency. Not everyday as in municipalities. In villages, there are enough spaces to store and self-dispose of wastes.

2) Collection Points

Collection points should be set for every 10-20 households. Not door-to-door collection as in municipalities.

3) Disposal Facilities

The facilities which nearby municipalities currently use are the proper facilities for them to use in the future. Negotiations by the municipalities with regard to new waste carriers are needed.

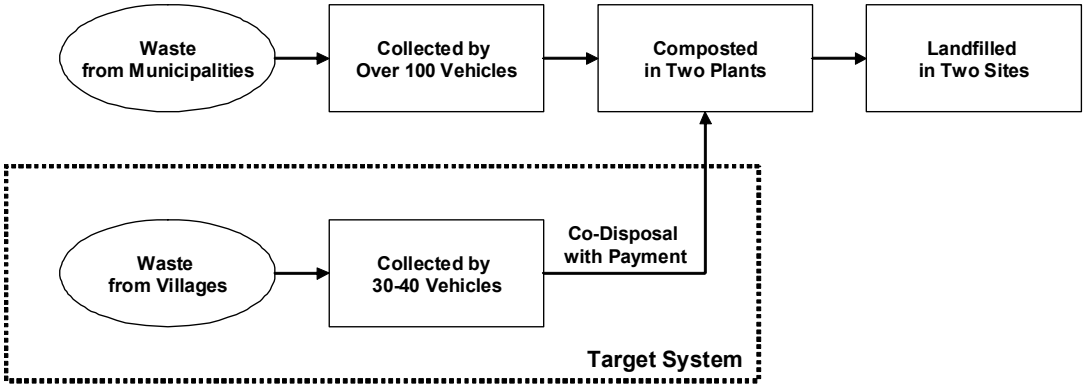


Figure 5.3.1 Co-disposal System for Wastes from Villages

(4) Implementation Steps

1) Collection System Design

Firstly, it is necessary to determine the proper collection frequency and collection point density. A village does not need everyday collection from every household like in municipalities, because the generated waste in villages is small compared with municipalities and they have enough space for storage or self-disposal. In fact, the waste generation rate in villages is only 300g/capta/day, while it is 900g/capita/day in municipalities. Three times a week from every 20 households, for example, can be recommended as practical numbers.

2) Negotiation with Concerned Organizations

Villages should negotiate with municipalities about the tipping fees and co-use of municipal disposal facilities with support from the provincial Governor.

3) Explanation to Residents

The discharging rule should be explained to residents along with the importance of sanitation. It is very important to make them understand the necessity of SWM.

4) Priority Areas

It can be proposed to prioritize the villages and areas along rivers to conserve the Wetland. To start with Somehsara and Anzali can be recommended.

(5) Cost

The vehicle purchase cost is 25 billion Rials over 15 years. The average annual operation cost is 6 billion Rials

5.4 Composting of Municipal Solid Waste

(1) Objective

The objective of this project is to stabilize the quality of wastes and to reduce the amount of wastes to be dumped in dumping sites.

(2) Executing Entities

Municipalities and Counties should construct a new composting plant and operate it in close collaboration.

(3) Systems to be Established

1) Number of Plants

- Rasht (existing)
- Anzali (planned)

2) Municipality Group to share

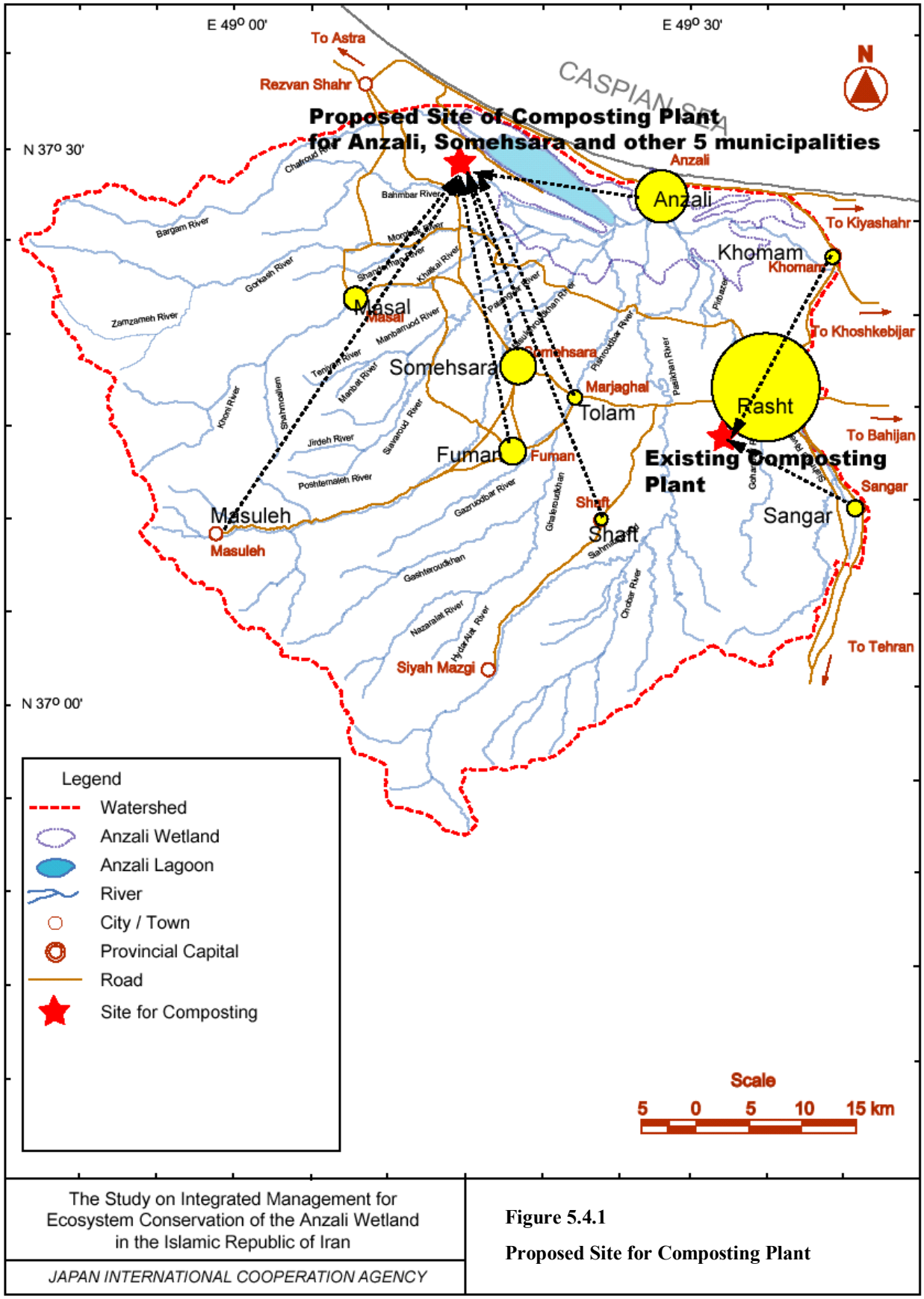
- Plant in Rasht: Rasht, Khomam, Sangar and surrounding villages
- Plant in Anzali: Anzali, Shaft, Somehsara, Tolam, Fuman, Masuleh, Masal and surrounding villages

3) Capacity

- Plant in Rasht 760 t/d
- Plant in Anzali 380 t/d

4) Proposed Sites

Proposed sites are shown in Figure 5.4.1.



The Study on Integrated Management for Ecosystem Conservation of the Anzali Wetland in the Islamic Republic of Iran

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Figure 5.4.1

Proposed Site for Composting Plant

(4) Cost

The construction of the composting plant in Anzali is expected to cost 12-20 billion Rials to be furnished by Anzali municipality. The average operation cost in 15 years for two composting plants is 12 billion Rials per year.

5.5 Construction of Pre-treatment Facility for Solid Waste Containing Heavy Metals

(1) Objectives

The objectives of this project are to stabilize the industrial waste containing heavy metals and to make it possible for them to be disposed of in municipal landfill sites as an urgent measure.

(2) Executing Entities

1) Facility Construction and Operation
   - Rasht Industrial City
   - Industrial Mining Organization

2) Inspection and Control
   - DOE

(3) System to be Established

1) Target

Factories generating wastes containing heavy metals, such as Chromium

2) Process

Figure 5.5.1 shows the flowchart of proposed management for hazardous waste. After pre-treatment, hazardous waste can be disposed of in a sanitary landfill. The amount of cement to be mixed is the same as the waste.

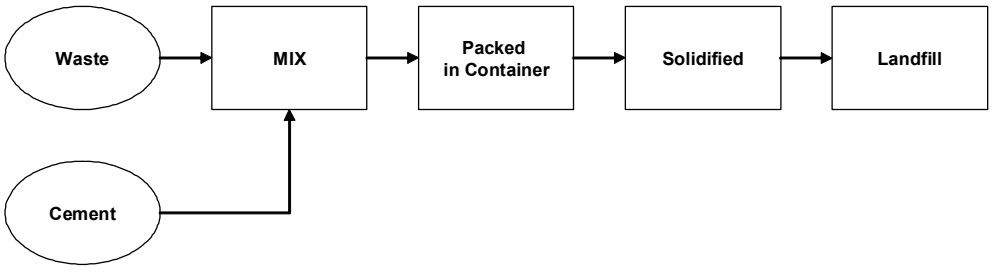

Figure 5.5.1 Solidification of Hazardous Industrial Waste

3) Structure of Facility

The facilities should be equipped with roofs and concrete floors.

4) Location

The facilities can be established inside the six industrial cities.

(4) Cost

The construction cost is 600 million Rials. The average annual operation and maintenance cost is 119 million Rials.

5.6 Establishment of Separation and Collection System for Infectious Waste

(1) Objective

The objective of this project is to sterilize the infectious waste by heat in incinerators.

(2) Executing Entities

Rasht municipality will start SWM service for infectious waste by preparing a new incinerator. Any hospital/clinic can bring their infectious waste to this plant by payment of a fee.

(3) System to be Established

In addition to the incineration, the separation at hospitals/clinics is very important. Apart from the importance of general infectious wastes such as organs generated in surgical operations, sharps should be treated carefully, so as not to harm the persons dealing with the wastes. Designated boxes to separate sharps should be used.

Separated wastes can be carried to the incinerator. The hospitals/clinics should pay the fee designated by Rasht municipality. After incineration, the ash should also be treated carefully.

(4) Cost

The construction has been started already. The average annual operation and maintenance cost is 428 million Rials.

APPENDIX 1 DISBURSEMENT PLAN

(1) Project Cost

1) Project Cost of Provision of Waste Collection Service to Villages

(Unit: million Rials)

Cost Item	Unit	Unit Price	Quantity	Amount
1. Construction Cost				
1.1 Purchase of Collection Vehicle	no.	570,000,000	39	22,471
Total				22,471

Source: JICA Study Team

2) Project Cost of Change of Collection Frequency and Collection Points in Municipalities

(Unit: million Rials)

Cost Item	Unit	Unit Price	Quantity	Amount
1. Construction Cost				
1.1 Purchase of Collection Vehicle	no.	570,000,000	174	99,180
Total				99,180

Source: JICA Study Team

3) Project Cost of Composting of Municipal Solid Waste

(Unit: million Rials)

Cost Item	Unit	Unit Price	Quantity	Amount
1. Construction Cost				
1.1 Building and Machinery (Anzali)	ton	33	384	12,654
2. Administration Cost	ls			633
(5% of 1.)				
3. Engineering Cost	ls			1,265
(10% of 1.)				
4. Physical Contingency	ls			2,531
(20% of 1.)				
Total				17,083

Source: JICA Study Team

4) Project Cost of Sanitary Landfill Construction (Rasht)

(Unit: million Rials)

Cost Item	Unit	Unit Price	Quantity	Amount
1. Construction Cost				
1.1 Civil Works	ha	237	12	2,827
2. Administration Cost	ls			141
(5% of 1.)				
3. Engineering Cost	ls			283
(10% of 1.)				
4. Physical Contingency	ls			565
(20% of 1.)				
Total				3,817

Source: JICA Study Team

5) Project Cost of Sanitary Landfill Construction (Anzali)

(Unit: million Rials)

Cost Item	Unit	Unit Price	Quantity	Amount
1. Construction Cost				
1.1 Civil Works	ha	397	6	2,288
2. Administration Cost	ls			114
(5% of 1.)				
3. Engineering Cost	ls			229
(10% of 1.)				
4. Physical Contingency	ls			458
(20% of 1.)				
Total				3,089

Source: JICA Study Team

6) Project Cost of Construction of Pretreatment Facility for Solid Waste Containing Heavy Metals

(Unit: million Rials)

Cost Item	Unit	Unit Price	Quantity	Amount
1. Construction Cost				
1.1 Building & Equipment	ls	74	6	444
2. Administration Cost	ls			22
(5% of 1.)				
3. Engineering Cost	ls			44
(10% of 1.)				
4. Physical Contingency	ls			89
(20% of 1.)				
Total				600

Source: JICA Study Team

(2) Operation & Maintenance Cost

Operation and Maintenance Cost for Solid Waste Management

Cost Item	Unit	Unit Price		Year 1 2005	Year 2 2006	Year 3 2007	Year 4 2008	Year 5 2009	Year 6 2010	Year 7 2011	Year 8 2012	Year 9 2013	Year 10 2014	Year 11 2015	Year 12 2016	Year 13 2017	Year 14 2018	Year 15 2019	Total
1. Provison of Efficient Waste Collection Services to the Whole Area																			
1.1 Provision of Waste Collection to Villages																			
(1) Personnel Cost																			
Collection Worker	person	30,000,000	Quantity	39	40	41	41	41	99	99	99	100	100	126	126	126	126	126	1,329
			Amount	1,170	1,200	1,230	1,230	1,230	2,970	2,970	2,970	3,000	3,000	3,780	3,780	3,780	3,780	3,780	39,870
(2) Expences																			
a) Fuel	liter	170	Quantity	243,025	244,888	261,922	246,658	247,176	620,015	620,237	620,203	648,091	648,313	794,583	794,595	794,412	794,212	794,009	8,372,339
			Amount	41	42	45	42	42	105	105	105	110	110	135	135	135	135	135	1,423
b) Repair	Lumpsum	1,000,000	Quantity	148	152	156	156	156	376	376	376	380	380	479	479	479	479	479	5,050
			Amount	148	152	156	156	156	376	376	376	380	380	479	479	479	479	479	5,050
c) Indirect	Lumpsum	1,000,000	Quantity	451	462	474	474	474	1,145	1,145	1,145	1,158	1,158	1,458	1,458	1,458	1,458	1,458	15,374
			Amount	451	462	474	474	474	1,145	1,145	1,145	1,158	1,158	1,458	1,458	1,458	1,458	1,458	15,374
Sub-total				1,811	1,856	1,905	1,902	1,902	4,597	4,597	4,597	4,648	4,648	5,851	5,851	5,851	5,851	5,851	61,717
1.2 Change of Collection Frequency and Collection Point in Municipalities (Including Cost before Change)																			
(1) Personnel Cost																			
Collection Worker	person	30,000,000	Quantity	354	366	363	381	390	405	411	429	426	435	414	420	432	444	450	6,120
			Amount	10,620	10,980	10,890	11,430	11,700	12,150	12,330	12,870	12,780	13,050	12,420	12,600	12,960	13,320	13,500	183,600
(2) Expences																			
a) Fuel	liter	170	Quantity	2,184,293	2,259,101	2,195,057	2,383,124	2,447,586	2,511,259	2,574,781	2,638,635	2,550,743	2,610,906	2,564,754	2,625,825	2,687,575	2,750,746	2,815,431	37,799,816
			Amount	371	384	373	405	416	427	438	449	434	444	436	446	457	468	479	6,426
b) Repair	Lumpsum	1,000,000	Quantity	1,345	1,391	1,379	1,448	1,482	1,539	1,562	1,630	1,619	1,653	1,573	1,596	1,642	1,687	1,710	23,256
			Amount	1,345	1,391	1,379	1,448	1,482	1,539	1,562	1,630	1,619	1,653	1,573	1,596	1,642	1,687	1,710	23,256
c) Indirect	Lumpsum	1,000,000	Quantity	4,093	4,232	4,195	4,407	4,511	4,683	4,754	4,960	4,922	5,026	4,787	4,858	4,996	5,134	5,205	70,762
			Amount	4,093	4,232	4,195	4,407	4,511	4,683	4,754	4,960	4,922	5,026	4,787	4,858	4,996	5,134	5,205	70,762
Sub-total				16,430	16,987	16,838	17,690	18,109	18,799	19,083	19,909	19,755	20,173	19,216	19,500	20,054	20,609	20,893	284,044
2. Composting																			
(1) Personnel Cost																			
a) Manager	person	42,000,000	Quantity	20	34	35	36	37	37	38	38	39	39	41	41	42	42	43	562
			Amount	840	1,428	1,470	1,512	1,554	1,554	1,596	1,596	1,638	1,638	1,722	1,722	1,764	1,764	1,806	23,604
b) Worker	person	24,000,000	Quantity	74	127	130	133	136	138	141	143	146	148	151	153	155	158	161	2,094
			Amount	1,776	3,048	3,120	3,192	3,264	3,312	3,384	3,432	3,504	3,552	3,624	3,672	3,720	3,792	3,864	50,256
(2) Expences																			
a) Electricity	kWh	500	Quantity	3,891,723	6,681,474	6,835,251	6,977,934	7,113,235	7,243,846	7,371,729	7,498,321	7,624,676	7,751,578	7,879,609	8,009,210	8,138,351	8,269,626	8,403,243	109,689,806
			Amount	1,946	3,341	3,418	3,489	3,557	3,622	3,686	3,749	3,812	3,876	3,940	4,005	4,069	4,135	4,202	54,845
b) Water	m3	1,000	Quantity	8,066	13,130	13,570	13,983	14,379	14,764	15,145	15,525	15,908	16,295	16,689	17,090	17,494	17,908	18,332	228,280
			Amount	8	13	14	14	14	15	15	16	16	16	17	17	17	18	18	228
c) Fuel	liter	170	Quantity	1,290,616	2,100,752	2,171,185	2,237,276	2,300,593	2,362,293	2,423,241	2,484,078	2,545,291	2,607,248	2,670,232	2,734,466	2,799,092	2,865,265	2,933,104	36,524,732
			Amount	219	357	369	380	391	402	412	422	433	443	454	465	476	487	499	6,209
d) Indirect	Lumpsum	1,000,000	Quantity	1,539	2,633	2,698	2,759	2,819	2,862	2,920	2,962	3,020	3,062	3,131	3,173	3,226	3,275	3,335	43,414
			Amount	1,539	2,633	2,698	2,759	2,819	2,862	2,920	2,962	3,020	3,062	3,131	3,173	3,226	3,275	3,335	43,414
Sub-total				6,328	10,820	11,088	11,347	11,600	11,766	12,013	12,177	12,423	12,587	12,887	13,054	13,273	13,471	13,723	178,557

Cost Item	Unit	Unit Price		Year 1 2005	Year 2 2006	Year 3 2007	Year 4 2008	Year 5 2009	Year 6 2010	Year 7 2011	Year 8 2012	Year 9 2013	Year 10 2014	Year 11 2015	Year 12 2016	Year 13 2017	Year 14 2018	Year 15 2019	Total

3. Sanitary Lnadfill																		
3.1 Rasht																		
(1) Personnel Cost																		
a) Manager	person	48,000,000	Quantity	2	2	2	2	2	2	2	2	1	1	1	1	1	1	23
			Amount	96	96	96	96	96	96	96	96	48	48	48	48	48	48	1,104
b) Worker	person	30,000,000	Quantity	10	11	11	11	12	12	12	12	5	6	6	6	6	6	132
			Amount	300	330	330	330	360	360	360	360	150	180	180	180	180	180	3,960
(2) Expences																		0
a) Fuel	liter	170	Quantity	78,067	80,883	83,370	85,687	87,894	90,037	92,149	94,257	40,617	41,751	42,906	44,085	45,289	46,522	47,786	1,001,301
			Amount	13	14	14	15	15	15	16	16	7	7	7	7	8	8	8	170
b) Electricity	kWh	500	Quantity	62,415	64,666	66,655	68,507	70,271	71,984	73,673	75,359	32,473	33,380	34,304	35,246	36,209	37,194	38,205	800,540
			Amount	31	32	33	34	35	36	37	38	16	17	17	18	18	19	19	400
c) Repair	Lumpsum	1,000,000	Quantity	118	119	120	151	152	153	154	155	60	60	61	61	62	62	63	1,553
			Amount	118	119	120	151	152	153	154	155	60	60	61	61	62	62	63	1,553
d) Indirect	Lumpsum	1,000,000	Quantity	91	95	95	108	112	112	113	113	46	49	50	50	50	50	51	1,185
			Amount	91	95	95	108	112	112	113	113	46	49	50	50	50	50	51	1,185
Sub-total				650	686	689	734	770	773	775	778	327	361	363	364	366	367	369	8,372
3.2 Anzali																		
(1) Personnel Cost																		
a) Manager	person	48,000,000	Quantity	1	1	1	1	1	1	1	1	1	1	1	1	1	1	15
			Amount	48	48	48	48	48	48	48	48	48	48	48	48	48	48	720
b) Worker	person	30,000,000	Quantity	4	4	4	4	4	4	4	4	3	3	3	3	3	4	54
			Amount	120	120	120	120	120	120	120	120	90	90	90	90	90	120	1,620
(2) Expences																		0
a) Fuel	liter	170	Quantity	24,311	25,055	25,702	26,285	26,821	27,326	27,810	28,279	21,126	21,494	21,867	22,246	22,610	22,982	23,364	367,278
			Amount	4	4	4	4	5	5	5	5	4	4	4	4	4	4	4	62
b) Electricity	kWh	500	Quantity	19,437	20,031	20,549	21,015	21,444	21,847	22,234	22,609	16,890	17,185	17,483	17,786	18,077	18,374	18,679	293,639
			Amount	10	10	10	11	11	11	11	11	8	9	9	9	9	9	9	147
c) Repair	Lumpsum	1,000,000	Quantity	52	52	53	53	53	53	54	54	50	50	50	51	51	51	51	777
			Amount	52	52	53	53	53	53	54	54	50	50	50	51	51	51	51	777
d) Indirect	Lumpsum	1,000,000	Quantity	39	39	39	39	40	40	40	40	35	35	35	35	35	36	39	566
			Amount	39	39	39	39	40	40	40	40	35	35	35	35	35	36	39	566
Sub-total				272	274	274	275	276	277	277	278	235	235	236	237	237	238	271	3,892
4. Proper Treatment of Hazardous Industrial Solid Waste																		
4.1 Pre-treatment for Solid Waste containing Heavy Metals																		
(1) Personnel Cost																		
a) Operator	person	30,000,000	Quantity	0	2	2	2	2	2	2	2	2	2	2	2	2	2	28
			Amount	0	60	60	60	60	60	60	60	60	60	60	60	60	60	840
(2) Expences																		0
a) Cement	kg	550	Quantity	0	55,125	57,881	60,775	63,814	67,005	70,355	73,873	77,566	81,445	85,517	89,793	94,282	98,997	103,946	1,080,375
			Amount	0	30	32	33	35	37	39	41	43	45	47	49	52	54	57	594
b) Indirect	Lumpsum	1,000,000	Quantity	0	23	23	23	24	24	25	25	26	26	27	27	28	29	29	359
			Amount	0	23	23	23	24	24	25	25	26	26	27	27	28	29	29	359
Sub-total				0	113	115	117	119	121	123	126	128	131	134	137	140	143	146	1,793
4.2 Separation and Collection System for Infectious Waste																		
(1) Personnel Cost																		
a) Operator	person	30,000,000	Quantity	9	9	9	9	9	9	9	10	10	10	10	10	10	10	10	140
			Amount	264	264	264	264	264	264	264	287	287	287	287	287	287	309	309	4,192
(2) Expences																			0
a) Electricity	kWh	500	Quantity	114,372	116,383	118,408	120,493	122,638	124,846	127,119	129,457	131,864	134,341	136,889	139,511	142,161	144,888	147,694	1,951,065
			Amount	57	58	59	60	61	62	64	65	66	67	68	70	71	72	74	976
b) Indirect	Lumpsum	1,000,000	Quantity	80	81	81	81	81	82	82	88	88	89	89	89	90	95	96	1,292
			Amount	80	81	81	81	81	82	82	88	88	89	89	89	90	95	96	1,292
Sub-total				402	403	404	406	407	408	410	440	441	443	445	446	448	477	479	6,459
Total				**25,892**	**31,139**	**31,313**	**32,470**	**33,182**	**36,741**	**37,279**	**38,304**	**37,957**	**38,579**	**39,132**	**39,589**	**40,369**	**41,156**	**41,733**	**544,835**

Source: JICA Study Team

Part 7: Environmental Education

THE STUDY ON INTEGRATED MANAGEMENT FOR ECOSYSTEM CONSERVATION OF THE ANZALI WETLAND

FINAL REPORT
Volume III Supporting Report

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PART 7 ENVIRONMENTAL EDUCATION

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CHAPTER 1 INTRODUCTION

1.1 Background

1.1.1 Main Focuses

This section of the supporting report considers three areas of work:

- environmental education,
- information and awareness raising,
- public participation.

Environmental Education, Information and Awareness Raising and Participation are three vitally important elements for the successful development and implementation of any management plan have therefore integrated into each component of this Master Plan. All three feature strongly in International Conventions related to Wetland and Watershed management. For example the Rio Declaration of 1992 and the following Declaration from Johannesburg in 2002 both strongly emphasize education and participation as key components. The Ramsar Wetlands Convention does the same.

The Environmental Education Plan is therefore designed to support the education, awareness raising and participation needs of the Wetland Ecological Management Plan, the Watershed Management Plan, The Wastewater Management Plan and the Solid Waste Management Plan.

1.1.2 Organization of Report

These three elements are related to each other and overlap considerably. However, for the sake of clarity and the effectiveness of implementation, the three areas are considered separately in the Master Plan. The activities proposed build on current strengths and addresses the weaknesses that have been identified in Chapter Two both nationally and in Guilan. The Plan proposes activities that will support the implementation of national and international strategies and action plans.

This section of the Report describes both the national context of Environmental Education and Public Participation in Iran and then the local situation in Guilan. This is because both Environmental Education and Public Participation in the Study Area have to operate within the national context and legislation and are subject to national trends and developments. For example, public participation in the planning and development process is governed by national regulations concerning access to information and participation in the EIA process. Likewise in education, what takes place in schools is based on national education decisions related to the curriculum or text book development. It is not realistic to propose activities unless they can be undertaken within these national legislative frameworks and to some extent this limits the kinds of activities that can be proposed.

1.1.3 Challenges in Development of Environmental Education Plan

It is important to state that the terms "environmental education" "Awareness Raising" and "public participation" mean widely different things to different people. That has been one of the challenges in the development of this aspect of the Master Plan. For many people in Iran, "environmental education" is the same as "nature education", "awareness raising" means telling people they must protect and love nature, and "participation" means taking part in activities. These interpretations however are only one part of what each term involves, and internationally the definitions of these terms and how they are implemented is much wider. These new approaches are largely understood by decision makers in Tehran, but less well by decision makes in the provinces. This has been one of the key challenges in the development of the environmental education Master Plan activities.

Efforts were made during the development of this Master Plan to engage with local stakeholders as well as experts in the review of the current situation and in the development of proposed activities. Having said that, it must be admitted that this stakeholder engagement and participation was not really at a sufficient scale or depth and a participatory process in a real sense was not implemented. As a result it is strongly recommended that the DOE and MOHA engage in a wider consultation with stakeholders and the community before the Master Plan is implemented.

CHAPTER 2 CURRENT CONDITIONS

2.1 Environmental Education Legislation

2.1.1 Relevant Laws

The requirement for Environmental Education and Public Participation are included in major legislative documents.

(1) Constitution

Article 50 of the Constitution of the Islamic Republic of Iran states that "It shall be considered a public duty in the Islamic Republic to protect the natural environment in which the present as well as the future generations shall have a developing social life. Therefore economic activities or otherwise which cause pollution or irreparable damage to environment shall be prohibited".

(2) Environmental Protection and Enhancement Act

Section 6 d of the Environmental Protection and Enhancement Act of the Environmental Code of the Islamic Republic of Iran (1999) states that one of the responsibilities of the Department of Environment in Iran is to "Develop and implement training and educational programs for purposes of public enlightenment in connection with the protection and enhancement of the environment"

Chapter 5 of the Executive By-Law on the Environmental Protection and Enhancement Act, specify the regulations on Education Programs for Environmental Protection and Enhancement. There are five Articles that cover

- The formulation of public awareness programs
- Collaboration with relevant authorities to include environmental education in the programs in the school curricula and higher education
- The establishment of special Institutions for learning in environmental protection – with the approval of the High Council.
- The development of Education programs for other organizations
- Provision of scholarships for study in other countries.

(3) Third Socio Economic and Cultural Development Plan of the Islamic Republic of Iran.

Chapter Twelve of this plan covers Environmental Policies. Paragraph A states that certain programs have to be implemented to provide for the sustainable exploitation of natural resources. One of these programs is entitled the "Institutionalisation of Public Participation in Planning, Decision-Making and Plan Implementation". Little progress appears to have been made on this program to date, though it is anticipated that it legislation will have been proposed before the end of plan date of 2004.

2.1.2 Other Strategies

Other international and national strategic documents related to the environment include statements relating to the importance of Environmental Education and Participation. These include the

- The Ramsar Convention signed by IR Iran in 1971
- Caspian Environment Convention, signed by IR Iran in November 2003, and to be ratified in the near future
- Strategic Action Plan for the Caspian Sea developed as part of the Caspian Environment Program
- The National Caspian Sea Action Plan
- The National Biodiversity Action Plan

2.2 Environmental Education for Children and Young People

2.2.1 Environmental Education in the Formal Sector

Education is provided free of charge in Iran through the Ministry of Education, although there is a growing network of Private fee paying schools. Education is divided into four phases - Elementary Schools (ages 6-11), Guidance School (ages 11-13), High School (ages 14-17) followed by Higher Education at University. Because of the large number of young people in the country under the age of 25, Schools usually work a two or even three shift system.

There is no formal system as such for environmental education in Iran. Although the Department of the Environment has a remit for Environmental Education, it does not have a policy statement or strategy for the development of Environmental Education. Neither does the Ministry of Education.

The curriculum is divided into subjects that take a traditional approach both in terms of content and teaching style. Some environmental content appears in subjects such as science and geography but not in any coherent fashion and the focus is on knowledge about the natural environment rather and in some cases broader environmental issues and in recent years the environmental component appears to have been reduced. Having said that, the High School text book on the Guilan Province does have six pages of environmental issues in the province focusing mostly on domestic waste and industrial pollution. Environmental Education is often linked with Health Education, and here one of the major concerns is the growth of drug abuse in amongst young people in Iran.

Text books are provided for children and follow a fairly traditional structure and content and many appear to be uninspiring. The High School txt Book on the Guilan province is an exception. It is colourfully illustrated, and has many photographs and maps. Newer books about the environment have been developed by the Department of the Environment, some

written by Iranian authors and others translated. These are colourfully designed and illustrated, but it is unclear whether these reach schools in any large numbers. In theory there is a two credit course of "An Introduction to the Environment" delivered by all teacher training colleges in Iran.

More investigation is needed to ascertain the exact nature of this course and who it is it offered to. In service training is provided through the Provincial Education Centers and again, few if any specifically environmental education components have been included over the last few years in Guilan though it would be possible to develop such courses Teachers form a significant group of people who become involved in environmental NGOs and they have exposure to new ideas and approaches, but this only a small proportion of the teaching body are involved. Many teachers are also members of subject based teachers groups, and

Students in some schools will therefore receive some environmental education based on the enthusiasm of individual teachers, but the majority of school students will leave school with a coherent understanding of environmental issues in Iran or elsewhere.

There are however a number of positive signs. These include the work of joint Committee of the Ministry of Education and Department of Environment that meets to strengthen Environmental Education. The immediate goals for this Committee include integrating more Environmental Education into the school text books that are currently being revised; to develop a greater environmental education component in teacher training and to promote environmental education in Kindergarten schools.

There is also an increasing engagement of NGOs working with schools. And yet another encouraging sign was the first ever National Conference on Environmental Education held in December 2003. Hosted by the Ministry of Education, over forty papers were presented covering topics from curriculum development, the role of women in environmental education, the use of media and evaluation.

2.2.2 Non formal Education

In terms of non formal education and after schools activities, relatively little environmental education takes place in a systematic way. For example, schools generally do not have Eco Clubs or any environmentally related extra curricular environmental activities. This is largely because of the huge pressure on timetables as a result of the large numbers of children and the two shift system. Most children do go on an excursion each year, but these are generally to historical or religious sites and are more site-seeing in nature rather than structured learning. Other than this, excursions are not common. There are some opportunities for children to attend environmental camps and the Ministry of Education has a camp near Rasht that provides camps for children in the summer. These are largely for sport and cultural activities rather than environment though, as with excursions, there is potential for the development of an environmental component.

The Department of the Environment through it's public relations department occasionally provides lecturers to visit schools to make presentations about the environment and is also involved in encouraging some practical children's actions such as demonstrating against litter and taking practical action against litter and waste. Some schools take part in NGO projects related to waste and other environmental issues. An interesting development in Rasht is the construction of a Natural History Museum in the Department of Environment in Rasht that will be opened at the end of 2004.

2.2.3 Main Issues

The main issues and need for environmental education are:

1) To be given a higher priority in the Ministry of Education and given strategic importance.
2) To be delivered in a more strategic way to ensure that all students at schools have an entitlement to environmental learning. It is most realistic to expect this to be within the framework of current subjects.
3) Capacity building for all levels, but especially for student training to be teachers and in service training.
4) The provision of resources - especially those that can be integrated in the current curriculum
5) The provision of "new" learning opportunities to expand the current rather traditional approaches taken in schools. These can include student centerd learning approaches, working outside the classroom, and linking learning to action through an eco schools approach.
6) A "right" approach to environmental education.

Education means different things to different people! In Iran the term is most commonly understood as "ecological education" and the focus is largely on knowledge about the environment and environmental problems. What is meant by the term environmental education in this section is broader and follows the definition adopted by UNESCO in 1977 and little improved on until being added to by the Rio Declaration on Environment and Development.

However, one of the challenges of producing an environmental education plan is that the concept is in a period of development and is likely to change over the period of this Plan. 2005 will see the start of UNESCO's decade of "education for sustainable development" and UNESCO will encourage schools to adopt a more sustainable development focus for education to replace the current environmental education. The organizations with responsibly for implementing this plan should be aware of this changing definition and to ensure that the activities proposed meet the current and future needs of society. The environmental education activities proposed in the Plan are described below.

In summary, the situation is encouraging. Environmental education was firmly placed on the global agenda after the Rio Summit of 1992. Since then there have been significant

improvements in Iran, but these have been improvements from a very low level. Although the signs are more promising now than five years ago, they have yet to take on a strategic importance.

2.3 Environmental Education in Higher Education

2.3.1 Environmental Education in Higher Education

Students apply for University after High School, and as a result of the population boom there is huge competition for University places throughout Iran. Places are oversubscribed by about five to one in the state system. First degree courses last anything from three or four years or more depending on the subject and Masters Courses from two years and upwards.

In Guilan there is the government funded University of Guilan and the essentially private Islamic Asad University. The former with around 16000 students and the latter 24000. Other Higher Education establishments include the six Distance Learning Colleges and a similar number of vocationally orientated colleges offering two or three year courses. All the state funded higher education comes under the authority of the Ministry of Higher Education. The Ministry of Education is also responsible for a number of Vocational Colleges and for teacher training.

Both the Universities have Faculties of Science and teach environmentally related subjects such as Biology and Ecology. In the University of Guilan there is also a Natural Resources faculty that has Masters courses in Forestry and Fishing and within the faculty there is an Environmental Department that will start Masters and possibly degree courses within the next few years. New courses are being developed to meet new demands. Guilan University has recently started a course on Urban Development, and the Azad University on Rural Development and another on Tourism. However the range of subjects that take a broad approach to the environment and that integrate key topics such as sustainable development is limited and falls far behind the range of courses found in, for example, western European countries. The development of new courses is to a large extent limited by the available of qualified and experienced lecturers. Lecturers also face pressures in terms of research. With such large numbers of students research time and funding s limited.

Obviously, people who obtain work in the environmental sphere will not just have studied locally. A number of Universities in Tehran also have Environmental Faculties. These focus mainly on ecology and environmental science and the Islamic University of Azad also has a Masters course on environmental management.

In terms of research and publications, the University of Guilan publishes the Caspian Journal of Environment and Sustainable Development on behalf of the Association of Universities of the Caspian Region. The University of Tehran has an active Department that publishes a regular Journal of Environmental Research

2.3.2 Higher Education in Department of the Environment

Nationally, the Department of the Environment has established a College of the Environment and The Institute for Scientific and Applied Environmental Research both to train Department Staff. The latter offers three undergraduate degree level courses in Environmental Pollution Control, Recycling Science and Air Pollution. The education departments of the Department of Environment and MOJA are largely responsible for internal training. The Department of the Environment in Tehran issues a program of training each year that includes a variety of courses ranging comprehensive courses on Natural Park management through to specific courses on public participation, ISO 14000 and species identification. These are mostly short courses lasting from about 30 hours upwards

At a regional level, professional development opportunities for those working in wetlands has recently taken a step forward with the establishment of the Ramsar Education and Training Center, in Ramsar itself. This has been established by the the Ministry of Foreign Affairs and funded by Department of the Environment, as a result of the commitment made by Iran at the Barcelona Ramsar COP meeting in 2002. The Center will start its work in 2005 after an initial start up period.

2.3.3 Main Issues

The main issues facing higher education are:

1) A lack of courses at first degree and masters level that cover important issues such as sustainable development, environmental management, environmental economics and so on.
2) A lack of integration of sustainable development and environment issues into all subjects at University level.
3) The need to build the capacity of lecturers and especially to keep them abreast of new ideas and developments in their subjects, together with a need for more resources both in English and Farsi.
4) The need to develop a greater research capability at University level

2.4 Education for Adults

2.4.1 General Adult Education

Adult Education is the responsibility of a number of different Ministries and Department including the Adult Education Department of the Ministry of Education, the PR Department of the DOE and the Education and Extension Departments of both MOJA and NRGO.

The Ministry of Education has a number of responsibilities including literacy education (in which they have been very successful raising adult literacy rates from 50% to over 85%), Life Skills and Vocational Education. One mechanism for delivering this education is through a

growing network of Community Learning Centers (CLCs). These Centers run Literacy, Life Skills and Vocation courses with the proportion being partly determined by local and partly national priorities. In Guilan there are 58 CLCs, each with a full time staff of five people, and in 2003 courses were run for over 30000 people.

The priorities focus on rural communities (with 50 of the 58 Centers being in villages) and women. The content of the courses are both locally and nationally determined. A number of the CLC courses have a content that includes environmental topics such as energy, waste, caring for the environment in the home and so on. These are supported by materials provided by a variety of agencies including the DOE both in Tehran and Guilan. Delivery of these courses is sometimes through experts from other organizations such as the DOE and sometimes through the full time staff - after being trained as trainers through by the DOE.

2.4.2 Education for Farmers and Fishermen

Education and Awareness raising for farmers is the responsibility of appropriate departments of the Ministry of Jihad-e-Agriculture through their Extension Departments. The Ministry provides short and long term training. MOJA's education activities are described in this section through there is obviously an overlap with awareness raising activities. Public Participation is described in the following section.

MOJA is responsible for training three groups of people. Firstly, decision makers at all levels; those who are called the beneficiaries, or managers of different programs and projects, and then people who live and work in rural communities. For the first two groups, the training is focused on specific technical needs, and subjects for training are selected through an annual needs analysis. For the third group, MOJA decides priorities for information and awareness raising. MOJA consciously uses a variety of training methodologies including class based, excursions and field visits, workshops, exhibitions, seminars, face to face discussions in the field, and group training. Courses are not formally evaluated however MOJA judges the impact through changes in behaviour.

The Department has six Agricultural Education Centers in the Study Area and each Center runs a program of training for farmers. The annual programs are based on local needs through feedback by farmers to the Agricultural Service Officers and on need identified by the regional office of the DOE and the national office. Most training takes place at the Agricultural Education Centers but there are also opportunities for farmers to use school libraries and those in Mosques. Most of these courses focus on the introduction of new farming practices and idea. Few of these courses focus on the impact of farming in the drainage basin though have a specifically environmental, drainage basin or wetland focus

The training is done by a mixture of central office DOE staff, University lecturers, and local Education Center staff depending on the needs. The format of the courses is based on a

nationally produced program and the training includes both class based work and visits to demonstration sites.

MOJA produces a large variety of education, training and awareness raising materials for a range of different audiences to be used on their own and to support the adult education courses. These include text books, information materials for farmers, posters, television and radio broadcasts. These are generally attractive, well produced and well written for their audience. Having said that no evidence is available about ho the materials are actually used or the impact that they have. Many education materials for example relate to one of the key issues in the watershed area - that over overgrazing and water pollution.

2.4.3 Education for Those Living in the Rangelands and Forests.

NRGO is responsible for education and awareness raising for those living in the rangelands and forests. An Education and Extension Department in Rasht with a staff of around 20 people, supporting 16 offices in townships in Guilan. Each township office has someone responsible for education and extension. The Department undertakes an impressive range of activities and produces a large number of materials each year. Many of the activities are undertaken by the regional offices by local staff after they have been trained by the Head Office. Activities in 2003 included:

- Production of published materials such as posters and leaflets such as a recent book on the value of forests and how to plant trees effectively - 50000 booklets were produced.
- Production of television of radio broadcasts (one program of around 30-45 minutes a week in each medium in the local Guilan language)
- Organising activities in schools including a recent art competition - and linking this with the training of teachers.
- Providing education for those with low education qualifications - this has been a new initiative over the last two years and has been especially successful with rural women and is now working in six townships.
- Providing a range of special content based professional development courses for NRGO staff - up to 20 courses are offered each year. In 2003, Guilan NRGO was in first place in the country in terms of the number of staff trained and hours of training provided.
- Providing practical opportunities for participation in events such as tree planting (with 10 million being planted!)
- Providing training for those involved in specific projects related to the rangeland and forests.
- Providing opportunities for the participation of local communities in decision making related to topics.

- Establishment of up to five rural cooperatives for forest and rangeland management and providing training for those involved.

The NRGO Education and Extension Office cooperates with a wide range of stakeholders including around 17 active NGOs. Evaluation of programs is undertaken informally and although there has been success in halting deforestation in the province, the degradation of the forest resources continues.

2.4.4 Other Groups

Two other groups are mentioned below that have the potential to have an impact on peoples thinking about and behaviour in the environment. The leaders of the Mosques and the members of the Village councils. At present there are no systematic environmental educational opportunities for either group.

2.4.5 Main Issues

The main issues facing environmental education for different groups of adults are:

1) Both MOJA and NRGO have stated that they faces a shortage of expert with specific qualifications including those that can work effectively in the field with local communities, that have a good understanding of sustainable development in a rural context, that understand and experienced in new communication approaches and that have an adequate understanding of new approaches to sustainable resource management.
2) There is a lack of coordination between organizations that provide education and awareness for those living in rural communities. DOE, MOJA and NRGO all have public awareness departments developing posters, leaflets, radio and television broadcasts; they have offices throughout the region; they each provide training courses for their staff - often on exactly the same topics. There is very little communication between the relevant departments and hardly any coordination of activities. This must lead to duplication, repetition and the danger of providing mixed messages.
3) There is generally a very low level of environmental literacy. In a country where there is large rural deprivation linked to low rural incomes and standards of living (though not always quality of life), environmental concerns are bound to be low down on the list of priorities and the demand for environmental learning low. It is a weakness of much of the work of many environmental and agricultural agencies that not enough attention is paid to the links between economy and the environment. These issues are described more fully below in relation to public awareness raising.

4) For a number of reasons it is especially difficult to interest farmers in environmental activities. Farmers in the region are considered to be very poor. They own only small plots of land and the inheritance system divides this between the children in the family on the death of the parents. Hence the plots get smaller with each generation and this puts pressure on the need to generate income rather than a need for environmental training. It encourages for example a greater use of fertiliser to achieve higher yields per hectare. There are also structural constraints. Some farmers practice transhumance and therefore cannot attend training in the summer. Access and communication is difficult especially with groups that move around the watershed such as graziers. It is considered that there is generally a low level of education amongst the farming groups which means that continuing adult education is not always perceived as being useful, especially by the older generation who might also find being trained by younger people difficult to accept.

2.5 Awareness Raising for the General Public

2.5.1 Background.

When considering the general public, there are many overlaps between environmental education and awareness raising - and in some ways it is false to distinguish between the two. When put environmental learning in the context of lifelong learning all environmental experiences can be called learning in one way or another whether presented formally. The Strategic Action Plan for the Caspian Environment Program states that "At present, significant parts of the region live in poverty. Unemployment rates are generally high ..Governments will need to give a higher priority to job creation, health, and education than to environmental protection.

To this list has to be added a rapid population increase". Whilst this conclusion is largely true, the picture of public awareness is that there is an increasing amount of activity directed by the Department of the Environment, NGOs and the media towards environmental issues, and that the public is much better informed now than it was even five years ago about the state of the environment. However, this awareness is not always translated into action although MOJA concludes that it in some areas awareness raising must be working as some aspects of the environment are improving.

2.5.2 Work of DOE in Raising Public Awareness

(1) At a National Level

- Nationally, environmental education and public participation are the responsibility of the Deputy Department for Education and Planning, established in 1997. The Office of Public Participation was also established in 1997. The Department of

the Environment in Tehran and each of the provincial offices engage in a wide variety of activities designed to raise awareness amongst different groups.

- Environmental Days are celebrated including the International Wetland Day in February which is celebrated locally in the region through different events. Public Holidays are often occasions when NGOs undertake activities such as open air festivals nd clean up campaigns.
- Environmental Competitions are held frequently with the most prestigious of these being the National Environment Prize. This is awarded on the 6th June and can be given to NGOs, individuals and other organizations such as schools.
- The DOE has a significant work with all the media and issues press releases. Some newspapers cover environmental issues both locally and nationally and there is a growing number of environmental journalists.
- The DOE manages a biannual Green Film festival and produces a number of films, some of which have focused on Wetland issues.
- Conferences and Seminars, the theme of which vary from year to year. An important Seminar in 2001 for example, was the Seminar on Islam and the Environment and previous events have been held for NGOs and Women in the Environment.
- Coordinating NGO workshops and networks. A recent workshop in Shiraz to establish a national network of NGOs was attended by representatives of over 500 organizations.

  Publication of environmental magazines for different audiences such as Green Message and numerous environmental texts including brochures, books and posters.
- The Department of the Environment is also responsible for education during army service and over the past four years a total of over 100 courses have been held.
- The Department of the Environment has also established a number of committees that have a remit for awareness raising and participation. The National Committee on Sustainable Development has examined the role of NGOs in civil society and the Recycling Committee has a responsibility to promote a public culture towards recycling.
- The Department of Environment in Tehran has established a Natural History Museum in Pardisan Park. The design and content of the museum compares with the best of Natural History Museums elsewhere in the world and located in the Park it is also the focus of other environmental events and festivals.

(2) Provincial Level

At a provincial level the Public Relations Department in the Department of Environment consists of a team of three people. Activities include organising specific events and producing specific information materials such as posters and leaflets for the seven of so special environmental days that are celebrated. The most significant day to be celebrated is the

Wetland Day held in February each year. Up to 20 posters are produced each year and these are distributed through various mechanisms including NGOs, University Departments, offices of the DOE, and through the Governors offices of the communities around Anzali. The Department also manages a small but well stocked library, runs an information Hot Line (8824626/7 and 8829561), liaises with NGOs and includes them in different activities.

The Department of the Environment also regularly contributes to local television and radio programs and has a regular five minute slot on a radio "message network". They also monitor the local media for environmental coverage, issue press releases on significant issues and produce a local information newsletter. 2004 will see the opening of an impressive Natural History Museum in the Department of Environment Building in Rasht and the opening of a Wetland Education Center in Anzali Wetland.

As at a national level, there is little evaluation of the impact of such initiatives. The only local evidence is related to an NGO campaign on domestic waste that was monitored two years after the event. It was found that the amount of waste had reduced from 1kg to 0.9kg per person per day and that the amount of plastic in the waste had reduced by 2%. These are small reductions and without information on the evaluation process, the data should be treated with caution.

Again, as at the national level, there is a general feeling amongst NGOs in the Province, although no hard evidence, that the Department of the Environment and NGOs have had some level of success in raising awareness though from a very low starting point. NGOs are also generally positive about the work of the Department of the Environment and their level of cooperation. However, they also state that in terms delivering changes "on the ground" local people still place greater trust NGOs. This conclusion appears to be substantiated by the evidence of a recent research report described below.

2.5.3 Role of NGOs

(1) National Situation

In many countries NGOs play a critically important role in raising public awareness and encouraging public action to solve environmental problems. They do so in a way that both works in partnership but at the same time challenges government and business initiatives. The situation is very different in Iran. The role of NGOs in civil society has only developed rapidly over the last few years as a result of President Khatemi's civil society campaign. This is illustrated by the growth in the number of NGOs from 22 in 1996 to over 500 in 2003 - the number that attended a national networking Conference, hosted by DOE.

Altogether in the country there are more than 2000 registered NGOs working in the environment, women's' issues, youth and health. These NGOs are increasingly active and are increasingly involved by government at different levels into their activities. A good example is

the creation of public participation offices in a number of Ministries and the involvement of NGOs in the process of drafting Iran's submission to the Johannesburg Summit in 2002.

(2) NGOs in Guilan

Two years ago a local consultant wrote that , "Most of the few local Environmental NGOs then, were hopelessly unorganised (sic) and in some instances, one man shows, which could not be considered helping hands or stable footholds for even short term planning for public awareness program, let alone public participation. The goals of these organizations were set so high and broad that most of their primitive actions and approaches were translated as offence or interference, and often created negative reaction and persistent resistance among the authorities"

However, as a result of a number of interventions associated with the work of Caspian Environment Program, the UNDP Small Grants scheme other projects, the number of NGOs in the region has grown over the last few years, and in Guilan Province there is an active network of around 30 NGOs many of whom are members of the Green Network. The NGOs have benefited from activities associated with the CEP and have been given training in Project Preparation provided by the World Bank. As a result their capacities are slowly developing. In Rasht for example there are a number of active NGOs including Sabz (Persian for Green) Guilan Association and the Women Against Environmental Pollution NGO (part of a national NGO). Both have relatively large numbers who are involved with the NGO (the Women's NGO has a member of over 200) with a smaller active core of around 30 members. Their activities often attract large numbers of people.

For example, Sabz Guilan has recently produced 10000 copies of a small booklet for children on solid waste and is planning others in a series using the same young girl as a character. They have also initiated a small recycling scheme in a number of Rasht Schools. The Women's NGO runs regular meetings on different themes twice a month and holds different festivals about environmental issues which have been attended by up to 500 people. They have also facilitated an effective community based recycling scheme in residential area of the city and in settlements around Rasht. Both work closely with the Department of the Environment on specific projects.

2.5.4 Environmental Awareness Raising for Tourists

Around 1.5 million visit the region each year, mainly in the summer (July and August) and around the New Year from the 15th March to the 5th April with most people concentrated along the beaches of the Caspian and a smaller, but significant number visiting the wetlands. The impact of these visitors is large. For example, period the amount of solid waste produced each day in Anzali rises from 300 to 500 tons during the tourist season and waste is the major problem caused by tourists. There are also traffic problems as 75% arrive by car. Those who visit the wetlands do so in high powered fast speedboats.

The Guilan office of the newly established Culture and Heritage Tourist Organization (CHTO) which replaces the Iran Tourism and Travel Office (ITTO) provides glossy high quality information leaflets about the province which describes the wetlands and other environmental and cultural sites and also run an excellent and informative web site. There is however, little information about the need for environmental protection or the problems the Wetland is facing and little encouragement for visitors to behave in a particular way, such as the Country Code in the UK. Although no formal research ahs been undertaken, it is unlikely that any more than a handful of visitors will realize that Anzali is a protected Ramsar Wetland.

However, the CHTO works closely with the Municipalities and produces other simpler materials that it distributes to visitors during the high seasons and a number of these stress the importance of caring for the wetland, not dropping litter and so on. They are distributed the Municipality Tourist Offices open in the summer and New Year and by the Red Cross Tent volunteers. The Guilan CHTO is also especially open to new ideas about the promotion of eco tourism activities.

Iran is a visual and audio culture and so the television is a better medium for disseminating ideas than detailed printed materials CHTO are producing a TV program to be broadcast later in the year about the wetlands. It will be broadcast on the Education Channel for a day a week for about 30 minutes.

2.5.5 Role of Other Organizations

Other organizations that could have an impact on environmental awareness of the general public are the Islamic Councils in the Cities and Villages. These were established in 1998 and represent a major step forward for the development of civil society. Each Council is elected for a four year term and has authority over a range of local social and economic issues. Currently, they undertake very little environmental awareness raising, but they have great potential for being a focus for public participation. The Mosques also provide opportunities for environmental awareness raising. Islamic beliefs, traditions and the writings of the Koran, have much to say about keeping a clean environment, and especially keeping water clean. There is currently little overt environmental message in the teaching of the Mosques but like the Islamic Councils, but great potential.

2.5.6 Main Issues

1) There is a need for capacity building for those managing public awareness activities. The emphasis of much work with the general public is on the “wonder” of nature and encouraging people to “love and respect” nature through positive behaviour. There are two problems with this approach. Firstly, "love and wonder" have never been enough on their own to change behaviour. For most people behaviour changes when they are forced to through legislation or when

there are very good economic or social reasons for doing so. Telling people to "respect nature and not to throw litter" and recycle, simply will not work unless linked with a whole range of other actions. Those managing public awareness do not always realize the complexity of process of behaviour change.

2) The focus of much public awareness is on relatively simple issues. There is very little public consideration of more critical environmental issues such as sustainable development, the use of genetically modified seeds in Iran, urban transport and traffic and so on.
3) There is "a low level of trust in society" especially between the decision makers and communities which militates against effective awareness raising. Linked to this is the fact that the general public is not ready for the level of participation that some NGOs and the DOE would like to offer them. To quote from a local consultants report "It is not easy for people to believe that the doors of democracy are open". In many countries the situation with public participation has developed over many years. This is not the case in Iran where there is no tradition of participation and so rapid changes cannot be reasonably expected. When the local administrations and general public are eager to work together, they are uncertain about the rules of and the processes to use to cooperate.
4) A fourth issue relates to the culture of the region. This is not so much a challenge, but a need to ensure that the most effective methods of communication are used. For example, in Iran, printed materials are not as useful for communicating with communities, especially is rural areas. Other methods such as television, radio, and especially face to face dialogue are more effective. Many people listen to the radio for a large proportion of the day and in rural communities people gather to listen to one of the four national broadcasting channels each evening.
5) A fifth issue relates to impact on the wetland. Those living in and near the wetland, appreciate that their activities might have an effect on the health wetland. Other stakeholders do not have this awareness. During the Study the Team has spoken to farmers about their impact on the quality of water in the wetland, and none showed significant levels of understanding or concern. Many people see the problems of the wetland being caused by everyone else except themselves! Most householders in Rasht do not realise that every time they flush their toilets in contributes towards the degradation of the wetland environment. This is obviously a significant awareness raising challenge.
6) A sixth issue is the lack of coordination between organizations
7) All these efforts are slowly having an impact on the general level of environmental awareness and understanding although one of the weaknesses pointed out in the Report to the Johannesburg summit was that little evaluation has been carried out into the effectiveness of what is produced.

2.6 Public Participation.

2.6.1 Meanings of Public Participation

Public participation can mean different things to different people. This section describes three meanings.

The first is Public Participation in the planning and development process. This has a number of components and in most countries there is legislation determining peoples' participation rights. Rights usually include: opportunities for the general public and different interest groups have to take an active part in development of different kinds of plans; consultation when new developments take place and rights to object to a proposed planning decision, such as is required by an environmental impact assessment; being provided with information about a planning issue.

Another meaning of the phrase Public participation is the level to which communities to which local people are involved in community development. This would commonly involve participatory rural appraisal and working with a community to plan for example, an approach to waste water treatment, or and rangeland restoration program.

In Iran, public participation is often assumed to mean the public taking part in some activity such as a clean up or a March for the Environment or an Environmental event - all of which are happening with increasing frequency in Iran. Whilst this is one form of public participation, it is participation at a relatively low level. The meaning of the word is similar to Public Awareness and these kinds of activities are described in a previous section. However, given the low starting point for in Iran, and the lack of any tradition even this kind of participation it is an important development.

2.6.2 Public Participation in the Structure Planning Process

Each Province has a plan for the Economic, Social and Cultural development of the region. These follow the pattern of the National Plan and therefore the plan for the Guilan Province runs from 2000 to 2004. Municipalities and Departments of Government developed the plan and comments were made by different Departments and Ministries. No public consultation on the plan took place, and only a minimum of information given to the public about the plan.

The Plan for 2001-4 included a proposal for the Renovation and Reconstruction Plan for the 865 villages with populations of more than 100 people living in them and stressed the importance of using public associations to assist in the drawing up the plan and also the use of public participation to assist in identifying priorities for the plans. The exact mechanisms for both these processes need to be identified. As yet there have been no projects in Guilan which have used participatory process for whole village planning.

2.6.3 Public Participation in the Planning Process Associated with New Developments

(1) Public Participation and Environmental Impact Assessment

Environmental Impact Assessments are required for specified large scale projects including petrochemical plants, power plants, steel industries, composting plants other centers for recycling and large scale forestry projects. The precise number of developments requiring an EIA is increasing all the time and currently stands at eighteen. The precise mechanisms for public consultation within the EIA process are not clear but it appears that no consultation is only required to take place with the people who are directly affected in the sense that they have to be moved from their homes for a new road or dam. For example, one of the few EIAs in Guilan took place related to the construction of the Share Bijar dam on the Ziklaki River. This involved talking to the people whose homes were going to be flooded by the Dam and offering them financial compensation or new land. It is unclear whether the local communities were asked whether they wanted the dam to be built, how much information they were given and whether there were opportunities to protest against decisions and what that system is.

A second major development in the region was the proposed road by pass to Anzali. This scheme has a long history with the original plan being developed before the Islamic Revolution. In 2003 it was announced that the planned route had not been given approval although a start had been made on some sections. Public participation and to some extent protest about this scheme was relatively active, and it was this together with the efforts of the DOE that persuaded the decision to build the road amended. However during the Study the situation has changed and recently the President has ordered that the ring road scheme be reconsidered. The current situation is unclear.

The Department of the Environment has a number of other rights and responsibilities in relation to the siting of new industrial plants, but it is also unclear whether these consultation mechanisms can include any public consultation.

Recognizing that public participation in EIAs is not required, GEF is supporting a project a project that is managed by a local NGO, Ofogh Sabz to undertake a pilot EIA to examine the impact of extending fish farming in the Keosha area of the Wetland. This will involve public participation and it is hoped that it might become a model for the further development of EIA and the integration of public opinion. Various stakeholder meetings have been held involving the Department of the Environment, and one proposal for the future is that the list of compulsory EIAs is extended to include developments that take place in an around protected areas.

(2) Public Participation in Rural Development

Public participation is not yet common in Rural Development projects in Iran, but the use of techniques such as Participatory Rural Appraisal (PRA) through projects funded by UNDP and others, is becoming more accepted as a methodology for rural development. A recent study

undertaken by Tehran University on participatory Planning and management of the Anzali Wetlands (University of Tehran Journal of Environmental Studies, Vol. 28, March 2003) highlights the gaps between communities and other stakeholders and stresses the need for great participation in rural planning. The research indicates that there is a "lack of sense of ownership amongst stakeholders" and a "resistance of the present management system against participation". Whilst this may be true, it is also apparent from the research that there is "weak organization amongst the stakeholders" and a "non familiarity amongst experts, planners and managers with participatory techniques and methods"

Although this might be the current situation in Anzali, public participation is slowly becoming more main stream to the work of the Ministry of Jihad-e-Agriculture and Department of Environment at a national level. The most well known project to take a participatory approach is the Hableh Rood Watershed Management Project. This is not in the Study Area, but a recent GEF project funded by the small grant scheme includes a project on Integrated Pest Management in Guilan that DOE's take a participatory approach. This involves weekly meetings between farmers and other stakeholders and is looking at ways of managing rice farming in a way that also tackles the Azolla problem. These projects can all form good models for the extension of public participation

(3) Promotion of Public Participation

The Department of Environment is also encouraging the spread of public participation methodologies. The Bureau of Public Participation was established in 1998 and has the goal of "raising participation impediments (sic), obtaining suitable opportunities for participation and empowering formations and volunteer peoples in the context of environmental protection" and since its formation the Bureau has prepared - an educational kit to encourage women's participation, a kit about participatory appraisal, and is preparing a booklet about participation for NGOs. In 2002/3 the Bureau ran 20 days of training for different groups. The Bureau is also responsible for the development of NGOs and is active in this field (see above)

MOJA has a Department of Extension and Participation and has a well structured approach to participation. MOJA works at a national level to encourage a great level of participation from other Ministries in natural resource management. MOJA also works with communities to establish cooperative companies. Currently there are X in Iran and they take the responsibility for elements of natural resource management in specific areas. At present they manage around 6 million hectares but still only a small proportion of land is under cooperative management - less than 10% in the case of forests. A number of NGOs are well known in the area of participatory rural appraisal, including CENSTA and Igra in Tehran, and both are frequently contracted by government agencies to advise and take part in participatory programs. There are few local NGOs with this expertise.

2.6.4 Main Issues

1) A lack of clarity and some confusion about exactly what public participation is and the purpose of public participation at different levels.
2) A lack of national legislation requiring participation in anything other than very large constructions, and then only in specific cases.
3) A lack of capacity to undertake and encourage public participation in a meaningful sense, possibly linked to a lack of commitment to and belief in participation by decision makers to the concept of public participation and hence a lack of motivation to make it happen.
4) A culture that accepts that decisions are made by experts for people, coupled with a lack of trust

2.7 Summary

This section above has described the current situation in environmental education, awareness raising and participation. It should be stressed that the main issues listed have largely been taken from official documents from different Ministries and Departments of the government of the Islamic Republic of Iran, together with evaluations undertaken by national expert consultants attached to national and international projects delivered in Iran and in discussions that formed part of the research for this Study. In summary these main issues are

- A lack of understanding of some of the key concepts of environmental education, awareness and participation, in particular amongst those responsible for their delivery at a provincial level.
- A lack of systems to ensure that education, awareness and participation are delivered in a strategic and consistent way.
- A lack of capacity to deliver education, awareness and participation - and especially a lack of knowledge and experience about effective methods of delivery
- A lack of tools to do work effectively including publications and other resources
- A lack of partnership between national and provincial government Ministries and Department themselves and between decision makers and other stakeholders including business and NGOs.
- A lack of motivation and interest on the part of both decision makers and other stakeholders. Other pressures take priority
- A lack of evaluation taking place to assess whether what is being done is working!
- A lack of finance allocated to education, awareness and participation.

CHAPTER 3 ENVIRONMENTAL EDUCATION PLAN

3.1 General Outline of the Environmental Education Plan

The plan proposes different activities for different target groups. For each target group activities include:

- Establishing Cross Sector Working Groups to coordinate and lead the development of the recommended activities.
- Reviews of the current situation
- Strategies and Action Plans.
- Capacity Building for those responsible for delivering the recommended actions and for the beneficiaries
- Establishing new systems for delivery
- Pilot activities and to demonstrate and test recommendations.
- Development of resources, networks and other activities to support the sustainability of recommended activities.

3.2 Objectives and Strategies

3.2.1 Objectives

The Objectives of Environmental Education Plan are:

- Increase the level of environmental awareness and understanding through effective provision of information and life-long learning, so that all stakeholders are more able to adopt environmentally sustainable behaviour and make environmentally focused decisions.
- Increase the level of all stakeholders' participation in decision making about their local environment so that they are more committed to and engaged in bringing about sustainable development.

This Plan describes the action that is proposed at a Provincial Level. Some of these recommendations will also need to be pursued at a national level and will have national level implications.

3.2.2 Strategies

(1) Target Groups

The strategies below focus on the following target groups. These target groups have been selected on the basis of their current impact on the environment and their potential for having a positive impact on the environment in the future.

- Students at school and University
- Teachers and University Staff
- Decision makers in government and non government organizations
- Islamic Leaders
- Business leaders
- Farmers and rural communities
- The General public and tourists
- NGOs and Journalists

(2) To Create Basic Frameworks for Environmental Education, Awareness Raising and Public Participation

There are essentially no basic frameworks for environmental education, awareness raising and participation, on which various activities can be built on. Thus, the first strategy is to create basic frameworks. This will include the integration of environmental education into the formal education at all levels in a structured and systematic way, development of an environmental education statement, development of a strategy for farmers and rural education, and the development of a system of public participation in development activities.

(3) To Build the Capacities of Key People

In order to deliver environmental education or to develop environmental awareness among stakeholders, the capacities of key people delivering these concepts have to be develop. This will include, the development of teacher training programs, training for decision makers in government and non government organizations, and seminar series for business leaders and Islamic leaders.

(4) To Create Resources to Support Environmental Education, Awareness Raising, and Public Participation

The third strategy is to create resources, such as education materials and facilities, required to promote environmental education, awareness raising, and public participation. This will include establishment of a Wetland Education Centre and a regular program of courses for students, establishment of a network of demonstration farms and an organic farms accreditation system, publication of a State of the Wetland Report for the general public, the publication of a Teachers Handbook on Environmental Education, and the establishment of networks of people involved in environmental education, awareness raising, and public participation.

3.3 Environmental Education in Schools

3.3.1 Development of an Environmental Education Statement

The Schools Environment Group should develop a short statement about environmental education to be sent to all schools. The statement should explain clearly what environmental

education is, and provide ideas on how environmental can be taught in schools. The statement should be based on current international statements developed by UNESCO, adapted for an Iranian context. (Short Term)

3.3.2 Preparation of a Teacher's Handbook

A Teachers Handbook on Environmental Education should be produced. The book should take a general approach and be aimed at teachers from Elementary, Guidance and High Schools of all grades of students. It should contain short general information about local national and global environmental issues, how to teach environmental education in different subjects, provide advice on effective teaching methodologies for environmental education, contain a list of resources to use and local NGOs and organizations that can support environmental education in the watershed. A copy should be provided for each school. (Short Term)

3.3.3 Preparation of Resources to Support Environmental Education

A text book should be produced on "The Anzali Wetland" and should be used to support teaching of the regional Guilan element of the Curriculum in High Schools and in other subjects as appropriate. The text book should be designed in such a way as to encourage student-centerd learning. Other educational materials about the Wetland should also be produced. These should include a large teaching poster, special activity books for students about the wetland, wetland bird and other identification keys, videos and other education materials. (Short Term) An environmental education web site should be developed and linked with an appropriate current web site which would contain up to date environmental information, education materials, teaching ideas and student resources in a format accessible to teachers. (Medium Term)

3.3.4 Development of Teacher Training Courses

Three kinds of Teacher Training courses should be developed.

(1) Pre-service Teacher training Course

A pre-service teacher training course on environmental education should be created and be taught as a compulsory module to all University and College students training to be teachers by 2007, especially those training to teach in Primary and Guidance Schools. This should be a minimum of 10 hours. (Medium Term)

(2) In-service Training Course

An in-service training course on environmental education should be developed and provided by the Ministry of Education Human Resources Department at the Provincial Education Center.

The Environmental Education coordinators appointed in each school (100 teachers each year) should attend this course. The course should a minimum of 10 hours and be open to NGOs and other bodies with an interest in environmental education. (Short Term)

(3) Training Course

A training course should be developed on "How to be an Environmental Education Trainer" by 2008 and a target of 15 people should participate each year. This training course will also be open to teachers, NGOs and should be provided by a national training institution working with an international organization. The purpose of the course will be to build a body of environmental education trainers in the region who can deliver the environmental education courses at a Provincial level and ensure that there is human capacity in the watershed for the ongoing development of environmental education. (Medium Term)

3.3.5 Establishment of a Wetland Education Center and Programs

A Wetland Education Center for Schools should be established. A target of 1000 children and young people, and 150 teachers should attend each year. The Center should consist of a classroom and other education facilities such as education trails, and bird-watching facilities. The Center should have a full-time member of staff provided by DOE and supported by the Ministry of Education, and offer programs to all the schools in the Wetland Area. As a part of this study, a center has already been constructed in Selkeh. This center has a classroom, spaces for instructors, trails, watching tower, etc. (see Supporting Report, Part 10, Capacity Development). The Ministry of Education should create a system that ensures that all students in the area around the wetland have an opportunity to participate in courses. Should the wetland education center prove successful then other Education Centers should be considered, including a Forest Education Center. (Short Term)

3.3.6 Establishment of an Eco Schools Scheme

An Eco Schools Program for Guilan Province Schools should be developed by 2008 and a target of 40 schools by 2015. Eco Schools does not mean the establishment of new schools, but is a simple and effective internationally recognized environmental management system for schools. It involves schools undertaking environmental audits and then with the support of staff, students and the community implementing environmental improvements. UNESCO has stated that in their decade of "Education for Sustainability" to start in 2005, Eco Schools are seen as an important method of delivery (see www.ecoschools.org). In the first two years of the scheme the focus should be on solid waste management, and support the implementation of the Solid Waste Management Plan. Other themes should be adopted after this. Up to 20 schools should join the scheme each year and be supported through teachers meetings and a newsletter. (Medium Term)

3.3.7 Establishment of an Environmental Education Support Network and the Role of NGOs

NGOs and other organizations should be encouraged to develop education materials and take a greater role in the education process. NGOs are in a good position to establish more information eco clubs for children and young people and develop other out of school activities.

The SEG should establish an "Environmental Education Network" of people and organizations willing to support environmental education initiatives including teachers, NGOs, University Students and Professors, and others willing to support environmental education and an Environmental Education network should have a target of at least 100 members in the first year. If appropriate, the EE Network Should take responsibility for the EE website and produce their own newsletter. (Medium Term)

3.4 Environmental Education in Higher Education

3.4.1 Review of Higher Education Provision of Environmental Education

The Higher Education Environment Group (HEEG) should review the provision of environmental education in the Universities and Vocational Training Centers in the watershed area. The review should include a number of consultation events and the outcomes should be matched with the future human resources needed to support sustainable development in the Watershed and Iran. For example, the Caspian Environment Programs has pointed out the serious lack of people with adequate training in biodiversity monitoring and integrated environmental management. The Review and Report should make recommendations for the development of new courses to meet future needs, especially with regard to the implementation of the recommendations in this Master Plan. (Short Term)

3.4.2 Development of New Courses and Integration of EE

On the basis of this Review, the HEEG should plan for the development and delivery of new courses to meet current and future needs. It is not possible to be specific about the courses that will be developed but they should include both courses at Bachelors and Masters Level. A Masters in Environmental Planning and Management should be a high priority and the HEEG should also plan for the integration of environmental issues into the content of other degrees courses, giving a high priority to economics and the development of an environmental economic module within Economic degrees. At least one new Masters Course should be developed in the short term and should attract a target for 20 students. The environmental education should be integrated into key subjects. (Medium Term)

3.4.3 Key University Staff to Gain International Experience through Masters Courses and Academic Links

Key members of the HEEG should participate in Environmental Planning and Management courses at Universities in other countries with an international reputation in these areas, to build capacity for the development and delivery of courses in Guilan. The academic staff to participate in such courses should be closely involved in the development of the new master courses at the University. The Institutions responsible for the development and delivery of these courses should also form Academic links with Institutions both within Iran and internationally. Up to five university staff a year should participate in international post graduate courses each year (Short Term). The University of Guilan should have established a working academic link with an International University in relation a newly developed master course (Medium Term).

3.4.4 Development of an International "Wetland Management" Masters Course in Partnership with the Ramsar Convention Bureau and Other International Partners

Linked to the development of the Ramsar Training Center, the Universities of the Caspian Sea Coast area should work in partnership together with international Institutions to develop a master course for an international target group, on "Wetland Management". The lecturers on the course would come from both Iran and overseas. The course would be part lecture based in Guilan and part experience based in a wetland in the home country of the students (10 students in the first year). (Medium Term)

3.4.5 Development of the "Greening" of Higher Education

The HEEG should build on international experience and develop an Environmental Management System to enable the "Greening of Higher Education" and encourage the adoption of this system. The development of a system should be launched at special Conference at Guilan University. (Long Term)

3.5 Public Awareness Raising and Participation

3.5.1 Decision Makers

(1) Review of Current Activities and Development of an Action Plan

The Wetland Professional Development Group (WPDG) should undertake a brief review of the current training needs for Decision Makers in relation to environmental awareness raising and public participation. This should involve a number of round table discussions with stakeholders together with a review of other training needs undertaken through other projects such as the Caspian Environment Program. As a result of the Review process the WPDG should with its member organizations to develop and coordinate programs of training. A Review Report should be produced by the WPDG and circulated to key stakeholders. (Short Term).

(2) Training of Managers and Decision Makers

Specific professional development training courses should be developed for DOE, MOJA and other government departments, local administration and NGOs on different issues associated with raising awareness, public participation and specific wetland and watershed issues. Two kinds of training courses are envisaged. Firstly, a number of courses should be developed that are compulsory for specific groups of manages and decision makers to attend. For example, all DOE, MOJA, NRGO and other government senior department staff that have a responsibility of working with the general public and other stakeholder groups should attend two courses - "Effective Awareness Raising" and "Effective Public Participation".

Secondly, other courses should be developed to meet specific needs after consultation with the target groups. These could include effective information provision, communication and participation techniques, how to conduct participatory rural appraisals and content based training related to different aspects of the implementation of the Master Plan. For example, the establishment of a Conservancy will require organizational and management training for the new staff to ensure that the concept is successfully implemented.

In some cases courses might have to be developed through a program involving international support. As recommended in the Institutional Plan, the training for Managers and decision makers will be particularly valuable if a cross-sector approach is taken. In other words, those attending the courses should come from all the stakeholder groups, including business and NGOs rather than running separate courses for the DOE, MOJA and so on. The development of an annual program of courses for decision makers on other specific themes, related to identified needs associated with the implementation of the Master Plan. （Short Term）

(3) Preparation of publications for key staff and organizations on awareness raising and participation

The WPDG should commission a series of locally appropriate short publications, on topics identified through the review including how to provide effective information and communication, how to encourage public participation, and so on. The short publications should be circulated to all appropriate DOE, MOJA, NRGO. These publications will also make various international awareness and information statements, such as the Aarhus Convention, available to the decision makers. Key themes linked with the Wetland Ecological, Solid Waste, Wastewater and Watershed Management Plans should also be covered. (Short Time)

(4) Local Government

Elected members to the local councils should be provided with environmental awareness courses starting from the next round of elections. The target is for all the leaders of the councils to have attended a course during their time in office. Short courses should be provided for the elected members of the local councils in the villages and towns. During the training the councils should be provided with information about the various Environmental Education and Awareness Raising activities proposed in this plan, and especially the opportunities provided by the Small Grant Schemes. A short handbook for local government should also be developed. (Medium Term)

3.5.2 Religious Leaders

(1) Islam and Environment Seminars

There are many opportunities to promote environmental awareness through the Mosques. The Islam and Environment Group (IEG) should prepare a series of seminars to be held regularly (five times a year) for the leaders of the Mosques (250 leaders a year) on environmental issues and how these relate to the teachings of the Koran (Short Term). If appropriate the seminars should be a regular part of the training for religious leaders and they should build on the outcomes of a major national DOE Islamic Conference held in 2002. (Medium Term)

(2) Preparation of A Handbook on Islam and Environment

The IEG should also develop a series of publications including a handbook for Religious leaders on Islam and the Environment. The Handbook should contain a basic summary of environmental problems together with a description of environmental teachings in the Koran, and how these can be effectively communicated to those attending the Mosques. The Handbook should also be available for purchase. (Medium Term)

(3) Preparation of a short leaflet for the general public attending Mosques

The IEG should also develop a short leaflet for distribution in the Mosques on "Islam and the Environment", and also to produce a short television program linked to this leaflet. These should both be in a popular style. (Short Term)

3.5.3 Business and Industry

(1) Business and the Environment Seminar Series

The Business Environment Association (BEA) should organise an annual series of regular seminars business leaders (five times and 250 leaders a year) with the goal of providing information about the impacts that business has on the wetland and watershed and promoting best environmental practice. The target groups should initially be on those businesses that have most impact on the wetland environment. The BEA (at least 250 members) should also organise other activities as part of an annual program including study tours to visit best practice businesses in other parts of Iran and the region and produce a regular newsletter (500 copies of a twice yearly) for its members. SWIM-I recommended in the Solid Waste Management Plan should be a sub group of the BEA. (Short Term)

(2) Publications to Encourage and Support Business/Industry to Adopt Better Environmental Practices

The BEA should develop a series of specific publications to encourage businesses to reduce their environmental impact. These should be short publications designed for busy business

people and should focus on environmental responsibility and how being good for the environment can be good for business. They should promote specific ways in which businesses could adopt "win win" solutions. The BEA should develop an information and support role for businesses and encourage members to implement environmental legislation. (Short Term)

(3) Pilot Businesses/Industries Selected for Environmental Audits and Adoption of Environmental Management Systems

The BEA should identify businesses/industries (up to three companies in key business sectors) that would be willing to participate in an appropriate environmental audit (ISO 14401, EMS or Waste Minimisation), and then to implement the recommendations resulting from the audit and to publicise this to other businesses of the same type. The pilot businesses should be willing to act as champions for the process and host visits of other businesses. (Medium Term)

(4) More Focus on Supporting Local Community Environmental Initiatives by Businesses

DOE should encourage businesses to provide support and take part in environmental initiatives in local communities. This is part of businesses need to develop a "triple bottom line" that includes social and environmental as well as economic elements. (Medium Term)

3.5.4 Farmers and Farming Community

(1) Review and Strategy Development

The work of government and non governmental organizations in rural areas, including the rangelands and forests has been strongly criticized for lacking strategic coordination and direction. As a key task therefore, the Rural Environment Group (HEG) should review the current situation in terms of the awareness of farmers, graziers and the rural community and evaluate the activities undertaken by the different stakeholders, and on the basis of this review produce a short strategy and action plan, to coordinate education, awareness raising and participation of those living and working in rural communities.

This action plan should give priority to supporting the needs required by activities recommended in other Sections of this Master Plan. For example, the Wastewater Management Plan recommends the promotion of the sustainable of pesticides, fertilizers and herbicides and the adoption of Integrated Pest Management whilst the Watershed Management Plan has significant recommendations related to participatory processes in the relocation of forest and rangeland graziers. (Short Term)

(2) Training of MOJA, NRGO, DOE and Other Organizations

Specific environmental training courses should be developed for MOJA, NRGO, DOE and other organizations that have staff that work directly with farmers and foresters. The courses should focus both on updating staff knowledge and awareness of environmental and farming/forestry issues and on process such as how to manage participatory development in the farming community. (Short Term)

(3) Establishment of A Small Grant Scheme and A Network of Demonstration Farms

A small grant scheme should be established by MOJA and NRGO for farmers, to encourage the adoption of more environmentally friendly ways of farming. In the first year the target is to award 10 grants, rising to 25 grants a year after the first year of the scheme has been evaluated. The scheme should be administered by the MOJA and NRGO Environment Officers advised by the HEG. Farms would be encouraged to apply through the Rural Advisors Network and one condition of accepting a grant should be the willingness of the farmer for his farm to be used as a demonstration farm for other farmers. Over time the farms receiving grants can be organized into a network of environmentally sensitive demonstration farms/forests. The Advisers should organize regular visits to these demonstration farms. (Short Term)

(4) Development of environmental courses for farmers

The Environment Officers and Rural Advisers Network should work with the MOJA Agricultural Service Centers and extension services to develop more strongly focused courses on environmentally sensitive methods of farming and forestry. These courses should be strongly linked to the awareness raising, education and training needs of the other components of the Plan. Development of at least one new course a year to be delivered at the Agricultural service Centers. The first courses should focus on sustainable rural development for graziers. (Short Term)

(5) Development of A range of Aappropriate Environmentally Focused Publications and Other Media for Farmers/Foresters

The Environment Officers and network of Advisers should develop a range of publications to promote environmentally sensitive farming/forestry practices, and especially publications that disseminate good practice and the success of local farmers. Publications should be coordinated with other media including radio and television and be linked with other elements of this Master Plan. The publications with sustainable rural development themes should be continuousely produsedand a series of programs for radio and television on the themes of sustainable rural development for graziers should be developed. (Short Term)

(8) Pilot Organic Farming Accreditation Scheme and Sustainable Forest Management Scheme

An organic farming accreditation scheme should be established and piloted. Organic Accreditation can be awarded to farms that meet specific criteria in terms of the use of organics fertilizers and pesticides (a minimum of 5 farms accredited within 5 years). If successful then the scheme should be actively promoted to the general public. A sustainable forest accreditation scheme should be established, possibly using one of the currently established global schemes such as the FSC (Forest Stewardship Council). (Medium to Long Term)

3.5.5 General Public and Tourists

(1) Preparation of an Annual State of the Wetland Report by DOE

DOE should produce an annual "State of the Wetland" Report in an attractive and popular format. This Report should contain information about the wetland presented in the form of environmental quality indicators related to different aspects of the wetland environment. Each year the Report should show graphically whether each indicator is getting worse, staying the same or getting better, using for example, a traffic light system. The report should be simple and should be available as a full report to the general public, as a small leaflet. It should also be reproduced in full by local newspapers. (Short Term)

(2) An Annual Single, but Large and High Profile Awareness Raising Campaign

Currently, the DOE and other organizations run an increasing number of small, uncoordinated and usually un-evaluated events that have little impact. The DOE and the Wetland Awareness Group should consider running one annual high profile and focused awareness raising event in the Wetland attracting the participation of a large number of people. A single large mass event with a target of at least 10000 people would achieve a much higher and longer lasting impact. This mass event could be on a new day or week specifically allocated for the Wetland - "Anzali Wetland Day". Schools and other organizations could be encouraged to hold specific activities on the same day and. The first event could focus on the launch of the "State of the Wetland" or the "Wetland Code". (Short Term)

(3) Specific Information to be Targeted at Different Groups

DOE and the Wetland Awareness Group should develop a series of information leaflets (at least one leaflet a year) targeted at different wetland user groups. Examples of such leaflets include information on where people can have safe access to the wetlands and facilities for them to enjoy the wetlands. Specific information should be provided for tourists. Mass numbers of copies of the Wetland Code and a specially produced Environment of Guilan leaflet which emphasizes environmental issues should be made widely available through shops, hotels and through the ITTO and Red Crescent activities at Norouz. Tourists should also be

targeted through other activities in the Wetland.

(4) A Small Grant scheme to Support Community Improvements

A small grant scheme should be established by DOE aimed at providing support for local community environmental initiatives. This could be called the "Improving Anzali" Scheme. There would be an annual award program aimed at supporting initiatives proposed by the Islamic Community Councils and other local community based organizations. The grant scheme, similar to schemes in the UK such as the Shell Better Britain Campaign or the Heritage Lottery Fund, would provide small grants for specific improvements and to qualify, organizations would have to present applications that met certain criteria both for content and management, including for example, NGO involvement. The small grants could be linked to the proposed activities in other components of the Master Plan. For example, in the first three years of the scheme priority should be given to community solid waste management schemes. In the first year the target is to award 10 grants, and rises to 25 grants a year after the first year of the scheme has been evaluated. (Medium to Long Term)

(5) Development of A Range of Courses by the Community Learning Centers

A range of courses for different groups in the community should be developed with a focus initially on women and housewives. The adult education courses can be delivered by the Community Learning Centers (CLCs) and should be linked to the DOE strategy, priorities and specific project needs and the training and awareness requirements of the activities proposed in other Section of this Master Plan. For example, courses developed can be used to support community solid waste initiatives. Trainers from the CLCs would need to be trained to develop and deliver the courses. At least three new courses should be delivered by the Community Learning Centers in Rasht, Anzali and other urban areas with a target of 25 people attending each course. (Short Term)

(6) Pilot consultation with the General Public on Planning Issues

As described in Chapter Two, there is no effective process in Iran to ensure public participation in development control planning processes or future development planning. In the context of this Plan it is not realistic to recommend the creation and adoption of such systems - such developments have to take place at a national level. However it is possible to recommend that when the partner organizations in this Study, the DOE and MOJA, propose new developments, that consultation takes place. The Wetland Advisory Group working with the Conservancy and other bodies should -

- produce and implement a simple system to pilot public participation and consultation when new developments are planned are planned by DOE and MOJA (a development control system).
- produce and implement a simple system to ensure that the recommendations made in the Master Plan are subject to consultation before being implemented.

This process should be led by DOE who should develop and then pilot the consultation

systems in relation to developments that DOE is planning. This system should build on the current experience of DOE in a number of projects in other provinces in Iran notably the Zagros Mountain project. (Medium to Long Term).

(7) Establishment of a Wetland Information center

DOE should establish a Wetland Information Center for the General Public and Tourists. This should be in an easily accessible location and will provide a range of information about the wetland, together with facilities for visitors such as boardwalk trails and awareness raising programs and events. In the short term this Center will share space with the Wetland Education Center. After a review of effectiveness it should be appropriate to establish a separate building on the same site and over time, other centers (further two small centers) around the Wetland. The Eco Tourism component of the Master Plan describes information provision in more detail.

3.5.6 NGOs and Journalists

(1) Increasing NGO Participation

This section contains only five recommendations for NGOs. This is not because NGOs do not have an important role, but because NGOs should be formally involved in most of the activities described in previous sections of the Environmental Education Plan. For example, NGOs should be formally represented on all the Groups established as part of the plan and will play a particularly important role in supporting environmental education in schools. NGOs should have at least one member on each of the Groups and Groups listed below in Section 8.6. (Short Term).

(2) Training to NGOs in the Watershed

There is already an active NGO Coordinating Body, the Green Network, for the NGOs in Guilan. It is recommended that more formal training be provided for these NGOs to encourage better management, more effective activities, and establishment of new community based organizations. This training should be provided by a competent body, probably another NGO from outside the Province working with an international NGO. It should also be closely linked to the training proposed by the Caspian Environment Program to reduce potential overlap. The members of the Green Network should identify priorities for training. (Short Term)

(3) A small Grant Scheme for NGOs in Guilan

A formal small grant scheme for NGOs should be established by DOE to support the development of awareness raising activities and at least 10 grants awarded in the first year. The small grant scheme can be funded from the income generated by fines from businesses and can be managed by DOE and each year would focus on encouraging activities related to a

different theme. The amount of funding allocated to the small grant scheme should increase from year to year. The themes selected each year should relate to one of the priorities identified in the Master Plan and also be related to other funding opportunities, such as the CEP Small Grant Scheme to ensure an effective use of funding. (Short Term)

(4) Appointment of a Community and NGO Development Officer at the Green Network of NGOs

To support the development of community based organizations a full time Community and NGO Development Officer should be appointed. Based at the Green Network offices he or she should encourage the formation of community organizations and the development of training and project applications. (Short Term)

(5) Training Course for Journalists

Training for journalists has been included in this section, largely because, like NGOs they are a stakeholder outside the government administration that has an important role in providing information to the general public and encouraging the development of civil society. DOE should run a course for journalists on the problem of the Anzali wetlands. Journalists with an interest in the environment should be encouraged to network with each other. Journalists should also be exposed to other national and international experience through a program of training provided by the BBC. Activities should link closely with the Caspian Environment Program (CEP) for support for journalists. CEP, for example is intending to produce a "media kit" for journalists in the region.

3.6 Institutional and Organizational Arrangement

3.6.1 Introduction

The Institutional Plan for the delivery of delivery of environmental education is described below and is based on the principles and issues outlined elsewhere in this Report. In particular the plan responds to one of the key weaknesses of the current situation - that environmental education, awareness raising and participation are currently delivered in an uncoordinated way to the majority of stakeholder groups. In response the plan recommends the establishment of working groups for to coordinate the provision of awareness raising and education for each stakeholder group in a strategic and coherent way. Each working group should have members drawn from each of the organizations responsible for the provision of awareness raising and education The Institutional Plan recommends the establishment of a Conservancy Body to manage the Wetland. If this recommendation is adopted then the working groups will also include a representative of the Conservancy body. The Wetland Environmental Action Group will be a part of the Conservancy as it deals directly with environmental education around the Wetland. NGOs also have an important role and should be fully represented on the following Working Groups.

3.6.2 Environmental Education in Schools and Universities

(1) Environmental Education in Schools.

Environmental Education in the formal education sector should be institutionally managed in three ways and should be the responsibility of and coordinated by the Ministry of Education (MOE).

1) The MOE should appoint a full time officer with responsibility for guiding Environmental Education in the Province. This person should chair the Schools Environment Group and act as an Adviser for Schools to promote environmental education. He or she should be based at the MOE offices in Rasht and appointed during 2005.
2) A Schools Environment Group (SEG) should be established to coordinate the implementation of activities in schools. The Group should be chaired by the MOE Environmental Education Officer, and with the support of the Ministry of Higher Education, should have representation drawn from the different stakeholder groups including DOE, Schools, Teachers Groups NGOs and Ministry of Higher Education. The SEG should be established by the end of 2005 and should be no more that 10 people
3) Each school should appoint a teacher with responsibility for environmental education in the school. This teacher will have the responsibility for promoting the development of environmental education programs and activities, managing the Eco Schools Program, and coordinating visits to the Wetland Education Center. By 2006 at least 35% of schools should have identified environmental coordinators rising to 50% by 2008.

(2) Environmental Education in Higher Education

The Ministry of Higher Education and the University of Guilan should establish a Higher Education Environment Group (HEEG). The Group should have representation from each of the Universities (three people from each Institution) and from appropriate Departments and Ministries including DOE, the Ministry of Industry and Mines, MOJA, NRGO, MOE and others. Leading environmental academics from other Universities in Iran should also be invited to join the Group. The Group should be established in 2005/6 and should consist of no more that 15 people.

3.6.3 Public Awareness Raising and Participation

(1) Decision Makers

The professional development for decision makers with environmental responsibilities in the watershed should be the responsibility of a cross sector Wetland Professional Development

Group (WPDG) established jointly by the MOJA, NRGO and DOE. Government Departments and NGOs with a responsibility for developing environmental awareness should be invited to join the Group. The group should consist of no more that 15 people. The remit of the group should be to plan and coordinate opportunities for professional development of decision makers in the Wetland. This will include the both internal training for government and local administration departments, together with the development of external professional training programs. Activities will include a systematic program of training needs analysis and the development of an appropriate range of programs and to ensure that funding is shared to ensure the most effective and efficient use of human and financial resources.

(2) Religious Leaders

The training for religious leaders should be coordinated by an Islam and Environment Group (IEG) with members appointed by the Representative of the Supreme Leader and facilitated by DOE. The group should also include representatives of the DOE, MOJA and NRGO and consist of no more than 10 people. The IEG will lead and coordinate activities to raise the capacity of Mosque leaders to engage in environmental education, and coordinate the production of materials.

(3) Business and Industry

A high level seminar should be organised by DOE with the support of the Ministry of Industry and Mines and other appropriate bodies and a Business and Environment Association (BEA) should be established as a result of this seminar to implement the recommendations for business. The group should be open to membership from all businesses, and should include representations from other stakeholders, especially the Ministry of Industry and Mines, DOE and MOJA. Ideally the BEA should have no more that 10 members on its management team. Initially the BEA should be supported by these Ministries and Department though at a later stage it should become financially self sufficient. It is often the case that through improving environmental performance, at the same time businesses can improve their profits; hence it should be possible for the BEA to charge for environmental services that have income generating potential.

(4) Farmers and Rural Communities

1) A high level Seminar should be organised by MOJA and NRGO for all stakeholders, governmental and non-governmental, with responsibility for, and working with, farmers and graziers.
2) The purpose of the seminar should be to establish a Rural Environment Group (REG) to coordinate the recommendations in Environmental Education Plan. This Group should be chaired and coordinated jointly by MOJA and NRGO. The RET should have representation from the Education and Extension Departments of MOJA and NRGO, together with the DOE, NGOs and other stakeholders including representatives of farmers and graziers themselves. The REG should

consist of no more than 15 people.

3) Both organizations should appoint a full time Environment Officer each with responsibility for overseeing and promoting, environmental initiatives. The MOJA Environmental Officer should have responsibility for working with farmers, and the NRGO Environmental Officer should have the responsibility of working with graziers in the rangelands and forests. The two Officers should be based in the same office to facilitate communication and coordination, and should jointly share the management of the Rural Environment Advisers Network.
4) A Rural Environment Advisers Network (REAN) should be appointed by MOJA and NRGO. The network should be a body of people who already live in rural areas and can acts as advisers and promoters of new ideas. The network members need not necessarily be full time employees could include farmers themselves, NGOs, retired MOJA or DOE officers. The network should be provided with a significant input of training related to sustainable farming practices and should be given specific tasks related to the implementation of the Environmental Education plan for farmers and graziers in a particular area. The network of Advisers should have the remit to visit farms and promote new environmentally sensitive farming practices (such as IPM) organize meetings of farmers and to work with the MOJA Education Centers to assist in providing training courses. They should be involved in spearheading new initiatives such as participatory processes in the relocation of forest graziers.

(5) General Public and Tourists

DOE should establish a Wetland Environmental Action Group (WEAG) to be responsible for coordinating the implementation of the recommendations for the General Public and Tourists. The WEAG should be chaired by the DOE and include representatives from MOJA, NRGO, MOE, ITTO, communities around the Wetland and other stakeholder Groups including NGOs and the Islamic Councils. There should be no more than 15 people on the group. Specific recommendations should be allocated to sub groups of the WEAG as appropriate. For example, CHO should be responsible for working with tourists. The WEAG should also develop a system to allow the participation of local stakeholders, and especially the general public in the management of the Wetland and the implementation of the recommendations in the Master Plan as a whole. Should the Conservancy be established a priority should be to create a process that will give representation to local communities on the management Board. Prior to the establishment of the Conservancy, the WEAG should have not more than 20 members and meet regularly to give feedback to DOE on the management of the Wetland.

(6) NGOs and Journalists

A Green Network for NGOs with an established structure and way of working is already in existence and therefore no new partnerships are required for the implementation of the recommendation for NGO and Journalists.

CHAPTER 4 SUMMARY OF PROPOSED ENVIRONMENTAL EDUCATION PLAN

The proposed projects in the Environmental Education Plan are summarized as follows.

Table 4.1.1 Summary of Proposed Environmental Education Plan

Sum-Components	Proposed Projects/Measures	Executing Organization
Environmental Education	(1) Environmental Education in School 1) Development of an Environmental Education Statement 2) Preparation of a Teacher's Handbook on environmental education 3) Preparation of resources to support environmental education 4) Development of Teacher Training courses 5) Establishment of a Wetland Education Center and programs 6) Establishment of an Eco Schools scheme 7) Establishment of an Environmental Education support network	Ministry of Education, SEG, HEEG
	(2) Environmental Education in Higher Education 1) Review of higher education provision of environmental education 2) Development of new bachelor and masters courses 3) Key university staff to gain international experience through master courses and academic links 4) Development of an international "wetland management" master course 5) Development of "greening" of higher education	
Public Awareness Raising and Participation	(1) Decision Makers 1) Review of current provision and development of an action plan 2) Training for managers and decision makers 3) Preparation of publications for key staff and organizations 4) Training for local government	Ministry of Education, Wetland Professional Development Team, Islam and Environment Group, Business and Environment Association, Rural Environment Group, Rural Advisers Network, Wetland Environmental Action Group
	(2) Religious Leaders 1) Islam and Environment seminars 2) Preparation of a handbook on Islam and environment 3) Preparation of a short leaflet for the general public attending Mosques	
	(3) Business and Industry 1) Business and Environment Seminar series 2) Publications to encourage and support business/industry 3) Pilot business/industry for environmental audits and adoption of environmental management systems 4) More focus on supporting local community environmental initiatives by business	

Sum-Components	Proposed Projects/Measures	Executing Organization
Public Awareness Raising and Participation	(4) Farmers and Rural Communities 1) Review and strategy development 2) Training of MOJA, NRGO,DOE and other organizations 3) Establish a small grant scheme and development a network of demonstration farms 4) Development of environmental courses for farmers 5) Development of a range of appropriate environmentally focused publications and other media for farmers/foresters 6) Pilot organic farming accreditation scheme and sustainable forest management scheme	Ministry of Education, Wetland Professional Development Team, Islam and Environment Group, Business and Environment Association, Rural Environment Group, Rural Advisers Network, Wetland Environmental Action Group
	(5) General Public and Tourists 1) Establishment of a Wetland Information Center 2) Preparation of an annual state of the Wetland report 3) An annual, but large and high profile awareness raising campaign 4) Specific information to be targeted at different groups 5) Establishment of a small grant scheme to support community improvement 6) Development of a range of course by the community learning centers 7) Pilot consultation with the general public on planning issues	
	(6) NGOs and Journalists 1) Increase of NGO participation 2) Training to NGOs in the watershed 3) Establishment of a small grant scheme for NGOs in Guilan 4) Establishment of training course for journalists	

CHAPTER 5 COST ESTIMATE

5.1 Basic Conditions for Cost Estimate

5.1.1 Price Level and Exchange Rate

The price level used is June 30th 2004, and the Exchange Rate used is USD 1= IRR 8,652, JPY= 79.55.

5.1.2 Cost Components

Except for the proposed construction of a Wetland Information Center and Forest Education Center, the environmental education, awareness and participation proposed measures do not involve construction, land acquisition, compensation, engineering or physical contingency costs.

Most cost components can be considered as Operation and Maintenance costs. Costs fall into four categories. Firstly there are Personnel costs. These are usually coordinators salaries or lecturers and trainers fees. The fees include development and training delivery costs. Secondly there are travel and subsistence costs. These costs are associated with Working Group meetings and training events. Materials and publications make up the third element of costs and these fall into the categories of education and awareness raising materials and training materials. Finally there are other costs that cover budget items such as small grant and demonstration schemes and items of equipment for schools, universities, organics farms and so on.

5.2 Project Cost Estimate

The total project cost (initial investment cost) is estimated at 1,175 million Rials, the total operation and maintenance (O&M) cost is estimated at 38,460 million Rials, and a total of 39,435 million Rials are required for the implementation of the environmental education plan. Each cost is shown in the Table 5.2.1. This can be seen as highly cost effective funding especially as much of this funding is not “new” money, but can come from a reallocation of current spending or income generation.

Table 5.2.1 Cost Estimate for Environmental Education Plan

Proposed Projects/Measures	Project Cost (million Rials)	O&M Cost	
		Overall (million Rials)	Average Annual (million Rials/Year)
1. Environmental Education			
(1) Environmental Education in Schools	0	3,324	222
(2) Environmental Education in Higher Education	0	4,838	323
2. Public Awareness Raising and Participation			
(1) Decision Makers	0	2,416	161
(2) Religious Leaders	0	1,052	70
(3) Business and Industry	0	1,825	122
(4) Farmers and Rural Communities	0	9,715	648
(5) General Public and Tourists	1,175	11,140	743
1) Wetland Information Center	(588)	(5,570)	(372)
2) Forest Education Center	(587)	(5,570)	(371)
(6) NGOs and Journalists	0	4,150	277
Total	1,175	38,460	2,564

The budget figures for some components of the Plan include both the development costs and the ongoing costs but not costs involved in the establishment of the Conservancy. For the best use to be made of resources the key organizations involved should be prepared to review their current activities critically and be prepared to reallocate resources. Unfortunately, there is a tendency, once something has been done, to continue doing it regardless of effectiveness. This can be called the "we've always done that" or "we do that every year" approach. Unfortunately these activities often take funding away from activities that might result in a greater impact and take staff time in preparation and delivery that would be better spent on other activities.

For example, DOE already has a budget for public awareness raising, and Government Ministries and Local Administration all have budgets to enable staff to attend meetings, for staff training and so on. A reallocation of current spending after the recommended reviews have been undertaken should therefore be possible. In some case additional funding might be required. For example, extra funding might be needed to support the development of new training courses, but additional funding can be used for staff to attend these courses. For a number of proposed activities such as the Wetland Education Center and Wetland Information Center, the start up of new Higher Education Courses, new funding will be required. This is also the case for new members of staff to be appointed though in some cases reallocation of current staff might be possible.

Some of the activities proposed have the potential for income generation especially after the initial development and pilot phase. For example both the Wetland Education and Information Centers have the potential for charging for services and products. Other

recommended activities such as the Environmental Audits and adoption of Management Systems for businesses and the Organic Farm Accreditation schemes, can also be paid for by the businesses and farms themselves, after the awareness and education programs have convinced the target groups that they such schemes are "good for business" as well as "good for the environment".

The organizations responsible for budgeting will be as follows:

Table 5.2.2 Responsible Organizations for Budgeting

Proposed Measures	Responsible Organization for Budgeting
1.1 Environmental Education in Schools	Ministry of Education
1.2 Environmental Education in Higher Education	Ministry of Higher Education
2.1 Decision Makers	Jointly from the MOJA , NRGO and DOE Education Departments
2.2 Religious Leaders	Islamic Council
2.3 Business and Industry	BEA should be self supporting from subscription after initiation by DOE
2.4 Farmers and Rural Communities	Jointly from MOJA and NRGO Extension Departments
2.5 General Public and Tourists	DOE
2.6 NGOs and Journalists	Green Network accessing funding through grants. DOE to supply funding for Community Officer.

CHAPTER 6 IMPLEMENTATION PROGRAM

6.1 Implementing Organizations

Table 6.1.1 summarizes the organizations responsible for implementation of the proposed measures. It should be noted that these measures should be implemented by concerted efforts of relevant organizations as summarized in Section 3.6, Institutional and Organizational Arrangement.

Table 6.1.1 Organizations Responsible for Implementation of the Environmental Education Plan

Component of the Plan	Implementing Organization
1) Environmental Education in Schools	Ministry of Education
2) Environmental Education in Higher Education	Ministry of High Education
3) Decision Makers	DOE and MOJA
4) Religious Leaders	Islamic Council
5) Business and Industry	DOE then an independent BEA
6) Farmers and Rural Communities	MOJA and NRGO
7) General Public and Tourists	DOE and then the Conservancy
8) NGOs and Journalists	Green Network

6.2 Prioritization of Proposed Projects

6.2.1 Introduction

Each of the activities described in Chapter 3 have been prioritized below. This prioritization has been based on following considerations.

Some of the activities have to be carried out in a particular sequence. This particularly applies to the creation of the Working Groups that will be established to coordinate the activities for each of the stakeholder groups and the development of strategies and action plans. These activities can logically be followed by capacity building, and after this, the development and implementation of specific activities.

To some extent, activities have also been prioritized according to the scale of their impact although this is difficult to do in the case of a number of activities. For example, a high profile awareness raising event for the general public can have a large scale and immediate impact creating a lot of media coverage. However, impact might not be long lasting. Other activities such as the creation of new University courses will take longer to develop and put in place though are more likely to have a long term and long lasting impact. It is often difficult to compare different activities.

Each component of the Environmental Education Plan falls within the responsibility of one or two different organizations listed in the Implementation Schedule. It is therefore possible for the activities for the different target groups to all start within the first five years of the Master Plan without placing unreasonable pressure on any one organization.

Few of the activities require a long lead in time. Many of the activities require the creation of systems, which once established are ongoing for the remainder of the period covered by the Master Plan. Nearly all the new systematic approaches proposed can be in place within ten years. The dates given in the Table below refer to completion dates. In the case of publications for example, the development of the publication might begin one or even two years before the publication is available or in another example, the first organic farm accreditation can only happen at least five years after the scheme has been launched.

Activities have not been prioritized in terms of cost. The total cost of the environmental education plan is relatively small compared with other activities in the Master Plan, and undertaking a cost benefit analysis is not possible with education activities.

6.2.2 Criteria for Prioritization

The projects were prioritized based on the following criteria.

(1) Necessity

Some proposed education measures will be more necessary than others for the long term protection of the wetland.

(2) Urgency of the Action to Protect the Wetland

Some proposed measures might be more important for the short term protection of the wetland.

(3) Efficiency

Some proposed measures will impact on more people for proposed measure cost.

(4) Impact on Environment

All the proposed measures will have an indirect impact on the environment, however some of the targets group will have a larger and more immediate impact than others.

(5) Affordability and Cost

Some proposed measures will be lower cost that others. Some of the required funding can be allocated from current budgets. Each implementing agency will also have to request additional funding from the appropriate government Ministry.

(6) Capacity of the Local Organizations to Implement

Each component of the Environmental Education Plan falls within the responsibility of one or two different organizations listed in the Implementation Schedule. It is therefore possible for most of the activities for the different target groups to all start within the first five years of the Master Plan without placing unreasonable pressure on any one organization. Some organizations will have more internal capacity to implement the proposed measures than others. It is however, a characteristic of environmental education and participation that most stakeholders will require capacity building an essential component of each proposed measure.

(7) Links with National Policy

Some of the proposed measures will be linked directly with national and regional policies and strategies.

6.2.3 Evaluation of Proposed Measures for Prioritization

(1) Results of Prioritization

Table 6.2.1 summarizes the results of the prioritization analysis.

Table 6.2.1 Evaluation of Proposed Measures for Prioritization

Criteria		Necessity	Urgency	Efficiency	Impact on Environment	Cost	Capacity	Policy	Total Score
1	**Environmental Education**								
(1)	Environmental Education in Schools	A	A	A	B	B	B	A	11
(2)	Environmental Education in Higher Education	B	A	A	B	C	B	A	9
2	**Public Awareness Raising and Participation**								
(1)	Decision Makers	A	B	A	A	B	B	A	11
(2)	Religious Leaders	B	C	B	B	A	C	C	5
(3)	Business and Industry	A	B	B	A	A	C	B	9
(4)	Farmers and Rural Communities	A	A	A	A	B	B	A	12
(5)	General Public and Tourists	A	B	B	A	C	B	A	9
(6)	NGOs and Journalists	B	C	B	B	A	B	A	8

(2) Categorization of Proposed Measures

In Iran, development activities are planned and implemented according to the 5-year development plans. Thus, the proposed measures are to be implemented according to the short-, mid- and long-term 3 terms as summarized in Table 6.2.1.

Table 6.2.2 Categorization of Proposed Measures

Term	Implementation
Short-term Measures	To be commenced in the 4th 5-year Development Plan (2005-2009)
Mid-term Measures	To be commenced in the 5th 5-year Development Plan (2010-2014)
Long-term Measures	To be commenced in the 6th 5-year Development Plan (2015-2019)

Table 6.2.3 classified the proposed measures into these three terms based on the results of the prioritization.

Table 6.2.3 Terms of Implementation of Proposed Measures

Item	Short Term Measure (2005-2009)	Medium Term Measure (2010-2014)	Long Term Measure (2014-019)
Environmental Education in Schools	Appointment of Environmental Education Officer Establishment of Schools Environment Group (SEG) Development of an Environmental Education Statement. Preparation of a Teacher's Handbook on environmental education Resources - A poster on the Wetland produced In service teacher training course offered Establishment of a Wetland Education Center and programs	Resources – web site established; text book produced Pre service teacher training course in place How to be an EE Trainer course in place Establishment of an Eco Schools scheme Establishment of an Environmental Education support network and the role of NGOs.	Resources – other resources
Environmental Education in Higher Education	Establishment of Higher Education Environment Group (HEEG) Review of Higher Education provision of Environmental Education Development of new Masters Courses Key University Staff to gain international experience through Masters Courses and Academic Links	EE integrated into key subjects Key University Staff to gain international experience and Academic Links Development of an international "Wetland Management" Masters course in partnership with the Ramsar Convention Bureau and other International Partners	Development of the "Greening" of Higher Education
Decision Makers	Establishment of Wetland Professional Development Group (WPDG) Review of current activities and development of an Action Plan Training of Managers and Decision Makers Preparation of publications for key staff and organizations on awareness raising and participation	Training in place for Local Government Preparation of publications for local government	
Religious Leaders	Islam and Environment Group (IEG) Islam and Environment Seminars Leaflets produced for those attending the Mosques	Environment seminar series integrated into training courses for religious leaders Handbook on Islam and Environment	

Item	Short Term Measure (2005-2009)	Medium Term Measure (2010-2014)	Long Term Measure (2014-019)
Business and Industry	Business and the Environment Seminar Series established Business Environment Association established (BEA) Newsletter produced BEA to produce publications	Businesses/industries should be selected for environmental audits and adoption of environmental management systems	More focus on supporting local community environmental initiatives by businesses
Farmers and the Rural Communities	Rural Environment Group (REG) Established Environment Officers appointment by MOJA and NRGO. Review and Strategy Development after High Level Seminar Establishment of Rural Advisors Network (RAN) Training of MOJA, NRGO, DOE and other organizations Establishment of a small grant scheme and a network of demonstration farms Development of environmental courses for farmers Development of a range of appropriate environmentally focused publications and other media for farmers/foresters	Pilot an organic farming accreditation scheme and sustainable forest management scheme	
The General Public and Tourists	Wetland Environmental Action Group (WEAG) established. Establishment of a Wetland Information center. Preparation of an Annual State of the Wetland Report by DOE An annual single, but large and high profile awareness raising campaign. Specific information to be targeted at different groups Development of a range of courses by the Community Learning Centers	Establishment of Forest Education Center A small grant scheme to support community improvements Pilot consultation with the general public on planning issues	
NGOs and Journalists	Increasing NGO participation Training to NGOs in the Watershed A small grant scheme for NGOs in Guilan Training Course for Journalists Appointment of an NGO and Community Development Officer in the Green Network		

6.3 Implementation Schedule

The implementation schedule of the proposed measures are as shown in Table 6.3.1.

Table 6.3.1 Proposed Implementation Schedule of Environmental Education Plan

Proposed Measures		Fourth 5-year Plan Period					Fifth 5-year Plan Period					Sixth 5-year Plan Period				
		2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
ENVIRONMENTAL EDUCATION PLAN																
1. Environmental Education																
(1)	Environmental Education in Schools - Sub-measures 1) - 5)															
	Environmental Education in Schools - Sub-measures 6) - 7)															
(2)	Environmental Education in Higher Education. - Sub-measures 1) - 3)															
	Environmental Education in Higher Education - Sub-measures 4)															
	Environmental Education in Higher Education - Sub-measures 5)															
2. Public Awareness Raising and Participation																
(1)	Decision Makers - Sub-measures 1) - 4)															
(2)	Religious Leaders - Sub-measures 1)															
	Religious Leaders - Sub-measures 2) and 3)															
(3)	Business and Industry - Sub-measures 1)															
	Business and Industry - Sub-measures 2) - 4)															
(4)	Farmers and Rural Communities - Sub-measures 1) - 5)															
	Farmers and Rural Communities - Sub-measures 6)															
(5)	General Public and Tourists - Sub-measures 2) - 4)															
	General Public and Tourists - Sub-measures 1) and 5) - 7)															
(6)	NGOs and Journalists - Sub-measures 1) - 4)															

6.4 Priority Measures

According to the evaluation, priority measures are:

- Environmental Education in Schools
- Decision Makers (awareness and public participation)
- Farmers and Rural Communities (awareness and public participation)

Each project includes a number of activities proposed in Chapter 3 with the purpose of linking capacity building with the delivery of a specific measurable output and outcomes. It is often the case that capacity building that is not linked immediately to the application of new skills and competencies, does not result in long term change. The projects proposed below use a different model of the direct and immediate application of new skills.

6.4.1 Environmental Education in Schools and Universities

An environmental education project will involve activities and outputs described below. These have been proposed so that the work established as part of the Anzali Wetland Study can be continued and developed. These should be developed by the SEG, external consultants and coordinated by the Environmental Education Officer.

(1) Activities

Year One

1) The Ministry of Education, working with DOE should establish a Schools Environment Group. The Ministry of Education should also appoint a full time Environmental education Officer.
2) Training for the SEG, the Environmental Education Officer and the Wetland Teaching Expert Group (already established as part of the environmental education pilot activity for the Wetland Education Program). The training can be provided by an appropriate mix of national and international trainers. For the environmental education officer more substantive training will probably be required and this include substantial training experience overseas as national capacity is not really available to provide this completely.
3) The Ministry of Education and the SEG should appoint environmental education coordinators in each school as part of the project. The will probably be geography of biology teachers. It is proposed that during this project the focus is on Guidance and High Schools.
4) The SEG should develop an environmental education statement.
5) The SEG should co-ordinate the development of a short training course for teachers.

Year Two

1) Delivery of the training program for teachers
2) Development of a short Teachers Handbook and/or supporting resources for teachers. This will involve the SEG working with both national and international consultants to write the materials through a series of writing workshops and piloting of outputs in schools.
3) Continued development of the Wetland Education Program by the Wetland Teaching Experts, supported by the SEG and national and international consultants.
4) Review and evaluation of the project based on a baseline survey undertaken at the start of the project. This could be a repeat of a survey already undertaken by the DOE in 2004.

(2) Expected Outputs

1) Environmental Education Statement produced and circulated to all schools in Guilan.

This should be a short leaflet style document that explain clearly what environmental education is, and provide some stimulus ideas on how environmental can be taught in schools. The statement should be based on current international statements developed by UNESCO, adapted for an Iranian context, and should be seen very

much as a first step to create an awareness amongst teachers and raise an interest in environmental education. It should not be seen as a theoretical document covering all aspects of environmental education.

2) An In-Service Teacher Training course.

An in-service training course on environmental education should be developed and provided by the Ministry of Education Human Resources Department at the Provincial Education Center. This should be a two day package and the Environmental Education coordinators appointed in each school should be the first to attend the course. The course should cover the basic principles of environmental education and ideas for classroom teaching. The course should be practically orientated, and it is likely that international expertise will be required to support the development of the course as no such course currently exists in Iran. A locally developed course will have a wetland and watershed focus. The course should be delivered at the Wetland Education Center and have a practical focus, including elements of fieldwork.

3) Teacher's Handbook on environmental education or additional supporting resources for environmental education.

It is difficult to be precise about the nature of additional materials to be produced as part of this project. During the Study different messages were given by different education stakeholders. Stakeholders have stated the need for both a general handbook on environmental education and more teaching resources to support environmental education in a practical way in the classroom. The SEG and Ministry of Education should decide during the first year of the project what would be most appropriate and would best meet local needs.

If a Teachers Handbook on Environmental Education is produced it should take a general approach and be aimed at teachers from Elementary, Guidance and High Schools of all grades of students. It should contain short general information about local national and global environmental issues, how to teach environmental education in different subjects, provide advice on effective teaching methodologies for environmental education, contain a list of resources to use and local NGOs and organizations that can support environmental education in the watershed. A copy should be provided for each school. The book should be no more that 75 pages long (otherwise teachers will not read it!) and take a practical approach.

Resources to support environmental education could take a number of different forms and again would depend on feedback from teachers. To begin with short text book should be produced on "The Anzali Wetland" and should be used to support teaching of the regional Guilan element of the Curriculum in High Schools and in other subjects as appropriate. The text book should be designed in such a way as to encourage

student-centered learning.

4) Further Wetland Education Program

The Wetland Teaching experts will develop other programs that will be offered to schools that wish to bring groups of young people to the wetland. These should be half day or one day courses linked to the geography and biology curricula of the Guidance and High Schools.

5) Evaluation Report.

The DOE undertook a major survey of students in the province in 2004 giving questionnaires to over 2000 students to assess levels of knowledge and understanding about a broad range of environmental issues. This provides an excellent baseline study for comparing the effectiveness of the activities proposed in this project. Additional questions will seek feedback on the other aspects of this project.

(3) Concrete targets

The concrete targets proposed for this project are

- The establishment of a full time Environmental Education Officer, a SEG consisting of up to ten people.
- Together with the Wetland Teaching Experts these groups should have at least 20 days of training over the two year period of the project
- At least 35% of schools in the wetland should appoint an environmental coordinator by the end of the project (around 250 schools) and the majority of these should be trained.
- 1000 copies of the leaflet should be produced and circulated to the 750 schools in and around the wetland
- 1000 copies of the teaching resources should be produced and circulated to the 750 schools in and around the wetland
- The Wetland Teaching Experts should develop ten documented teaching programs to be delivered from the Wetland Education Center.
- At least 1000 students and 150 teachers should attend courses at the Center in 2006.

6.4.2 The General Public

This proposed project is developed from one of the pilot activities and the priority short term proposal in the Education Master Plan. These both respond to a number of key needs for training and raising awareness including the fact that many awareness campaigns tend to be relatively small scale and relatively general with a very wide message. The proposal also links the training of two of the Working Groups and working with communities and will therefore provide a stimulus for the Working Groups to cooperate in a multi sector partnership.

(1) Activities

Year One

1) DOE should establish a Wetland Environmental Action Group (WEAG). The composition of this group has been described elsewhere in this report. The Wetland Professional Development Team (WPDT) should also be established.
2) Training should be provided to these groups by national and international experts on Communicating with the General Public and the development of Environmental Awareness Campaigns. There is a foundation for these courses in the professional development programs currently offered by DOE and MOJA to their staff.
3) The WEAG should develop a plan for the on going production of the Wetland State of the Environment Report.
4) The WEAG should identify a key issue of the wetland and develop a plan for a Wetland Awareness Campaign and produce appropriate materials.
5) As a result of the training and working closely with national and international experts the WPDG should produce two documented courses that can be

Year Two

1) The Campaign should be delivered by the WEAG and include the distribution of the State of the Environment Report
2) Review and evaluation of the Campaign and feedback on the State of the Environment Report.
3) The Professional Development Courses should be offered to DOE, MJA and NRGO staff as part of the on going professional development program.

(2) Expected Outputs

1) Training for the WEAG and WPDG

The members of the WEAG and WPDG should attend at least five days of formal training on the development of the State of the Wetland Report and Campaign Planning. The training should be delivered by national and international experts. It is proposed that these experts should provide in going support during the planning of the campaign and during the development of the professional development courses.

2) Preparation of an Annual State of the Wetland Report

DOE should produce an annual "State of the Wetland" Report in an attractive and popular format. This Report should contain information about the wetland presented in the form of environmental quality indicators related to different aspects of the wetland environment. Each year the Report should show graphically whether each indicator is getting worse, staying the same or getting better, using for example, a traffic light system. The report should be simple and should be available as a full

report to the general public, as a small leaflet. It should also be reproduced in full by local newspapers.

3) The Campaign

The campaign should be planned with the support of national and international experts and should concentrate on making a big impact on a very specific theme. The theme should be identified by the WEAG and should focus on both raising awareness and offering suggestions for new behavior. The campaign should be run during the period of a week and should involve coordinating a number of focused activities to promote the theme. These activities could include all schools in the region spending morning learning about the theme of the campaign, radio and television broadcasts each day, and community events, perhaps focused on the visit of an Eco Bus to different key locations during the week. The week could be concluded by a large scale environmental fair or event in one of the parks in Rasht or Anzali. The Statement of the Environment Report should be distributed at the events and the theme of the campaign should focus on one of the aspects of the environment in need of major improvement.

4) Professional Development Courses

During the project the WPDT should develop documentation and program for two courses – one of "Effective Awareness Raising" focusing on the process of campaign development, and the other on "Effective Information Communication" focusing on communication of environmental information through different media, and using the State of the Environment Report as a case study.

(3) Targets

- The WEAG and WPDT should attend at least five days for formal training.
- The State of the Environment Report should be reproduced in full in all major newspapers of the province as a full page feature.
- 25000 copies of the State of the Environment Report should be produced and distributed at the awareness campaign events.
- Campaign should be organized with the goal of reaching 100000 people directly taking part in an activity and 250000 being aware of the campaign. The campaign will involve the setting of additional targets related to media and press coverage of the theme and events.
- Two training courses should be run for DOE, MOJA and NRGO staff during the second year of the project with the goal of at least 25 key staff members attending.

6.4.3 Business and Industry

A third priority project would be to start work with business. Environmental awareness of

business is at a very low level and a relatively simple project would be for the DOE to run a series of Business and Environment seminars on different topics over a period of six months. The DOE should have a target of running one seminar a month during this period. The seminars should be developed by the DOE with the support of national and international experts and tackle key topics related to the Master Plan where the Plans require action by business. For example, solid waste, and waste water are two critically important areas.

During the seminars the idea of the establishing a Business Environment Association raised and discussed with participants. One of the purposes of the series of seminars would be to create initiative from within the business community itself for the formation of such a group. BEA's cannot successfully be run by people other than business leaders themselves. Hence the seminars should be practical, give businesses real ideas for environmental improvement without putting under pressure on the businesses from a legislative and financial perspective. The seminars should be delivered by credible people. They should not be delivered by environmental experts, but by business people who have a track records either in Iran or other countries of both running a successful business and at the same time demonstrating environmental consciousness and business behavior.

The goal would be to attract at least 25 businesses to each event, and the events would need to be organized in a way that allows the maximum number of businesses to attend.

6.4.4 Priority of Projects in the Case of Different Budget Scenarios

The tables below shows the short term activities in order of priority should funds for all activities not be available, and the estimated funding required for the high priority activities. The criteria for this prioritization are:

1) The establishment of the Working Groups and initial reviews of needs. Without these it will be not be possible to coordinate future work. The reviews of needs will confirm the activities proposed in the Master Plan
2) The appointment of people in MOE, MOJA and DOE. In the experience of other countries the appointment of people with specific responsibilities for education, awareness and participation provides an important stimulus for the development of future work.
3) The third priority is the development of capacity building courses for those working with the stakeholder groups. Enhanced capacity is the foundation for future development.
4) The fourth priority is the production of publications to support both the capacity building and the future development of environmental education. Resources are important for each stakeholder group to both disseminate good practice and ideas more widely and to encourage further professional development of decision makers and practitioners.

The total budget for the Short Term High Priority activities is 6,627.5 million Rials or around 0.78 million US dollars of new money required. This is just over 155,000 US dollars a year for five years. As indicated above, some of this money can be recouped through income generation, but it is difficult to predict the exact proportion at this stage.

Table 6.4.1 Priority of Short Term (2005-2009) Activities

Item	High Priority	Medium Priority	Lower Priority
Environmental Education in Schools	Appointment of Environmental Education Officer Establishment of Schools Environment Group (SEG) Development of an Environmental Education Statement. Preparation of a Teacher's Handbook on environmental education Resources – a poster on the Wetland produced In service teacher training course offered Establishment of a Wetland Education Center and programs		
Environmental Education in Higher Education	Establishment of Higher Education Environment Group (HEEG) Review of Higher Education provision of Environmental Education Development of new Masters Courses		Key University Staff to gain international experience through Masters Courses and Academic Links
Decision Makers	Establishment of Wetland Professional Development Group (WPDG) Review of current activities and development of an Action Plan Training of Managers and Decision Makers Preparation of publications for key staff and organizations on awareness raising and participation		
Religious Leaders	Islam and Environment Group (IEG) Islam and Environment Seminars	Leaflets produced for those attending the Mosques	
Business and Industry	Business and the Environment Seminar Series established Business Environment Association established (BEA) BEA Newsletter produced	BEA to produce publications	
Farmers and the Farming Community	Rural Environment Group (REG) Established Environment Officers appointment by MOJA and NRGO. Review and Strategy Development after High Level Seminar Training of MOJA, NRGO, DOE and other organizations Establishment of Rural Advisors Network (RAN) Establishment of a small grant scheme and a network of demonstration farms	Development of a range of appropriate environmentally focused publications and other media for farmers/foresters	Development of environmental courses for farmers
The General Public and Tourists	Wetland Environmental Action Group (WEAG) established. Preparation of an Annual State of the Wetland Report by DOE An annual single, but large and high profile awareness raising campaign.	Specific information to be targeted at different groups Development of a range of courses by the Community Learning Centers	Establishment of a Wetland Information center.
NGOs and Journalists	Appointment of a Community and NGO Development Officer Increasing NGO participation in official Committees and Groups Training to NGOs in the Watershed Training Course for Journalists	A small grant scheme for NGOs in Guilan	
Estimated budget			