E.3.2. Environmentally Conscious Products

a. Knowledge of environmentally conscious products(Q-5, Q-6 and Q-8)

Quite a big proportion of the sample say that they know or have heard of environmentally conscious products **(73.1%)**.

The knowledge is really good among the **institutions** interviewed, where the percentage comes to **98.7%**, while among the **people** living near landfills or potential landfills, the knowledge is low, only **47.4%** have heard about these type of products, that means, that 52.6% do not know these products.

Those who know environmentally conscious products, mention in the first place aerosols, sprays and deodorants, then detergents, followed by recyclable paper and bottles. This shows a reasonable knowledge about what these products are about, but one has to consider that this is mainly due to the institutions interviewed, where we have people with education and also with environmental concern.

Regarding environmentally conscious companies, Torre, Opción verde, Indus Lever and CMPC are mentioned most. It is interesting to observe that **60,9% of the people** who affirm to know environmentally conscious products, **are not capable of mentioning company names.**

b. Opinion about environmentally conscious products and companies who produce environmentally conscious products (Q-7 and Q-9)

Those who knew environmentally conscious products, were also asked about what they actually do in their daily life, in terms of purchasing them.

Generally there is not a great enthusiasm about buying them, since only **30.8%** say that they buy them even if they are a little bit more expensive than ordinary products, and another **32.6%** say that they only buy them if the price is the same. Another important group does not really believe that they are environmentally conscious products.

The interest in buying these products, even at a higher price, is a lot more among the people belonging to the institutions interviewed, especially the NGO's and the politicians.

In general, people believe that companies which produce or are at least trying to

produce environmentally conscious products, are correct companies, which should be imitated (44.9%), but nonetheless an important number do rather think that these companies gain profits and use the environmental issue as a tactic to develop more their business.

This means that there exists little confidence in the companies which produce environmentally products, and people are rather suspicious of their sincere environmental orientation.

c. Beer Consumption (Q-10, Q-11, Q-12 and Q-13)

As far as beer consumption is concerned, the majority buy **bottled beer (64.3%)**, and only **2.6%** buy **canned beer**, which is very expensive in Chile. A good number declare themselves as not being beer drinkers (33.1%).

Those who buy bottled beer, give as the main reasons: it is cheaper and it is more in quantity. In the third place they mention, that it is **more environmentally friendly (15.7%)** and the **bottle can be reused (15.2%)**, which shows some environmental concern.

Those who buy canned beer (only 8 people of the sample) say that the main reasons are: it is more convenient to carry and it has better flavor.

The ones who buy bottled beer and give as reasons "it is cheaper" or "it is more environmentally friendly", seem to have little desire to change, even if the price (1 liter) of bottled beer is raised to the level of canned beer. They are very convinced about the type of beer they buy at present. Even at a higher price a good number of them will carry on buying bottled beer.

d. Soft drink Consumption (Q-14, Q-15, Q-16 and Q-17)

In relation to soft drink purchase, the majority buys usually **plastic bottled (86.3%)**, and only a small number buys **glass bottled (8.8%)**. This is due to the fact that in the Chilean market glass bottled drinks are basically not existing any more, except in mineral water.

Hence the main reason for buying plastic bottled drinks, is **"it is most common" (62.8%)**, followed by **"it can be returned" (16.0%)**. The few people who buy glass bottled drinks, mention as the main reasons: more environmentally friendly (29.6%)

and "recyclable" (25.9 %), which reflects some environmental consciousness.

e. **Knowledge of no-phosphate and phosphate detergents (Q-18, Q-19 and Q-20)**

As regards detergents used for washing clothes and for cleaning dishes, the majority does not know the difference between phosphate (conventional) and no-phosphate detergents. **Only 29.5%** of the total sample knows this difference.

We can observe an important difference between **institutions** and **homes,** with a knowledge of **40.9%** and **18.2%** respectively. The knowledge of the difference between the detergents is especially well perceived among the **NGOs,** coming to **66.7%.** This is quite logical, since the NOGS chosen work in issues related to environment and have, hence, a better developed consciousness.

But when we asked about the actual use of detergents in the homes of the interviewed, the situation is not very promising, not even among the NOGS.

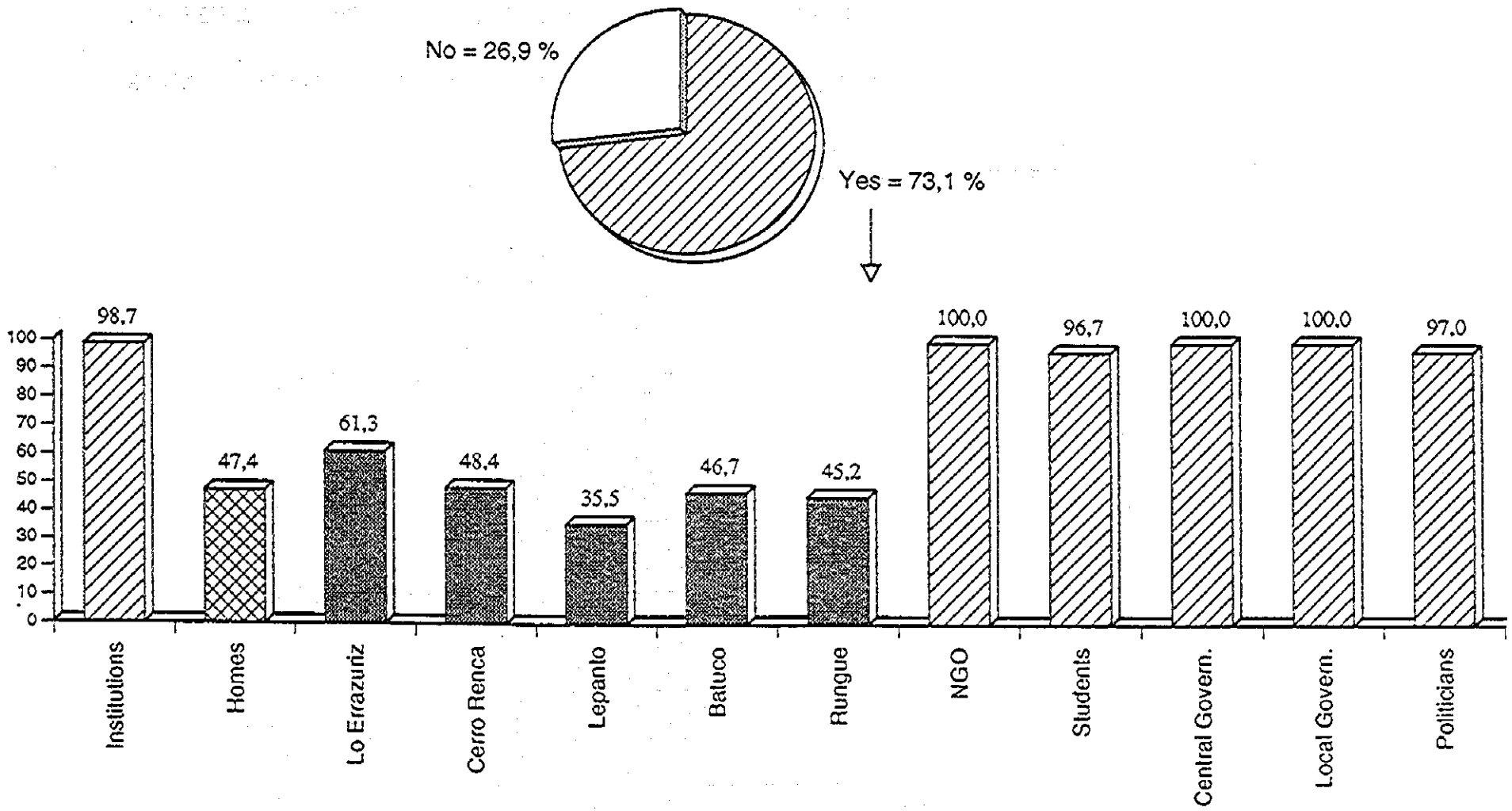
Only 11.4 % say that no-phosphate detergents are being used in their **home: institutions (22.1%)** and homes **(0.6%)**.

The NOGs, as it is to expect, use in the highest proportion no-phosphate detergents **(43.3%)**.

The main reason given for buying phosphate detergents, is **"it is better for washing" (65.3%)** and it is **cheaper (21.1%)**.

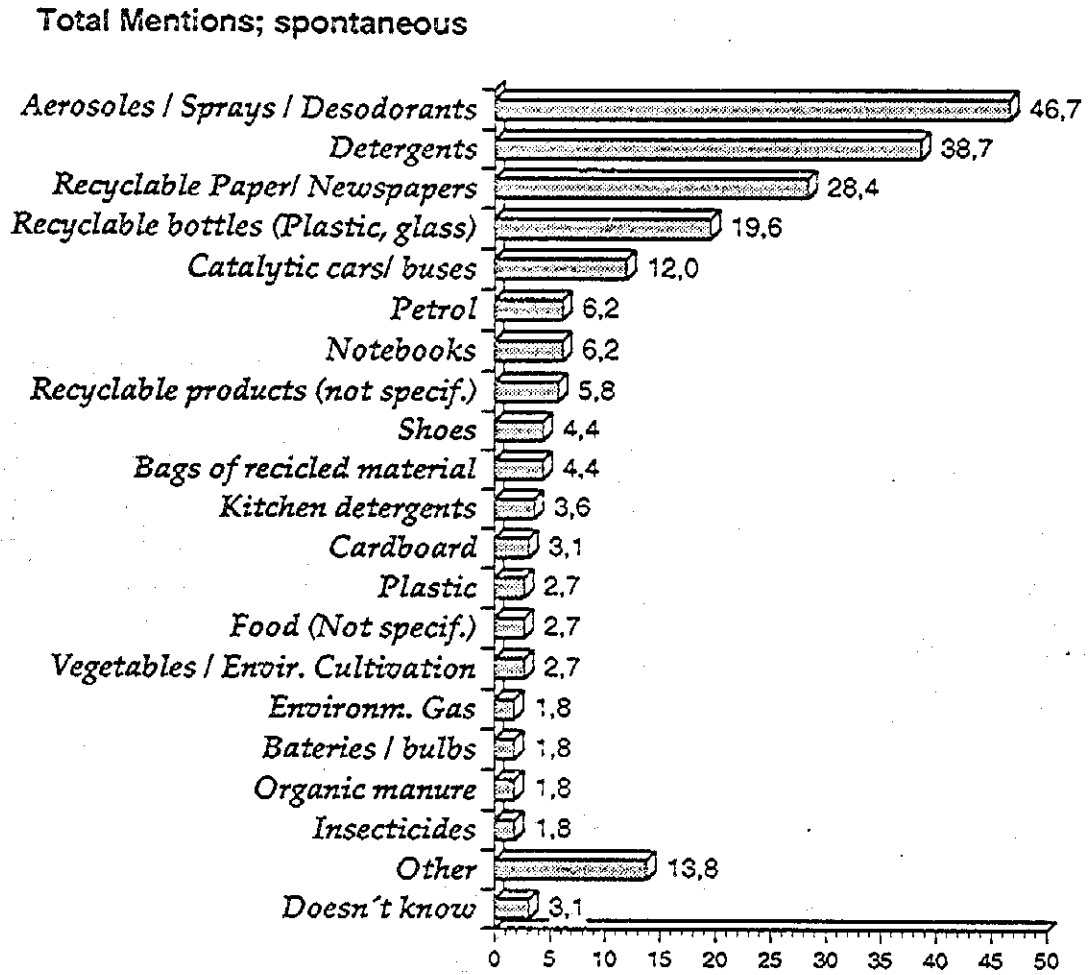
The few who buy no-phosphate detergents, mention that they do it mainly because **"it is environmentally friendly (60.0%)"**, which is a sign of the presence of environmental consciousness.

But, in general terms, one may conclude that, although **the knowledge is very low,** there is also **a certain gap between what the people know and what they actually do.** A lot of education in this point is needed.



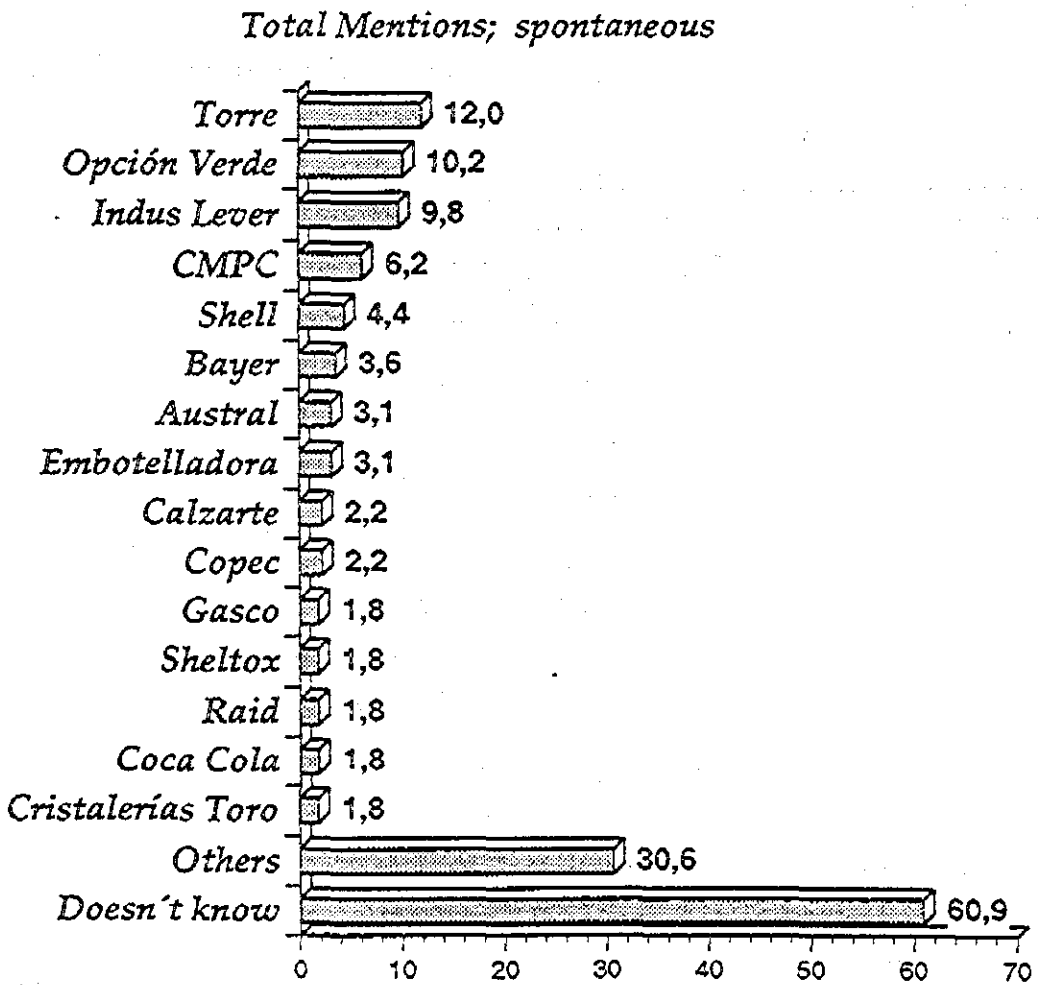
Total Sample :308

Figure E.3.2a Do you know "Environmentally Conscious Products"?



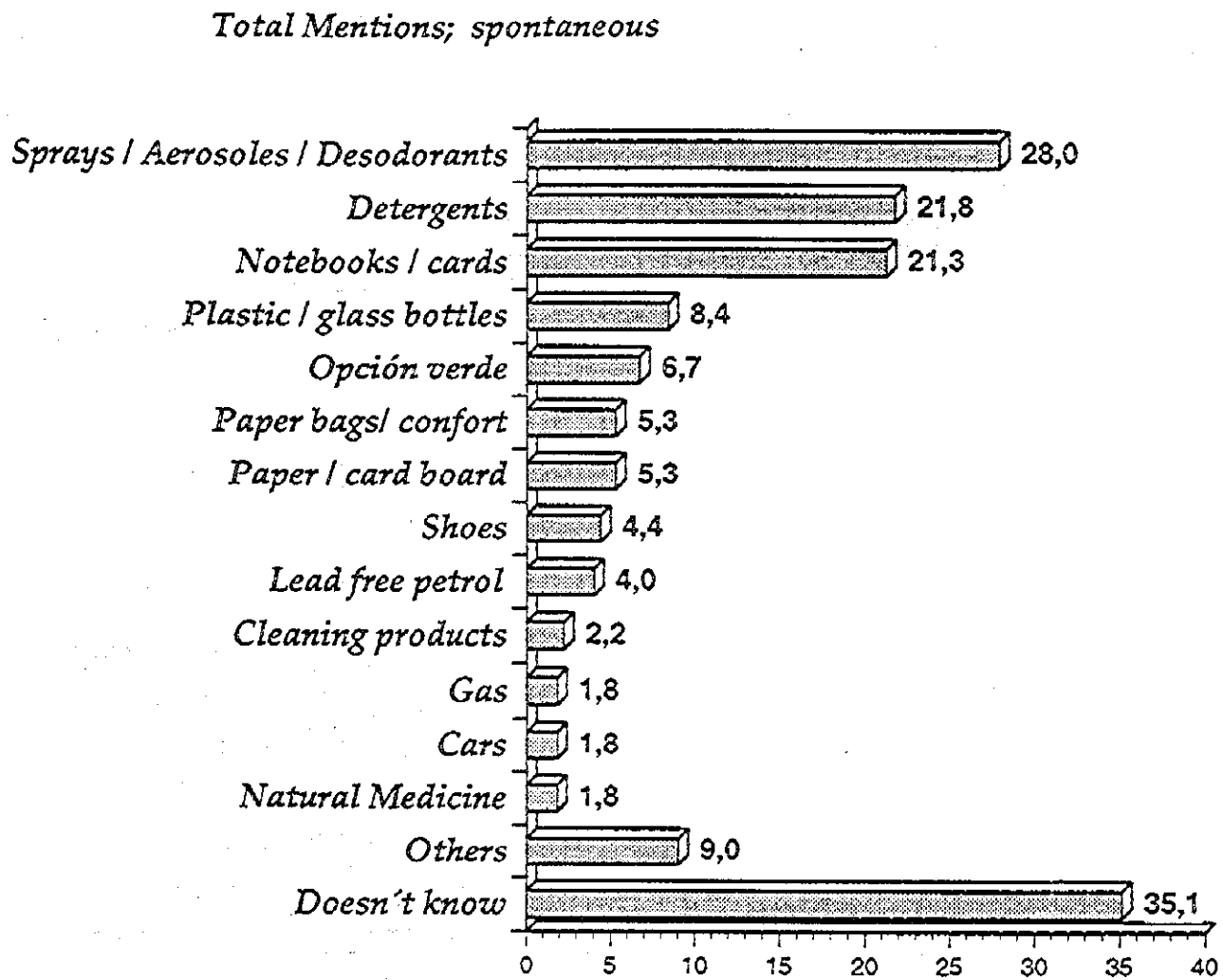
Sample : Those who know Environmentally Conscious Products = 225(73.1%)

Figure E.3.2b Please list some of these Environmentally Conscious Products



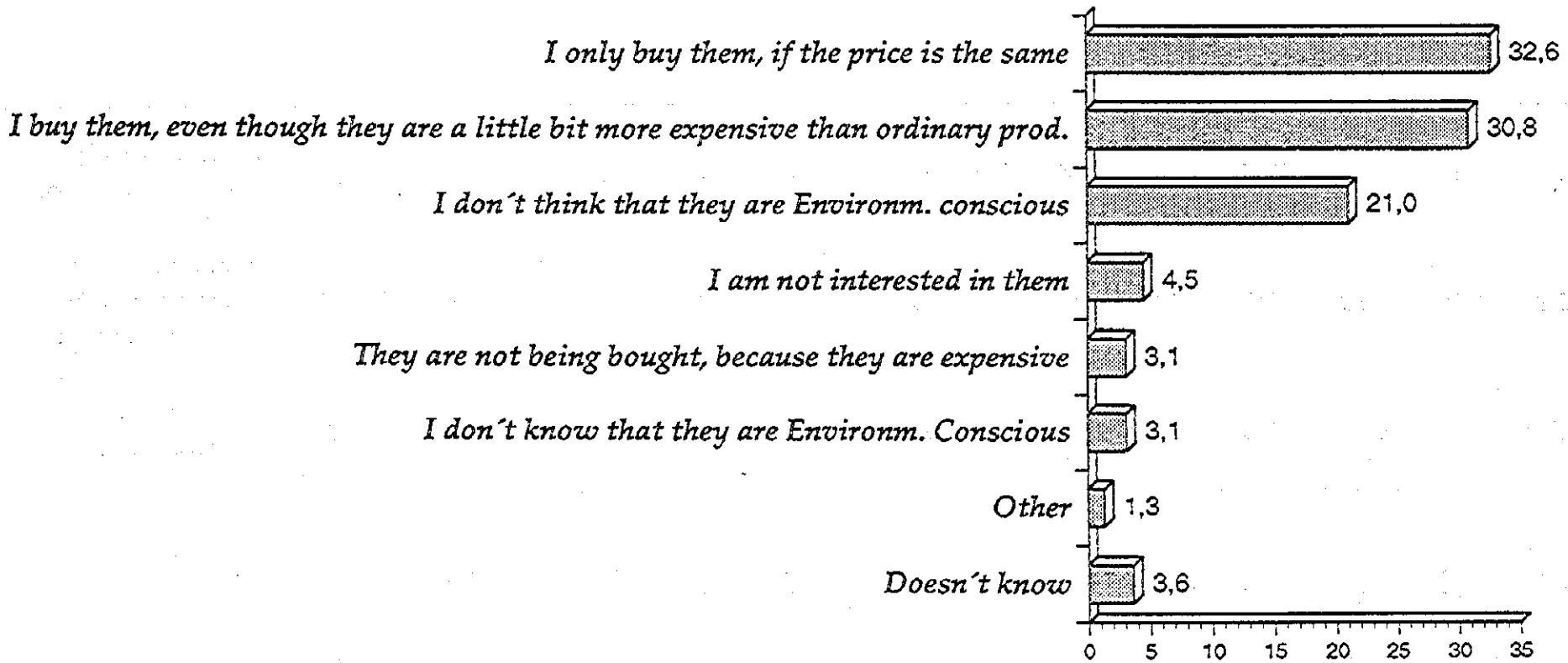
Sample : Those who know Environmentally Conscious Products = 225(73.1%)

Figure E.3.2c When you hear "Companies that produce Environmentally Conscious Products " which companies do you think of?



Sample : Those who know Environmentally Conscious Products = 225(73.1%)

Figure E.3.2d When you hear "Companies that produce Environmentally Conscious Products", which products do you think of ?



Sample : Those who know Environmentally Conscious Products = 225(73.1%)

Figure E. 3.2e What is your opinion regarding Environmentally Conscious Products ?

Table E.3.2a What is your opinion regarding Environmentally Conscious Products ?

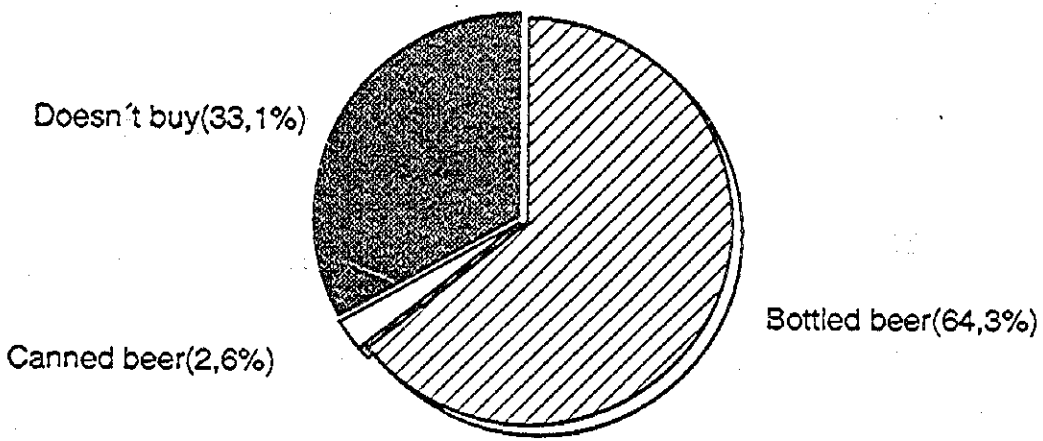
Sample : Those who know Environmentally Conscious Products = 225(73.1%)

	Total	Instit.	Homes	Lo Erraz.	Cerro Renca	Lep.	Bat.	Rung.	NGO	Stud.	Cent. Gov.	Loc. Gov.	Polit.
I only buy them, if the price is the same	32,6	31,8	34,2	26,3	40,0	63,6	28,6	21,4	20,0	37,9	32,3	48,3	21,9
I buy them, even though they are a little bit more expensive than ordinary	30,8	38,4	15,1	10,5	6,7	0,0	42,9	14,3	46,7	24,1	38,7	34,5	46,9
I don't think that they are Environm. conscious	21,0	22,5	17,8	21,1	13,3	27,3	0,0	28,6	20,0	27,6	19,4	13,8	31,3

Table E.3.2b What impression do you have on Companies that produce or try to produce Environmentally Conscious Products ?

Sample : Those who know Environmentally Conscious Products = 225 (73.1%)

	Total	Instit.	Homes
Correct companies, which should be imitated	44,9	45,6	43,6
These companies can further develop their business share and gain profits	27,6	32,0	19,2
Deceptive tactics of company's propaganda	23,1	19,0	30,8
Doesn't have an idea / no answer	4,4	3,4	6,4



Total Sample : 308

Figure E.3.2f What type of beer do you usually buy ?

Total Mentions ; spontaneous

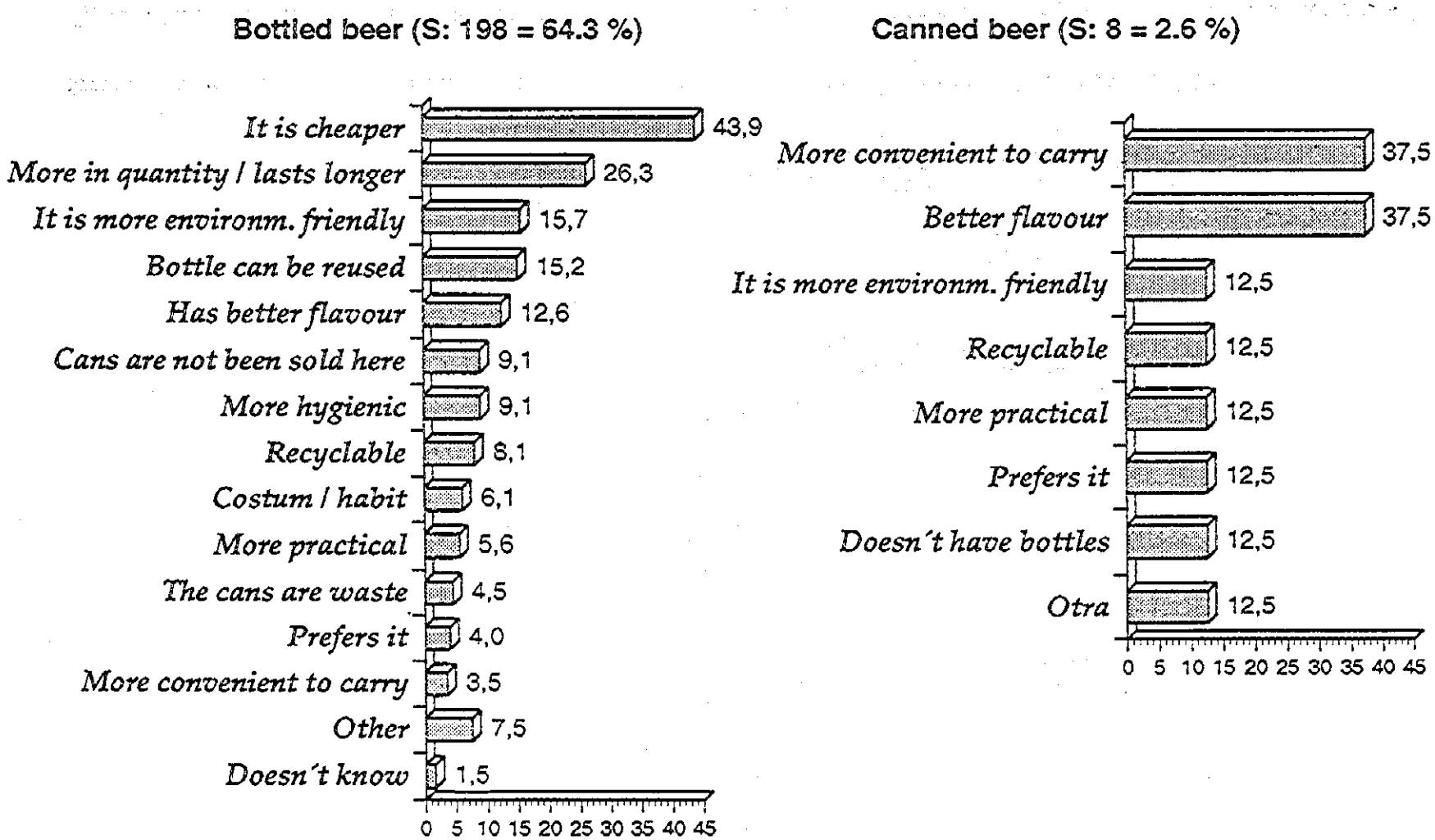
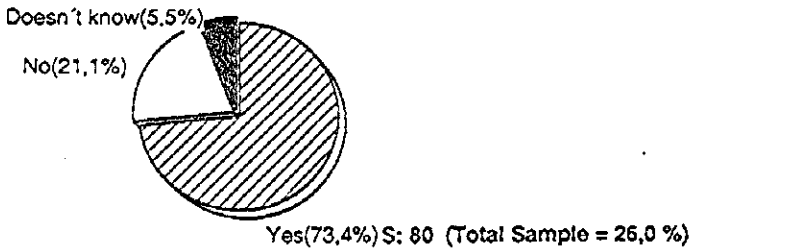
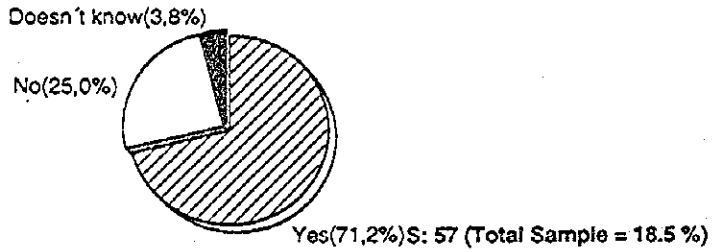


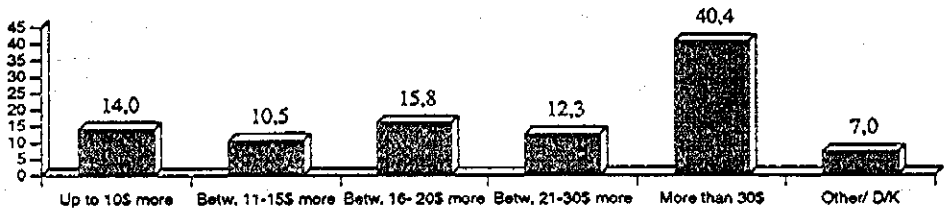
Figure E.3.2g Reasons for buying bottled or canned beer



Do you still buy bottled beer, even if the price is higher than that of canned beer?

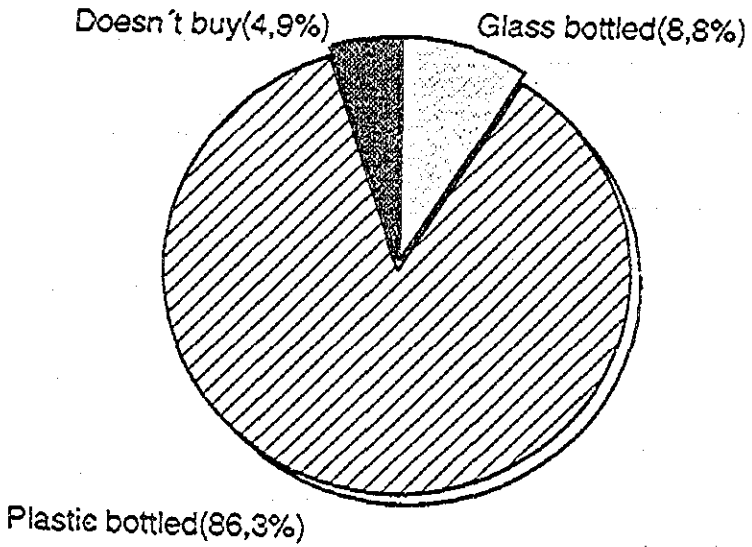


Up to what price difference do you still buy bottled beer?



Sample : Those who buy bottled beer and give the reasons: cheaper and it is more environmentally friendly = 109(35.4 %)

Figure E.3.2h If, the future, deposit fee for bottled beer is terminated and, furthermore, the price (e.g. 1 liter) of bottled beer is raised the same as that of canned beer, do you still buy bottled beer ?



Total Sample : 308

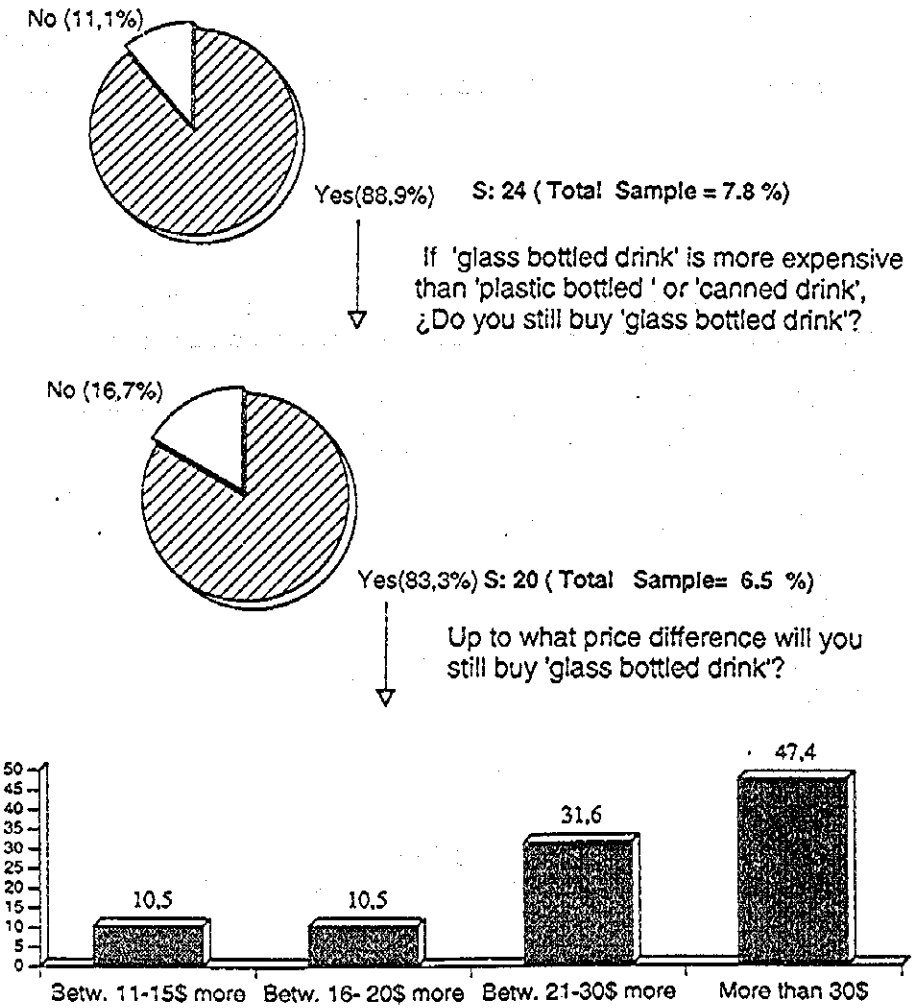
Figure E.3.2i As for soft drinks, which do you usually buy in your home, 'glass bottled' , 'plastic bottled' or 'canned' ?

Table E.3.2c Reasons for buying usually 'Glass bottled' or 'Plastic bottled'

Sample : Those who buy soft drinks = 293 (95.2%)

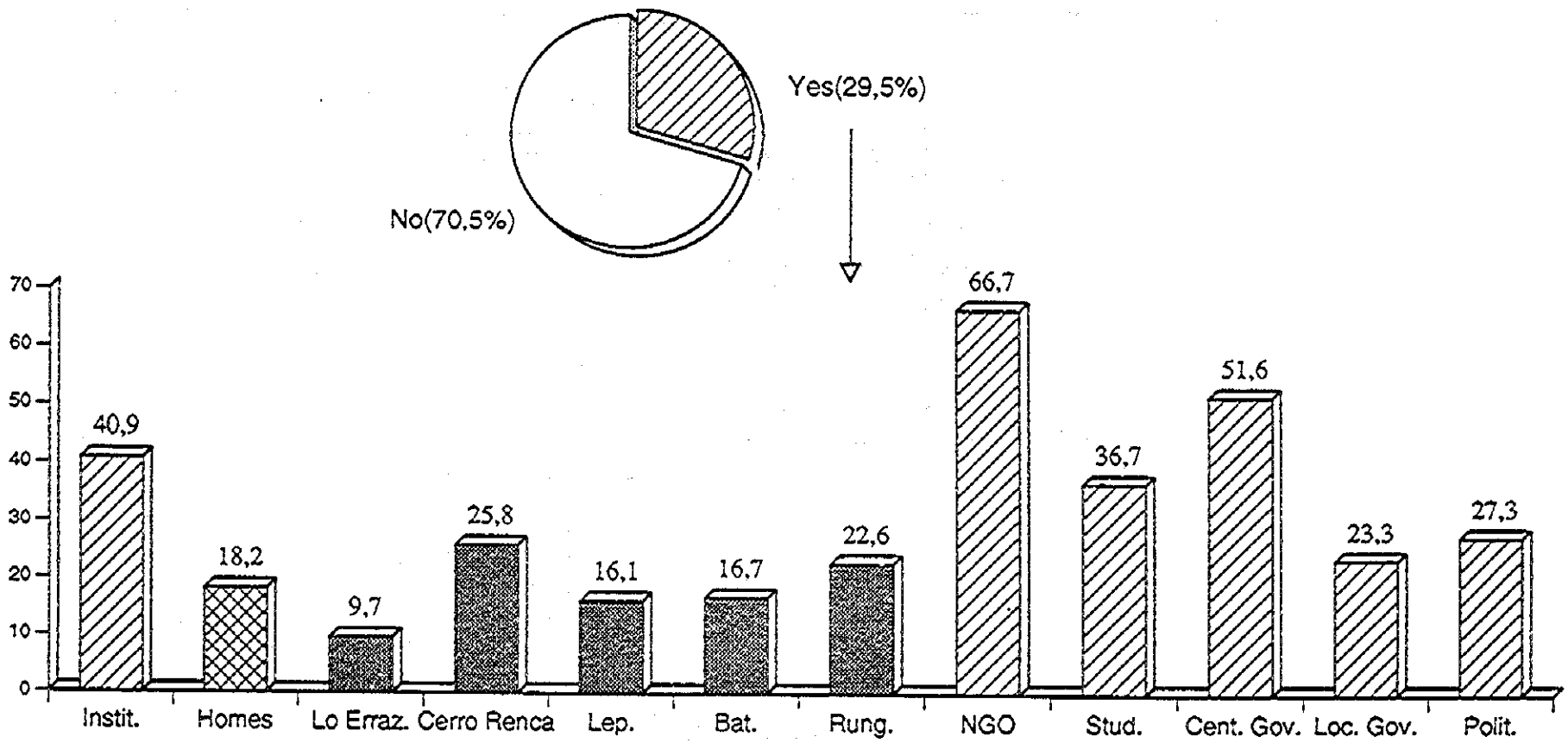
Total Mentions; spontaneous

	Total	Glass bottled	Plastic bottled
		S: 27	S: 266
Is most common	62,8	7,4	68,4
Can be returned	16,0	18,5	15,8
More convenient to carry	14,3	3,7	15,4
Cheaper	14,0	18,5	13,5
More resistent	13,0	3,7	13,9
More practical	8,9	0,0	9,8
Recyclable	7,8	25,9	6,0
More Environm. friendly	7,2	29,6	4,9
They are light	7,2	0,0	7,9
Bigger / enough for everybody	4,8	3,7	4,9
Just be be thrown away	3,8	3,7	3,8
More appropiate size	3,4	11,1	2,6
More hygienic	1,0	3,7	0,8
Better flavour	0,7	7,4	0,0
More security	0,7	7,4	0,0
Others	4,0	7,4	3,8



Sample : Those who buy 'glass bottled drink' = 27(8.8%)

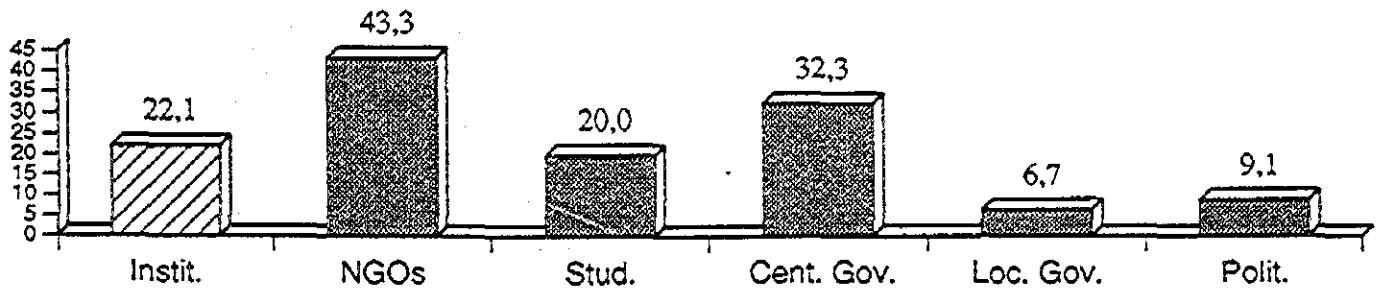
Figure E.3.2j If in the future, deposit fee for 'glass bottled drink' is terminated and furthermore the price (1 liter) of 'glass bottled drink' is raised the same as that of 'canned drink' and/or 'plastic bottled drink', do you still buy 'glass bottled drink' = 27(8.8%)



Total Sample : 308

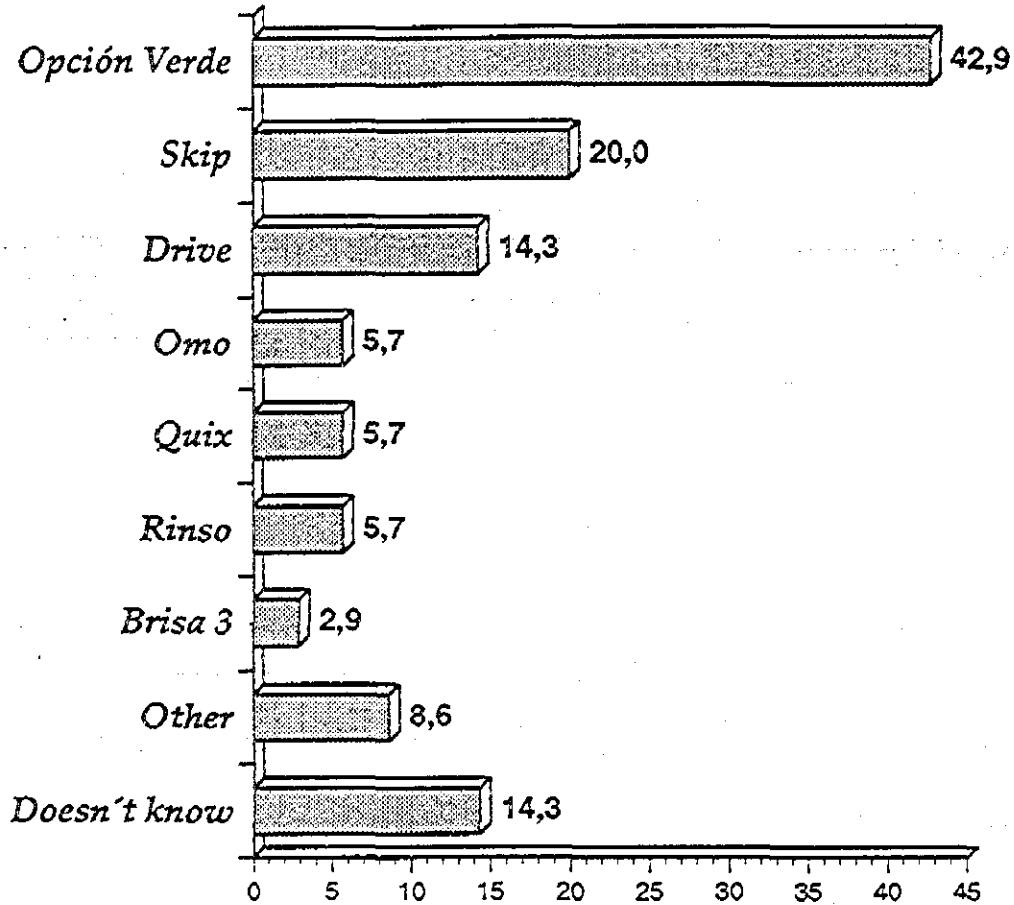
Figure E.3.2k As for detergents used for laundry and dishes, do you know there are ' No phosphate detergent' and 'Conventional (phosphate) detergent' ?

	Total	Homes	Instit.
No-phosphate detergent	11,4	0,6	22,1
Conventional (phosphate) detergent	69,2	93,5	44,8
Doesn't know /no answer	19,5	5,8	33,1



Total Sample : 308

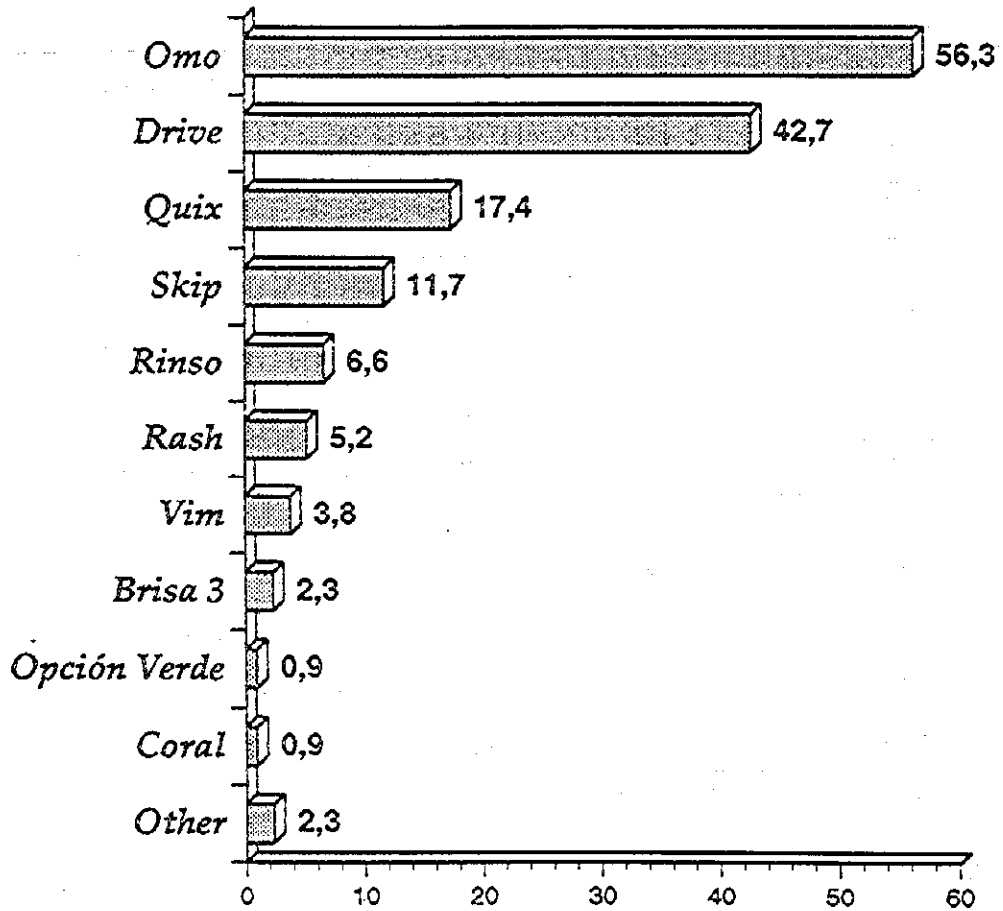
Figure E.3.21 What type of detergent is used in your home ?



Total Mentions ; spontaneous

Sample : Those who affirm using no-phosphate detergents = 35 (11,4%)

Figure E.3.2m Name of the No-phosphate detergent (brand) usually used in the home ?



Total Mentions ; spontaneous

Sample : Those who affirm using conventional detergents = 213 (69.2%)

Figure E.3.2n Name of the conventional (phosphate) detergent (brand) usually used in the home ?

Table E.3.2d Reasons for buying No-phosphate or Phosphate detergents

Sample : Those who know the type of detergent being bought = 248 (80.6%)

Total Mentions ; spontaneous

	Total	Phosphate	No-Phosphate
		S: 213	S: 35
It is better for washing dishes/ clothes	59,3	65,3	22,9
It is cheaper	18,5	21,1	2,9
It is more environm. friendly	14,1	6,6	60,0
Custom / habit	10,9	12,7	0,0
Recommended for washing machine	7,7	7,5	8,6
Healthier / smoother for hands	5,2	5,6	2,9
Better quality	4,8	5,2	2,9
It is preferred	4,4	4,2	5,7
Good smell/ more pleasant	4,0	3,8	5,7
Doesn't know other detergent	3,2	2,8	5,7
Lasts longer	2,4	2,3	2,9
Others	2,0	2,4	0,0
Doesn't know / no answer	4,4	4,2	5,7

E.3.3 Public Co-operation in Recycling

a. Willingness to cooperate (Q-21, Q-22, Q-23 and Q-24)

It is interesting to see that people are extremely willing to cooperate if the municipality would introduce a new waste collection system , consisting in separating waste into "compostable waste", "recyclable waste" and other waste types.

Nearly all, 96.5% of the sample, say they would cooperate in such a system.

All the people would also be **prepared to participate, separating waste,** if a resident association in their area were to raise funds through the sale of recyclable material.

This can be explained by the fact that **95.8% think that the resource recovery from waste is important.**

If we look more closely at the importance people assign to the recycling, we can see that 38.3% say that it is absolutely essential, 39.6% very important and 17.9% important.

Again the difference between the institutions and the homes is notorious; but at this point **the people living near potential landfills (Batuco, Rungue) show a greater awareness than those living near the actual landfills, which is definitely an interesting finding.**

The best known resource recovery from waste is the recycling of materials (paper, bottles, etc.), followed by composting (fertilizer from waste) and heat recovery by incineration.

The people belonging to institutions have a better knowledge about kinds of resource recovery, nonetheless the homes too show quite a good knowledge.

b. Co-operation in maintaining a clean city (Q-25, Q-26, Q-27 and Q-28)

Also in this aspect (willingness to cooperate in maintaining a clean city and its environment), everybody expresses great enthusiasm about co-operating.

Spontaneously, people give different forms of possible ways of co-operation: not throwing waste away in the street (36.1%), separating waste (30.8%), cleaning streets

(16.4%) and teaching people (14.1%).

In the institutions the concept "teaching" is felt much more strongly than in the homes interviewed.

The high willingness in co-operation, is based on the importance assigned to the public co-operation in order to keep a clean city and its environment. **98.9% say that the public co-operation is important.**

If we look at the percentage who think that the public co-operation is absolutely essential (59.7%), we can see that the difference between institutions and homes is quite big.

But we may also conclude that **the people living in Batuco and Rungue (potential landfill sites) show greater awareness than the people living next the actual landfills.**

c. Public education for maintaining a clean city (Q-29, Q-30 and Q-31)

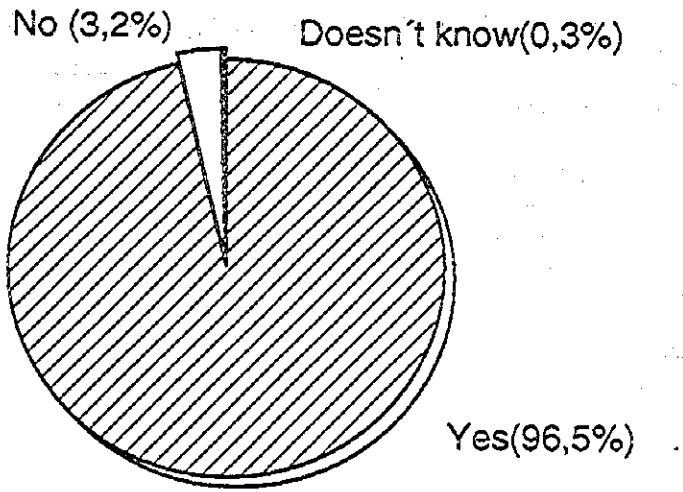
As in the previous questions, the great majority believe that public education campaigns are really important for maintaining a clean city and its environment. The institutions interviewed, specially the politicians and the government, assign more importance than the homes to public education.

Also the people living in Batuco and in Rungue think it is very essential.

The interviewed say that all the institutions (municipality, schools, associations, families, central and regional government), except the churches, should take such action.

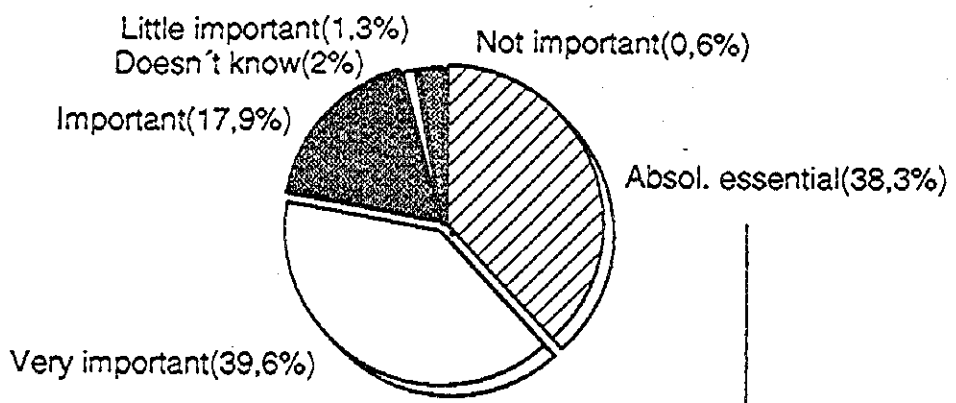
When asked about the three institutions who should take this action in the first place, the following order is given: municipalities, central government, schools.

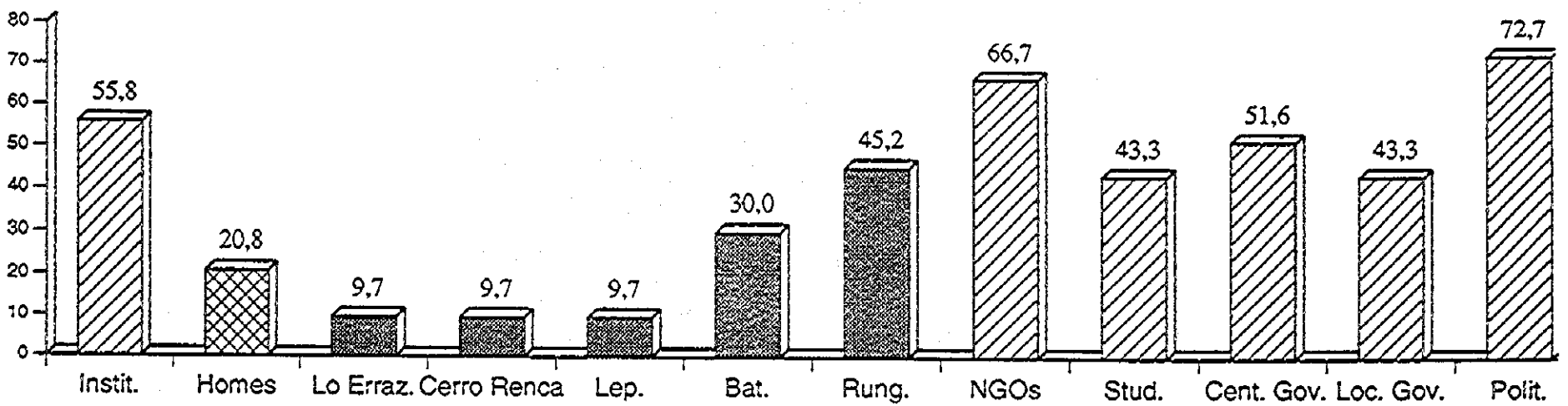
Less importance is assigned to families, regional government and neighborhood associations.



Total Sample : 308

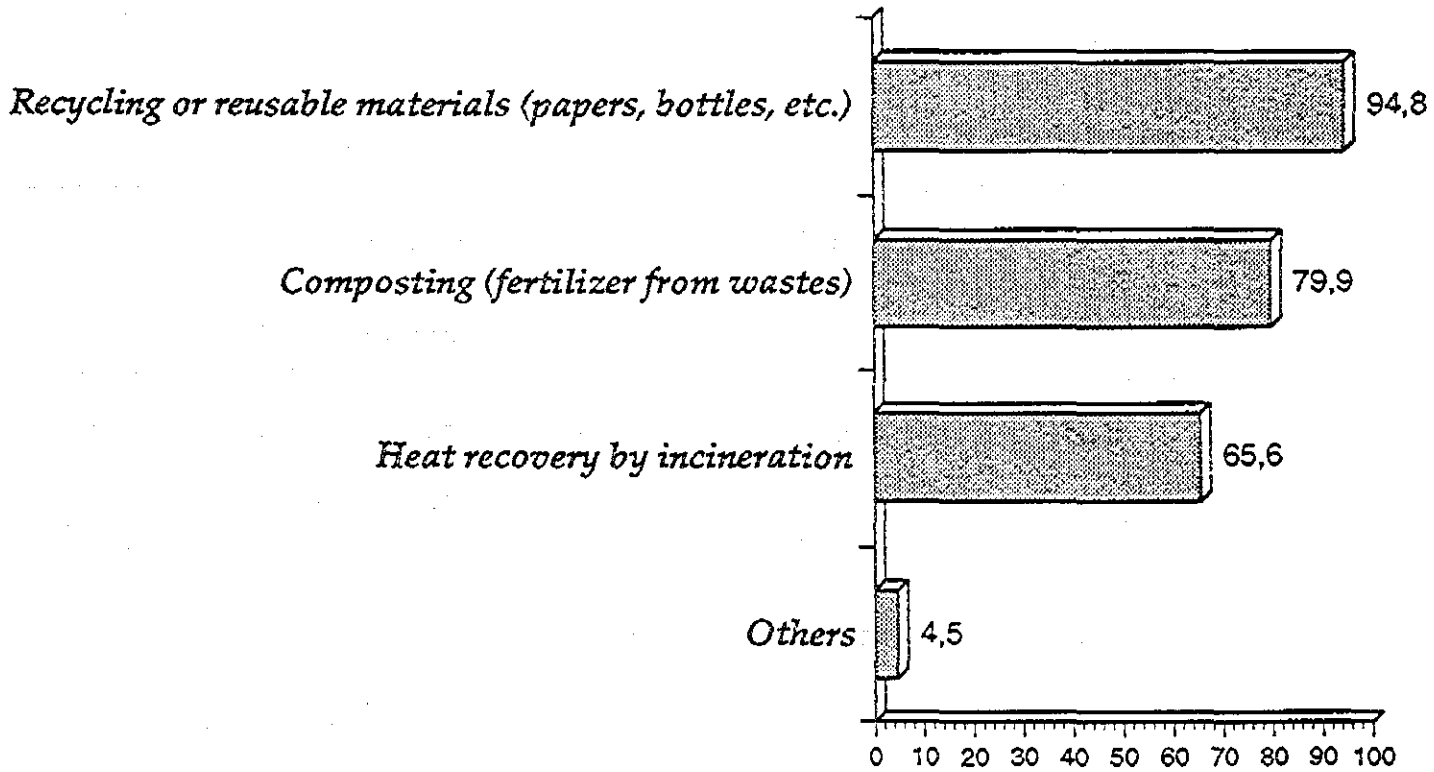
Figure E.3.3a If the municipality introduces a separate waste collection system to utilize waste, would you cooperate with the system ? (segregating your wastes into' compostable' '{Food, paper, garden}, 'recyclable waste '{metals, bottles} and other wastes)





Total Sample : 308

Figure E.3.3b How important do you think resource recovery from wastes and recycling / reutilization are ?



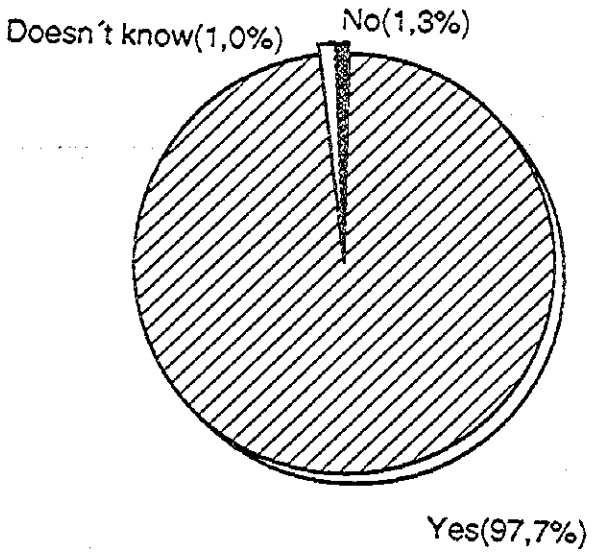
Total Sample : 308

Figure E.3.3c What kinds of resource recovery from wastes and recycling do you know ?

Table E.3.3a What kinds of resource recovery from wastes and recycling do you know ?

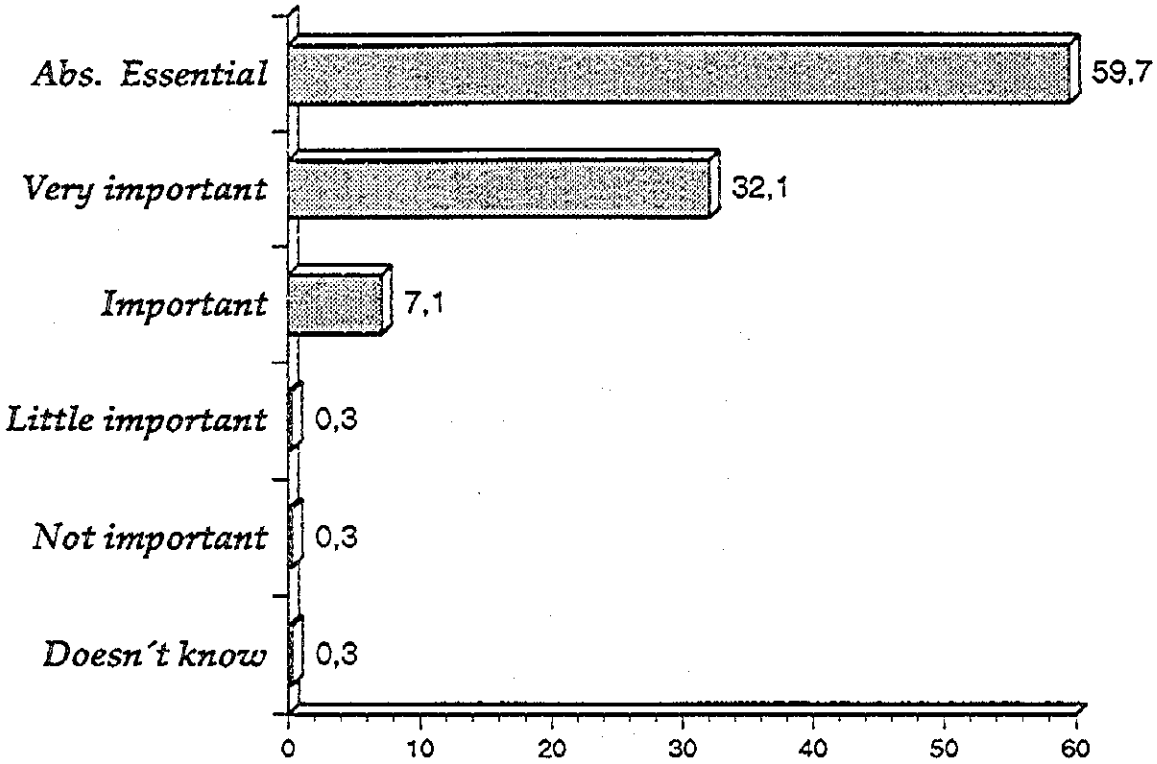
Total Sample : 308

	Total	Homes	Instit.
Recycling or reusable materials (papers, bottles, etc.)	94,8	89,6	100,0
Composting (fertilizer from wastes)	79,9	66,9	92,9
Heat recovery by incineration	65,6	60,4	70,8
Others	4,5	0,6	8,4



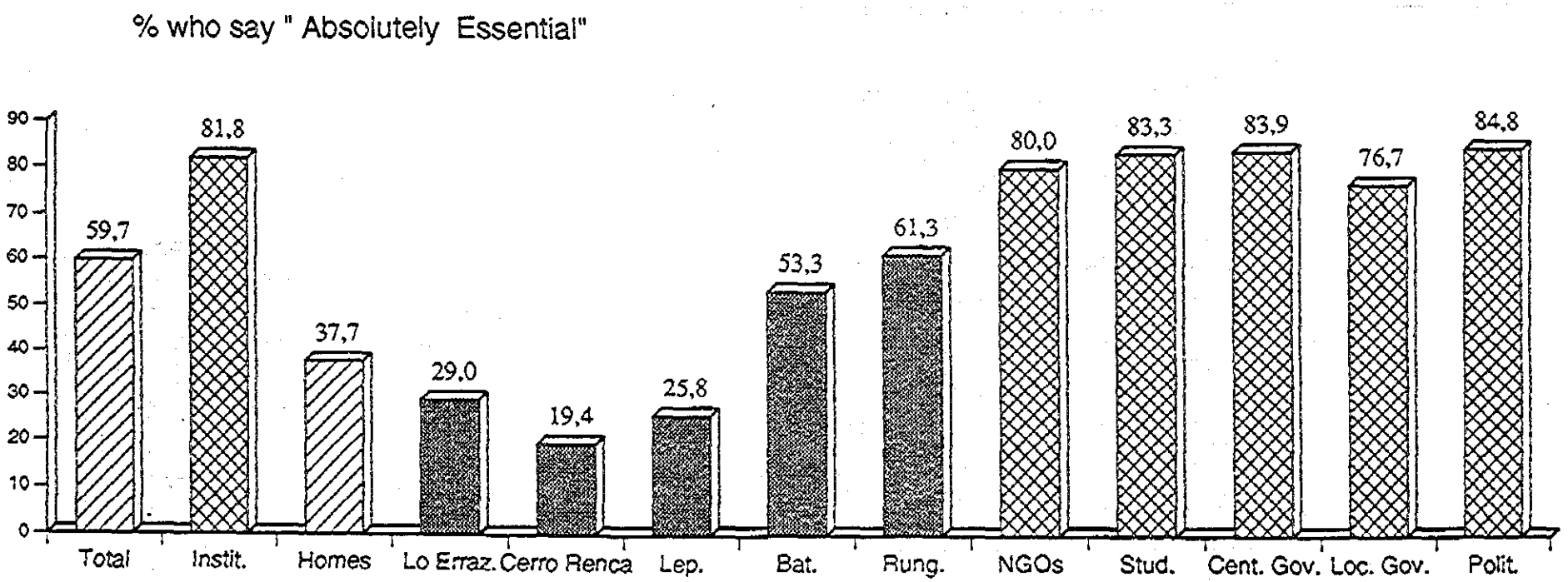
Total Sample : 308

Figure E.3.3d If the resident association or cooperative in your area were to raise funds (in order to engage beneficial activities for residents) through sale of reusable or recyclable materials, (bottles, paper), would you be wiling to contribute or participate, by separating you waste ?



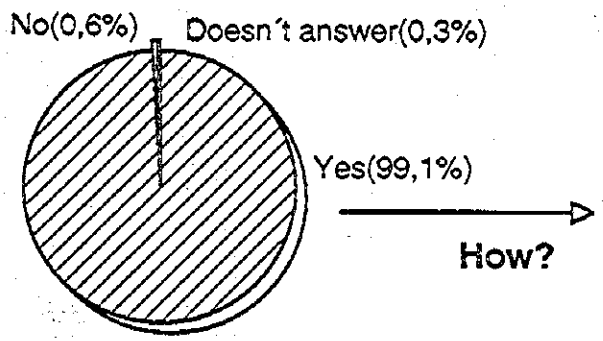
Total Sample : 308

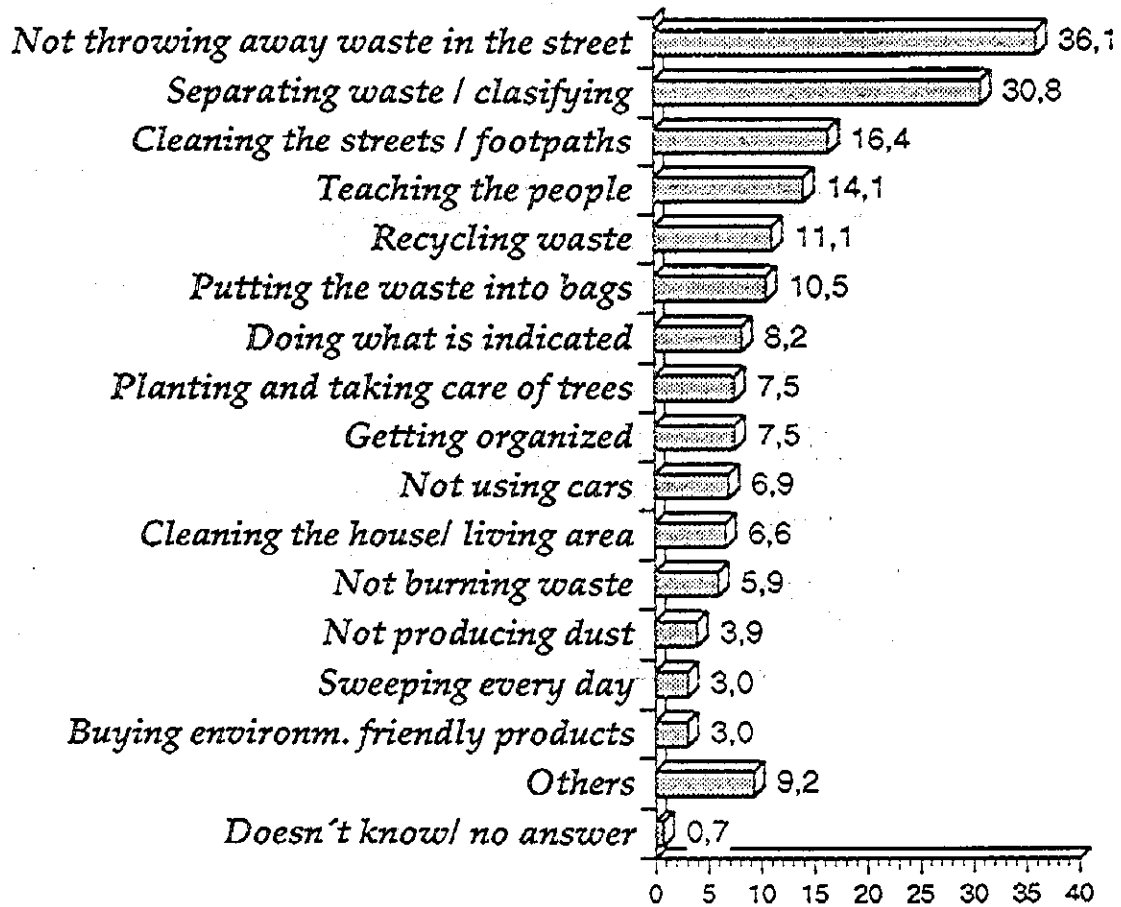
Figure E.3.3e How important do you think the public cooperation is for keeping the city and its environment clean ? (No.1)



Total Sample : 308

Figure E.3.3f How important do you think the public cooperation is for keeping the city and its environment clean ? (No.2)





Total Mentions ; spontaneous

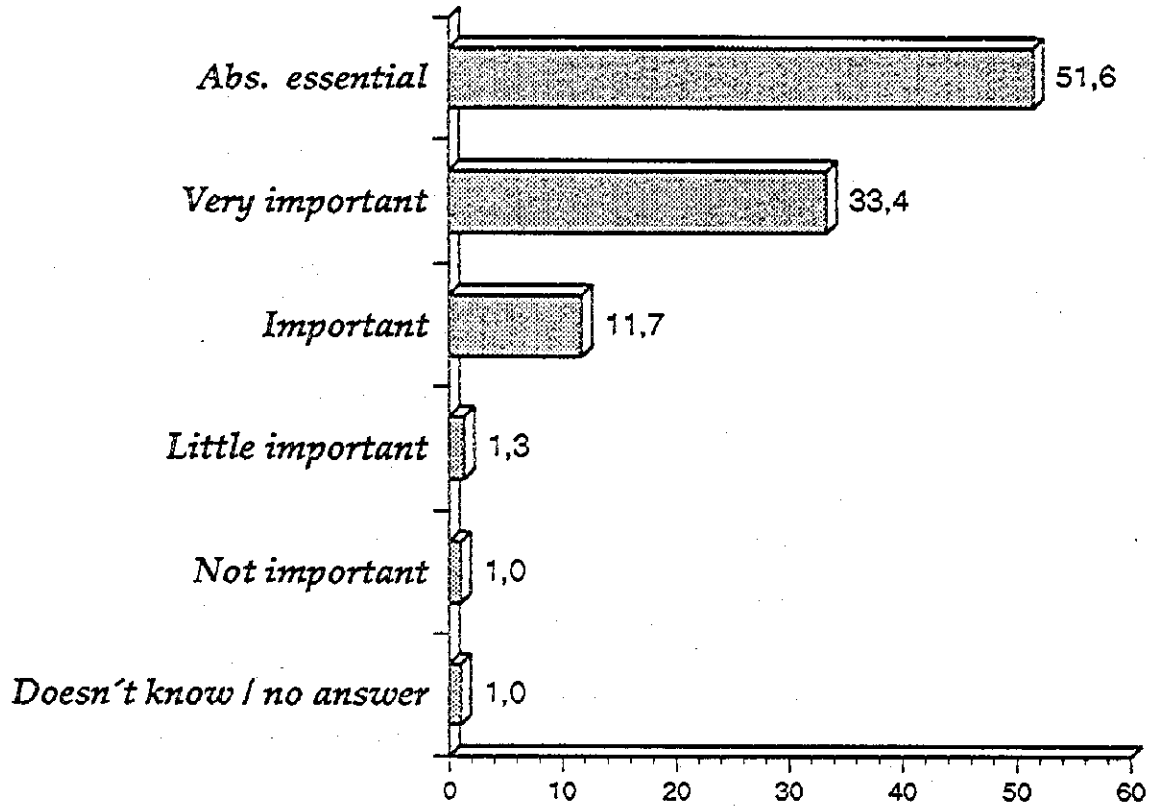
Total Sample : 308

Figure E.3.3g Would you be willing to cooperate for keeping the city and its environment clean ?

Table E.3.3b How do you think that you could cooperate ?

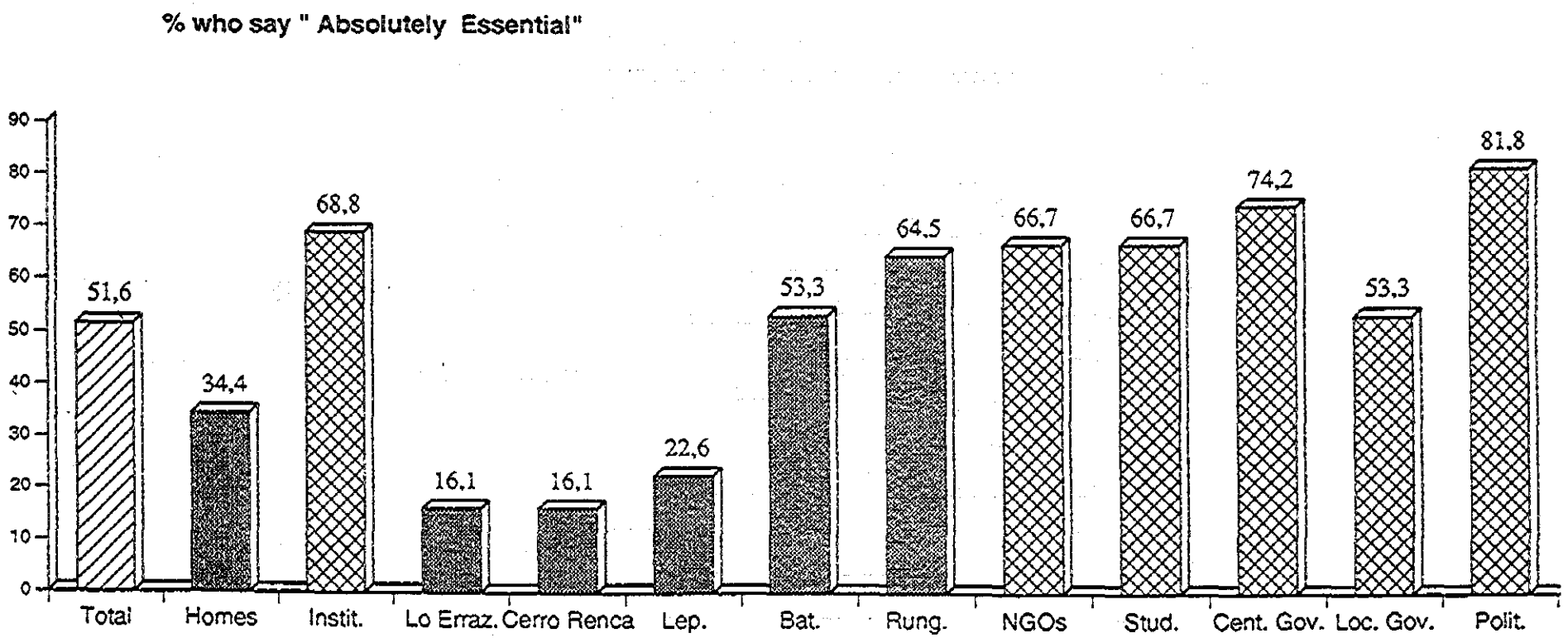
Sample : Those who are willing to cooperate = 305 (99.1%)

	Total	Homes	Instit.
Not throwing away waste in the street	36,1	35,1	37,0
Separating waste / clasifying	30,8	31,1	30,5
Cleaning the streets / footpaths	16,4	26,5	6,5
Teaching the people	14,1	6,0	22,1
Recycling waste	11,1	6,6	15,6
Putting the waste into bags	10,5	11,3	9,7
Doing what is indicated	8,2	4,6	11,7
Planting and taking care of trees	7,5	9,3	5,8
Getting organized	7,5	5,3	9,7
Not using cars	6,9	1,3	12,3
Cleaning the house/ living area	6,6	7,3	5,8
Not burning waste	5,9	8,6	3,2
Not producing dust	3,9	4,6	3,2



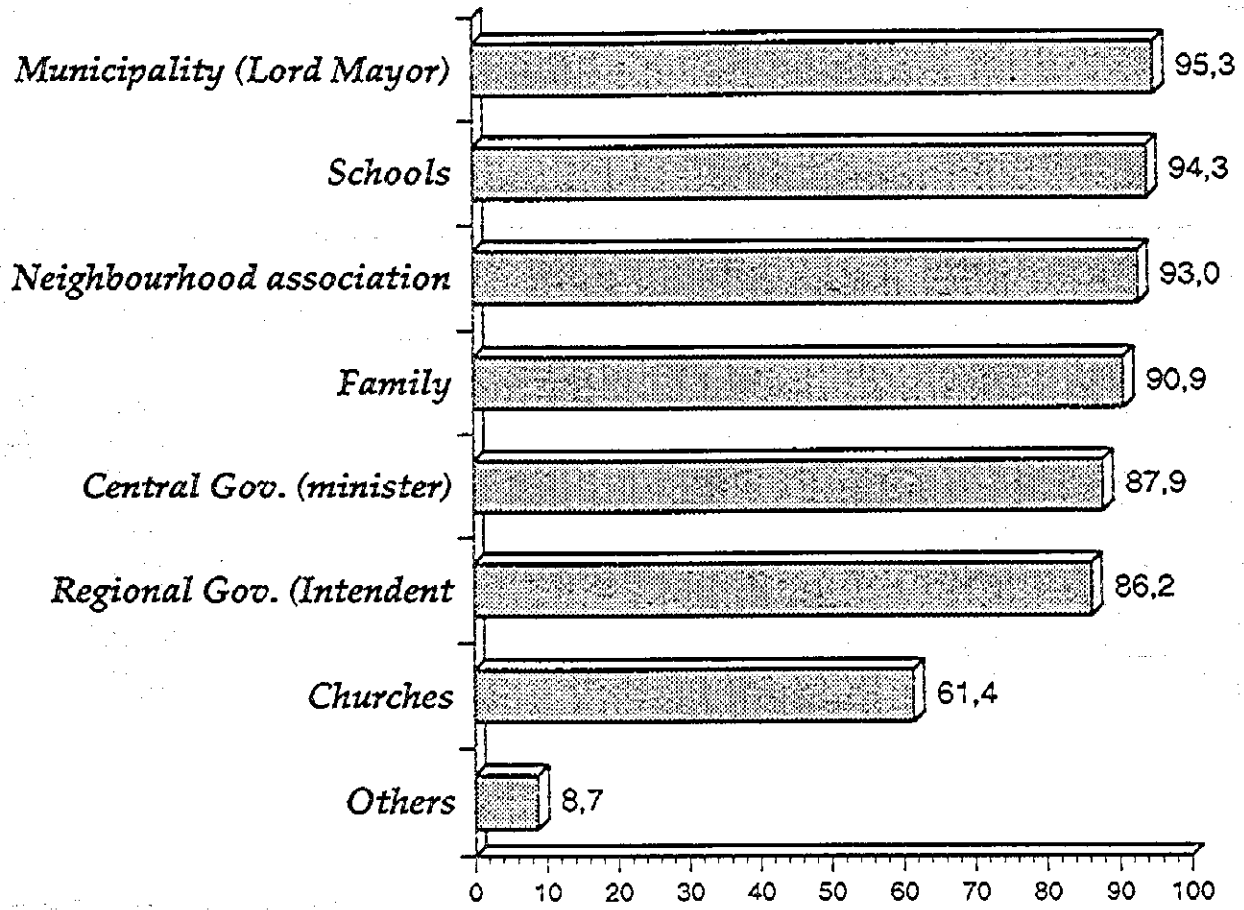
Total Sample : 308

Figure E.3.3h How important do you think public education and campaigns are for keeping the city and its environment clean ? (No.1)



Total Sample : 308

Figure E.3.3i How important do you think public education and campaigns are for keeping the city and its environment clean ? (No. 2)



Sample : Those who consider important public education or campaigns = 298 (96.8%)

Figure E.3.3j Who should take such action (public education and campaigns) ?

	1º Place	Total 3 Mentions
Municipality (Lord Mayor)	21,5	79,9
Central Gov. (minister)	45,6	60,3
Schools	9,4	51,0
Family	10,1	40,9
Regional Gov. (Intendent	10,1	32,6
Neighbourhood association	3,0	29,5
Churches	0,0	2,7

Sample : Those who consider important public education or campaigns = 298(96.8%)

Figure E.3.3k Which are the 3 main institutions that should take this kind of actions ?

E.3.4 Opinion about Industrial Waste

a. Actions to be taken (Q-32, Q-33 and Q-34)

All the people interviewed are in agreement that enterprises which discharge waste water and/or emit smoke should introduce waste water treatment plant and/or smoke treatment facilities.

They also think that the government should expedite promotion policies for inducing those companies which should introduce environmental preservation facilities.

As regards the efficiency of a list of possible promotion policies that the government could apply, the people believe that all of them are quite efficient. Nonetheless they consider as the two **most efficient policies the reinforcement of regulations and legislation standards and incentives to move outside the metropolitan region.**

Reinforcement of monitoring and guideline, guidance and support, and financial incentives are considered to be of a little less efficiency.

b. Seriousness of various problems (Q-35)

As regards industry waste, the people consider that industrial waste creates, first of all, environmental problems for the country, and secondly it is a risk for the workers at the treatment/disposal facilities. These two problems are thought to be the most serious ones.

But also the fact that industrial waste is a risk for all the citizens and that industries create a lot of waste which takes up space at the disposal facilities, is considered to be a quite serious problem.

Less serious seems to be that industries create unnecessary waste instead of recycling.

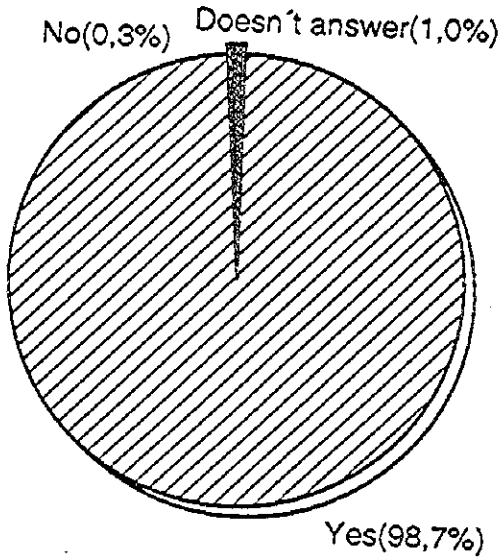
We observe a slight difference of appreciation between the homes and institutions. The homes say that the most serious problem is the risk for the workers at the disposal facilities, while the institutions mention problems for the country as the most serious problem.

c. Solutions thought to be most adequate (Q-36)

Asked about which would be the most adequate alternative to minimize the problems caused by industrial waste, the answer is: **the industries should separate hazardous and non-hazardous waste, being this opinion very strong among the institutions interviewed.**

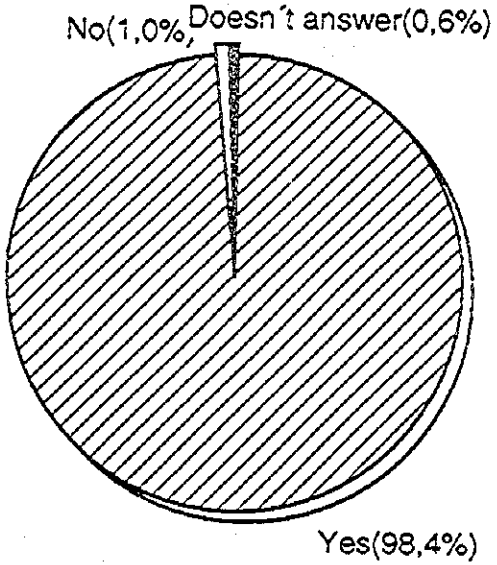
The homes think, in the first place, that the industries should treat all their waste as hazardous and apply high security standards.

The solution of a compulsory recycling scheme is not felt to be so adequate for solving problems caused by industrial waste.



Total Sample : 308

Figure E.3.4a Do you think enterprises generating waste water and gases should introduce treatment facilities for these elements ?



Total Sample : 308

Figure E.3.4b Do you think the Government should implement promotion policies/measures for inducing companies to install environmental protection facilities ?

Table E.3.4a How efficient would be each of the following promotion policies/measures that the Government could apply ? (No.1)

Sample : Those who think that the Government should apply policies = 303 (98,7%)

	Reinforcement of monitoring and guideline	Reinforcement of regulations and legisl. standard	Financial Incentives	Guidance and support	Incentive to move outside Met. region
Very efficient	46,2	53,1	38,6	42,9	49,5
Efficient	47,2	39,6	37,6	47,5	35,0
Doesn't know	1,0	1,0	5,3	2,0	1,7
Little efficient	5,0	5,9	12,5	6,3	10,2
Not efficient	0,7	0,3	5,9	1,3	3,6

Table E.3.4b How efficient would be each of the following promotion policies/measures that the Government could apply ? (No.2)

Sample : Those who think that the Government should apply policies = 303 (98,7%)

% who say " Very Efficient"

	Total	Homes	Institutions
Reinforcement of regulations and legisl. standard	53,1	55,3	51,0
Incentive to move outside Met. Region	49,5	53,9	45,0
Reinforcement of monitoring and guideline	46,2	57,9	34,4
Guidance and support	42,9	47,4	38,4
Financial Incentives	38,6	32,9	44,4

Table E.3.4c How serious do you think each of the following problems is in relation to industrial waste ? (No.1)

Total Sample : 308

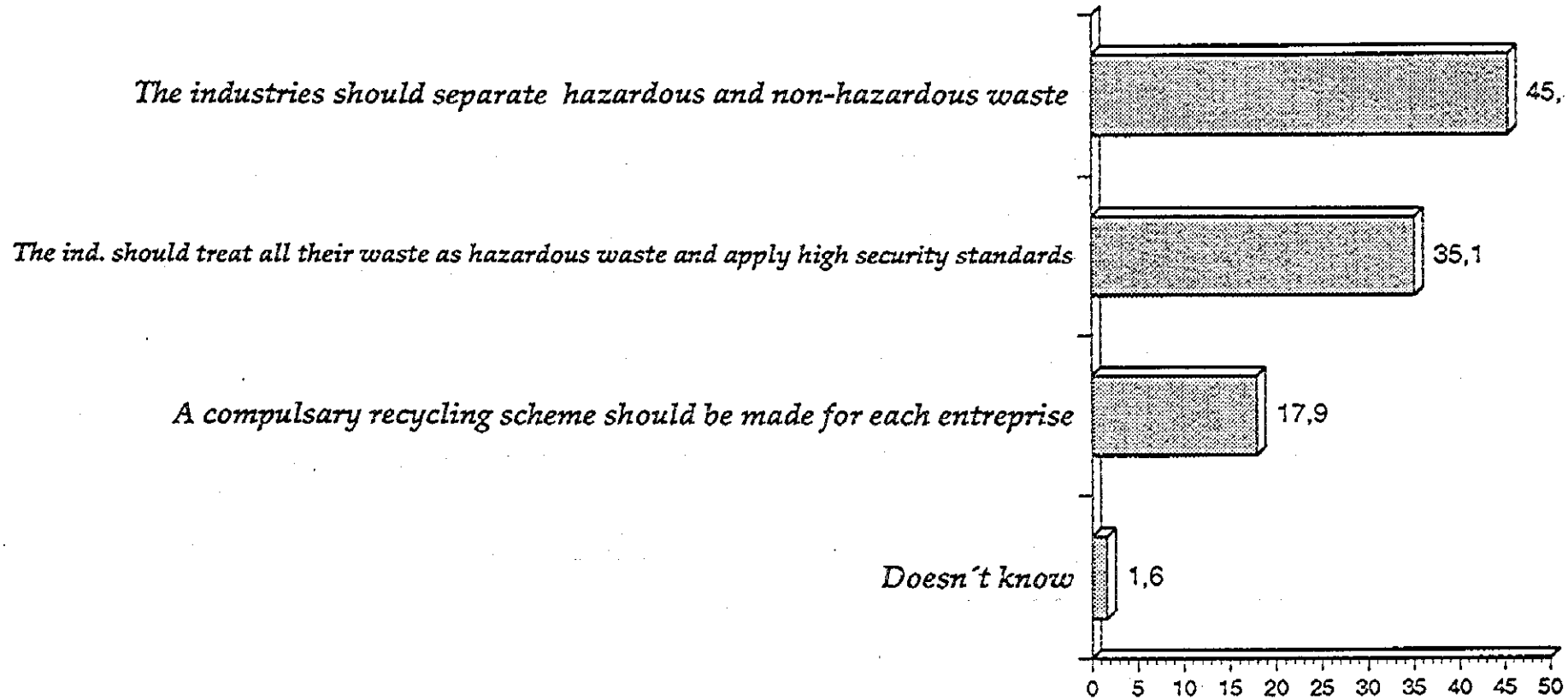
	Very serious	Quite serious	Little serious	Not serious	Doesn't know
It creates environm. probl. for the country	71,4	26,9	0,3	0,0	1,3
It is a risk for the workers at treatment/disposal facilities	68,5	27,9	2,3	0,3	1,0
It is a risk for all the citizens	65,6	29,9	3,2	0,0	1,3
Generation of much waste which takes up space at disposal facilities	62,0	30,5	4,9	1,0	1,6
Generation of unnecessary waste instead of recycling	55,8	38,0	4,2	0,0	1,9

Table E.3.4d How serious do you think each of the following problems is in relation to industrial waste ? (No.2)

Total Sample : 308

% who say " VERY SERIOUS"

	Total	Homes	Institutions
It creates environm. probl. for the country	71,4	64,9	77,9
It is a risk for the workers at treatment/disposal facilities	68,5	72,7	64,3
It is a risk for all the citizens	65,6	63,6	67,5
Generation of much waste which takes up space at disposal facilities	62,0	62,3	61,7
Generation of unnecessary waste instead of recycling	55,8	51,3	60,4



Total Sample : 308

Figure E.3.4c Any solution implies expenses which are finally shared by the consumer and the manufacturer. A more stringent alternative will mean higher costs. Which do you think would be the most adequate alternative to minimize the problems caused by industrial waste?

Table E.3.4e Any solution implies expenses which are finally shared by the consumer and the manufacturer. A more stringent alternative will mean higher costs. Which do you think would be the most adequate alternative to minimize the problems caused by industrial waste?

Total Sample : 308

	Total	Homes	Instit.
The industries should separate hazardous and non-hazardous waste	45,5	24,7	66,2
The ind. should treat all their waste as hazardous waste and apply high security standards	35,1	55,2	14,9
A compulsary recycling scheme should be made for each entreprise	17,9	18,8	16,9
Doesn't know	1,6	1,3	1,9

E.3.5 Opinion About Hospital Waste

a. Problems produced (Q-37)

As far as hospital waste is concerned, the people believe that **the most serious problem** caused by hospital waste is **the risk for the workers at the disposal facilities**, being this opinion especially high among the homes.

In the second place, the people mention that hospital waste produces environmental problems for the country. Less serious are considered to be the risk for all citizens and that hospital waste is unaesthetic.

It is important to add that the homes consider all the problems to be much more serious than the people belonging to institutions. This is surely a consequence of greater awareness of the people about the problems produced by the waste.

Table E.3.5a Regarding hospital waste, how serious do you think each of the following problems is ? (No.1)

Total Sample : 308

	Very serious	Quite serious	Little serious	Not serious	Doesn't know
It is a risk for the workers at treatment/disposal facilities	65,6	28,9	3,9	0	1,6
It creates environm. probl. for the country	61,4	30,8	5,5	0,3	1,9
It is a risk for all the citizens	54,2	33,4	9,7	0,6	1,9
Hospital waste is unaesthetic	45,1	35,4	15,6	2,6	1,3

Table E.3.5b Regarding hospital waste, how serious do you think each of the following problems is ? (No.2)

Total Sample : 308

% who say "VERY SERIOUS"

	Total	Homes	Institutions
It is a risk for the workers at treatment/disposal facilities	65,6	76,6	54,5
It creates environm. probl. for the country	61,4	66,9	55,8
It is a risk for all the citizens	54,2	66,2	42,2
Hospital waste is unaesthetic	45,1	65,6	24,7

E.3.6 Reaction About Waste Treatment/Disposal Facilities

a. Knowledge about facilities (Q-38, Q-39 and Q-40)

Only 55.6% answer that they know solid waste treatment/disposal facilities, being the difference between institutions and homes really enormous: **homes (23.4%), institutions (88.3%)**. It is quite possible that people are not very familiar with the concept "waste treatment facilities", since people usually talk about landfills only, thus the low percentage of knowledge, especially in the homes interviewed.

In fact, the homes do not consider the landfills to be treatment facilities.

Those who know treatment/ disposal facilities were also asked to mention spontaneously the types of facilities they were thinking of.

In the first place, **"recycling"** is mentioned **(47.1%)**, followed by **landfills (27.3%), incineration (23.8%), composting (15.1%)** and **bio-digestion (13.4%)**.

Those who mention the various facilities, have also a reasonable knowledge about the activity of each of them.

In relation to the responsibility of reducing the disposal/treatment facilities, the majority think that it is **the task of everybody to reduce them (56.2%)**, being this opinion shared by both, institutions and homes.

In the second place, the people think that it is **the responsibility of the industries**, they should take care of their waste **(23.7%)**. The **municipalities** are only mentioned in the third place with **18.8%**, although the **homes** assign more responsibility to the municipalities **(24.7%)**.

The institutions, on the other hand, are more concerned about the industries.

b. Reaction in case of the construction of waste treatment/disposal facilities near the residence (Q-41 and Q-42)

To understand properly the results of the following questions about what would be the reaction of the people if a treatment/disposal facility would be constructed near their area of residence or in their commune, one has to take very much in mind the type of sample we have taken: people living already near landfills, potential candidates with a

certain awareness, people belonging to institutions who are professionals with good education, living mostly in upper class areas.

The reaction against accepting a treatment/disposal facility in the neighborhood or nearby area, is very strong, since **54.5% of the total sample say that they would make a strong objection without exception**. In the homes, and especially in the **candidate areas**, the objection is stronger even , being in **Batuco and Rungue 76.7% and 87.1%** respectively. These last data are surely the consequence of the different activities organized in these areas within the last year in order to reject strongly the possible installation of a landfill there.

The objection among the people belonging to institutions is very low among the central government (only 19.4 %), but in the other groups it reaches nearly 50.0%, also in the NOGS, who have shown great environmental consciousness.

In spite of the strong rejection of the majority, **a smaller proportion (41.2%) would accept the construction of a disposal facility if certain requirements were fulfilled.**

The situation changes a lot as regards the second alternative: constructing a disposal facility, not that near their residence, but in the commune, without any negative environmental impact. **The objection without exception gets only 30.5%, and 62.0% of the total sample would be willing to accept the construction if certain requirements were fulfilled.**

The objection is low among the **institutions (11.7%)**, but still high among the **homes (49.4%)**. This shows that the people living at present near landfills or are possible candidates, are very much against these sort of facilities and do not really believe that there in not going to be any environmental impacts.

c. Reasons for making a strong objection (Q-43, Q-44 and Q-45)

The main reasons given for showing such a strong objection against the construction of treatment/disposal facilities in the area of residence, are:

- **Pollution of the environment**
- **Increase of infections**
- **Bad smell**
- **Risk of flies, rats, insects**

This tells us that the people have a bad impression of these sort of facilities, they think

that there is going to be a very negative environmental impact, somehow based on their experience with the existing landfills.

In order to change this deeply rooted experience and perception, one will have to put much emphasis in education and also trying to convince the people that it is possible to construct treatment/disposal facilities with minimum environmental impact.

As a further step, a list of possible reasons for rejecting the construction of facilities, was presented and the interviewees were asked to select the two most important ones in their personal case.

The results are as follows: **these facilities cause environmental pollution (66.1%), the authorities do not do enough to avoid pollution (46,4%), I just don't like these places in my area (30.4%).**

***These answers indicate that there is lack of confidence in the authorities, no* believing that the authorities are going to take the appropriate measures to avoid pollution. This is again a result of the experience with the present landfill situation.**

Finally, the people with a strong rejection, were asked under what conditions they would accept the construction of facilities. A very high number (49.1%), in the homes 61.3%, insist that they would never accept these places.

Some, 25.4%, say that they would accept, if the necessary security measures were taken. Others, 14.8%, express that they would only accept, if the place would be far away from people, from their houses.

d. Types of treatment/disposal facilities acceptable (Q-46, Q-47 and Q-48)

The people who were willing to accept some types of treatment/disposal facilities in their area under certain conditions (65.0%), were asked about the kinds of facilities acceptable for them.

Most acceptable is a **waste recycling plant (84.5%)**, followed by a **biological treatment plant (56.5%)**.

Less acceptance receive a sanitary landfill and a waste incineration plant. Generally, there exists a negative attitude towards landfills and a positive attitude against any form of recycling.

With the help of a card, people were asked to answer to a list of possible requirements, how important is each one for them.

The most important requirement is a previous environmental survey: site aptitude, impact assessment.

The second place occupy a number of requirements, with similar percentages: clarification of responsible party in case of pollution, reliability of technology and financial ability of facilities operation sector, in depth clarification of the facilities construction procedure, contract about suspension of operation in case of breach of agreement.

Of less importance seem to be a compensation system, giving reasons why the area was chosen, insurance system, identification of necessity of certain facilities (incinerator).

The institutions , generally, assign more importance, to the various requirements, especially to technology, construction procedures, clarification of responsible party, strict control of entrances.

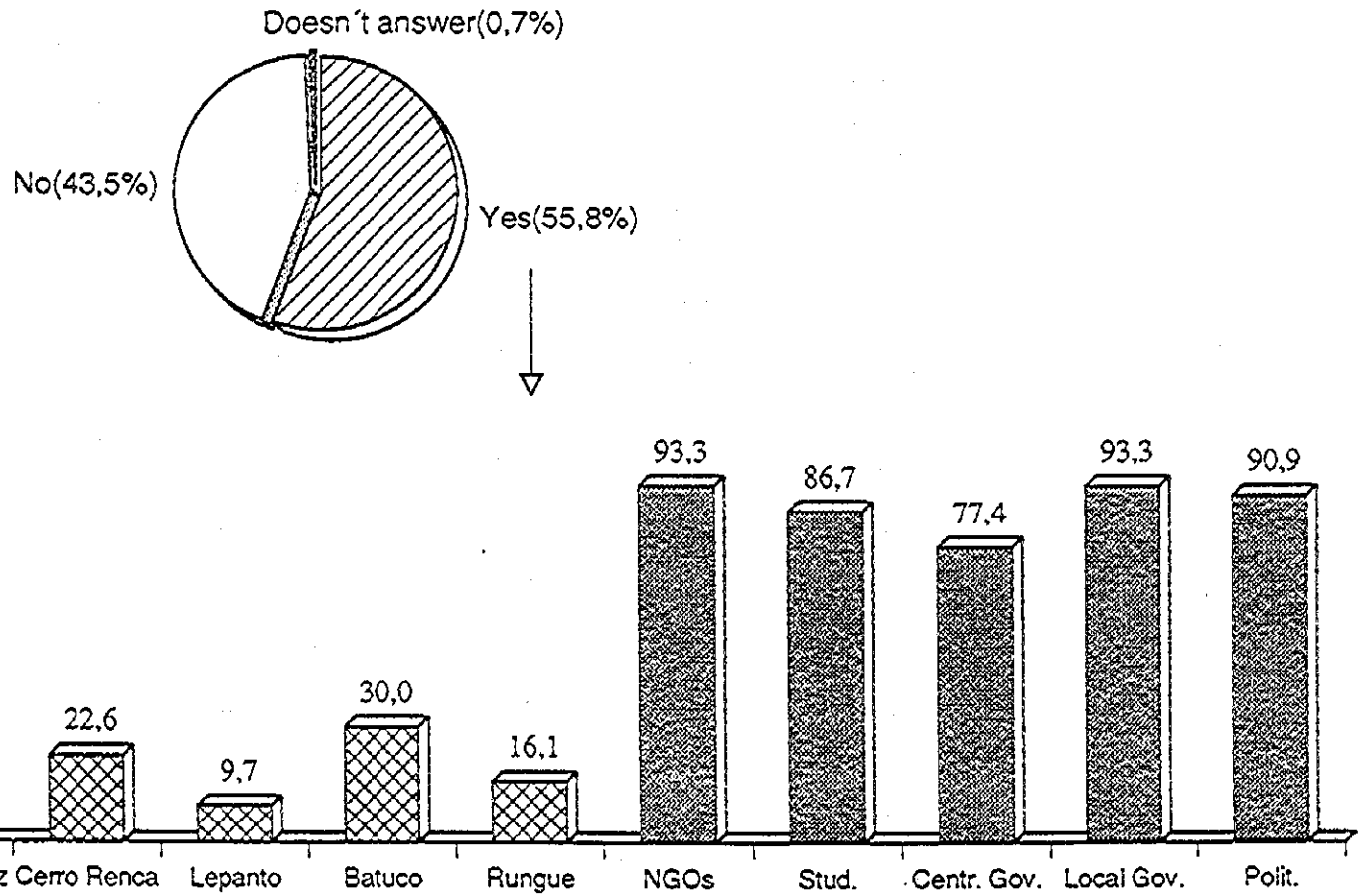
Finally, we conclude, that the two most important requirements are: previous environmental survey and in depth clarification of the facilities construction procedure.

e. Final proposals (Q-49)

When the people were asked to give some concrete proposals as regards the construction of disposal facilities, **the outcome is very poor.**

This indicates, that people have no real proposals what to do with the waste. They do not want to have anything to do with, but they don't know really what could be done with this necessary existence.

The main idea is that the waste should be disposed far away from where people live.



Total Sample : 308

Figure E.3.6a Do you know solid waste treatment/disposal methods ?

Table E.3.6a Types of treatment/disposal facilities known

Sample : Those who know treatment/disposal facilities = 172 (55.8%)

Total Mentions ; spontaneous

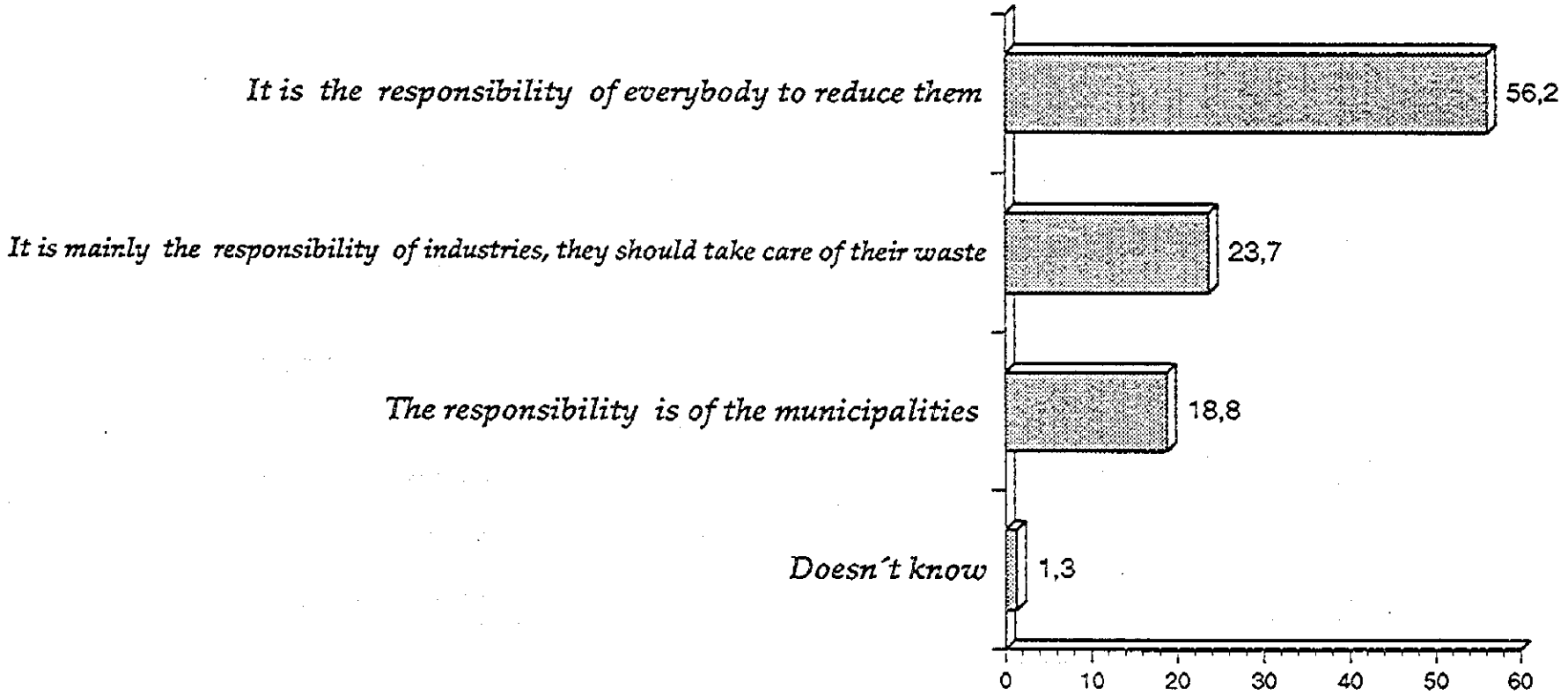
	Total	Homes	Instit.
Recycling	47,1	69,4	41,2
Landfills	27,3	0,0	34,6
Incineration / burning waste	23,8	16,7	25,7
Composting	15,1	25,0	12,5
Biodigestion	13,4	0,0	16,9
Recycling paper / cardboard	10,5	5,6	11,8
Recycling bottles / glass	8,7	8,3	8,8
Gas	7,6	5,6	8,1
Waste separation	5,2	0,0	6,6
Recycling cans/ metal	3,5	0,0	4,4
Compacting	2,9	0,0	3,7
Recycling of plastic	2,3	2,8	2,2
Generation of energy	2,3	0,0	2,9
Treatment of sewage water	1,7	0,0	2,2
Others	8,2	5,6	8,9
Doesn't know / no answer	4,1	8,3	2,9

Table E.3.6b Activities of the treatment/disposal facilities

Sample : Those who know waste treatment/disposal facilities = 172 (55.8%)

Total Mentions ; spontaneous

	Total	Homes	Instit.
Reusing / recuperating	42,4	55,6	39
Selecting / separating	27,3	22,2	28,7
Extracting gas, heat, water	19,2	5,6	22,8
Burning waste	17,4	16,7	17,6
Can be used as manure	16,9	16,7	16,9
Sanitary Landfill	12,8	0,0	16,2
Compacting waste	5,8	0,0	7,4
Waste disposal	5,2	0,0	6,6
Colecting / gathering	2,9	11,1	0,7
Energy generation	2,9	0,0	3,7
Water purifying	1,7	0,0	2,2
Others	9,9	5,6	11,1
Doesn't know	12,8	13,9	12,5



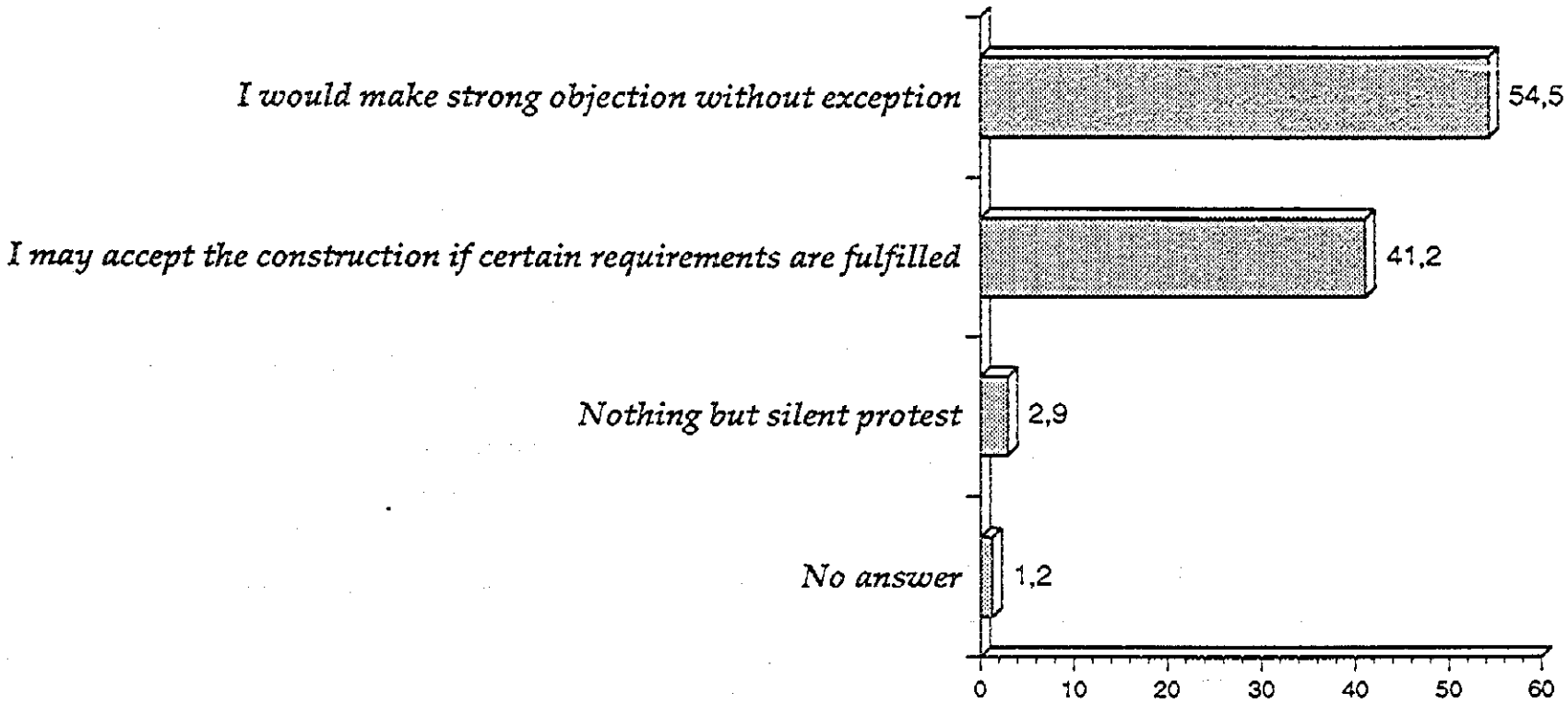
Total Sample : 308

Figure E.3.6b Regarding the existence of waste treatment/disposal methods, which of these statements better reflects your opinion ?

Table E.3.6c Regarding the existence of waste treatment/disposal methods, which of these statements better reflects your opinion ?

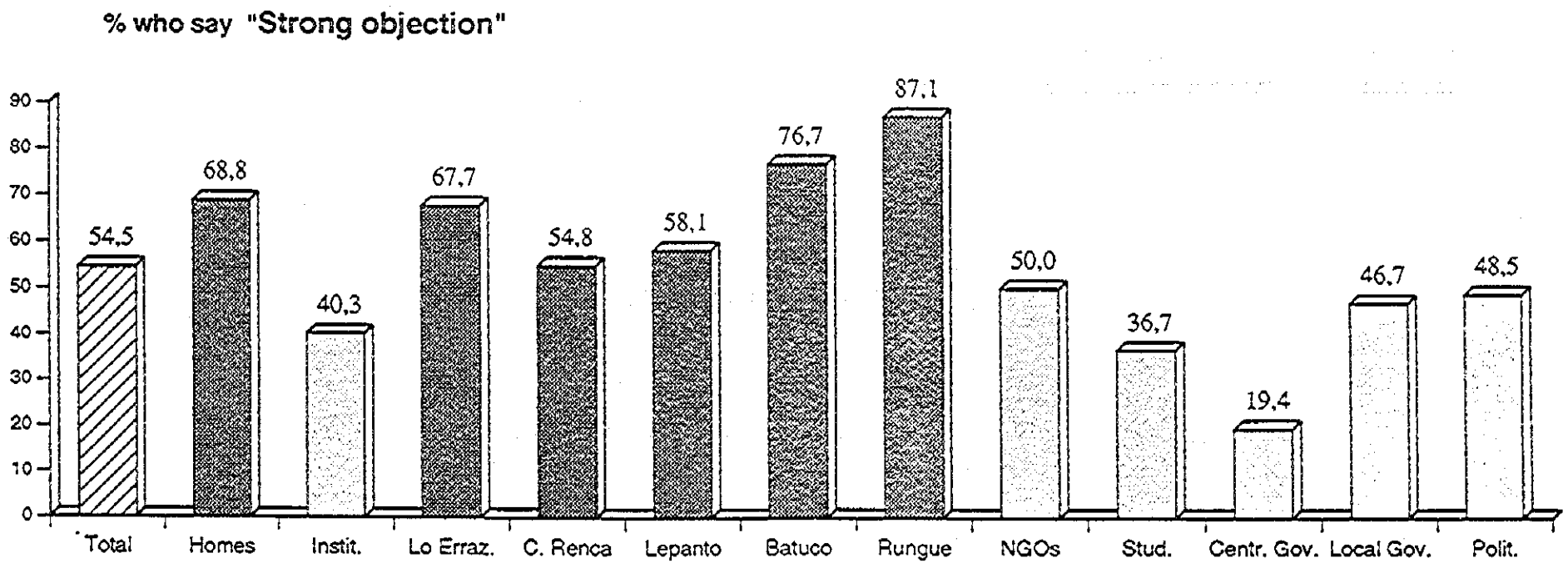
Total Sample : 308

	Total	Homes	Institutions
It is the responsibility of everybody to reduce them	56,2	53,9	58,4
It is mainly the responsibility of industries, they should take care of their waste	23,7	20,1	27,3
The responsibility is of the municipalities	18,8	24,7	13,0
Doesn't know	1,3	1,3	1,3



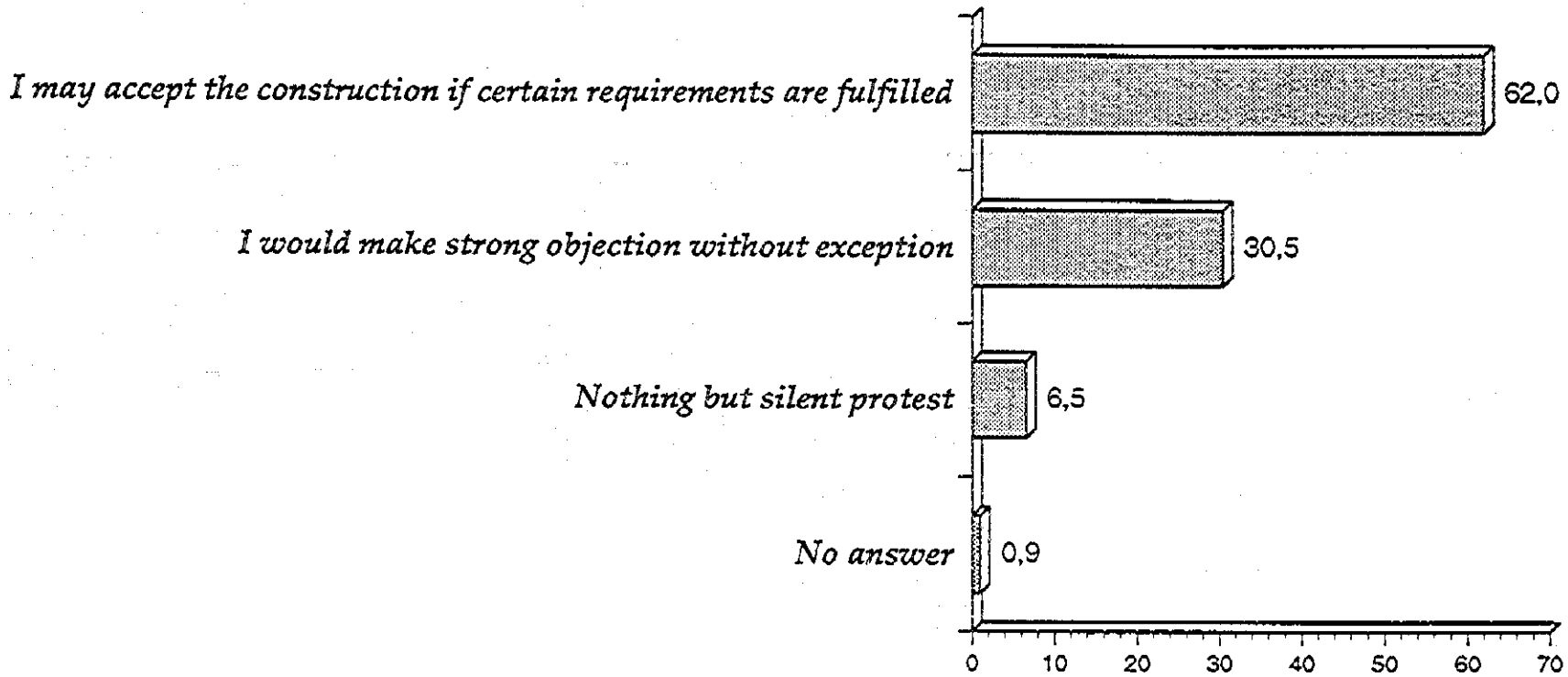
Total Sample : 308

Figure E.3.6c What would be your reaction towards a plan for constructing waste treatment/disposal facilities near your place of residency ? (No.1)



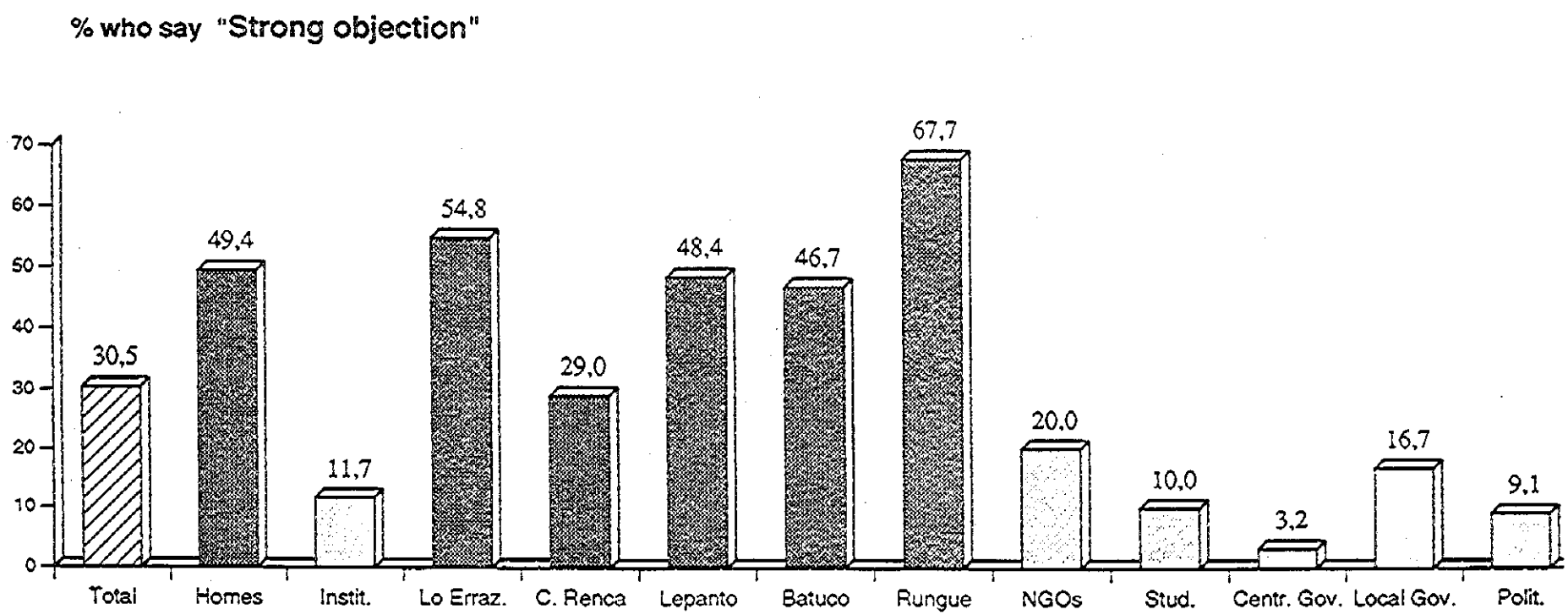
Total Sample : 308

Figure E.3.6d What would be your reaction towards a plan for constructing waste treatment/disposal facilities near your place of residency ? (No.2)



Total Sample : 308

Figure E.3.6e What would be your reaction towards a plan for constructing waste treatment/disposal facilities in your "comuna", but quite far from your residence and where no significant environmental impact is envisaged ? (No.1)



Total Sample : 308

Figure E.3.6f What would be your reaction towards a plan for constructing waste treatment/disposal facilities in your "comuna", but quite far from your residence and where no significant environmental impact is envisaged ? (No.2)

Table E.3.6d What are the main reasons for your strong objection ?

Sample : Those who show a strong objection = 169 (54.9%)

Total Mentions ; spontaneous

	Total	Homes	Instit.
Pollution of the environment	40,8	43,4	36,5
Increase of infections	36,7	49,1	15,9
Bad smell	35,5	39,6	28,6
Risk of flies / rats / insects	32,5	39,6	20,6
It must be far a away from people	12,4	6,6	22,2
We already have this problem and it is worrying	6,5	8,5	3,2
Bad people would come / thiefs	5,9	9,4	0,0
It brings many problems for everybody	5,3	1,9	11,1
The protection measures promised are not kept	4,1	0,9	9,5
Uncomfortable noise	4,1	1,9	7,9
Contaminating gases	3,6	3,8	3,2
The value of the land goes down	1,8	0,0	4,8
There is no space in the popular areas	1,8	0,0	4,8
Doesn't know	0,6	0,0	1,6

Table E.3.6e Among the following possible reasons for objection, which 2 would be the most important ones for you ?

Sample : Those who show a strong objection = 169 (54.9%)

Total 2 Mentions ; given alternatives

	Total	Homes	Instit.
These places cause environm. pollution	66,1	61,3	74,2
The authorities don´t do enough to avoid polution	46,4	50,0	40,3
Because I don´t like the fact that these places are constructed in my "comuna"	30,4	37,7	17,7
Previous cases prove that the effects are detrimenal	27,4	25,5	30,6
Image of the area deteriorates and asset values get devaluated	25,6	22,6	30,6
Other	1,8	0,9	3,2
Doesn´t answer	2,4	1,9	3,2

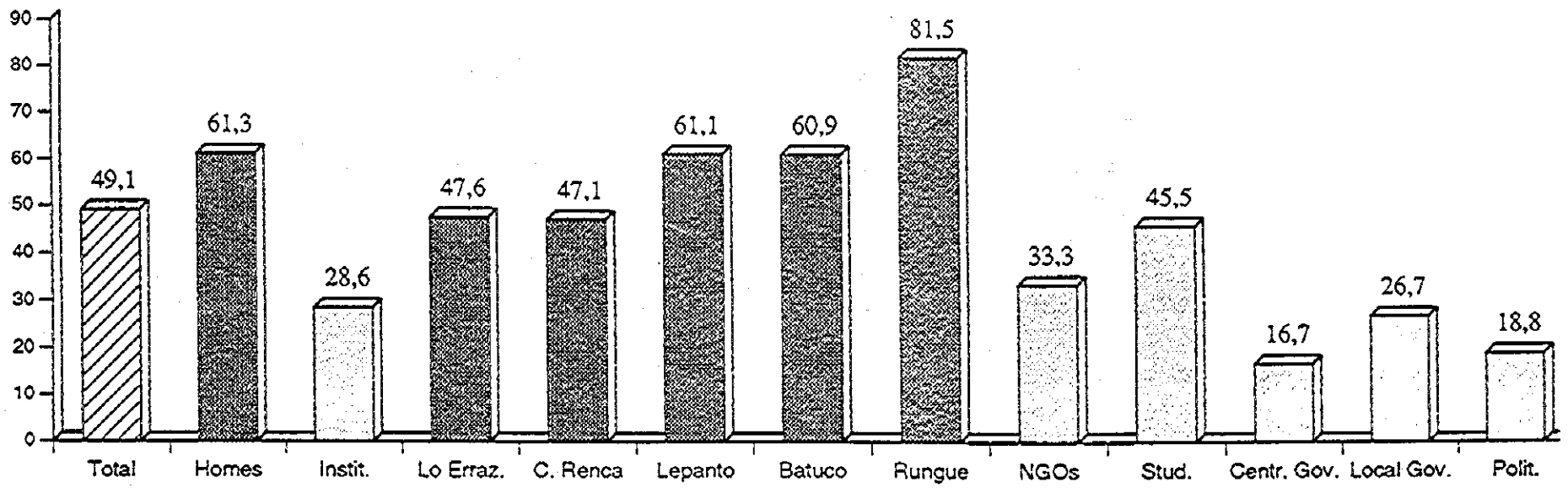
Table E.3.6f Under what conditions would you be willing to accept the construction of these facilities in your "comuna" ?

Sample : Those who show a strong objection = 169 (54.9%)

Total Mentions ; spontaneous

	Total	Homes	Instit.
I would never accept	49,1	61,3	28,6
Having all the necessary security measures	25,4	11,3	49,2
Far away from the houses / from the people	14,8	9,4	23,8
If it would not contaminate people	13,0	10,4	17,5
If they were closed	9,5	7,5	12,7
If it would mean work opportunities in the area	3,6	2,8	4,8
High technology	1,8	0,0	4,8
Other	1,8	1,9	1,6
Doesn't know	3,6	3,8	3,2

Total Mentions; spontaneous ---- % who say 'I would never accept'



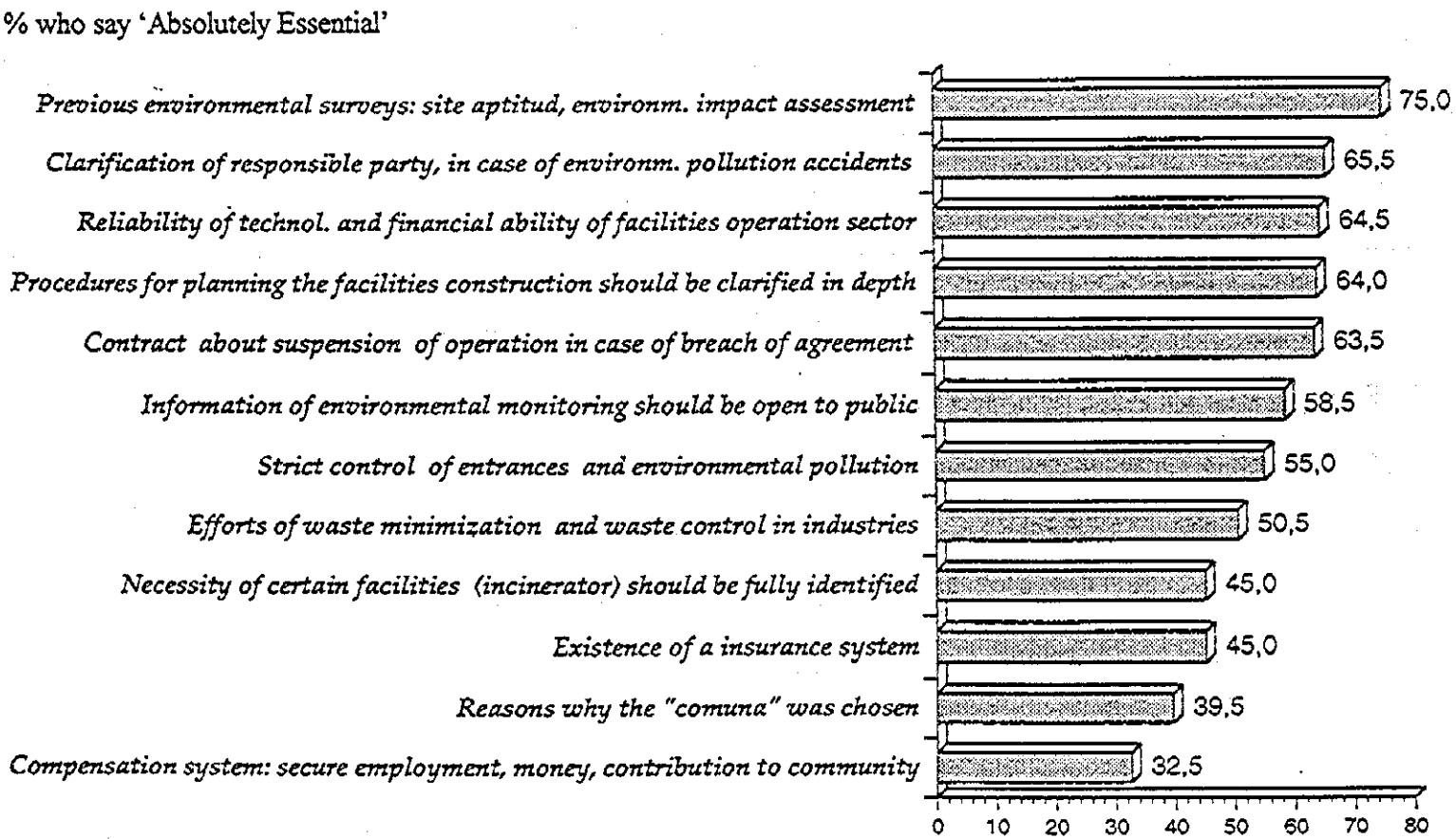
Sample : Those who show a strong objection = 169 (54.9%)

Figure E.3.6g Under what conditions would you be willing to accept the construction of these facilities in your "comuna" ?

Table E.3.6g What kind of waste treatment/disposal facilities would you accept in your 'comuna' ?

Sample : Those who would accept the construction of waste treatment/disposal facilities if certain requirements are fulfilled = 200 (65%)

	Total	Homes	Instit.
A waste recycling plant	84,5	78,5	87,4
A biological treatment plant	56,5	60,0	54,8
A sanitary landfill	30,0	35,4	27,4
A waste incineration plant	26,5	32,3	23,7



Sample : Those who would accept the construction of waste treatment/disposal facilities if certain requirements are fulfilled = 200 (65%)

Figure E.3.6h In order for you to accept the construction of this type of facility, which conditions should be fulfilled ?

Table E.3.6h In order for you to accept the construction of this type of facility, which conditions should be fulfilled ?

Sample : Those who would accept the construction of waste trearment/disposal facilities if certain requirements are fulfilled = 200 (65%)

% who say 'Absolutely Essential'

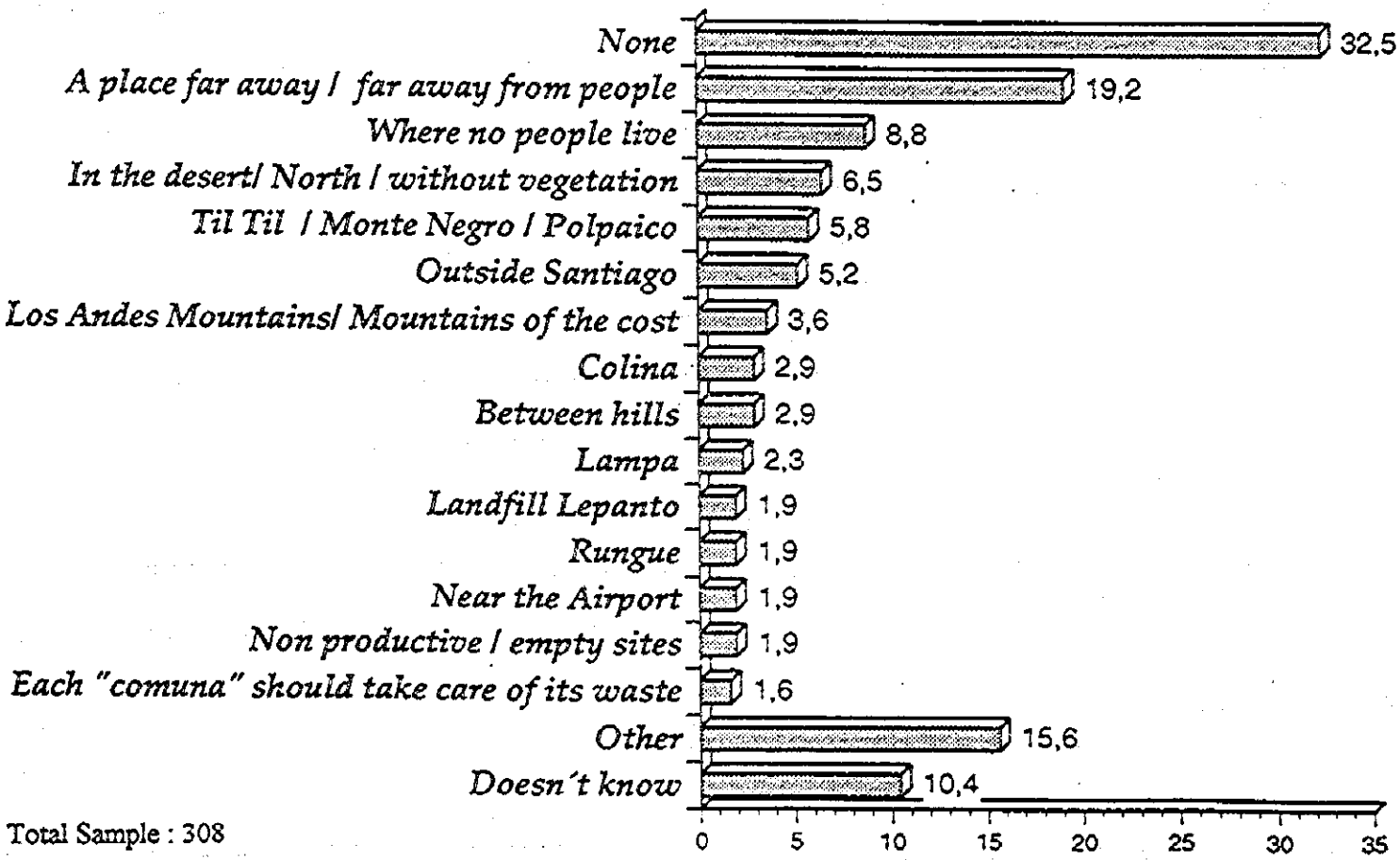
	TOT.	Homes	Instit.
Previous environmental surveys: site aptitud, environm. impact assessment	75,0	53,8	87
Clarification of responsible party, in case of environm. pollution accidents	65,5	47,7	74,1
Reliability of technol. and financial ability of facilities operation sector	64,5	49,2	71,9
Procedures for planning the facilities construction should be clarified in depth	64,0	50,8	70,4
Contract about suspension of operation in case of breach of agreement	63,5	55,4	67,4
Information of environmental monitoring should be open to public	58,5	41,5	66,7
Strict control of entrances and environmental pollution	55,0	38,5	73,9
Efforts of waste minimization and waste control in industries	50,5	43,1	54,1
Necessity of certain facilities (incinerator) should be fully identified	45,0	41,5	46,7
Existence of a insurance system	45,0	36,9	48,9
Reasons why the "comuna" was chosen	39,5	30,8	43,7
Compensation system: secure employment, money, contribution to community	32,5	35,4	31,1

Table E.3.6i The most important requirements

Sample : Those who would accept the construction of waste treatment/disposal facilities if certain requirements are fulfilled = 200 (65%)

	1ª Place	1º and 2º place
Previous environmental surveys: site aptitud, environm. impact assessment	37,5	58,5
Procedures for planning the facilities construction should be clarified in depth	29,0	47,0
Reasons why the "comuna" was chosen	9,5	20,0
Efforts of waste minimization and waste control in industries	5,5	19,5
Contract about suspension of operation in case of breach of agreement	4,5	7,5
Necessity of certain facilities (incinerator) should be fully identified	2,5	8,0
Strict control of entrances and environmental pollution	2,5	10,0
Clarification of responsible party, in case of environm. pollution accidents	2,5	9,5
Information of environmental monitoring should be open to public	2,0	6,5
Reliability of technol. and financial ability of facilities operation sector	2,0	6,5
Compensation system: secure employment, money, contribution to community	1,0	3,0
Doesn't know	1,5	3

Total Mentions, spontaneous



Total Sample : 308

Figure E.3.6i Some concrete proposals as regards the construction of waste treatment/disposal facilities

E.4 Follow-up Research of the POS

E.4.1 Background, Objectives and Methodologies of Follow-up Research

a. Background

It is found as an outcome of the POS that majority of interviewees who live near candidate sites and present sites of municipal landfill showed "objection without exception and/or strong objection" against construction of SW treatment/disposal facilities in their community, i.e.:

- 68.8% showed strong objection to the construction in their neighborhood,
- 49.4% showed strong objection to the construction in their community but which is quite far away from their residence.

Furthermore surprisingly, objection to construction of incineration facilities surpassed the objection to construction of a sanitary landfill. Previous surveys conducted by the Chilean side also revealed similar public reactions.

b. Objectives

In order to investigate and understand "true reasons" deeply-rooted in the people's "strong rejection without exception" and in order to seek keys to the solution (i.e. prerequisite for neighborhood consensus), the "Follow-up Research of the POS" was programmed.

The objectives are firstly to discover unique reasons of objection (by people near present sites and/or by people near candidate sites) for example:

- disappointment to the past incidents (promises by promoting sectors were not well kept) experienced by people near present sites,
- fear to unknown outcome of the facilities (landfill and incinerator) operation,
- intrinsic problems related to SWM facilities (nuisance such as mal-odor, fly and rats breeding, noise of garbage transporting vehicles and infestation of waste related diseases),
- deterioration of land and assets value, etc.

And secondly to seek keys to respective solution to above unique reasons. It could be:

- in-advance campaign,
- in-advance environmental assessment,
- transparency in procedure,
- public participation to assessment,
- appropriate legal framework,
- compensative measures (e.g. construction of green area, employment from neighbor for the projects, improvement of local infrastructure).
- agreeable distance from the facilities to neighboring houses,
- agreeable level of protection measures, etc.

Meanwhile, SWM facilities, from a social viewpoint, are indispensable for urban societies, although they are evidently sources of nuisances to an individual who lives near the facilities. Hence, the following assemblies (assemblies-1 and -2) were provided after free discussions in order to examine "objection without exception and/or strong objection" against construction of SW treatment/disposal facilities. This was pursued with the intention of establishing whether these prejudices stemmed from:

- objection without acknowledging the society's needs of facilities, or
- objection in spite of well-acknowledging the society's needs of facilities.

c. Methods

In response to the above-mentioned outcome of the POS, the following "Follow-up Research of the POS" was carried out in order to investigate and gain an insight to "true reasons" of the people's deeply-rooted "strong rejection without exception" and in order to seek keys to the solution.

A sociological approach was employed in the following researches to seek "true reasons" of the objections: i.e., free discussion of more or less 8 persons who strongly objected in the questionnaire, moderated by a neutral chairperson.

i. Session-1: Assemblies for "people living near the present landfills (Lo Errazuriz, Renca, Lepanto)"

After the free discussion, "video footage of an incineration plant in Japan" was shown to the participants. Dr. Arellano, as an expert in SWM, participated in explaining the video and facilities and answered related questions from the participants. Free discussions were held after seeing the video.

ii. **Session-2: Assemblies for "people living near the candidate landfills (Runge, Batuco)"**

After the free discussion, the participants visited an illegal un-controlled dumping site and a legal controlled landfill (e.g. Lo Errazuriz). Dr. Arellano, as an expert in SWM, participated in the visit and explained about facilities and answered related questions posed by the participants. Free discussions were held after the visit.

The research was intended to observe, among others, the following issues:

- Whether the "objection without exception and/or strong objection" against construction of disposal facilities from people at the candidate sites remains the same under any conditions (e.g. job creation, etc.) or whether there could be any indication that certain conditions (e.g. job creation, etc.) may contribute to change from objection to acceptance.
- Whether the "objection without exception and/or strong objection" against construction of incineration facilities from people at the present landfill sites remains all the same under any conditions (e.g. air pollution prevention measures, etc.) or whether such objections are derived from certain prejudice or mis-conception that "incineration means source of smog" etc..

E.4.2 Outcome of the Follow-up Research

E.4.2.1 Major Objection

a. Major Influencing Factors

Before proceeding into the details of the outcome and conclusions derived therefrom of the follow-up research, two prevailing important factors must be pointed out as the major influencing factors that lie below all opinions gathered. These are:

- The people involved in the siting problem of final disposal facilities are, in general, of very low social and economic status and marked by a feeling that they are socially excluded and marginalized away.
- The experiences and rumors of Lo Errazuriz landfill, with all the negative perceptions associated with it, have become the main reference point for

most opinions on the matter.

It is, therefore, important in evaluating and interpreting all the opinions that freely expressed, that these two major influencing factors should be taken into consideration.

b. Nature of the popular objection

The main objections expressed by the people in the follow-up research were in line with the main objections strongly manifested by the interviewees of the POS. These can be categorized into two in general. One is the "objection related to the procedures", and the other is "objection related to the adverse impacts (of landfill projects)".

i. Objection to the communication procedures (and attitudes?)

It refers specially to the manners and attitudes displayed by the authorities and promoting sectors at the time of informing and consulting the people involved to the projects.

ii. Objection to the adverse impacts of the project

This refers to the inherent concerns and worries that any facilities of SW treatment/disposal may and/or must cause damaging impacts over nearby inhabitants. People specially fear health damages, nuisances and safety.

For the purpose of a more clear understanding of the situation, all reasons for objection are summarized into two types.

E.4.2.2 Objection to the Communication Procedures

The people involved suffer a strong feeling of social exclusion that marks their rationale at the time of evaluating this kind of subjects: "As we are the waste of society, it does not matter to the authorities that we live near waste". For this reason, the issues of institutional transparency and popular participation deserve very sensible and special care.

The group sessions clearly revealed the people's resentments, all of which are addressed to the authorities:

- Lack of direct/official spokesmen
- Evasion of responsibility
- Lack of social participation
- Lack of transparency and honesty

During the sessions the participants overtly expressed their gratitude and appreciation towards the invitation to voice their opinions and they displayed great predisposition towards reconsidering their misconceptions on the subject on the basis of the explanations provided by a technically qualified person like Dr. Arellano (although the latter cannot be extrapolated to a situation of mass summon). Furthermore, besides the natural favorable response to a situation of public participation, the condition of Dr. Arellano as an independent expert free of political or economic interests provides an important strategic consideration for future situations of public participation.

In front of this, the steps that summarize the institutional procedure requested by the people are these:

- Identify all institutions involved
- Involve the community through all its representative organizations
- Debate and reach an agreement ("contract") on the responsibilities and commitments of all parts

One further consideration must be noted. It is widely accepted that rumors on such sensitive issues must be avoided: they quickly evolve into misconceptions that make people's disposition difficult to overturn.

E.4.2.3 Objection to the Adverse Impacts of the Projects

The idea of people objecting to the location of a final disposal/treatment site near their homes is not in itself revealing. The importance lies in understanding how their fear and concern towards such situation are manifested and which perceptions are the main sources of objection towards these type of facilities. In this regard, the group sessions provided valuable results that identified the following as the main concerns associated to the proximity to final disposal/treatment sites:

- Health
  Cause of illnesses and headaches; the perception that waste is not treated but simply dumped contributes to strengthen this concern;

- Living standard
  The visual effects, pests and bad smell all contribute to lower the standard of living;

- Safety
  The gas issue conveys a strong sense of fear and safety concern; it was revealed as one of the main anxieties;

- Delinquency
  Fear exists that migration of scavengers will bring about higher crime rates; and

- Nuisance caused by increasing traffic
  It is expected that a large number of trucks will transit the area creating a serious dust problem, etc..

It is important to point out that, in many cases, all the listed concerns were directly or indirectly linked to the children and measured on the basis of the effects they would have to suffer. Another interesting observation was that, even though people agreed that final disposal/treatment facilities should be built as far as possible from the city, fear existed that such remote location from news and opinion centers would eliminate the authorities' incentive to provide appropriate safety conditions.

The mentioned concerns should then provide definite insight on the main issues that need to be addressed. More specific actions to be implemented by the authorities' as mitigation measures were suggested by the participants themselves:

- waste should be processed and efforts should be made to exploit all its recycling possibilities;

- adequate investment should be made for the safety measures surrounding the operation of the facilities;

- the chosen comuna should receive some degree of economic compensation as well as other indirect benefits resulting from the facility.

E.4.3 Conclusions

As for keys for solutions with regard to "neighborhood consensus", POS and Follow-up Research at least suggested that the following three aspects (namely: **improvement**

of communication, sufficient environmental protection and fulfillment of the agreement (exchanged between promoting sector and neighbor) to be secured by authorities) should be taken into consideration both for private sectors' preparing projects and for authorities' permission procedures.

a. Improvement of communication

The followings, among others, were found through the "follow-up research of the POS":

i. Poor communication in the past of both public authorities and SWM promoting sectors towards neighborhood community (such as, lack of public hearing, project implementation without notification, broken promises', information concealment, etc.) worsened the situation and induced stronger objections by neighbors.

ii. *Meanwhile, since neither information were disclosed nor advance campaigns* conducted, there are quite a few objections which are mainly based upon their prejudice and mis-conception. It is found that most objections against "incineration facilities" were based upon the prejudice that "incineration means source of smog". Therefore, it is observed that sufficient campaigns and education by promoting sectors are indispensable for establishing "neighborhood consensus" for construction of SWM facilities.

iii. While it is said that there was no successful case of formulation of neighborhood consensus by "compensation" in Chile in the past, as far as observed in this "Follow-up Research for POS", there are few people in the participants in the free discussions who are interested in "job opportunities" as a compensation for the facilities construction. There seems to be an indication that some sort of compensatory offers (e.g. job opportunity, etc.) might work for accepting the construction with conditions. Meanwhile since the reason why they make "objection without exception and/or strong objection" are considerably *attributable to poor and insufficient communication in the past; it is needless to* say that improvement of communication is indispensable as one of main prerequisites for the formulation of neighborhood consensus.

Hence, both ways communication is essential for private sectors' preparing such projects and authorities issuing permission for construction of a facility and/or its operation.

b. Sufficient Environmental Protection

Although communication is substantially improved, people's fear and anxiety regarding environmental deterioration to be caused by SWM facilities can not be eliminated. In this regard:

- authorities, at the time of a project EIA appraisal, should examine at length whether environmental protection measures proposed in a project is sufficient or not;
- a promoting sector should be obligated to hold public hearings, explain their environmental protection measures to the public fully, and review and/or improve their protection measures reflecting neighbor's opinions;
- authorities, in case where necessary, should call an advisory committee of independent and neutral experts to further examine sufficiency of environmental protection measures; and
- as preconditions of ISWM facilities' siting permission and operation permission, the promoting sector should be obligated to reach an agreement with neighbors regarding environmental protection measures promised by them.

c. Fulfillment of the agreement (exchanged by promoting sector and neighbor) to be secured by authorities

Although sufficient environmental protection measures are presented in the planning stage by a promoting sector, neighbors are doubtful and worried whether actual ISWM facilities to be constructed fully comply with what was proposed at the planning stage and whether proposed protection measures will actually be taken place or not. Neighborhood consensus can not be realized without removing neighbors' doubt and worries. For this purpose, the authority should establish a system to ensure that promoting sector complies environmental protection measures proposed. Namely, the authority needs to strengthen monitoring and administrative guidance capabilities including on-site inspections to secure the agreement.

It is suggested in practices of authorities' administrative measures that it should be obligated that promoting sector contract environmental risk insurances and/or funds to provide for contingencies such as accidents.

ANNEX F

SURVEY ON PRIVATE SWM ENTERPRISES

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ANNEX F SURVEY ON PRIVATE SWM ENTERPRISES

F.1 Objectives of the Survey

In order to understand the actual status of ISWM, a survey was conducted to the private SWM enterprises that are presently registered in the manifest system database. Upon examining the data presently available regarding the waste amount discharged by the 510 factories, several equivocal points were observed:

- according to the information from producers there are many other destinations than the present municipal landfill, which should be examined.
- there are also many final destinations for waste subject to recycling.
- there are 12 landfills registered in the manifest system. However, only 7 of them reported amount of waste received.
- there is substantial disparity between the amount of waste reported by producers and that from final receivers.

The survey aimed at clearing these questions and at providing further insight on the actual waste flow after generation at the industries. The survey was carried out by means of a personal interview with a knowledgeable company manager and through the completion of a survey sheet. The private enterprises registered correspond to the following three groups;

- transporters
- landfill sites
- recyclers

Three different types of survey sheets were designed in order to accurately target the questions and organize the information received.

F.2 Survey to Solid Waste Transportation Enterprises

a. Survey Sample

The manifest system includes a list of 65 registered transporters. Only 21 of them (32%) were successfully contacted and interviewed. The inability to interview the

remaining transporters can be explained by the following reasons:

- the contact data (address, telephone, fax) is deficient or unreliable.
- the transporter is explicitly unwilling to cooperate.
- after several telephone conversations the transporter could not find the time for holding an interview.

Although the success rate may seem low, the 10 largest solid waste transportation enterprises were in fact interviewed, as well as several medium and small size companies. Furthermore, the transporters excluded from the survey are registered as having, at the most, 2 waste collection vehicles. In light of this, and after reviewing the opinions expressed by the interviewees, the sample is judged to be well balanced and a realistic representation.

b. Quantitative Analysis of the Survey

The first step in this quantitative analysis is to understand the size of transporters and the market share distribution as concluded from their declared "capital", "number of employees" and "annual sales" in Table F.2a. The gathered numbers describe an average profile of 477 million pesos in capital and 169 employees. This figure, however, is misrepresentative as few transporters fall under the "middle size" category: the top 4 transporters have over 800 million pesos in capital, while the bottom 4 have less than 40 million pesos. At the same time, the market share is even further polarized with the top 4 companies sharing 95% of the total annual sales. It is therefore clear that competition takes place at two different levels, that is, at both extremes of the company size scale.

With regard to this financial data, it is unavoidable to notice a 33% rate of unwillingness to provide the requested information, even when interviewees were always assured full confidentiality. Such caution may be explained by a highly competitive market where information is regarded as very valuable or by the existence of unauthorized activities (e.g. illegal dumping) which require certain degree of concealment. As the mentioned 33% of transporters belong to the "small size" category, where competition is stronger, a combination of both reasons seems to be the appropriate interpretation.

The most widely found types of collection vehicles, as shown in Table F.2c, were "compacting trucks" and "container trucks". Both types are owned in large numbers by the predominant companies and, as cross reference with Table F.2d indicates, while compacting trucks are associated to the collection of municipal SW, container trucks

seem to be the preferred option when ISW is involved.

The same table shows a total of 20,298 ton/month of ISW collected by transporters, a figure which is roughly in agreement with the generation amount obtained through the Factories' Survey: 18,632 tones/month. However, the grand total of waste collected (125,245 ton/month) leads us to a discrepancy that requires some explanation. According to Table F.2e, 83% of this amount (that is, 103,953 ton/month) is destined for the authorized landfills, while in part two of this survey (Table F.3d) the landfills declared as receiving 170,000 ton/month. When we consider that 10% of all waste generated is collected directly by the municipalities and when we take into account the non comprehensive nature of this survey, the mentioned discrepancy is put into perspective.

Finally, it is noteworthy to mention the small amount (4%) of the waste collected that is send to recycle (this issue is further develop throughout the quantitative analysis of the survey).

Table F.2a General Data on Transportation Enterprises

Company Code	Rut. No.	Company Name	Address		Capital Mill. Peso	Year Est.	Number of Employees				Annual Sales Mill. Peso
			Present	Future			Total	Operation	Administration	Other	
1	6.396.896-k	MULTICERRILLOS	Lo Errazuriz # 126, Cerrillos		40	1984	9				21
2	88.842.000-2	MULTIASEO S.A.	Pelayo Benzanilla # 4154, Estacion Central		800	1985	40	32	6		700
3	88.446.500-1	STARCO S.A.	Panamericana Norte #4241, Quilicura	Quilicura, 1996	900	1982	650	598	52		4,300
4	89.696.400-3	Empresa de Residuos RESISTER y CIA LTDA	Jose joaquin Prieto # 9750 , El Bosque		2,000	1983	520	442	31	47	2,800
5	50.664.900-5	Residuos Solidos Santa Fe	Camilo Henriquez # 3967, Puente Alto		22	1990	6				30
6	97.705.090-3	Servicio y Transportes TRANSBASA S.A.	Camino Sta Margarita, Parcele 19, San Bernardo		70	1994	9				60
7	79.651.730-1	Dieguez y Dieguez Ltda. , DISAL	Julio Pavez Ortiz # 6109, Penhalolen			1963	35				
8	88.277.600-k	DEMARCO S.A.	Fleming # 9381, Las Condes		1,600	1981	600	480	120		
9	96.580.270-3	Empresa Nacional de Servicios Nacionales ENASA S.A.	Yungay # 0515, La Granja		481	1990	500				155
10	50.348.450-1	Transportes Segali - Ortega	Camino La vara , Parcela # 2, San Bernardo		20	1975	13				
11	3.988.841-6	Fosa Quik	General Velasquez # 1845, Estacion Central		60	1983	5				26
12	96.511.800-4	HIDRAGUAS S.A.	J. Alessandri # 277, La Reina				60	37	20	3	
13	78.125.880-6	SERLIMPIO LTDA	Angamos # 286, Santiago		75	1982	32	25	7		190
14	4.665.642-3	Empresa Pelantaro	Pasaje Pelantaro, Estacion Central		40	1977	14				15
15	87.711.330-k	J.J. Barzelato y CIA. LTDA	Av. Presidente Eduardo Frei Montalva # 3981, Conchali			1950	110	97	10	3	
16	8.692.690-0	MULTITRANCER	Coyaique #6177, Estacion Central		10	1992	4				3
17	9.467.000-2	Aceros Cox Ltda.	Juana Wever # 4866, Estacion Central			1979	80	62	18		
18	92.615.000-6	MAPOLENO, Manufactura de Politileno S.A.	Av. Einstein # 1071, Recoleta			1960					
19	6.582.825-1	Fernando Solis Garcia	Jose Joaquin Perez #4809, Quinta Normal			1994	16				20
20	8.292.999-3	Productos ROCHE	Av. Quilin # 3750,Macul			1971	120				
21	87.803.800-2	COINCA S.A.	Fundo La Gloria El Pangal, Limache		560	1980	570				2,400
				Average	477		169.65				824.61

Table F.2b Information on Interviewee

Company Code	Rut No.	Interviewee		Phone	Fax
		Name	Position		
1	6.396.896-k	Pedro Gajardo	Manager/director	5386856	
2	88.842.000-2	Rodrigo Leiva	Manager of Operation	7764155	7764850
3	88.446.500-1	Fernando Pinochet	Assistant Manager of Operation	7344062	7344062
4	89.696.400-3	Enrique Penhafiel	Technical Assistant Manager	5273902	5583215
5	50.664.900-5	Octavio Martinez	Administrative Manager	2871653	2871653
6	97.705.090-3	Roberto Bass/Sergio Morales	Manager/Chief of Operations	5593440	5593440
7	79.651.730-1	Juan Carlos Fernandez	Chief of Solid Waste Traffic	2380723	2841793
8	88.277.600-k	Abelardo Troncoso	Engineer of Studies and Projects	2123604	2123606
9	96.580.270-3	Eugenio Rivero Gagardo	Operations Manager	5253407	5259068
10	50.348.450-1	Sergio Ortega	Associate	5283577	5217238
11	3.988.841-6	Doris Chamod	Manager	7794823	7794823
12	96.511.800-4	Fernando Valenzuela	Assistant Manager of Machinery and Transportation	2734960	2734960
13	78.125.880-6	Flavio Navarrete Mondino	Manager	2221035	6345531
14	4.665.642-3	Jose Gregorio Silva Lopez	Owner	7795553	7795553
15	87.711.330-k	Jorge Barzelato	Associate	7369499	7368862
16	8.692.690-0	Rosa Escobedo	Owner	7784476	
17	9.467.000-2	Roberto Sanchez	Mechanical Execution Engineer	7798192	7764088
18	92.615.000-6	Felix Segovia	Manager	6218515	
19	6.582.825-1	Fernando Solis Garcia	Owner	7732308	7732308
20	8.292.999-3	Alfredo Finch	Human Resources Manager	2213617	2210148
21	87.803.800-2	Hugo Cruzar	Control Manager	2731293	2731293

Table F.2c Number and Type of Vehicles Owned

Type	Code of Company																				Grand Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	21	
Compacting Truck	-	-	76	-	3	-	4	200	60	-	-	-	7	-	-	-	-	-	1	70	421
Container Truck	-	19	-	104	-	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	131
Heavy Duty Truck	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	3
Hoist Truck	5	7	-	-	-	2	5	-	-	-	-	-	-	-	-	2	-	-	-	-	21
Reservoir truck	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
Small Truck	-	-	-	19	-	1	-	-	-	-	-	3	-	-	-	-	-	-	-	-	23
Street Sweepers	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	2
Tipper Lorries	-	-	5	-	-	-	-	60	10	2	-	-	2	-	4	-	1	4	1	4	93
Vacuum Truck	-	-	-	-	-	-	-	-	-	-	2	-	-	3	-	-	-	-	-	-	5
Van	-	6	20	15	-	1	-	1	-	-	-	3	4	1	-	-	2	-	-	-	53
Bulldozers	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	4
Compacting Trailer	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
Frontal load trailer	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Small bulldozer	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Small excavator	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Sweeping vehicles	-	-	-	-	-	-	-	6	-	-	-	-	-	-	-	-	-	-	-	-	6
Tractor	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1
Grand Total	5	25	101	138	3	4	10	272	70	10	2	11	16	4	4	2	4	4	2	74	761

Table F.2d Type of Waste Dealt With

Unit: ton/month

Company Code	Type of Waste				Grand Total
	Municipal SW	Industrial SW	Medical SW	Construction W	
1	-	3,500	-	-	3,500
2	-	4,000	-	-	4,000
3	19,000	1,000	-	-	20,000
4	3,000	960	40	-	4,000
5	-	60	-	-	60
6	-	178	-	-	178
7	-	1,400	350	-	1,750
8	24,800	4,340	1,860	-	31,000
9	14,848	3,712	-	-	18,560
10	-	700	-	-	700
11	225	225	-	-	450
12	-	-	-	600	600
13	-	6	-	-	6
14	224	96	-	-	320
15	0	3	-	-	3
16	-	47	-	-	47
17	-	40	-	-	40
18	-	-	-	-	-
19	-	30	-	-	30
20	-	1	-	-	1
21	40,000	-	-	-	40,000
Grand Total	**102,097**	**20,298**	**2,250**	**600**	**125,245**
%	**81.5%**	**16.2%**	**1.8%**	**0.5%**	**100%**

Table F.2e Destination of Waste Collected

Company	Landfill				Total (%)	Total (%)	Total (%)	Grand
Code	Lo Errazuriz	C. de Renca	Lepanto	Other*	Landfill	Recyclers	Others	Total
1	80	20	0	0	100	0	0	100
2	0	0	0	0	0	0	0	0
3	20	80	0	0	100	0	0	100
4	70	0	30	0	100	0	0	100
5	100	0	0	0	100	0	0	100
6	90	8	2	0	100	0	0	100
8	0	0	0	0	0	0	0	0
9	50		50		100	0	0	100
10	0	0	0	0	0	0	0	0
11	0	50	0	0	50	0	50	100
12	50	0	0	0	50	0	50	100
13	5	95	0	0	100	0	0	100
14	0	30	0	0	30	0	70	100
15	0	100	0	0	100	0	0	100
16	100	0	0	0	100	0	0	100
17	100	0	0	0	100	0	0	100
18	0	100	0	0	100	0	0	100
19	0	40	0	0	40	60	0	100
20	0	42	0	0	42	0	58	100
21	9	0	0	91	100	0	0	100
Total	**48%**	**40%**	**6%**	**6%**	**100%**	**100%**	**100%**	**100%**
Grand Total	**83%**					**4%**	**13%**	**100%**

Note: Other* = Company's own landfill and other landfills outside the MR

c. Qualitative Results of the Survey

The qualitative observations gathered through this sample survey can be arranged as follows:

i. Institutional criticism
ii. Recycling
iii. Intention to expand SWM activities
iv. Illegal Dumping
v. New landfill
vi. Manifest System

ca. Institutional Criticism

The most recurrent criticism against the sanitary institutions was the absence of appropriately trained and knowledgeable personnel that could effectively carry out its monitoring role. According to the interviewees, the prevailing ignorance shown by government inspectors is the cause of unnecessary costs that could easily be avoided if sound criteria and reasonable flexibility were displayed. Such ignorance is also extensive to many municipal authorities which not only stigmatize waste management but also make decisions on the basis of political interests without considering all the sanitary implications.

Another important criticism pointed towards the lack of sufficient enforcement over waste generators (specially regarding the manifest system) and towards the need for employing more resources in final disposal control (these factors were associated to the occurrence of illegal dumping). The need for a more stringent enforcement was emphasized by a large portion of the interviewees. For some, an official waste characterization, to be submitted by the industries would enable to target the monitoring activities towards the more problematic sectors. For others, the key lies in setting the necessary legal framework that enables the issuance of penalties to those industries which do not follow the manifest system (at present, the mandatory status of the system is completely undermined by the inexistence of a penal system). Increased field inspections were also mentioned as an enforcement tool to be used. At any rate, and regardless of the specific proposals suggested by the managers, the need for increased enforcement was strongly revealed by the survey. As some managers mentioned, the lack of intermediate treatment facilities is symptomatic of the low enforcement level.

Finally, a greater commitment regarding the advisory and educating role expected from the sanitary authorities was requested.

cb. Intention to Expand

The results obtained under the question "Intention to Expand SWM Activities" provide a clearly distinctive attitude between large and small companies. Invariably all companies having more than 10 collection vehicles expressed their intention for aiming at growth, both through the expansion of activities or the acquisition of a larger market share. Here are two facts supporting the findings:

- two of the companies surveyed were in the process of competing for the operation of the future transfer stations for the new municipal landfill.
- a few transporters have carried waste content analysis to evaluate the recycling potentials of the waste collected.

In some instances, however, the entrepreneurial attitude was presently being delayed until the uncertainty regarding the new municipal landfill was cleared.

On the other hand, the majority of small companies assumed a less ambitious role and declared themselves satisfied with maintaining their present size.

cc. Illegal Dumping

As it was expected, none of the transporters surveyed was willing or able to identify the companies involved in illegal dumping, even though the large majority could name a few illegal dumping sites. Invariably, they named the authorized landfills as the destination given to all ISW or MUNICIPAL SW collected. They also identified construction waste as the main subject of illegal dumping, while the low educational level of the people involved was said to be one of its reasons. Two actions were proposed to end its occurrence:

- implement a more stringent enforcement over waste generators;
- devote more human resources towards controlling final disposal practices; both the monitoring bodies (at municipal and regional level) and the police have insufficient people to engage in prevention duties.

One of the interviewees ventured to give a rough quantitative estimate of illegal dumping activities: 12,500 tones/month or 40% of the waste collection market.

cd. Recycling

At present, only one of the transporters surveyed is engaged in recycling activities. few others, however, have carried out waste content analysis to evaluate the recycling

possibilities. According to the transporters, these are the reasons that explain the inexistence of further interest in the recycling field:

- in many cases, the content of organic matter is too high to leave any room for profits
- many transporters blame the present declaration system as an obstacle to engage in recycling (as explained in "Declaration System").

Further insight on this issue was obtained from the survey to recyclers.

ce. Declaration System

As all the transporters surveyed are presently operating under the manifest system, they seemed to have a strong opinion regarding its creation and its present operation.

As mentioned earlier, the declaration system is considered by many as an obstacle for recycling. The argument is that the amount declared by generators must match the amount declared by final receivers, therefore foreclosing any possibility to divert waste from this established flow. PROCEFF's reply was that any proposal from a private company (transporter or other) to undertake recycling activities will be evaluated and requested to comply with some terms of reference. After this is cleared, the company must submit information regarding the amount reutilized and that which is sent to the landfill for final disposal. Such procedure leaves the door open for undertaking recycling activities.

It is also a common opinion that not enough enforcement is executed to make industries comply with the system's requirements. The fact that some industries participate while others opt out of the system is seen as a source of problems regarding waste management and as a symptom of the government's leniency on the matter. This issue is also addressed under "Institutional Criticism" and "Illegal Dumping".

cf. New Municipal Landfill

During the execution of the survey, the situation regarding the new municipal landfill reached its highest level of uncertainty and controversy. Under these circumstances, several opinions were gathered on the subject, which is of undoubted importance to the Study. As they are very diverse in content, it is presented in an outlined manner.

- One small transporter fears they will be harmed by the remote location of the new landfill, while a second sees the increased distance as increase in profits.

- Generators of waste unsuitable for entering transfer stations (due to smell, etc.) expressed their concern regarding the unbearable costs that would arise from direct transportation.
- Four transfer stations surrounding the urban area should be constructed.
- A compensation scheme for the nearby inhabitants is the best method to obtain neighborhood consensus regarding the location of future landfills.
- The present near monopolistic situation regarding final disposal sites should be avoided in the future.

F.3 Survey to Solid Waste Landfills

Given the intrinsic characteristics of solid waste landfills, where a visual inspection may provide the most valuable information, the approach used for this part of the survey included a visit to the sites by several Study Team members in cooperation with the counterpart personnel most knowledgeable on the matter. Such visual inspection was complemented, whenever possible, with the information obtained from available persons at the site (in some cases no one was available). It must also be noted that the nature of many sites (i.e. unauthorized or illegal) accounts for the impossibility to obtain data for certain items originally included in the survey sheet.

a. Survey Sample

All solid waste landfills registered in the CDSI database (10 sites), except for one, were visited. (The exact location of "Calera de Tango, parcela 15" could not be established). Furthermore, three additional sites were visited which, upon consultation with the Chilean counterpart, entailed some degree of uniqueness and interest. The classification of the visited sites was conducted in the following manner:

i. **Authorized:** (3)

ii. **Unauthorized:** (9)
   a. Pure Landfills (5)
   b. Landfills with Recycling (4)

Note: in parenthesis, the number of visited sites for that category

b. Quantitative Analysis of the Survey

It was earlier mentioned that the survey to solid waste landfills entailed a high degree

of difficulty in obtaining information (except for the authorized sites), a factor which becomes apparent by looking at the summary tables presented.

The most noteworthy figure from Table F.3a is the long-standing existence of most unauthorized sites, ranging from 5 to 21 years into the past. The establishment of some of this sites, therefore, dates back to a period where no authorized landfills existed. However, the appearance of unauthorized landfills continued well into the late '80s, even when the first final disposal site (Cerros de Renca) had been inaugurated for more than a decade.

Table F.3c summarizes the "Main Equipment Owned" by the sites, where the leachate extraction pumps (numbering 6 of them) stand out among the expected bulldozers, fork lifts and tipper lorries. Such sophisticated sanitary installation at the authorized landfills are proof of the advanced knowledge that may be found among local experts, but at the same time provide a tremendous contrast with the poor conditions under which some of the landfills operate.

Regarding disposed quantities, as shown in Table F.3d, the total of 170,000 ton/month are received by authorized landfills including 17,870 ton/month of ISW, which again roughly reconciles the figure found from the survey to transporters (20,298 ton/month) with relation to this type of waste. Finally, a mention to the declared tipping fees is in order as the most expensive one is only 6,000 pesos/ton, charged by Lo Errazuriz landfill to private generators.

Table F.3a General Data on Landfill

Company Code	Rut No.	Cat*	COMPANY NAME	Address	Capital	Year of	Number of Employee				Annual Sales	Landfill	
					Mill. Peso	Estab.	Total	Operation	Administration	Other	Mill. Peso	Area (hec.)	Year
1	79.670.770-4	A	EMERES (Empresa Metropolitana de Residuos Sólidos)	Las Rejas Sur 1616 (Estación Central)	53.9	1987	150	140	10		1,900	40	8
2	69.071.200-8	A	Cerros de Renca Mayors Council	Av. Américo Vespucio 1701, Quilicura (landfill)		1979	193	192	1			44	9
3	78.248.010-3	A	Vertedero Lepanto S.A.	Camino Los Morros, Fundo Lepanto (San Bernardo)		1978	20	4	6	10		26	6
4		B	Eulogio Gordo y CIA	Palmas Lo Errázuriz (Cerrillos)								4	15
5		B	municipalidad de El Monte	Sector La Cantera El Monte								0.5	8
6		B	Emile Strandsky	Ecuador # 1352 (Renca)								5	13
7		B	Unidentified	Botadero La Montaña Panamericana Norte km. 14 (Quilicura)								5	
8	2.214.600-2	B	Mineral Santa Adela	Camino Lonquén, Parcela 3 (Maipú)		1974	20					2	21
9		C	José Dieguez	Viña Santa Rosa del Peral Parcela 19 (Puente Alto)								12	5
10		C	Mario Heressmann	Panamericana Norte Km. 17.5 (Quilicura)								5	
11		C	Dagoberto Baeza	Av Brasil # 854 (Renca)								10	10
12		C	BABARIA S.A.	Fundo San Pedro San Francisco de Moztazal		1985						0.6	10

Note: Cat* = Category of Landfill

A. Authorized Landfill

B. Unauthorized pure landfill

C. Unauthorized Landfill with Recycling

Table F.3b Information on Interviewee

Company Code	Rut No.	NAME	TITLE OR POSITION	TELEPHONE	FAX
1	79.670.770-4	Francisco Lopez	Administrative and Financial Director	7413956	7413956
2	69.071.200-8	Patricio Sanchez Saavedra	Executive Secretary of the Council	6411788	6411882
3	78.248.010-3	Agustin Garces	Operational Manager	8571130	8571655
4					
5		Juan Vera	Laborer/Guard		
6		Emile Strandsky	Land Owner		
7					
8	2.214.600-2	Julio Martinez	Manager/owner	5399014	
9					
10					
11					
12		Luis Morales	Farmer and caretaker		

Table F.3c Main Equipment Owned

		Company Code				Grand Total
	TYPE	1	2	3	10	
Type of equipment owned	Bulldozers	0	0	0	1	1
	Generator equipment	1	0	0	0	1
	Fork Lift	0	0	0	1	1
	Frontal Loader	0	0	1	0	1
	Leachate extraction Pumps	6	0	0	0	6
	Tipper Lorry	0	0	0	1	1
Total		7	0	1	3	11
Other main Equipment and facility	Bulldozers	5	3	2	0	10
	D-8	0	1	0	0	1
	Excavators	2	0	0	0	2
	Front Loader	2	1	0	0	3
	Maintenance truck	1	0	0	0	1
	Soil Compactor	1	0	0	0	1
	Trucks	4	0	3	0	7
Total		15	5	5	0	25
Grand Total		22	5	6	3	36

Table F.3d Type of Waste Disposed

Company Code	Type of Waste			Total (ton/month)	Tipping Fee (Peso/ton)		
	MUNICIPAL SW	ISW	Construction Waste		Private	Municipality	Other
1	100,000	-	-	100,000	6,000	2,000	
2	35,000	15,000	-	50,000	2,200	1,051	
3	18,000	2,000	-	20,000			1,400
5	13	-	-	13	The Municipality owns the landfill		
6	-	870	-	870			3,165
8	-	-	1,000	1,000	2.5 Mill. Peso /year		
Grand Total	153,013	17,870	1,000	171,883			

c. Qualitative Results of the Survey

ca. Authorized Landfills

The most determining factor regarding the three authorized landfill sites is the recently announced plan that establishes the closing dates for two of them. These are:

i. Lo Errazuriz: December 1995

ii. Cerros de Renca: March 1996

The plan provides for the progressive reduction of the waste to be disposed at both landfills which will then be sent to the Lepanto Landfill. Besides shortening the economic life of Lepanto, this situation brings about a much more critical scenario: the envisaging of near future increase in the disposal fees due to the remote location of the new landfill. The implications of this are of key importance as the industries will then have a renewed incentive for engaging in illegal dumping. It is in light of this situation that the surveyed unauthorized landfill sites acquire special significance.

cb. Unauthorized Landfills

It is worthy to point out that even though most of the unauthorized sites visited were small in scale, the negative environmental impact observed was quite significant as a results of inadequate operation. The relevance of the survey, however, was targeted not only towards verifying the conditions of operation, which in most cases were found unacceptable, but also towards establishing the reasons for the existence of the unauthorized sites. It is in the latter direction that the survey has provided the most valuable insight.

Secondly, we must understand the "illicit" nature of the landfills registered in the manifest system. These are sites which are declared by some industry/transporter as the final destination for the waste it generates/carries. There is no intention to conceal the "unauthorized" site. The implication of this is that their existence must be attributed in all cases to the indulgence of the environmental authorities.

cba. Present Criteria by Authorities

The significance of the previous paragraph lies in understanding the basic attitude of the authorities, specifically PROCEFF. Through the execution of the survey, it became clear that PROCEFF is willing to display an important degree of flexibility by implicitly accepting the operation of such unauthorized sites. Its basic policy is to tacitly allow

the disposal of certain hazardous waste (such as asbestos) by taking no actions to prevent it. In most instances this policy is executed under the following two arguments (none of which are shared by the Study Team):

- no alternative sites exist for the disposal of hazardous wastes and discontinuing the operation of the unauthorized sites would result in a bigger problem;
- the operation at the unauthorized site is judged to be acceptable.

According to PROCEFF, the acceptability of this policy is completely related to its transitory nature, that is, until a sound final disposal alternatives exist.

cbb. Lack of Enforcing Power

The visits carried out verified that not all cases correspond to the disposal of hazardous waste with a sound operation of the unauthorized site. In some instances the reasons behind the existence of unauthorized landfill sites are much more simple: unwillingness or impossibility by the waste generator to bear the disposal costs associated to the authorized landfills. Therefore, it is not a case of environmental concern but an economic reasoning to reduce costs. It is in those cases that the lack of enforcement (according to the authorities, lack of enforcing power) becomes apparent. Good examples of this are a municipality that has created its own landfill (unauthorized) claiming insufficient funds to dispose at the remote, authorized landfill and a site where the hazardous content of industrial drums is burnt into the air. The prevalence of such places speaks for the mentioned indulgence or impotence on the government side.

cbc. Alternative Landfills for Recycling

Upon realizing the reality of the unauthorized landfills the need to create the category "Landfills with Recycling" became apparent as almost 50% of the alternative landfills visited entailed some kind of recycling activity. This indicates the increasing entrepreneurial interest in undertaking recycling, also verified during the survey to recyclers. Most importantly, however, the survey visits provided a valuable outlook regarding the informality under which many recycling activities are still carried out. They operate not only without institutional consent and support, but also without the public's knowledge (their existence is unknown). The latter means that an opportunity is being lost towards improving the overall environmental awareness and consciousness.

F.4 Survey to Solid Waste Recyclers

a. Survey Sample

The CDSI database entries corresponding to recyclers do not provide specific information identifying the recycler to whom the waste is entrusted. Rather, the data base includes general categories according to the type of recyclable material, namely:

- plastic
- glass
- wood
- rubber and cork
- scrap
- paper and cardboard
- textile and fibre

In light of this situation and in cooperation with counterpart personnel knowledgeable on the matter, an effort was made to compile a representative sample which included both small and large recyclers. "Wood" and "rubber and cork" recycling could not be surveyed in their final user stage (see next paragraph), but the reutilization of industrial drums was added to the survey sample. Other than that, the sample includes all other recyclable materials and recycling stages.

The second criteria under which the survey was arranged refers to the stage of the recycling flow in which the interviewees operated. Three were the identified possibilities (with the number of surveys for each category in parenthesis);

- Individual Collectors (10)
- Middlemen (5)
- Final Users (10)

"Final users" are those actually engaged in the recycling process as such (i.e. industrial processing). As the most relevant factor for the Master Plan is to understand the existing waste flow after collection at the generation source, the survey results begin with an empirical description of each recycling stage followed by some general conclusions gathered from the interviews.

b. Quantitative Analysis of the Survey

ba. Individual Collectors

As the initial recycling stage, where collection takes place at an informal level, the figures for individual collectors are correspondingly small scale: 1.3 million pesos of average annual sales and on average 2.06 ton/month collected (Tables F.4a and F.4b). Furthermore, collectors have been on the business for an average of 9.83 years and use tricycles as the main equipment for transporting the waste, which they find mainly on the street.

Cardboard, glass and paper are the recyclable materials most frequently collected, while bottles and plastic have a much lower recycling incidence at this level.

bb. Middlemen

Although middlemen are almost as old participants as individual collectors (8.6 years in average), their role as measured by average annual sales and number of employees is much more significant: 216.25 million pesos and 12 persons (Table F.4d). This is also reflected in the type and number of equipment owned (Table F.4e), where the light tricycles have now become trucks, containers and vans.

This higher stage in the recycling process is well reflected by factories and individual collectors being now the main source of recyclable materials (Table F.4g), and by cans and plastic playing a significant role as types of recyclable materials (Table F.4g).

bc. Final Users

At this stage, average annual sales have grown to 756.75 million pesos with 178 employees on average providing for such large business volume (Table F.4h). The year of establishment of some final users is surprising as most of their recycling activities can be traced back to 1960.

Final users obtain their recyclable materials overwhelmingly from factories and middlemen, the amounts being as high as 5,800 ton/month of scrap, 3,500 ton/month of glass or 300 industrial drums/week (Table F.4j). In all, we are dealing with volumes that must justify the significant investment in fixed equipment required by this stage of recycling.

Table F.4a General Data on Recyclers (Individual Collectors)

Company Code	Rut No.	Company Name	Address	Annual Sales Mill. Peso	Position	Year of Operation
1	8.511.245-7	Erwing Ivan Luengo Gomez	Maria del Pilar # 249, Recoleta	0.96	Individual Collector	15
2		Leonardo Andres Vasquez	Pasaje Guerrillero #5871, Huechuraba	2.40	Individual Collector	12
3		Carlos Enrique Vasquez Lopez	Pasaje Guerrillero #5871, Huechuraba		Individual Collector	12
4	10.193.249-4	Gustavo Mena Barrales	Pasaje 78 # 1440, La Faena, Penhalolen	1.92	Individual Collector	10
5	5.861.380-6	Juan Antonio Carrillos Antivil	Pasaje El Dorado # 2218, Penhalolen	0.72	Individual Collector	9
6	10.629628-6	Hector Montenegro Novoa	Calle 1 # 6090, Huechuraba	1.70	Individual Collector	5
7	40.795.007-k	Toribio Antiman Cayupi	Los Pinos # 3793, Macul	1.20	Individual Collector	12
8	5.272.367-1	Mario Salas Rodriguez	Pasaje Penco # 6086, Penhalolen	0.96	Individual Collector	11
9	6.634.421-5	Carlos Encalada Travol	Maria Ignacia # 956, Pudahuel	0.48	Individual Collector	12
10	7.412.726-6	Eno Humberto Frias Contreras	Poblacion Jaime Eizaguirre, Pasaje 6 # 2237, Macul	1.32	Individual Collector	0.3
			Average	1.30		9.83

Table F.4b Equipment and Main Sources of Recyclable Materials (Individual Collectors)

Company Code	Rut No.	Equipment	Main Sources of Recyclable Materials				Amount (ton/month)
			House holds	Commer cial	Factories	Others(found on the street)	
1	8.511.245-7	Tricycle				x	2
2	R01	Tricycle				x	2
3	R02	Wheel cart				x	1
4	10.193.294-4	Tricycle				x	4.2
5	5.861.380-6					x	5
6	10.629.628-6	Tricycle				x	1.6
7	40.795.007-k	Tricycle				x	2
8	5.272.367-1	Tricycle				x	1
9	6.634.421-5	Bag Holding				x	0.8
10	7.412.726-6	Tricycle				x	1
						Average	2.06

Table F.4c Recycled Materials (Individual Collectors)

Company Code	Material					
	Bottles	Cardboard	Glass	Others	Paper	Plastic
1	0	1	1	1	1	0
2	1	1	1	1	1	1
3	1	1	1	1	1	1
4	0	1	1	1	1	0
5	0	1	1	1	1	0
6	0	1	1	1	1	0
7	0	1	1	1	1	0
8	0	1	1	1	1	0
9	1	1	1	1	1	1
10	0	1	1	1	1	0
Grand Total	3	10	10	10	10	3

Note: 1= Yes
0 = No

Table F.4d General Data on Recyclers (Middlemen)

Company Code	Rut No.	Company Name	Address	Share Capital	Year of Estab.	Nos. of Empl.	Annual Sales Mill. Peso
11	R01	Marta Lopez	Nueva Andres Bello # 3635, Quinta Normal			20	
12	6.694.644-4	Recuperadora Carrascal # 5078, Quinta Normal	Carrascal # 5080, Quinta Normal	100	1984	20	600
13	96.665.640-9	ECOBAS	Av. Ossa # 2259, La Reina	200	1993	15	180
14	11.258.519-2	Luis Soto Montecinos	Guillermo Mann # 1042, Nhunhoa	5	1980	4	13
15	9.979.925-0	Claudio Flores Sanhueza	Guillermo Mann # 946, Nhunhoa	1.5	1991	3	72
			Average	76.63		12.4	216.25

Information on Interviewee				Year of
Name	Position	Telephone	Fax	Operation
Marta Lopez	Family head and lot owner			11
Diego Riveros	Owner/Manager	7734628	7734628	11
Andres Astorga	General Manager/Associate	2770574	2770574	2
Luis Soto Montecinos	Owner			15
Claudio Flores Sanhueza	Owner			4
				8.6

Table F.4e Type and Number of Equipment Owned (Middlemen)

Company Code	Rut No.	Main Sources of Recyclable Materials			
		Households	Commercial	Factories	Others (i.e. Ind. Collectors)
11				1	1
12	6.694.644-4		1	1	1
13	96.665.640-9	1		1	
14	11.258.519-2		1		1
15	9.979.925-0			1	1
Total		1	2	4	4

Table F.4f Main Sources of Recyclable Materials (Middlemen)

Company Code	Rut No.	Type and Number of Equipment Owned							
		Truck	Forklift	Containers	Vans	Scale	Compacting	Filter	Mill
11									
12	6.694.644-4	5	1						
13	96.665.640-9	3		70	3				
14	11.258.519-2	1			2	1			
15	9.979.925-0						1	1	1
Total		9	1	70	5	1	1	1	1

Table F.4g Recycled Materials (Middlemen)

Company code	Recycled Materials					Amount (ton/month)
	Cans	Cardboard	Glass	Paper	Plastic	
11	1	1		1	1	
12		1		1		1,200
13	1	1	1	1	1	115
14		1		1		2
15					1	8
Total	2	4	1	4	3	1,325

Table F.4h General Data on Recyclers (Final Users)

Company Code	Rut No.	Company Name	Address	Share Capital	Year of Establ.	Nos. Empl.	Annual Sales (Mill. Peso)
16	R01	Carlos Besoain	Av Brasil #6225, Renca		1984	3	
17	90.331.000-6	Cristalerias Chile S.A.	Hendaya # 60, piso 2, Las Condes		1905	800	
18	92.176.000-0	Siderurgicas AZA	La Union # 3070, Renca		1955	290	
19	80.750.600-5	Textil Plos Ltda.	Av Buzeta # 4027, Cerrillos		1958	150	
20	95.051.000-5	INDUSAC S.A.	Bernardo O'Higgins # 0252, Puente Alto	1,000	1982	160	2,500
21	93.372.000-4	Cristalerias Toro S.A.I.C.	Dagoberto Godoy # 145, Cerrillos		1952	250	12
22	815.870-3	Industrias ENGAR	Jose Joaquin Perez # 4809, Quinta Normal		1945	18	15
23	81.866.400-1	FOSKO S.A.	Eduardo Matte # 2071, Santiago			30	
24	81.290.000-5	Fabrica de Carton Bellavista y CIA. LTDA.	Eyzaguirre # 1605, Puente Alto		1960	46	
25	79.522.140-9	PLASTISERVI LTDA.	Sta. Rosa # 3021	120	1985	40	500
				Average		178.7	756.75

Table F.4i Information of Interviewee (Final Users)

Company Code	Rut No.	Information of Interviewee		Telephone	Fax
		Name	Title		
16	R01	Veronica Martinez	Assistant Manager	6424584	
17	90.331.000-6	Monica Marin Rodriguez	Supervisor of Recycling Unit	2468880	
18	92.176.000-0	Carlos Ferrer	Plant Engineer	6418683	
19	80.750.600-5	Javier Plos	Manager	6833123	
20	95.051.000-5	Andres Poniachik	General Manager	8500523	8501448
21	93.372.000-4	Pedro Toro Harnecker	Operation Manager	6833971	6832539
22	815.870-3	Fernando solis	Owner	7732349	7732349
23	81.866.400-1	Eduardo Toro	Recycling Plant Manager	5517963	5517963
24	81.290.000-5	Raul de la Barrera	Plant Engineer	8500243	
25	79.522.140-9	Antonio Bermudez	Associate/Manager	5559643	5544798

Table F.4j Main Sources of Recyclable Materials

Company Code	Rut No.	Main Sources of Recyclable Materials				Average Amount
		Indiv. Collectors	Middlemen	Factories	Others	
16	R01			1		250 drums/week
17	90.331.000-6		1	1	1	3,500 tn/month
18	92.176.000-0		1			5,833 tn/month
19	80.750.600-5			1		20 tn/month
20	95.051.000-5			1		200 tn/month
21	93.372.000-4			1		900 tn/month
22	815.870-3	1		1		300 drums/week
23	81.866.400-1		1	1		185 tn/month
24	81.290.000-5		1		1	170 tn/month
25	79.522.140-9		1	1		150 tn/month
Total		1	5	8	2	
%		10%	50%	80%	20%	

c. Qualitative Results of the Survey

ca. Individual Collectors

This activity corresponds, in most cases, to the informal stage of the recycling flow. Collectors, on low income, carry out small scale collection with very basic equipment and with special emphasis on the paper and cardboard materials. The typical flow at this stage is represented as follows:

Waste collected from the street by individual collectors ⇒ middlemen

The significance of individual collectors lies in the large number of them currently existing. Although the individual quantities observed through this survey average around 2 tones/month, the total amount becomes relatively significant (perhaps comparable to that of a large size middleman). However, as it became apparent through the survey to "final users" (explained later in this report), the tendency points towards higher levels of environmental consciousness and organization among the industries: not only do they tend to recycle more, but they also organize better their supply flows better for recyclable materials. This results in a significantly diminished role by individual collectors (and even small middlemen). That is, their stage in the industrial waste recycling flow is being displaced by an emerging relationship, more direct and efficient, between the industries discharging recyclable materials and final users. Interestingly enough, all interviewed collectors unanimously claimed recyclables becoming scarce in the last two years. As the environmental awareness is also adopted in the household domain, individual collectors will become marginal participants.

cb. Middlemen

Next is the typical waste recycling flow in which middlemen are involved:

Collectors
Factories ⇒ middlemen ⇒ larger middlemen ⇒ final users
Commercial Shops

In many instances, small size middlemen may be associated to individual collectors: they are fulfilling a task which will become marginal as the recycling market becomes more efficient. Large size middlemen, on the other hand, were found to display a sound and long term commitment, as the following two strategic decisions were observed to be carried out by them:

- they intend to engage in education campaigns, specially aimed at children,

that encourage reutilization consciousness;

- they permanently allocate their own personnel at the source of recyclable materials (supermarkets, printing mills, etc.) to guarantee the supply and to promote reutilization among the industries.

These strategies allow middlemen to obtain uncontaminated material which will not generate additional waste from separation procedures. As it has been observed that such waste is sometimes subject to illegal dumping by recyclers, these strategies are also recommendable from a waste management point of view.

cc. Final Users

The most relevant finding from the survey to final users is that factories are clearly their main source of recyclable materials, except for the paper and cardboard sector where individual collectors and middlemen still retain an important role. Besides eliminating a potential source of illegal dumping (i.e. middlemen), this situation conveys that industrial consciousness (or, as one interviewee explained, interest to improve corporate image) and organization towards recycling are becoming increasingly important. Although the same is not yet clear at the municipal level (past attempts to include schools and municipalities in the recycling system have failed), renewed efforts are also being done in that field as one of the companies surveyed has engaged in a recycling campaign in the municipality of La Reina.

The interviewees also informed about recent corporate decisions to create a "Recycling Department" as well as recent investment decision to broaden recycling operations, both of which also support the mentioned efficiency improvements in the recycling market.

cd. General Conclusions

In general, both as a result of the data collected and from an intuitive perception through the visits, it was observed that the recycling system is undergoing a turning point where formal and sound recycling is replacing unorganized and inefficient flows. Whatever the reasons behind the emerging interest (environmental consciousness, profit making or corporate image), industries are seriously devoted to turning recycling into a common procedure.

It must also be noted that recent institutional actions, such as the creation of a commission to promote recycling, are committed to support the mentioned trend in the private sector. Although such commission is only starting its promotion activities, its creation may be interpreted as a response to several opinions obtained in the survey