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SANITATION SURVEY MISSION
TO KAMPUCHEA

JUNE 13 TO JULY 23, 1986

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I. Acknowledgements

I wish to take this opportunity to thank all those whose support, advice and assistance made this mission and survey possible.

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The Municipal Health Services and Office of Hygiene not only gave their guidance and the benefit of their previous survey experiences but enthusiastically mobilized their energies, personnel and survey teams to implement the survey and also assisted in the translation and consolidation of the 217 questionnaires.

The Department of Public Works, especially the Sewer and the Garbage Disposal Division arranged, co-ordinated, facilitation, advocated and assisted in the implementation of the entire program. All of the above spared no efforts and often worked into the night so that this study could be executed and completed in the five weeks available.

Many other individuals and services also contributed in this effort and helped me to gain a better understanding of PNH's urban problems, its strengths and weaknesses - name the Office of Habitat, the Center for Epidimidology, The People's Revolutionary Committees of Daun Penh and 7 January Districts, and the "Organizations de Masses" in those districts and countless others as well.

A special appreciation goes to the surveyors and participants in the survey for their time and insights and patience.

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NOVIB and the Delft Wageningen team set up the groundwork for this mission and provided valuable insights through discussions and their technical studies of the Phnom Penh Sanitation system. The industriousness collaboration between the Kampuchians I had the

privilege to work with were a source of inspiration and encouragement throughout the mission and writing of this report.

II. Introduction

This mission follows a series of three technical missions undertaken by NOVIB in collaboration with TH Delft and Wageningen School of Agriculture. NOVIB has been involved in various aspects of relief and rehabilitation work in Kampuchea since 1979. Beginning in November of 1982, the above parties have implemented a number of in depth technical studies of the Phnom Penh sanitation system with the intention of supporting programs which would improve the sanitation conditions of this capital city and reduce health risks among the population.

The preceding missions carried out successively in November 1984, March 1985 and February 1986 by the Delft-Wageningen team have resulted in valuable studies of all aspects of the PNH Sanitation System, in laying a solid foundation for collaboration and good working relationships with the various Kampuchean department involved in sanitation, in identifying recommended priorities for NOVIB intervention and in designing practical projects to respond to the needs. NOVIB is currently implementing some of these recommendations by providing both material assistance and technical expertise.

Following a budget approval of DFL 612,448 in December of 1985 for PNH sanitation, and in order to make most efficient use of the funds, NOVIB has felt an urgent need to gain more insights into the socio-cultural-economic background of the population of PNH and into people's appreciation of the present sanitary conditions and their attitudes and practices.

This report will not attempt to discuss the technical aspects of the PNH sanitation system since it has already been done by the Delt Wageningen technicians competent in their fields. However, it is recommended that their report be read in conjunction with this one as together they attempt to present a more wholistic picture of the sanitation situation in PNH.

III Phnom Penh in Transition

Phnom Penh, as it stands today still devastated and bearing the scars of years of war and abandonment and vandalism, has seen many improvements in the last six years and is now entering a period of transition which will markedly affect any long planning strategies and projects. The 1985 re-organization of this city into six arrondissements represents only the first changes to affect this capital and will be followed by further decentralization and re-organization of institutions and services. Several officials felt that such reorganization and decentralization will in the long run allow for better delivery of services to the inhabitants of PNH.

The city of PNH - situated on the west bank of the four branches of the Mekong River, Toule Sap and Toule Bassac has grown at a rapid rate since 1979 and is officially at the same level attained in the 1950's. Growth and delivery of services has progressed at a slower pace.

Year	Total Population	No. of Families
1979	122,779	25,219
1980	323,958	61,973
1981	346,503	64,804
1982	391,456	71,054
1983	398,792	72,628
1984	426,539	81,497
1985	427,944	-

At present, the population of PNH (based on a 1985 census) stands at 427,944 officially registered and recognized residents. This does not account for the 100,000 to 200,000 transients who live in PNH during part of the year, nor does it account for the military and security personnel living in cordoned off and restricted parts of the city. The survey undertaken during this mission suggests that more than seventy percent of the official residents of PNH today originally come from the provinces and settled in PNH for the first time after 1979. This partially helps to explain some of the sanitation problems and attitudes now plaguing the

city. The transient nature of one fourth of the population greatly exacerbates the sanitation problems and compromises some of the programs designed to resolve them. Often living in unsuitable and unsafe habitations, abandoned cinemas or schools, or on rooftop terraces or makeshift huts in abandoned lots or courtyards, this population has little consideration for, and sensitivity and responsibility for sanitation in their environment. They often are the main perpetrators of unsanitary conditions and a source of conflict in the community. Their presence in a community also hinders the development of cohesiveness and community spirit.

Plans to enlarge and develop the capital to include "Greater Phnom Penh" became official on July 20th with the turning over of one district of Kandal Province to PNH thus doubling the total surface area of PNH and bringing to it an additional population of 40,000 persons. The newly acquired area is for the most part underdeveloped and is located on the present western boundary of PNH extending beyond the national airport toward Kg Speu.

A new census is currently under way in order to account for the new re-organization and to obtain a more accurate picture of the population for planning purposes. The municipality is in the process of exploring long term plans to develop self-contained suburban districts to release the center city from a chaotic and overcrowded situation thus reducing the urban stress and many of the problems resulting from it.

METHODOLOGY

This mission was very fortunate in being able to take advantage of the experiences gained in three recent surveys implemented within the last year by Municipal Health and Hygiene Sectors. Similar methods, recommended by WHO, were thus adopted for this study into the living conditions of PNH residents. Participants implementing the projects collaborated in every phase of the study and included the Department of Garbage Disposal, the Public Works Department (Division of Sewers), the Municipal Health Department, the Municipal Office of Hygiene and the NOVIB consultant.

The objectives of the study were:

1. To gain insights and a better understanding of the living conditions of PNH residents especially regarding health and sanitation in order to identify priority needs and in order to plan and support programs that address the current problems and respond to the actual situation,
2. To gather information on the attitudes and practices of PNH residents towards hygiene and sanitation in order to later evaluate the impact of projects designed and implemented to improve the situation. This survey would then serve as a point of reference or benchmark.

A questionnaire was defined by the parties mentioned above and a house-to-house survey was conducted by fourteen teams (2 persons each) of health and sanitation workers. In some cases the teams were accompanied by a neighborhood official who acted as guide but who did not determine the house selection. The NOVIB consultant also participated in the house-to-house survey and joined different teams of surveyors.

A meeting was held for the surveyors the day before the study was to begin in order to explain and discuss the questionnaire in detail and to assign the areas of work. Due to time constraints it was not possible to

pre-test the survey and this proved to be a weakness in the study as a few questions caused problems and were interpreted differently by the various teams. Therefore, those questions subject to a high discrepancy were omitted from the final analysis.

Population statistics from a 1985 PNH census were used to identify a representative sample. In order to choose as representative a sample as possible, eight bunches (quartiers) of seven families each were randomly selected from each of Phnom Penh's four zones: Zone I - heavily populated, Zone II - moderately populated, Zone III - peripheral rural, and Zone IV - peripheral industrial. Thus eight bunches of seven families each equals fifty-six families per zone times four zones for a total of 224 families. In some quartiers surveyors interviewed more than seven families but only the first seven were accepted for final analysis. In Zone III (the rural area) the work was not completed and only forty-nine families in seven quartiers were interviewed thus bringing the total sample population to 217 families. Houses were also randomly selected by choosing digits on a currency note and going to the house bearing the same number. Floors and left or right hand apartments were selected by "flipping a coin". The questionnaire and its results will now be discussed by section.

KEY

- Zone I - heavily populated area
- Zone II - moderately populated area
- Zone III - peripheral rural area around PNH
- Zone IV - peripheral industrial area

PNH	Provincial	French	English
Khan	= Srok	= Arrondissement	= District
Sangkut	= Kkum	= Quartier	= Ward
Mondol	= Phum	= Village	= Village
Krom	= Krom	= Groupe	= Group

Since the reorganization in December, 1985, Phnom Penh is divided into six

districts called "Khan" in the interior of the City and "Srok" on the outskirts of PNH. There are four Khan - Khan 7 January (7 Makara), Khan Daun Penh, Khan Chamcar Morn, and Khan Tuol Kork; and two Srok - Srok Russey Keo and Srok Mean Chey. The districts are divided into sixty wards (quartiers) and then subdivided into villages and groups.

Education: Primary and secondary education are combined in a ten year program.

Level I - years 1 - 4

Level II - years 5 - 7

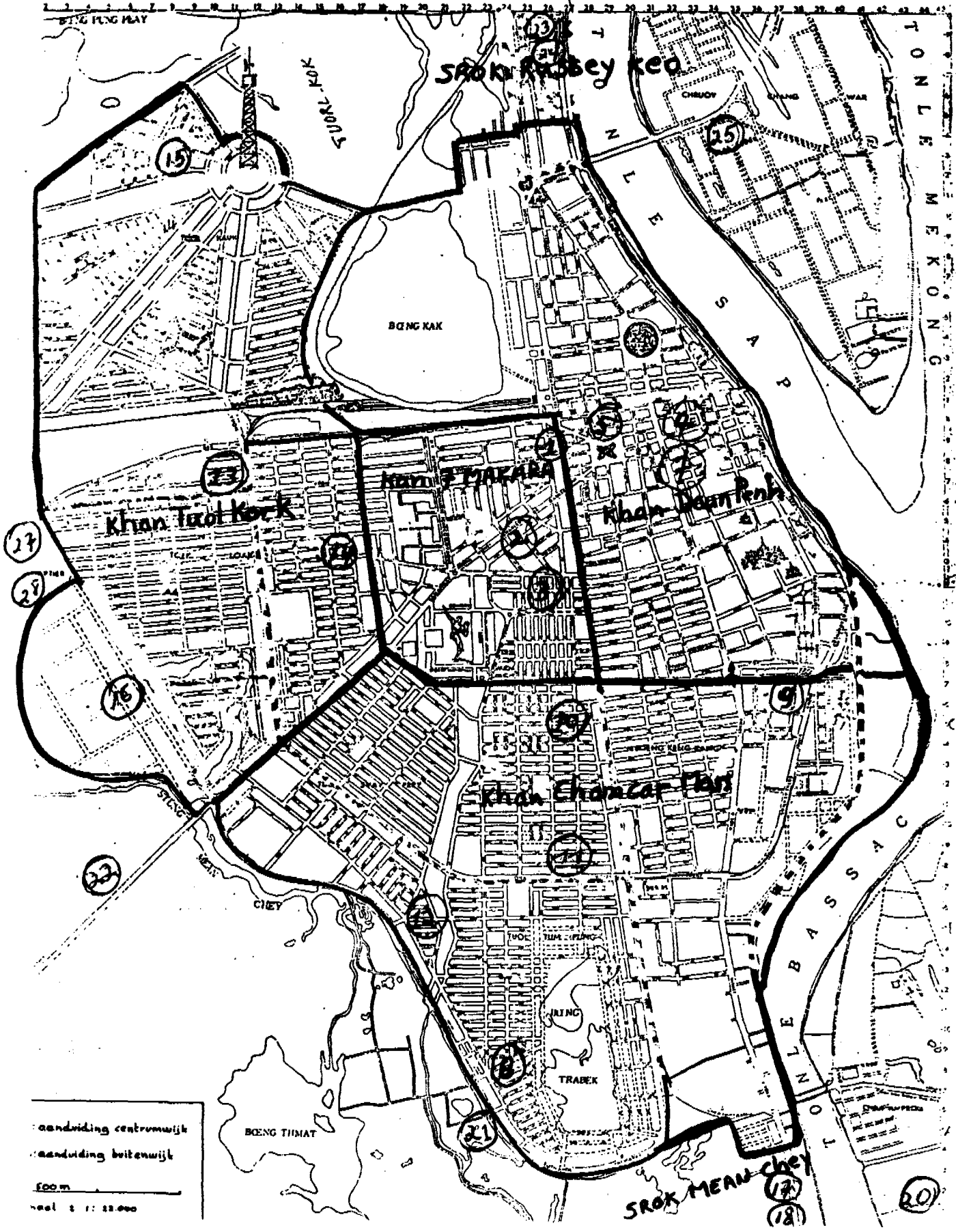
Level III - years 8 - 10

Phnom Penh Districts randomly selected for survey

Map Location	Zone	District	Ward	Size of Sample
		7 January		(total) 21
1	I	"	Monorom	7
2	I	"	O'Russey III	7
3	I	"	Boeung Pralit	7
		Daun Penh		(total) 28
4	I	"	Psar Chas	7
5	I	"	Psar Thmei I	7
6	II	"	Sras Chak	7
7	II	"	Chey Chomnas	7
		Chamcar Mon		(total) 35
8	I	"	Psar Doeum Thkeu	7
9	II	"	Tonle Bassac	7
10	II	"	Boeung Keng Kang II	7
11	II	"	Boeung Keng Kang III	7
12	II	"	Tuol Svay Prey II	7
		Tuol-Kork		(total) 21
13	I	"	Tuk Laak II	7
14	I	"	Psar Depot III	7
15	II	"	Boeung Kak I	7
16	I	"	Boeung Salang	7
		Mean Chey		(total) 56
17	IV	"	Chak Angre Krom	14
18	IV	"	Chak Angre Loeu	14

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19	III	-	Niraut	7
20	III	-	Prek Pra	7
21	III	-	Boeung Tompon	7
22	III	-	Stung Mean Chey	7

Map Location	Zone	District	Ward	Size of Sample
		Russey Keo	(total)	56
23	IV	-	Km 6	14
24	IV	-	Russey Keo	14
25	III	-	Chroy Changvar	7
26	III	-	Chraing Chamres II	7
27	III	-	Phnom Penh Thmei	7
28	III	-	Tuk Thlar	7

A. Socio Economic Data

Zone I: This densely populated urban zone is located around the markets of O'Russey, Psar Thmei, Tuol Tampong, Psar Depot and in Center City. The population is made up of civil servants or government employees, merchants, laborers and artisans living mostly in crowded flats with poor to mediocre water and sanitation facilities. The standard of living varies considerably from the extremely poor peasant population coming from the rural areas in search of work to wealthier merchants and business people. Seventy-two percent of this population came from the provinces and settled in PNH after 1979.

There is also a large transient population, not officially registered in the census, living in temporary make shift quarters or abandoned buildings unsafe and unsuitable for habitation. All quarters of Khan 7 January fall into this densely populated zone and for this reason it has been selected as a target and priority area for sanitation "model quartier" projects.

Zone II: This is a moderately populated zone outskirting the city and also characterized by flats and a slightly higher proportion of wood and rudimentary straw mat houses, as well as old concrete single family

villas. There is a higher concentration of intellectuals and government employees (forty-one percent) in this area though a higher percentage (eighty-three percent) of the population is originally from the provinces, having moved to the capital for the most part after 1979. There is also a large number of institutions (schools, etc.) in this zone. The sanitary situation in this area is better than in Zone I and there is more space for family gardens and raising of courtyard animals. There is a more heterogenous population and many poor families.

Zone III: This rural peripheral zone is located at the outer limits of PNH along the rivers and is inhabited mostly by farmers (thirty-seven percent) engaged in rice cultivation and vegetable growing, and laborers (forty-four percent) or fisherman (the Cham minorities in North and South PNH.) The housing is mostly of traditional wood construction and design (eighty-one percent) with a smaller number of straw houses interspersed. Many of the wooden houses have been in the family for more than one generation and the present inhabitants returned to them immediately after 1979. Sanitation is best in this zone, the spacious environment is healthier, families seem to take pride in keeping the surroundings clean and almost all seem to have garden plots and raise animals. The low population density and environmental conditions reduce sanitation problems and make this area a low priority in relation to Zones I and II.

Zone IV: This is a peripheral industrial zone also at the outer limits of the city and as the name suggests an area of factories (Russey Keo, Km 6, Chek Angre Krom and Chek Angre Loeu) with a high concentration of factory workers (fifty percent). Forty-eight percent of houses are of a wooden type and a lower number divided between flats and straw mat houses. Sixty-six percent of the population originally comes from the provinces. Adequate water and sanitation facilities are in short supply and sanitation practices leave much room for improvement (fifty-four percent of the population throws its garbage in the river).

The sample survey population totals 217 families, 1286 persons, of whom seventeen percent are children five years of age and younger. Fifty-eight percent of the families are of four to seven persons with twenty-six percent having eight to twelve members and fourteen percent having one to three members. Seventy-six percent of the families interviewed were headed by men and twenty-four percent by women. Of these women heads of households, ninety-one percent are widows. Fifty-seven percent of the families were extended families, i.e. families included in-laws, brothers and sisters, nieces, nephews but very few grandparents (or parents of the heads of households).

Of the total sample population, seventy-three percent originally came from the provinces and of these, eighty-three percent come to PNH after 1979. This is one of the major factors contributing to sanitation problems in PNH today - ignorance of the demands and hazards of urban life compounded by crowded conditions and inadequate and broken down water, sewer and sanitation facilities. In three of the sample quarters, no two of the seven families interviewed came from the same province and this lack of homogeneity could also influence the sense of community and the sense of shared responsibility in a community which are necessary if sanitation projects are to work effectively in that community.

In contrast to this, education is a factor on the positive side. Barring a few exceptions, the survey indicated that all children of school age attended school and at least eighty percent of the population have received some education, be it formal or through literacy programs. Thus, such a population could potentially be responsive to brochures and sanitation and health education materials designed to address the problems. It was interesting to note throughout the survey that hygiene practices regarding treatment of water and garbage disposal were not better among the more educated population and in some cases were even worse.

The following tables have been included to give the reader more details and insights.

Phnom Penh Sanitation Survey - July 1986

Population

Surveyed Zone I Zone II Zone III Zone IV Total

No. of Families	326	340	307	313	1286
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Age Distribution

0 - 5 years	59	55	69	42	225
6 - 10	42	40	36	32	150
11 - 15	51	54	48	45	148
16 - 20	26	51	22	37	136
21 - 30	54	39	46	47	186
31 - 40	44	48	32	40	164
41 - 50	30	37	31	39	137
51 - 60	11	11	10	11	43
61 +	9	5	13	20	47

Total number

Interviewed	326	340	307	313	1286
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Total number

families	56	56	49	56	217
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Age Distribution

	<u>M</u>	<u>F</u>	<u>Total</u>	<u>Birthdate</u>	<u>% of Total</u>
0 - 5	112	113	225	1981 - 86	17
6 - 10	78	72	150	1976 - 80	12
11 - 15	98	100	198	1971 - 75	15
16 - 20	66	70	136	1966 - 70	11
21 - 30	80	106	186	1956 - 65	14
31 - 40	61	103	164	1946 - 55	13
41 - 50	67	70	137	1936 - 45	11
51 - 60	19	24	43	1926 - 35	3
61 +	17	30	47	19... - 25	4
Totals	598	688	1286		100
	47%	53%			

Head of

Household Zone I Zone II Zone III Zone IV Total Per Cent

Male	42	46	35	41	164	76
Female	14	10	14	15	53	24

Of the Female Heads of Households, 48 (91%) are widowed.

Of the Male Heads of Households, 11 (6%) are widowed.

<u>Family Structure</u>	<u>Zone I</u>	<u>Zone II</u>	<u>Zone III</u>	<u>Zone IV</u>	<u>Total</u>	<u>Per Cent</u>
Nuclear	24	19	22	16	81	43
Extended	32	30	21	26	109	57
Not available	-	7	6	14	27	

Family Size

1 - 3 persons	9	7	4	12	32	14.7
4 - 7	33	35	30	29	127	58.5
8 - 12	13	14	15	15	57	26.2
13 +	1	-	-	-	1	0.4

Origin of Family

Phnom Penh Province	15	7	15	16	53	25
Viet-Nam	-	2	-	3	5	2
Not Available	1	-	7	-	8	

Families stating Province as Origin Date of Arrival in PNH

Before 1970	5	7	-	2	14	9
1970 - 1975	2	1	1	1	5	3
After 1975	33	39	26	34	132	87

<u>Education</u>	<u>Zone I</u>	<u>Zone II</u>	<u>Zone III</u>	<u>Zone IV</u>	<u>Total</u>
Level I	105	120	96	119	440
Level II	75	83	40	59	257
Level III	10	24	2	21	57
Literacy Program	26	13	21	28	88
Illiterate	36	15	37	16	104
Other*	-	-	2	1	3
% Population with some education					
> 5 years old	81	84	83	90	

*Includes Buddhist or Koranic school.

Occupation	Zone I		Zone II		Zone III		Zone IV		Total	%
	%	#	%	#	%	#	%	#		
Civil Servant/ Government Employee	30	39	41	46	18	21	28	38	144	29
Teacher/ Merchant	5	7	13	15	6	7	14	19	48	10
Laborer/ Factory	58	75	45	50	44	51	50	67	243	49
Farmer	-	-	-	-	32	37	5	7	44	9
Artisan	7	9	8	1	-	-	3	4	14	3
Total		130		112		116		135	493	

B. Housing

The large demand for limited housing in PNH has created city slums, overcrowding and squatting problems. The problem of housing in PNH dates back to the Lon Nol Regime (1970 - 1975) when PNH suffered not only from shelling and lack of maintenance but especially from the stress of a refugee population influx raising the normal population of the capital from 750,000 to over a million and a half. From 1975 - 1978 the city was almost completely abandoned and suffered deterioration not only from the elements and lack of maintenance but from deliberate destruction by man. Housing and buildings were dismantled in order to use the construction materials elsewhere or for other purposes. Many buildings suffered serious deterioration, i.e. roof leakage, wall cracks, foundation subsidence, windows and doors became detached from hinges, trees and weeds grew inside or on verandas, etc.

Immediately after the elimination of the K. R. regime, PNH took on a resurgence but further damage also occurred as newcomers cannibalized neighboring houses in order to get the materials needed to repair their own houses.

After 1979, the housing situation was assessed to be as follows (figures from Office of Habitat and Urbanism).

1. Before 1975, PNH had 122,000 dwellings,
2. 82,000 dwellings were destroyed or seriously damaged from 1970 - 1978,
3. 45,736 habitable houses remain after 1979 and belong to the state. Among these, there are:
 - 9,017 villa type dwellings (combined and single, wooden and concrete),
 - 4972 half villa type dwellings (combined and single, wooden and concrete),
 - 31, 752 dwellings in flats (mostly concrete)

In addition to these and because of the shortage of housing, people have built 17,692 huts or shacks of bamboo or wood and thatch.

During the survey a number of families were found to be living in schools, theatres, restaurants, old hotels or other buildings abandoned and condemned because of dangerous structural problems or because they are inadequate as housing units. In other buildings visited, especially in the oldest parts of the city, some families lived in partially damaged houses where entire rooms had caved in and had come to be used as garbage dumps.

Infrastructure was also seriously damaged between 1970 and 1978 - especially the water distribution and sewer systems such that today only twenty-three percent of PNH residents at ground level have running water (contaminated due to the many leaks in the system) in their homes, while barely sixty percent of the inner city population have functioning toilets in their homes.

Many toilets and latrines have been blocked or damaged and very few have a water flush system. The Office of Habitat reports that it has slowly repaired a number of latrines in the city. In some flats, a latrine or toilet will be used by several families and usually are maintained (not too well) on a rotating basis. Twenty percent of the population have access to public latrines and this might be looked into as a possible interim solution for other areas having no toilets or latrines.

In one flat our group visited, fifteen families lived on one floor

separated by hanging mats. This concrete building was raised above the ground (sur pilotis) and sat on a heap of garbage and stagnant water. The family interviewed stated that there was no toilet in the entire building and that they defecated behind the house at night or onto some leaves which they then wrapped and added to the garbage heap.

Sewer openings along the streets have been used as dumps for household waste and garbage and consequently sewers are blocked in several sections. The problems are further exacerbated during the rainy season when waste water is expelled from sewer openings and spreads over residential areas causing serious health hazards.

Though we are here pointing out some of the worse cases, it is important to note that there were also many houses in fairly good condition, comfortable and well kept. One must also look back on the years 1979 and 1980 to see that much progress has been made to raise the standard of living of PNH residents, to rehabilitate and beautify the city, and to extend health and sanitation services, but the needs are still great and the resources of the municipality and residents are very limited.

Current housing problems not only include water and sanitation but also are dark and poorly aerated and thus provide an unhealthy environment. Though electric supply has greatly increased in the last few years still only 51% of the population has electric power (which is intermittent). The healthiest environment is found on the outskirts of PNH and especially in Zone III where there is plenty of space, fresh air, traditional wooden houses well aerated and easy to maintain.

Again, data relating to housing is included for further clarification.

Types of Houses in Survey					% Zone	% Zone
Sample	Zone I	Zone II	Zone III	Zone IV	I & II	III & IV
Flats	40	39	0	15	71.7	14
Wood	7	7	40	27	12	64
Straw/Mat	9	10	9	14	16	22
Total	56	56	49	56		

Flats - Floor Surveyed	Zone I		Zone II		Zone III		Zone IV		Total		% with FTs *
	FT	*	FT	*	FT	*	FT	*	FT	*	
Ground	13	18	15	24	-	-	12	2	30	54	55
First	6	7	9	13	-	-	0	2	15	23	
Second	3	3	1	1	-	-	-	-	4	4	100
Third	3	10	0	1	-	-	-	-	3	11	27
Fourth	1	2	-	-	-	-	-	-	1	2	50

*FT - Functioning Toilets

	Zone I	Zone II	Zone III	Zone IV
Families Using Public Toilets	12	16	18	12

- Of the 217 families surveyed, 120 have access to private WC/latrine or public latrines. This represents fifty-five percents of the sample population.

- In the inner city, Daun Penh, 7 January, Chamcar Mon, and Tuol Kork, seventy percents of the sample population have a functioning WC/latrine.

- In 7 January District, eighty-five percent of the sample had WC/toilets, four percents used public WC/toilets and 9 percent have no toilet facilities.

- In Daun Penh District, thirty-two percent of the sample population have WC/toilets, while forty-six percent have access to public WC/toilets and twenty-two percent have no toilet facilities at all.

Electricity	Zone I	Zone II	Zone III	Zone IV	Total	% I & II	III & IV
Yes	21	44	8	38	111	51	
No	35	12	41	18	106	49	
Total	56	56	49	56	217		

C: Water

Today only twenty-three percent of the households in Zone I and II have access to water in their homes while almost seventy-five percent get their water at public taps, usually situated in alleys between flats or in courtyards. The water board can provide water during the day only and

with very low pressure such that few buildings (unless they have their own pump) are unable to get water to the floors above ground level. While many efforts are underway to rehabilitate the Water Treatment Station and Pumping Stations, recent studies show that present water supply is contaminated and constitutes a health hazard to city residents unless boiled or chlorinated before consumption. Even though water is chlorinated at the Water Treatment Station, the distribution system itself is riddled with leaks thus recontaminating the water as it passes through the system. There is not only contamination of drinking water from waste water from open trenches, but also from contamination at public taps (often crudely assembled), the site for public baths, washing of dishes and clothing. The lack of drainage and stagnant waters around these areas are ideal locations for breeding of germs and spread of disease.

In a way, tap water encourages a false security among urbanites because it appears clear and thus may be considered safe for drinking. It seems that people using pond or river water take much more caution in treating their water than those who receive clear water from a tap. The Municipality has for years now focused on campaigns and propaganda, urging city residents to boil their water and this seems to have had a positive effect since approximately eighty percent of the population claim to boil their water. Another matter is whether or not they bring their water to boil only to allow it to boil long enough (eight to ten minutes) to kill all bacteria. Other families treat their water by decantation or by adding gypsum which helps particles to settle, but neither of these methods kills bacteria or viruses.

At present, no water fees are collected because there are no meters to monitor and control water supply. In Srok Mean Chey, however, families reported paying from 150 to 300 riels per month and this seems to be a private type of enterprise where water is pumped from the river and delivered to houses on a regular basis. Problems around public water taps could be greatly reduced by providing adequate public bathing areas,

raising water spigots on proper platforms, allowing for areas for washing clothes and dishes and insuring proper drainage.

Source of Water	Zone I	Zone II	Zone III	Zone IV	Total	% I & II	% III & IV
Tap inside house	13	13	-	-	26	23	-
Outdoor tap	43	41	7	25	116	75	30
River/Pond	-	-	24	25	49	-	47
Well	-	-	18	6	24	-	-
Not available	-	2	-	-	2	2	-
Total	56	56	49	56	217		

Water Treatment*	Zone I	Zone II	Zone III	Zone IV
Boiling	47	40	34	48
Decantation	2	1	3	4
Gypsum	-	-	1	5
No treatment	7	15	12	4

*Some families use more than one treatment

How Water is Stored	Zone I	Zone II	Zone III	Zone IV	Total	%
Open Jar	13	9	6	11	39	18
Closed Jar	36	37	43	44	160	74
Bassin (open)	3	7	-	-	10	5
Other (open)	-	-	-	-	1	4
Not available	4	3	-	1	7	3
Total	56	56	49	56	217	

Bathplace	Zone I	Zone II	Zone III	Zone IV	Total	%
In the House	24	25	4	18	71	33
Public bath/tap	10	4	-	5	19	9
River	-	1	13	1	15	7
Outdoors	21	25	32	32	110	51
Not available	1	1	-	-	2	1

D. Health /Hygiene

This section of the questionnaire seemed to create the most problems for both surveyors and respondents. Only 160 questionnaires completely answered these questions and thus these represent a very small percentage of the total sample population. It did, however, clearly indicate how little people know about common diseases and their causes. Only a handful of respondents could make the relationship between lack of hygiene or sanitation and intestinal diseases or diarrhea. Even fewer made the connection between water and the latter. About thirty of the respondents blamed disease on the "atmosphere" and fevers on poor hygiene. Most just admitted that they did not know the causes.

The following table, taken from a February 1986 survey report on vaccinations, conducted by the Municipal Health Department, better illustrates the current problems.

Health Problems of PNH Residents*

Illness	<u>1983</u>			
	Municipal		Central Hospital	
	Cases	Deaths	Cases	Deaths
Diarrhea	91,388	-	10,538	70
Grippe fevers	123,374	-	-	-
Typhoid Fever	135	-	711	4
Resiratory				
Infections	591	4	16,873	63
Haemorrhagic				
Fever	2,977	138	2,919	177
Dermatosis	23,589	589	-	-
Intestinal				
Parasites	25,196	-	-	-
Conjunctivitis	6,414	-	-	-
Cholera	104	-	-	-
Tetanos	-	-	-	-
Whooping Cough	65	-	40	-
Polio	-	-	-	-
Tuberculosis	135	-	-	-
Measles	316	-	-	-

1984

Illness	Municipal		Central Hospital	
	Cases	Deaths	Cases	Deaths
Diarrhea	19,284	-	12,158	35
Grippe fevers	95,864	-	-	-
Typhoid fever	92	1	625	3
Respiratory infections	2,983	-	25,550	64
Haemorrhagic fever	172	22	288	19
Dermatosis	25,609	-	2,262	-
Intestinal parasites	25,933	-	-	-
Conjunctivitis	1,915	-	-	-
Cholera	26	-	-	-
Tetanos	-	-	6	6
Whooping Cough	134	-	147	1
Polio	32	-	13	-
Tuberculosis	309	-	612	3
Measles	462	-	201	4

1985

Illness	Municipal		Central Hospital	
	Cases	Deaths	Cases	Deaths
Diarrhea	22,582	-	7,139	37
Grippe fevers	40,268	-	-	-
Typhoid Fever	34	-	872	3
Respiratory infections	3,931	-	33,189	146
Haemorrhagic fever	1,934	95	3,565	317
Dermatosis	10,636	-	4,533	-
Intestinal parasites	10,695	-	-	-
Conjunctivitis	2,896	-	-	-
Cholera	1	1	-	-
Tetanos	-	-	78	31
Whooping cough	97	-	158	2
Polio	1	-	18	2
Tuberculosis	114	-	269	6
Measles	175	-	280	1

1985 Totals

<u>Illness</u>	<u>Cases</u>	<u>Deaths</u>
Diarrhea	29,712	37
Grippe fevers	40,268	-
Typhoid Fever	906	3
Respiratory infections	37,125	146
Haemorrhagic fever	5,494	412
Dermatosis	15,169	-
Intestinal parasites	10,695	-
Conjunctivitis	2,896	-
Cholera	1	1
Tetanos	78	31
Whooping cough	255	2
Polio	19	2
Tuberculosis	383	6
Measles	455	1

*Taken from Vaccinations Report - Municipal Sanitation Department, February, 1986.

This data comes from Phnom Penh's eighteen Municipal Health Centers (of which one is a municipal hospital) and seven Central Hospitals. It is not completely reliable since some hospitals only declared the number of hospitalized cases while other included out-patient consultations. Also not all cases are laboratory confirmed and there are undoubtedly cases which did not come to the attention of PNH health services.

Concerning haemorrhagic fever, statistics come from PNH health center and hospitals but include patients who came from nearby Kandal province.

Though the above data contains flaws, certain observations are self-evident and can be directly related to poor standard of living, lack of hygiene practices and inadequate sanitation.

Diarrhea, intestinal parasites, typhoid, haemorrhagic fever, dermatosis, cholera and tuberculosis are all in some way related to hygiene and

sanitation practices and could be greatly reduced if not completely eliminated through improvements in the sanitation situation and education.

Another illness not usually considered as such, but very common in post-Pol Pot years and very directly related to the suffering and consequences of the Khmer Rouge period, is depression. It afflicts many Kampuchians today and especially women and widows and greatly influences how they feel about themselves and their environment. The lack of motivation and failure to participate in activities aimed at improving the environment can often be attributed to depressions.

An outbreak of cholera in 7 January district in June and July 1986, greatly concerned local officials who mobilized all their resources to contain the problem. Though the situation is for the time being under control, some sanitary situations in PNH are ideal for such outbreaks to occur again with more serious consequences.

Haemorrhagic fever has been a serious problem since 1983 and resulted in 412 deaths among children in 1985. Haemorrhagic fever is transmitted by Aedes Aegypti mosquito which breeds in open water containers, rubbish (abandoned tires, tins, etc.), heaps of garbage and other dark, damp areas.

Once again the Municipality has launched several educational campaigns aimed at improving sanitation and eliminating the breeding sites, and have also made several attempts to combat the vector by fumigation of neighborhoods with insecticides. But the problem persists. While propaganda has been effective in convincing the majority of the population to keep water jars covered, the problem cannot be eliminated while mountains of garbage remain in back of houses, in collapsed buildings and courtyards (see photo).

Most Common Illnesses Identified by Sample Population
160 Respondents

Grippe

31%

Fever	30
Anemia/weakness	29
Diarrhea	11
Conjunctivitis	11
Other (tuberculosis)	9
Skin Infections	2
Malaria	2

How Much Spent on Medicines per Month
160 Respondents

Riels

1 - 100	46%
101 - 300	27
301 - 600	6
600 - 1000	0
1001 - 1500	1
1501 - 2000	3
over 2001	3
Free at hospitals	6

E. Sanitation and Hygiene

The sanitation problems of PNH are quite complex and the result of a combination of factors including the shattered state of the city and infrastructure after the war and Khmer Rouge regimes, overcrowding, the rural origins of the majority of the present urban population, the transients, ignorance, limited materials, resources and other priorities, etc. Marked improvements have taken place in the overall sanitation situation for PNH since 1979 and the city received a real boost and facelift around the time of the fifth anniversary of the Liberation in 1984. But, these tell only part of the story. The more dangerous health and sanitation situations remain unseen by the public eye and hidden from view; - behind the apartment buildings and even inside them lie mountains of garbage, perhaps 10 - 15 years worth that are inaccessible to equipment that might remove them. What is the incentive for putting one's rubbish in a bin when

it is even more convenient to drop it from a back window onto a "depot" that has build up over the years?

Other factors also complicate removal of these illegal depots, including availability of laborers and attitudes toward this type of work. The responsibility for cleaning these neighborhood sites, fall both on the sanitation garbage division and the neighborhood committees. The role of the garbage division is to provide the logistical resources - trucks, bins and hiring local personnel for collecting garbage and delivering it to the designated areas. The work itself is considered demeaning and unpleasant and never ending since quartiers cannot manage to raise enough funds to hire an adequate number of laborers. The few laborers who do accept such jobs find themselves overworked with little reward. Quartiers, in theory, collect three riels per month per family in order to hire and pay laborers but in practice, have great difficulty obtaining this contribution from many of the residents. Families living on ground floors are generally more conscientious of keeping the surroundings clean and often complain that those living above them undermine their efforts by throwing things out of windows and not observing good sanitation practices.

Model quartiers in Daun Penh and 7 January districts, who benefit from sanitation projects assisted by NOVIB and implemented by the Municipal Garbage division, show some improvement in sanitation practices over other neighborhoods but still have some illegal depots and problem areas. In these model quartiers project attention is focused on education and providing garbage bins and chariots. Many people resources are involved in these projects - mass organizations, neighborhood officials, health services, volunteer Red Cross and community sanitation agents and the Public works and sanitation division of the Municipality.

The most urgent matter at hand now is the removal of the illegal garbage depots found in neighborhoods, in alleyways and behind and inside houses. Community manual labor activities do not appear to be very effective for resolving these problems because it is too reminiscent of Pol

Pot forced labor. It is suggested that food for work projects (providing rice for garbage removed) be considered for such work. This would provide energy for the hard work involved as well as motivation. The municipal authorities have already responded favorably to initial findings of this study and to verbal reports made by the representative of the Garbage Disposal Division on the serious unsanitary conditions found, by increasing the fuel allotment for garbage collection vehicles, authorizing the hiring of a hundred additional sanitation laborers and by forming a committee headed by the services of various Municipal offices to oversee and implement programs addressing the sanitation problems. The required per capita contribution for sanitation has also been raised from three to six riels. The "model quartier" experience is still relatively new but hopefully will provide lessons and experience for effective extension into other parts of the city.

Sanitation disposal of waste and garbage in the peripheral zones of PNH seems to be less of a problem. It is oftentimes burned and buried or used for composting, the more serious exceptions being those thirty percent of families who dispose of their waste and garbage in the river.

Families with Garbage Bins						
	Zone I	Zone II	Zone III	Zone IV	Total	%
Yes	30	42	11	25	108	49.8
No	26	14	38	31	109	50.2
Total Sample - 217						

Where Families Deposit their Garbage							
	Zone I	Zone II	Zone III	Zone IV	Total	% I & II	% III & IV
Garbage bin	20	10	-	1	31	29	.9
Designated depot	13	7	-	-	20	20	-
Yard	6	11	2	13	32	17	14
Street/sewer	1	-	-	-	1	.9	-
Burn & bury	13	21	33	12	79	33	43
River	-	-	-	30	30	-	29
Brush	-	-	11	-	11	-	10

<u>Model Districts</u>	<u>7 January</u>	<u>Daun Penh</u>
Have garbage bins	76%	58%
No garbage bins	24%	42%

<u>Deposit Garbage</u>	<u>7 January</u>	<u>Daun Penh</u>
Bin	71%	21%
Depot	29	38
Yard	-	29
Burn & Bury	-	12

In order to identify the most effective means for reaching people with health and sanitation education programs, the sample population was asked how or where they heard about health and sanitation measures and issues. Almost all consistently responded "through monthly conferences" which are held in each neighborhood to disseminate information about recent government or party circulars and to discuss issues of common concern to the community. The radio and community sanitation agents rank second and third as sources of information on health and hygiene. It is evident that despite the already ongoing efforts undertaken by Health, Sanitation and other services in educating urbanites about better health and hygiene practices, there is a need for still more effective and creative methods to get the messages across. Education, especially with the objective of changing attitudes and well ingrained practices takes time and patience and resources. Conferences and hours of lecturing and meetings were a part of life under Pol Pot and the negative association such events recall perhaps also make this means of communication not very popular and effective for sanitation education.

How People Receive Information about

<u>Health and Hygiene</u>	<u>Zone I</u>	<u>Zone II</u>	<u>Zone III</u>	<u>Zone IV</u>
Radio	18	31	33	29
Public dissemination	13	24	18	30
School children	10	15	26	13

Activities	22	26	29	26
Conferences	45	47	43	46
Not available	7	3	-	4
* Sample surveyed	56	56	49	56

Films are a very popular distraction in PNH and many educators and officials think that this type of tool would be the most appreciated and efficient method for outreach. Film strips, slides, brochures, visual materials and theatre are also much appreciated by the population. Theatre has historically and traditionally been used to convey moral, political and other educational themes.

Municipal Health and Hygiene Services have already produced a number of brochures, posters, calendars, etc., designed to educate and address current problems and one hopes that such efforts will be further encouraged and supported. The Municipal Garbage Disposal Division in collaboration with the Municipal Health and Hygiene Department have recently designed a brochure (attached in the appendix) addressing some of the more frequent sanitation problems and practices and these will be distributed to families in the model quarters with practical demonstrations given by volunteer community sanitation agents. The Municipal Hygiene Department is currently training one hundred such volunteers for this type of community work. Women's associations and youth associations are also involved in similar undertakings and activities.

F. Participants' Recommendations

Only seventy-five of the respondents voiced any opinion concerning whether or not they were satisfied with present sanitation conditions and services. Part of the hesitation comes from survival tactics learned under Pol Pot where criticism was punishable by death and, secondly, is the natural temerity felt by some respondents at voicing a negative opinion

which they feel might be interpreted as criticism of the administration or a reflection on themselves and admission of their responsibility and role in creating the problems.

Usually people will not hesitate to voice a positive opinion if asked, and if they are pleased with a particular program or item. We can then safely assume that the ninety-four percent of the population who did not respond to this question were either dissatisfied with present sanitation conditions, or did not see it as important. Of those who did answer, twenty were from Zone III, the rural zone where environmental sanitation is better than in other areas. Nineteen of those were satisfied with present conditions. In other zones, seventy-two percent of those who did answer, mostly from 7 January and Daun Penh, were satisfied, while twenty-eight percent were not, along with the silent majority.

The last questions of the survey solicited recommendations for improving sanitation in PNH. There were few concrete suggestions. While a number of families recommended that measures be taken to improve hygiene and sanitation; they failed to give concrete ideas as to how this might be done.

Most recommendations came from Daun Penh and 7 January Districts, where some families admitted that "cleanliness was better than in previous years," but that there was a need for making more 'model quartiers'; for community manual labor once a week to clean areas around houses and picking up garbage, for more regular garbage collection by the Sanitation Department, for repairing sewers and putting lids on open ones, for putting lids on garbage cans. Some respondents in Chamear Mon district suggested that there was a need to raise people's awareness about hygiene and sanitation and to educate them.

VII. Observations and Conclusions

There has been an increase in awareness and concern among PNH administration and some residents about sanitation problems and issues and a sincere effort and attempt to resolve them in the last two years. The fact that this survey was so well supported and enthusiastically implemented by the various municipal services most directly concerned with health and sanitation is clear evidence of that as well as the many other measures as already mentioned in previous sections.

The "transformation" of PNH for the celebration of the fifth anniversary of the Liberation from Pol Pot and formation of the People's Republic of Kampuchea was an impressive achievement and showed what can be done when something becomes a priority; when there is commitment and collaboration and resources. Nothing was spared to beautify PNH to make it a city to be proud of. Certainly for all its residents it became a place much more pleasant to live in and more uplifting. It gave the city a real boost.

It was a first step and addressed some of the more visible "eye sores" and problems of the city. It could not and did not resolve all of the not so visible problems of water, sewers, garbage in back alleys and houses, toilets, etc. - problems of such a scale as to daunt any administration and even more so one who is denied "development" and "bilateral" aid from the Western International Community. The cholera incidents, the hemorrhagic fever outbreaks, the typhoid, diarrhea, etc. - are warning signs that there are matters needing urgent action. Thus far they have been contained and the symptoms treated, but it will not take much for them to get out of control in the future if the causes themselves are not eliminated. However, they are a drain on society and on the country.

The effort and momentum and commitment demonstrated for the fifth anniversary did not continue at the same level afterwards although some of the many improvements in sanitation services continue today. There

are many reasons for this. There are many priorities in administering a municipality each deserving at least equal attention, and this is not always possible with problems of shortages of skilled personnel and material resources. So many situations are dealt with on a one by one basis. For example, when the Mekong rises too high and threatens to flood PNH, all energies and resources are mobilized to build dykes to protect the city. When there is a haemorrhagic fever epidemic, all energies are focused to combat this problem, etc., and other matters temporarily take second place. In light of the many constraints, the municipality has devised good coping mechanisms.

Sanitation is an ongoing concern requiring consistent commitment and attention. The problems are complex and the solution not so simple. The problems are not just dealing with garbage collection or sewer repair and do not concern only the Sanitation Departments but require an integrated approach and collaborative effort that addresses at the same time issues of public awareness and education, potable water and distribution, drainage, sewer rehabilitation, safe housing and especially toilets and bathplaces, garbage disposal, community responsibilities, personnel and laborers. For example, it is not enough to collect garbage from a neighborhood. If there are no WCs what are people expected to do? How does one encourage citizens to practice proper hygiene if there is not adequate water supply or facilities for bathing, washing, etc. How can the garbage division efficiently collect garbage if the individual citizens do not make a conscientious effort to put it in a container or area designed for collection? How does one recruit laborers and provide enough incentive to make the work both safe and attractive. What are the most efficient means for reaching the public with educational materials?

Many municipal services have several programs under way addressing some of the above questions. A Committee for the Coordination of Hygiene and sanitation has been appointed by the President of the People's Revolution Committee to develop, co-ordinate and oversee efforts to

improve sanitation. Health services have been organizing seminars, developing visual aids and educational materials (with UNICEF's help), and training volunteer community sanitation agents to work closely with the communities. The Municipal Department of Communications, Sewer Divisions are working on a program to clean and rehabilitate sewer lines and provide sewer covers. They have recently purchased a dredger to drain the lagoons where sewers empty. The Garbage Division of that same Department co-ordinates manual labor activities, and implements a program of garbage collection throughout the city. Both of the above are closely collaborating with NOVIB in "model quarters" projects and in a project to use garbage as compost for agriculture. The PNH Regie des Eaux (Waterworks) has with the help of OXFAM embarked on a five year rehabilitation program. All of the above need not only moral support but material and technical support from the AID community in order to continue and expand such efforts. There are some very competent and motivated Kampuchean giving the best of themselves in the above projects but they cannot resolve all the problems above.

VIII. Recommendations: (For NOVIB and all interested Aid Agencies and the Municipality)

- 1) That NOVIB assist the Municipality in developing five-year long term sanitation plan outlining detailed and concrete objectives and steps for each year of planification and implementation. The technical studies have already been undertaken by the NOVIB-Delft teams and some of the recommendations already acted upon.
- 2) That NOVIB make available to the Municipality a "resident" or "permanent" technical assistant (a sanitation engineer) to assist the Municipal Sewer and Sanitation Division on a more regular basis in co-ordinating, facilitating and implementing small sanitation projects.
- 3) That NOVIB explore with the Municipality appropriate technologies for public latrines and sanitary public water installations in the "model quarters".
- 4) That the Model Quartier projects be extended to other communities.
- 5) Increased assistance for the development of visual aid materials for educational purposes (including slides, films, brochures, posters, etc.).
- 6) That "Food for Work" projects be considered for stimulating and supporting campaigns to clean all illegal garbage depots in alleys, courtyards, houses, etc.
- 7) That an emergency fund (Caisse noire) be made available to the garbage disposal and sewer division for immediate repairs of trucks and equipment when necessary pending reimbursement through local administrative channels.
- 8) That small projects be developed and supported to provide income and incentives to sanitation laborers.
- 9) To provide adequate logistical support, spare parts and equipment and tools to maintain and carry out sanitation and sewer works efficiently.

10. That all aid agencies working in PNH try to assist in some of the areas mentioned above and co-ordinate their efforts in a common direction.

BROCHURE FOR SANITATION EDUCATION

The attached brochure has been designed by Municipal Health services in collaboration with the Sub Division des Ordures, UNICEF and NOVIB in response to the need for visual education materials to encourage proper sanitation and hygiene practice. Each page is divided into parts representing common practices found in Phnom Penh which contribute to poor sanitation and the recommended practice. the brochure also reflects themes which the Service des Ordures and Delft Team have identified as a priority.

They are also the same themes adopted by a seminar on hygiene and environmental sanitation sponsored by UNICEF (a few weeks earlier) for cadre from the hygiene department.

The brochure was pre-tested in several neighborhoods to see how they were understood by the participants and to solicit suggestions for their improvement. the brochures will be corrected to reflect the comments and inaccuracies identified by the participants and will then be distributed in the SDO - NOVIB model quartiers. Community health agents will explain the lessons in the brochure to groups of families in the model quartiers and this is to be immediately followed by practical demonstrations or manual labor. three thousand posters bearing the same themes are already being printed.

អរ កម្រិតនៃការកាន់កាប់សេវា
បានដឹងពីការប្រកាន់និព្វាន



បើប្រិយភិក្ខុ រស់នៅខ្លាចខ្លាច កើតមកក្នុងនិព្វាន គ្មានប្រែប្រួល

យើងចំណាយសូយកាក
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បិណ្ឌ តើក្នុងយើង រឺ
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ប្រិយភិក្ខុ... ខ្លាចកាច់
ឬខ្លាចនាម...?



ក៏យល់ថាតូចមិន ឆ្កេះធំ បើញាបាយស្រានិញញឹមខ្លីប

មុនពេលប្រកួតកែចេះពិនិត្យ យល់ពិតថាស្រាកសីមនស្រស់

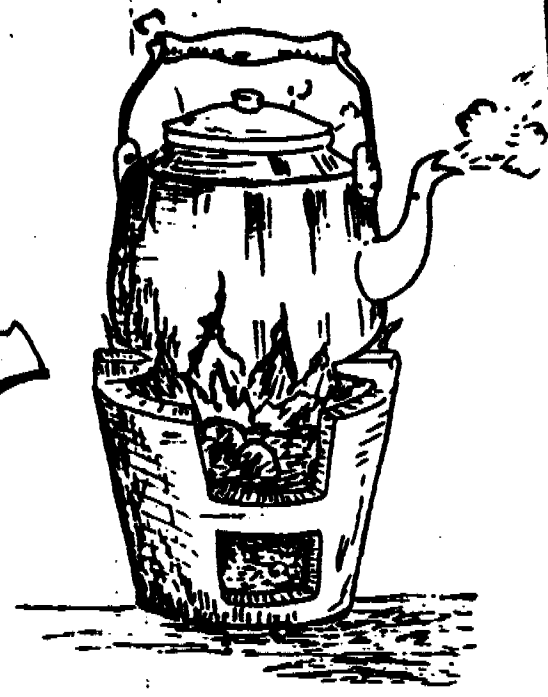
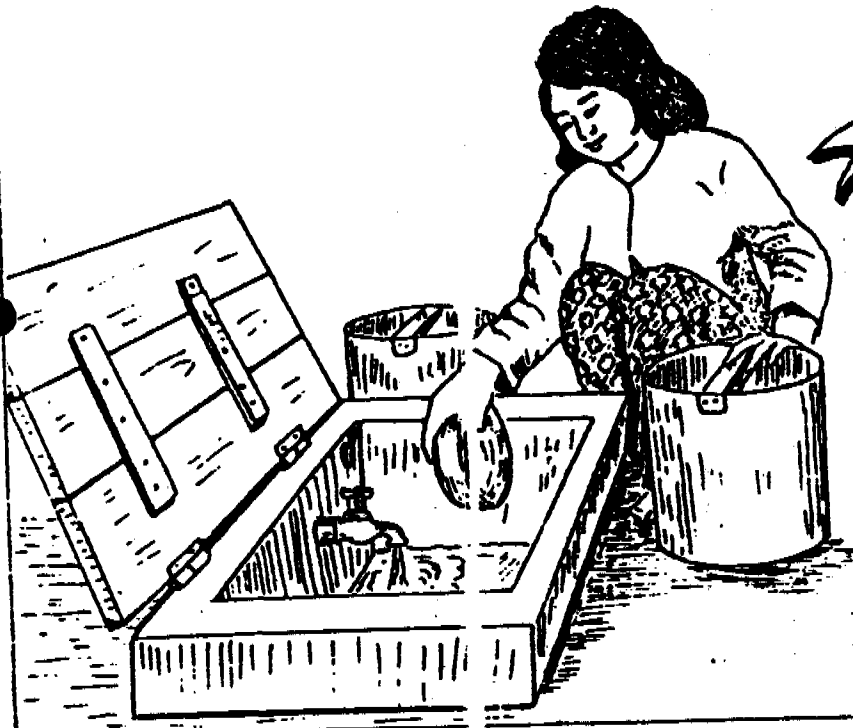


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ហ្មាប្តូរព្រាបែងពិតតម្រានកាត គង់មានថ្លៃណាខ្ពស់នាសេដ្ឋកិច្ច



ទឹកដងទៅដោះសាយពុះសិន



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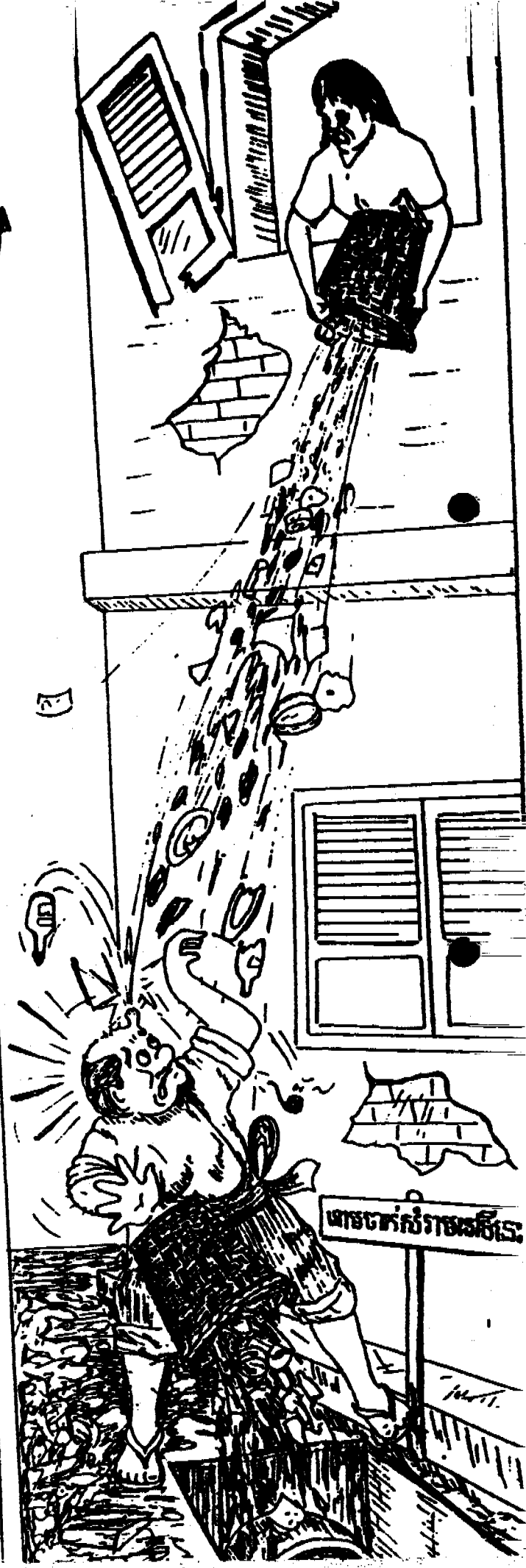
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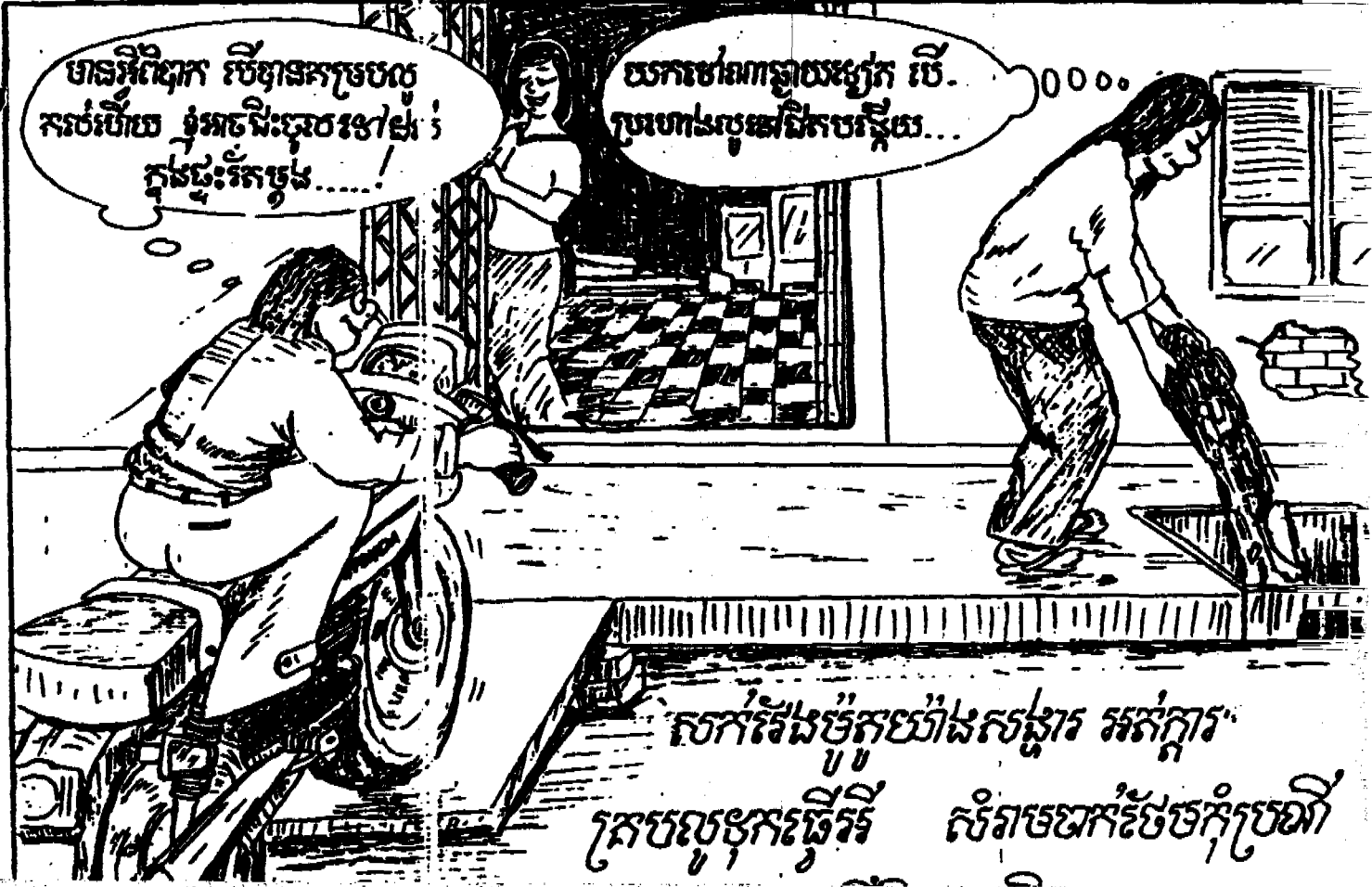
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កុំបេះតែដោះបេះតែចាត់ កុំ
បេះតែមិលាក់ ក្នុងខ្សែក





ដើម្បី អាចរំលោភទៅក្នុង
ដើម្បី សុខភាពក្នុងគ្រួសារខ្ញុំ
ខ្ញុំត្រូវ ចាក់សិរាម ក្នុងឆ្នងសំរាម



មានអីពិបាក បើមានកម្រិតបច្ចុប្បន្ន
គ្រប់យ៉ាង ខ្ញុំអាចដោះស្រាយទៅ
ក្នុងដំណើរការ.....!

យកមកលាងឱ្យស្អាត បើ
ប្រហោងលុបចោលបង្កើត.....

ស្រាប់តែបង្កើតយ៉ាងសង្ហារ អន្តរការ
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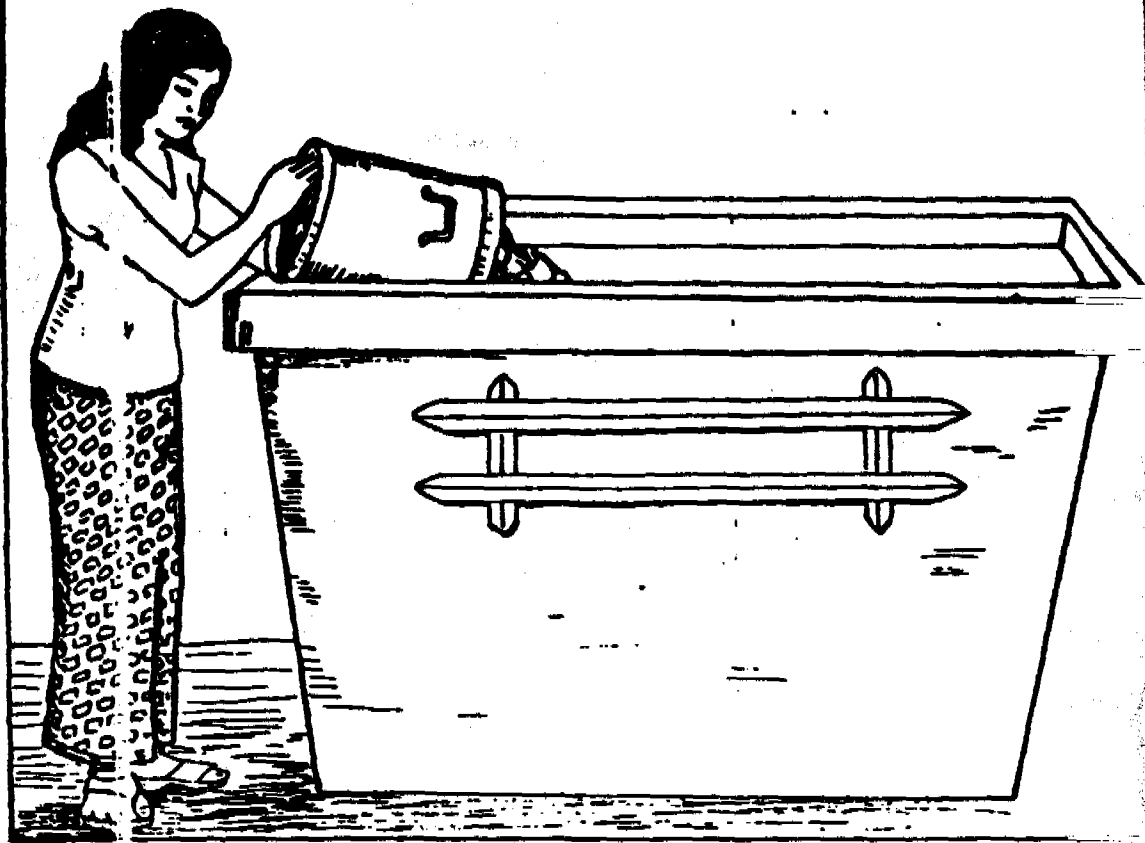


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 ផ្ទះ រឹបដាច់មាស
 ឆេះហាក់មេដើ
 ឈប់កាំជន្តារឡើង
 រាល់ថ្ងៃ ស្រាតតត
 ហានឈប់រឹបរឹបវិស

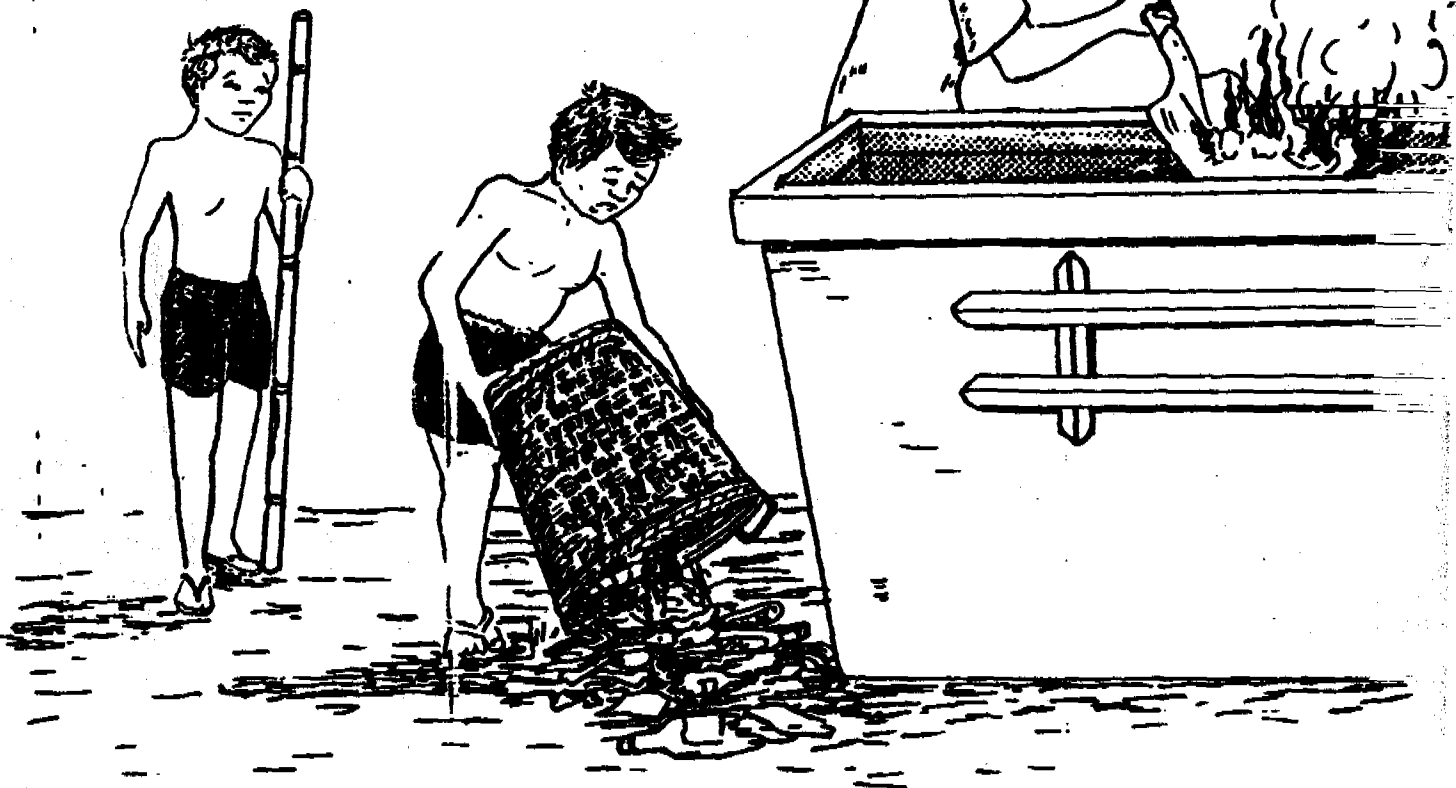
ប្រាណា ២



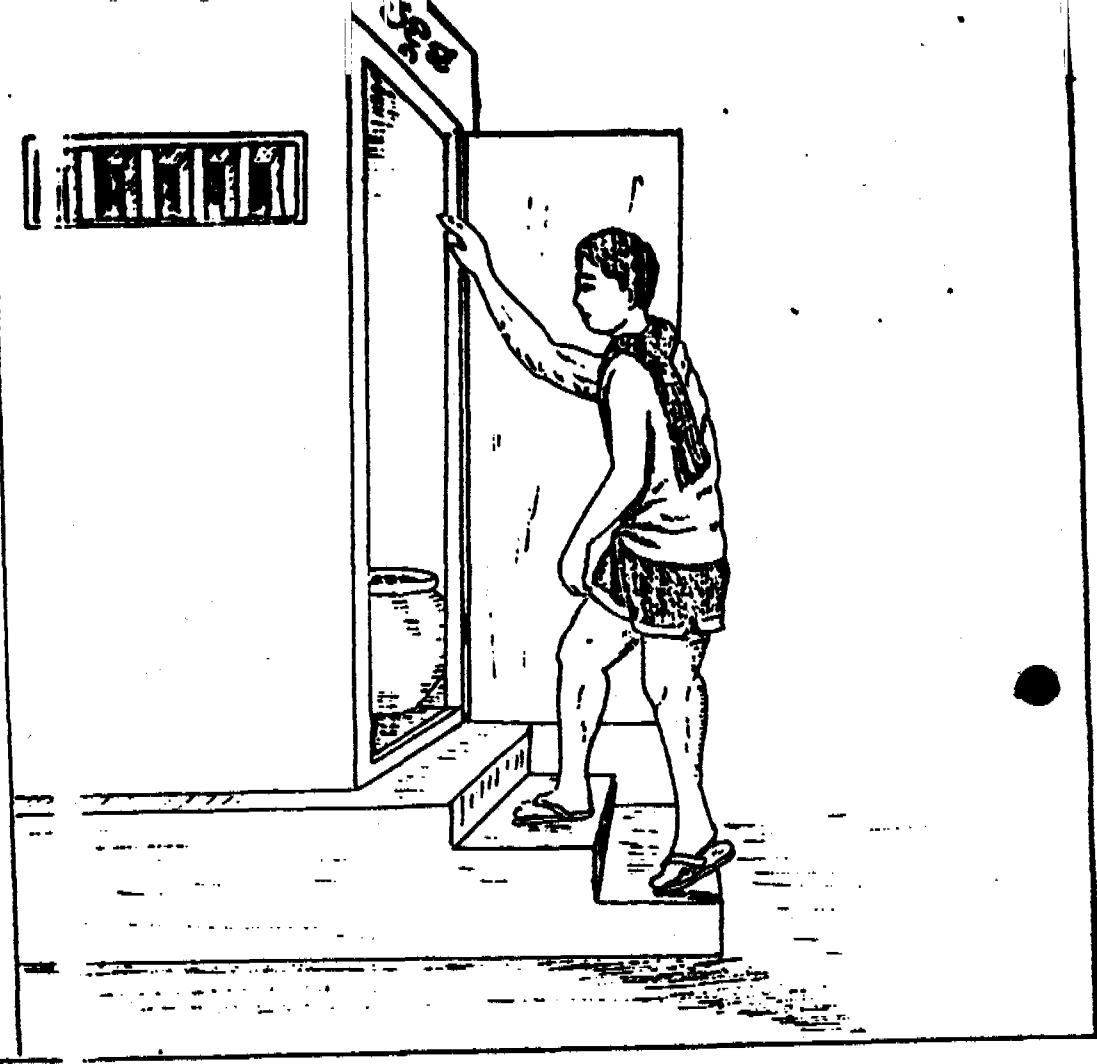
សំនាមប្រមូល
 ពីក្បែរកោះ
 កើបដាក់ក្នុងឆ្នាំង
 ត្រូវបំបាត់ ពេញ
 ហើយយកចាក់ទុក
 មិនឲ្យស្រស់ដំបែល
 មានការចងដៃ



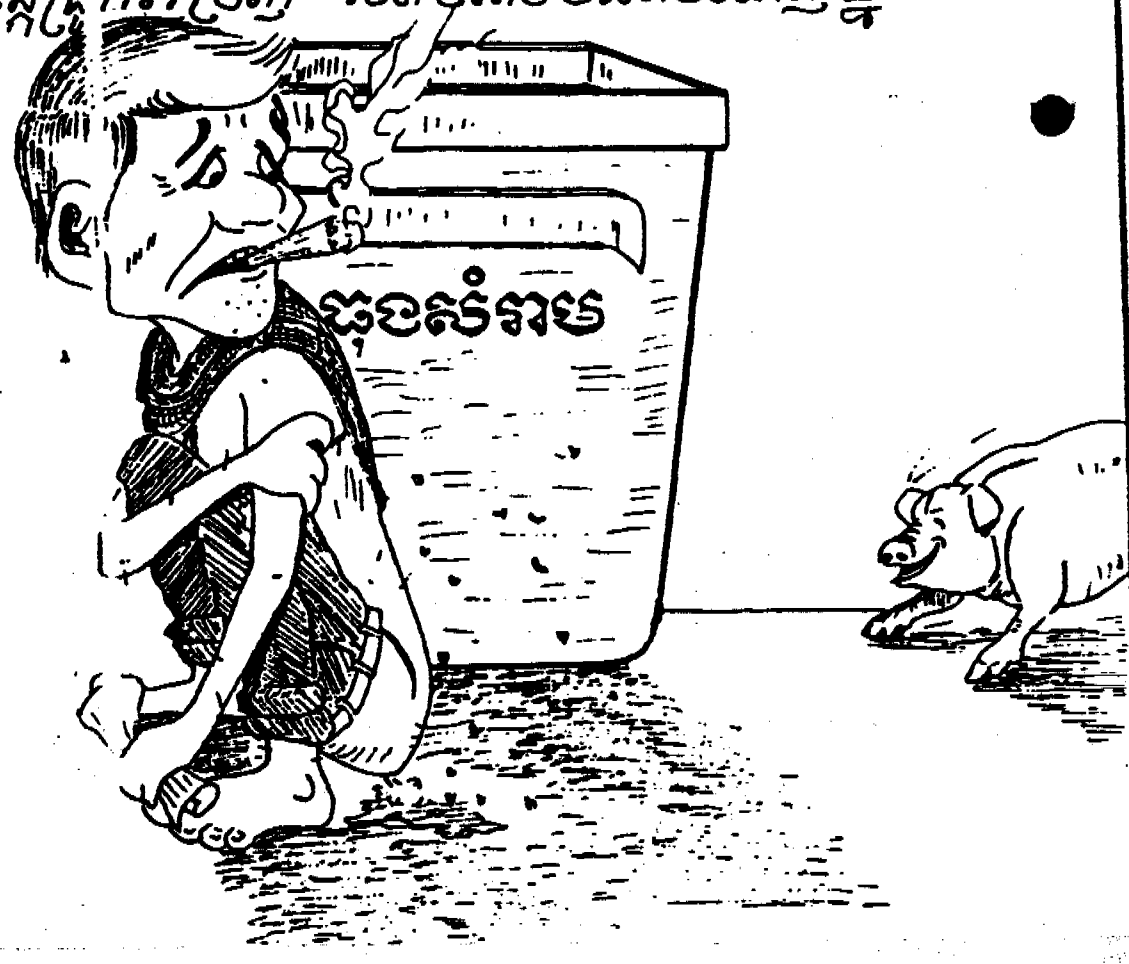
កុំយកឆ្នាំងយកទៅផ្ទះ ចាក់ទឹកប្រដាប់ទៅក្នុងឆ្នាំង
 កុំចាក់ទឹកទៅក្នុងឆ្នាំង វាជួបមក ឆ្នាំងក៏ហិនហោច



បាក់ដឹងជំនោច
ក្នុងបង្គន់
កុំប្រើក្រសពាន់
ជំនោចដី



នរាយសត្វខ្ពស់ ក្រាបបញ្ជី សំនាមអាចម៍ដីនាយឆ្មាញាផ្លូវ



លក់ផ្លែឈើ រោងចុងសំរាម
ដាក់តាម របៀបស្តុកទឹក



កំចៃទឹកចោលកាកដីស្លឹក
ប្រមូលយកទឹកស្រកប្រើ

