UNITED NATIONS

ECONOMIC COMMISSION
FOR LATIN AMERICA
AND THE CARIBBEAN - ECLAC

Distr.
GENERAL

LC/L.378
1 April 1986

ORIGINAL: ENGLISH

DRINKING WATER SUPPLY AND SANITATION FOR THE DISPERSED RURAL POPULATION IN LATIN AMERICA

86-4-446

CONTENTS

TABLES

SUMMARY

Economic growth in Latin America has been accompanied by increasing urbanization of the population. One repercussion of this has been the neglect of the needs of the rural population, including effective policies for the provision of protected sources of drinking water supply and adequate sanitation. This problem is particularly acute for the dispersed population.

This paper is directed towards specific proposals for development of effective policies. A description of the contemporary situation is provided and of the magnitude of the demand for better services. The proposals for improved policies are placed within the context of the International Drinking Water Supply and Sanitation Decade.

/Introduction

Introduction

Economic growth in Latin America, as elsewhere, has been accompanied by the steadily increasing urbanization of the population. This increasing urbanization engendered by rural emigration has led among other effects to the relative neglect of the needs of the remaining rural population, even where it is still a large proportion of the total population. One aspect of this neglect has been the absence of policies directed towards the effective provision of protected sources of drinking water supply and adequate sanitation. Recently, particularly in some countries, efforts have been made to remedy this situation but the problem remains acute at the regional level, especially for the dispersed population.

This paper is directed towards a consideration of specific proposals for developing effective policies upon which successful programmes for the provision of services could be built. A description is given of the contemporary state of the provision of drinking water and sanitation services to the rural dispersed population in Latin America and of the magnitude of the demand for better services. The proposals for improved policies are placed within the context of the objectives of the International Drinking Water Supply and Sanitation Decade and the development of technology that has accompanied the initiation of the Decade.

In some aspects, although the relative neglect of the rural dispersed population can be seen as a logical, if negative, consequence of the direction of economic and social development in the region, it is somewhat contradictory when the low cost of providing adequate services is considered. The persistence of the failure is a vivid illustration of the political and social isolation which accompanies the spatial isolation of the dispersed rural population. The possibility of resolving the problem of this section of the rural population does not appear to have been seriously considered at any level of government within the region.

The Rural Dispersed Population

No direct estimate of the size of the rural population living dispersed through the countryside is possible for Latin America, as a whole. The normal concept of the rural population, for which population estimates are readily available includes both those living in nucleated settlements and the dispersed population. It has been estimated, however, that some 85% of the rural population live in settlements

/of less

of less than 500 inhabitants (see table 1).1/ This would mean that in 1980 some 110 millions of people lived in such settlements and that some 130 million will do by the year 2010 (see annex 1, table 1). It can be expected that with the tendency of the rural population to decline relatively, and even absolutely in some countries of the region, the proportion of that population living in dispersed as opposed to nucleated settlements will also decline. There is no direct evidence to support this assertion although the larger rural settlements, those defined as 'mixed rural-urban' by the Economic Commission for Latin America and the Caribbean (ECLAC), do appear to act "as bridge between the rural areas and the urban system".2/ This bridge function will undeniably continue and possibly increase in significance over the next twenty to thirty years so that it can be anticipated that many of the rural dispersed population will move to nucleated rural or even urban settlements.

Whatever the degree of migration of the rural dispersed population it will undeniably continue to form a significant part of total population of the region for the foreseeable future. There are variations in the proportion of the population living in dispersed settlements from country to country but in the region as a whole approximately one-third of the total population lived in settlements of less than 500 inhabitants in 1970. A recent ECLAC study concluded that,

> "the rural population will retain a system of settlement in which dispersed and the small rural villages will have equal or greater relative weight in the distribution of the rural population, without any significant change in their present living conditions".3/

The Present Supply of Drinking Water and Sanitation Services to the Rural Dispersed Population

The lack of direct information on the characteristics of the population living in dispersed hamlets extends to the provision of water and sanitation. Direct statistics are not generally available and the state of services has to be inferred

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1/ See Economic Commission for Latin America and the Caribbean, Latin American Conference on Human Settlements, Population, Urbanization and Human Settlements in Latin America. Present Situation and Future Trends (1950-2000), E/CEPAL/CONF.70/L.4, 10 October 1979.

2/ Ibid., p. 17.

3/ Economic Commission for Latin America and the Caribbean, Dynamics and Structure of the Human Settlement Process in Latin America and the Caribbean. The Main Critical Areas, E/CEPAL/G.1282, 1984, p. 65.

/Table 1

Table 1

LATIN AMERICA: PERCENTAGE DISTRIBUTION OF THE POPULATION IN RURAL AREAS BY TYPE OF SETTLEMENT

Country	Year	Rural settlements of dispersed population (up to 500 inhabitants) (A)	Rural settlements of concentrated population (500 to 1 999 inhabitants) (B)	Rural population by census definition (A+B)	Mixed rural-urban settlements (2 000 to 19 999 inhabitants) (C)
Bolivia	1976	51.8	5.7	57.5	10.2
Honduras	1974	51.0	6.3	57.3	12.2
Costa Rica	1973	30.7	22.3	53.0	14.0
Perú	1972	36.3	16.2	52.5	-
Colombia	1964	42.7	5.7	48.4	15.4
Panama	1970	37.7	8.7a/	46.4	16.6b/
Brazil	1970	41.5	3.2	44.7	15.7
Cuba	1970	-	-	42.0	15.0
Mexico	1970	-	-	40.0c/	16.8
Venezuela	1971	18.7	8.2c/	26.9c/	13.8

Source: National censuses, Population Distribution by Size of Locality.

a/ Population in settlements of up to 1 000 inhabitants.
b/ Population in settlements of 1 000 to 25 000 inhabitants.
c/ Population in settlements of up to 2 500 inhabitants.

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from the information available on the rural population as a whole. This situation is not as serious as it might be given that the dispersed population form the overwhelming majority of the rural population in most countries of the region.

In 1980, the last year for which region-wide information is available, in all countries of the region the provision of water and sanitation facilities to the rural population was notably inferior to that of the urban population (see table 2, annex 1). This is particularly the case with sanitation and, as might be anticipated, with house connections to centralized piped systems. In fact, there is only a vague definition of what supply of water services to the rural population constitutes. The terms used are "adequate" and "reasonable access" which, even if defined, are less concrete than the existence of house connections used as the common definition in urban areas. In sanitation, the statistical basis is as clearer as adequate sanitation does imply the existence of some facility for excreta disposal other than the open ground.

The general regional picture can be clarified, and the conclusions drawn, reinforced, by examining the situation shown by recent censuses in the different countries of the region. Unfortunately, this information is only available for a few countries. Even with the census information, it is not possible to establish the specific characteristics of service to the dispersed population as separate tabulations are normally not provided in the published census volumes.

In the four countries, for which information is available, the same pattern is repeated although the level of service does vary. In each country, however, there is a notable lower level of service for the rural population (tables 2 and 3). This is particularly marked in Peru, although the complete absence of water and sanitation perhaps reflects a problem of definition rather than the real situation. In the other three countries, the proportion of rural houses without access to a protected water source, the "other" category in the table, varies from over half in Bolivia to a fifth in Panama. In sanitation the rural houses with no sanitation varies much more from over 95% in Bolivia to 12% in Panama but is always far greater than the proportion of the urban houses reported as having no sanitation facilities. The proportion of houses sharing facilities is much lower in rural areas, Panama is an exception to this probably reflecting the weight of the dispersed population in the rural total.

/Table 2

Table 2

LATIN AMERICA, SELECTED COUNTRIES, DRINKING WATER SUPPLY

Country	Houses							
	Piped supply				Well		Other [a]	
	In house		In lot					
	Nº	%	Nº	%	Nº	%	Nº	%
Bolivia (Census, 1976)								
Urban	107 476	25.5	247 019	58.6	31 473	7.5	35 217	8.4
Rural	8 300	1.3	46 167	7.5	215 375	34.8	349 674	56.4
Brazil [b] (Census, 1980)								
Urban	12 774 996	72.0	1 783 511	10.0	1 864 622	10.5	1 324 213	7.5
Rural	1 344 065	18.1	82 189	1.1	3 740 134	50.3	2 259 079	30.4
Panama (Census, 1980)								
Urban	141 835	71.0	49 230	24.6	1 833	0.9	6 850	3.4
Rural	183 750	50.4	91 045	25.0	15 465	4.2	74 065	20.3
Peru (Census, 1980)								
Urban	1 253 248		60.8		809 568		39.2	
Rural	0		0		1 240 510		100.0	

[a] River, lake ,spring, canal, tank truck, etc.
[b] Excluding houses not reporting.

/Table 3

Table 3

LATIN AMERICA, SELECTED COUNTRIES, SANITATION

Country	Houses					
	With sanitation				No sanitation	
	Exclusive a/		Shared			
	Nº	%	Nº	%	Nº	%
Bolivia /Census, 1976/						
Urban	113 139	26.9	84 709	20.1	223 340	56.0
Rural	21 490	3.5	5 103	0.8	592 923	95.7
Brazil b/ /Census, 1980/						
Urban	14 248 312	81.9	1 874 456	10.8	1 284 676	7.4
Rural	2 942 857	40.0	183 777	2.5	4 225 223	57.5
Panama /Census, 1980/						
Urban	156 525	78.4	36 455	18.3	6 770	3.4
Rural	267 765	73.6	49 480	13.6	47 080	12.9
Peru /Census, 1980/						
Urban			954 178	46.3	1 108 638	53.7
Rural			0	0.0	1 240 510	0.0

a/ In house or lot
b/ Excluding houses not reporting.

/For Brazil

For Brazil more detailed data are available on both water supply and sanitation. These data confirm the lower levels of service available to the rural population (annex 1, table 3), only 3% of rural houses had internal piped supplies of drinking water compared with 66% of urban houses, but also demonstrate the possibilities for upgrading service. The technologies available are already widely diffused if Brazilian data can be said to reflect the probable situation in the region as a whole. For example, of the rural houses with sanitation, exclusively or shared, more than two-thirds had latrines.

Current Policies towards the Provision of Rural Water Supply and Sanitation

It is puzzling, at least on the surface, that the provision of clean water and sanitation to the rural dispersed population, has not become a more central part of the IDWSSD programmes in most of the countries of the region. The provision of service to the rural dispersed population uses relatively simple technology, well within the technical capability of all the countries of the region. The explanation cannot be sought in the direct opposition of any particular interest group, or in the lack of the appreciation of the benefits to be obtained, nor in any change in the level of external assistance. The explanation appears rather to be in a particular combination of internal and external factors which have influenced the development of policy towards water supply and sanitation in the region.

The internal influences of most significance appear to be the strong urban bias of water supply and sanitation institutions coupled with an absence of specific institution for the provision of water supply and sanitation to the rural dispersed population. In general, this has led to the adoption of what could be described as high technology solutions hostile to the handpump and the latrine.

The creation of uniform national services to replace or supplement existing municipal or state water supply and sanitation companies has been a central part of the policies adopted towards the sector in almost all countries of Latin America. The particular form has varied but the reform has possessed a common set of characteristics, the amalgamation of the provision of water supply and sewerage services under the responsibility of one institution, and the adoption of more rigorous management criteria with an emphasis on self-financing. The policy has led

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to an increase in both the quantity and quality of services and in many countries led to the creation, for the first time, of continuing efficient institutions. It is true that these institutions in many countries are organized at the national level, rather than on a municipal basis, but most are only concerned with urban services. On occasion, these institutions also provide services for the nucleated rural population or a separate institution exists for this purpose. The dispersed rural population however, is not included and normally falls under the responsibility of rural development institutions or the ministry of health where water supply and sanitation must compete for funds with many other programmes in the same institution. The result of this competition is not always favourable and in few countries of the region are there vibrant water supply and sanitation programmes directed towards satisfying the needs of the rural dispersed population. In fact, in few countries are there programmes of any kind.

As a corollary, the policy has led, also, to an emphasis on centralized piped water supply systems and waterborne sewerage systems of the traditional western type with individual house connections. This policy has much to recommend it for the large, relatively high income, metropolitan areas, makes sense even in provincial towns and in some countries can even be successful in villages. Nowhere, however, can it be extended to the dispersed rural population, and the policy too often excludes the very poor due to their inability to pay for even a minimum service.

Current preoccupation with sector policy focuses, therefore, primarily on perfecting the superstructure necessary to support these relatively large scale centralized systems. Emphasis is placed on the necessity to generate sufficient finance, followed by the need to improve levels of operational efficiency, particularly through better maintenance of the installed infrastructure, and with the need to increase the supply of skilled staff at all levels. The technology applied is very conservative and is identical to that used traditionally in North America and Europe. In consequence, there is little local innovation in technology or even managerial practice; exactly the areas where emphasis is required for the provision of service to the rural dispersed population.

Externally, the urban focus has been encouraged by strong emphasis in the policies of international agencies on sector policies directed towards the development of water supply and sewerage systems so managed as to generate

/revenues in

revenues in sufficient quantities to cover both operating and maintenance costs and to finance new capital investments. These concerns have overshadowed other activities of international organizations directed towards rural problems. Moreover, globally there has been a tendency to neglect the rural water supply and sanitation problems of "middle-income" countries to concentrate on the problems of the poorest countries which has weakened the impact of the rural directed programmes of the international agencies in Latin America.

The sum of current policy is, in many if not all countries of the region, the absence of policy for the supply of the rural dispersed population. These millions of Latin Americans are left to find for themselves. This is despite the suggestion that to achieve the objectives of the IDWSSD, that governments should emphasize service to the unserved low-income rural and urban populations.

Options in Providing Water Supply and Sanitation to the Rural Dispersed Population

The major technical options for providing drinking water supply and sanitation to the rural dispersed population lie with non-central piped systems. It is possible that in the larger and denser populated rural areas piped water supply could be provided. The cost of any conventional sewerage system would certainly prohibit its use even in areas of densest population. In general the technological options which could be applied are adaptations or improvements to better the present sources of water or means of excreta disposal used by the rural dispersed population in the region, the protected well and the latrine.

The improvement of technology appropriate for the dispersed population has not been a central part of the activity undertaken in relation to the Decade to develop alternatives to central piped systems of the traditional western type. The work undertaken by the World Bank, UNICEF and other organizations has been directed towards the village populations of the least developed or poorest countries, particularly in Africa and Asia.4/ This work is of value for some of the poor

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4/ There has developed a very large literature on this subject of which unfortunately very little is available in Spanish. Due to the abundance of literature it seems redundant to make extensive general reference. Perhaps the best introduction both to the work that has been done and the related literature is the following World Bank publication, John M. Kalbermatten, De Anne S. Julius, D. Duncan Mara, and Charles G. Gurrasen, Appropriate Technology for Water Supply and Sanitation - A Planners Guide, World Bank, Washington, December 1980.

/countries of

countries of Latin America with large rural populations but has not, in general, been undertaken with the situation of the rural dispersed population in mind.

It is true that many of the technological options that have been included in the efforts to identify the most appropriate water supply and waste disposal technology are applicable to dispersed as well as concentrated populations. The particular demands on technology of the two populations are not however the same. For example, the need to reduce costs is important to both cases but for individual supplies is of greater significance than for even the poorest communities. Equally, much stress has been placed on the development of handpumps which can withstand constant heavy use but this is not a serious problem for installation for individual or small group use. Many existing models of handpumps could probably be used without modification.

An important restriction on the use of sanitation technologies in individual rural households is the unlikely provision of a large enough supply of water to permit the use of technologies requiring piped water supplies. Given this restriction, the technological alternatives must be chosen from those needing no or very small amounts of water (see table 5). Other factors such as ease of construction, potential for self-help, the need for little or no maintenance and the absence of any requirement for complementary off-site investments would limit the selection of appropriate technologies to the first two technologies listed in table 5.

These two technologies, ventilated improved pit latrines and Reed Odorless Earth Closets (ROEC) and Pour flush toilets, are technologies closest to the latrine commonly used in rural Latin America. In terms, however, of sanitary results, these are undeniably superior to conventional pit latrines. The conventional simple pit latrine has two major disadvantages; they smell and are attractive to flies and mosquitoes for breeding. Both these negative factors are countered by ventilated improved pit latrines and ROECs.

The following description is provided by the World Bank,

"VIP latrines are a hygienic, low-cost, and indeed sophisticated form of sanitation, have minimal fly and mosquito nuisance, and have only a minimal requirements for user care and municipal involvement. The pit is slightly offset to make room for an external vent pipe. The vent pipe should be at least 75 millimeters in diameter (ranging up to 200 millimeters); it should be painted black

/ Table 4

Table 4

LATIN AMERICA: INVESTMENT NEEDED TO MEET DECADE TARGETS

(Millions of US dollars, 1981)

Country	Total	Rural Water Supply	%	Rural Sanitation	%
Argentina	4 456	56	1,2	0	0
Bolivia	130	160	21,9	72	9,9
Brazil	10 300	200	1.9	100	1.0
Chile	444	48	10.8	n/a	-
Colombia	1 612	58	3.6	100	6.6
Costa Rica a/	184	12	6.5	21	11.4
Dominican Republic	620	85	13.7	n/a	-
Ecuador	1 536	316	20.6	327	21.3
El Salvador	712	57	8.0	20	2.8
Guatemala	621	71	11.4	15	2.4
Honduras	364	120	33.0	191	52.5
Mexico	11 500	2 230	19.4	1 670	14.5
Nicaragua	236	56	23.7	0	0
Panama b/	138	13	9.4	0	0
Peru	1 484	n/a	-	n/a	-
Trinidad and Tobago	1 055	210	19.9	0	0
Uruguay a/	246	0	0	0	0

Source: PAHO, Sector Digests.

a/ 1981-1985.
b/ 1981-1986.

/Table 5

Table 5

DESCRIPTIVE COMPARISON OF SANITATION SUITABLE FOR RURAL DISPERSED POPULATION

Sanitation technology	Construction cost	Operating cost	Ease of construction	Self-help potential	Water requirement	Required soil conditions	Complementary off-site Investments a/	Reuse potential	Health benefits	Institutional requirements
1. Ventilated improved pit (VIP) latrines and Reed Odorless Earth Closets (ROECs)	Low	Low	Very easy except in wet or rocky ground	High	None	Stable permeable soil, groundwater at least 1 meter below surface b/	None	Low	Good	Low
2. Pour-flush (PF) toilets	Low	Low	Easy	High	Water near toilet	Stable permeable soil, groundwater at least 1 meter below surface b/	None	Low	very good	Low
3. Double-vault composing (DVC) toilets	Moderate	Low	Requires some skilled labor	High	None	None (can be built above ground)	None	High	Good	Low
4. Self-topping aquaprivy	Moderate	Low	Requires some skilled labor	High	Water near toilet	Permeable soil; groundwater at least 1 meter below ground surface b/	Treatment or disposal facilities for sludge	Moderate	very good	Low
5. Three stage septic tank	Moderate	Low	Requires some skilled labor	High	Water near toilet	Permeable soil; groundwater at least 1 meter below ground surface b/	Treatment or disposal facilities for sludge	Moderate	very good	Low
6. Septic c/ tanks	High	High	Requires some skilled labor	Low	Water piped to house and toilet	Permeable soil; groundwater at least 1 meter below ground surface b/	Off-site treatment or disposal facilities for sludge	Moderate	very good	Low

Source: World Bank.

a/ On or off-site sullage disposal facilities are required for non sewered technologies.

b/ If groundwater is less than 1 meter below ground, a plinth can be built.

c/ Suitable only for institution or high income households.

/and located

and located on the sunny side of the latrine updraft with a corresponding downdraft through the squatting plate. Thus any odors emanating from the pit contents are expelled via the vent pipe, leaving the superstructure odor free. The pit may be provided with removable cover sections to allow deslidging.

Recent work has indicated that pit ventilation may also have an important role in reducing fly and mosquito breeding. The draft discourages adult flies and mosquitoes from entering and laying eggs. Nevertheless, some eggs will be laid and eventually adults will emerge. If the vent pipe is large enough to let light into the pit, and if the superstructure is sufficiently dark, the adults will try to escape up the vent pipe. The vent pipe, however, is covered by a gauze screen so that the flies are prevented from escaping and they eventually fall back to die in the pit".5/

The design can be improved by constructing a double pit so as to eliminate the need to move the latrine once the pit is full or by displacing the pit to one side, on ROEC. All designs can be easily upgraded to pour-flush toilets.

The difference between pour-flush toilets and dry latrines is the use of water seals beneath the squatter plate or pedestal seat and the use of limited amounts of flushing water, 1 to 2 litres. The advantage of the pour-flush toilet is that as it is completely free from both odours and flies and mosquitoes it can be installed in the house. The pits for pour-flush toilets can be smaller than those of dry latrines because the digestion of excreta solids proceeds more rapidly in wet than in dry conditions.

Both the latrines and ROECs and the pour-flush toilets seem good technological options for the upgrading or new provision of sanitary facilities to the rural dispersed population of Latin America. They offer a combination of characteristics suited to the particular conditions of the rural areas of the region superior to the other alternatives identified.

Due to the recent nature of the economic and technical analysis of sanitation technologies good data are available on the costs of the different alternatives. Again the World Bank has obtained some information on costs both on the initial capital costs of construction and on annual economic costs of the

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5/ World Bank, p. 79.

/different options.

different options. The alternatives suggested here are by far the cheapest with installation costs ranging from US$ 50 to US$ 225 per latrine unit depending on the particular technology, the terrain and the superstructure materials employed. Similarly the annual economic costs are the lowest of the options included in the World Bank study (table 6).

Table 6

SUMMARY OF ANNUAL ECONOMIC COSTS PER HOUSEHOLD

(U.S. dollars, 1978)

Sanitation technology	Cost a/		
	Mean	Highest	Lowest
Pit latrines, poured-flush toilets, and ROECs	28	56	8
DVC toilets	46	75	29
Vault and vacuum collection	104	210	26
Sewered aquaprivy or poured-flush toilets	159	191	125
Flush toilets with septic tanks	233	390	35
Conventional sewerage	400	641	142

Source: World Bank.

a/ Costs include annuitized capital and annual operating costs of on-site, collection and treatment facilities, shadow priced as appropriate. Sewerage costs are average incremental costs. The figures given in this table are taken from a limited number of observations only (particularly in the cases of DVC toilets and sewered aquaprivies and PF); they should therefore be used as an indication of relative costs rather than for their absolute value.

For water supply there are far fewer technical options than for sanitation. The only possible options are handpumps or gravity fed piped systems from a protected source. As this latter alternative can only be used under special physical conditions, it will not be discussed in any detail.6/ With the advent

6/ Except for high income rural residents or institutions where mechanical pumps can be used but this is not significant for the establishment of policy towards supply to the rural dispersed population as a whole.

/of the

of the IDWSSD much effort has been placed on the development of handpump technology which previously had not changed in any significant way for the last century. Efforts have been made to incorporate new materials into the traditional cast iron and bronze pump, as well as to develop pumps entirely constructed of steel and plastics. At the same time much emphasis has been placed on producing more reliable pumps particularly under conditions of heavy use.7/

The most elaborate of these efforts has been the joint World Bank-United Nations Development Programme project on "Manual Pumping Devices for Rural Water Supply" which aims to reduce the costs and improve the reliability of rural water supply schemes through technological improvements of handpumps. The project includes both laboratory and field testing of alternative pump designs in large numbers around the world. It is hoped by testing a large number of pumps, some 6 000 in total, to develop, in co-ordination with manufactures, improved designs for differing conditions of use.8/ Other more limited efforts have been made, however, by other agencies.9/

It is not clear, however, from the literature whether these efforts to develop improved pump designs have achieved the degree of success initially expected. The impression gained is that improvement in pump design has proved to be much more difficult than was originally anticipated.10/

Irrespective of the success of the programmes of the international agencies to improve handpumps design, there are available in the handpump a viable and proved technology for providing safe water to populations that cannot be served by centralized piped systems.

7/ For an account of the recent history of handpump technology development see, WHO, International Reference Centre for Community Water Supply, Hand Pumps, Technical Paper Series 10, July 1977, pp. 131-169.

8/ A report on this programme including the tests on 18 pumps was issued by the World Bank in 1984, Consumer Association Testing and Research Laboratories, Rural Water Supply Handpumps Project, Laboratory Testing of Handpumps for Developing Countries: Final Technical Report, World Bank Technical Paper No. 19, June 1984.

9/ See for example, Donald Sharp and Michael Graham (ed.), Village Handpumps Technology, Research and Evaluation in Asia, International Development Research Centre, Ottawa, 1982.

10/ See for example, the discussion on the India Mark 11 pump design in World Water, August 1984.

/There is

There is less information available on the costs of handpumps with the information available on alternative sanitation technologies. The costs of installing handpumps can vary, however, greatly depending mainly on the costs of well-drilling even if the comparison is restricted to handpumps on shallow wells, less than 20 metres deep. In a recent study in Asia, the total average installation costs of handpumps varied from US$ 180 in Malaysia to US$ 651 in Sri Lanka. The average costs for the four countries included in the study, Malaysia, Philippines, Sri Lanka and Thailand, were just over US$ 400 with an average well depth of 9 metres.11/

It is perhaps worth emphasizing that there is little new in the technological options for rural water supply and sanitation discussed here. All the options have been and are being used in the region. It is not the novelty of the technology that has prevented its widespread adoption. It remains the case, however, that the region has been largely isolated from the recent attempts to improve the technologies and to make them more accessible and useful in application.

Possible Policy Alternatives

It has been recognized for some time that on a world-wide basis institutional weakness is perhaps the most important difficulty to be overcome for the development of effective rural water supply and sanitation programmes.12/ This is certainly the case for the rural dispersed population in Latin America. The first priroity for policy, therefore, in this area must be the development of an institutional base in each country from which effective programmes can emerge. At the present such an institutional base does not exist in most of the countries of the region.

The present institutional system varies among the different countries but generally it can be said that the supply of rural sanitation suffers from a lack of clear definition of institutional responsibility. The clear definition of responsibility for the provision of water supply and sanitation to the rural dispersed world appears to be the first essential step in rescuing this population from its present neglect. The particular institutional form is not significant

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11/ IDRC, op. cit., p. 65.
12/ See, for example, World Bank, Village Water Supply, Washington, 1976.

compared with the need to establish definite institutional responsibility. There is, however, a strong argument where national or state centralized water supply and sanitation institutions exist of giving the responsibility to them rather than creating a new separate institution which would have to establish an identity in competition with the longer established institutions in the water supply and sanitation field.

Given past experience, there appear to be forceful reasons for maintaining the institutions independent from other rural development agencies, agrarian reform institutions, etc., as to ensure that the institutions' objectives are restricted to the provision of water supply and sanitation and not widened to include others as desirable as these may be in themselves. Fundamentally, the argument advanced is that the supply of water and sanitation to the rural dispersed population should be subjected to the same institutional policy as that successfully applied to the urban and concentrated rural population in so many countries of the region.

It is only with the creation of a suitable institutional base that other elements within a total policy package can be put into place. The other important items for inclusion within the package are the use of appropriate and effective technology acceptable to the rural population and the establishment of a sound financial base for both the required capital investment and, equally if not more importantly, for the operation and maintenance of the facilities once installed.

It is undeniable that the technology exists but its existence and its application are not the same thing. A considerable effort is required to develop a technological package that can be applied in actual programmes. The handpumps for water supply and the latrines for sanitation must be compatible with local habit and customs of the potential users, susceptible to local, or at least national, manufacture, they must be acceptable within the technical environment of the countries as well as having the more general characteristics sought of economy, reliability and ease of maintenance. Even the simplest technology requires a certain period for successful adoption.

The final element in this trilogy of policy components is the need to ensure the sound and continuing financing of the provision of water supply and sanitation to the rural dispersed population. A serious difficulty in the development of strong institutions and effective programmes has been the lack of adequate finance and the unreliability of the finances when provided. One of the bases of the

successful development of urban water supply and sanitation institutions has been the increased importance of direct revenues raised through the sale of water by the adoption of universal metering.

Traditionally, money payment has not been a characteristic of the water supply and sanitation environment of the rural dispersed population apart from any capital payments made for the original installation of facilities. If, however, long term universal programmes for the supply of the rural dispersed population are to flourish then some form of independent financing should be found. It would seem possible to use some kind of fixed charge system to households supplied with improved facilities in addition to any charges made for the original installation. There is no inherent difference in the water supplied from a well, even on an individual household basis, and the water supplied through a centralized system, particularly if public resources are used to provide the supply. A charge can therefore be justified and could be made acceptable by the continuing provision of operation and maintenance services by the water supply and sanitation institution.

The fixed charge made should be quite independent of original installation charges against which it might be practicable for households to contribute labour or other resources to reduce the money component of the charge. It would be possible, however, to reduce the initial size of the installation charge by amortizing the work over a period of years and collecting the payments at the same time as the charges for use. The amortized capital cost would be better related to the type and capacity of facilities than the user charge. The aim in establishing the charges would not be to relate consumption to price but generate an independent source of finance and establish that the provision of water supply and sanitation services has an economic cost.

It could be objected that the institution of a system of charges could deter people from accepting the improved services. This tendency could be contained, however, by persuasion, sanitary education, and a degree of cumpulsion. It could be expected, however, that as in many urban areas amongst low income households, the actual collection of charges might prove difficult. This should not, however, be used to counter the establishment of the principle of payment for water supply and sanitation services. The principle of payment would seem to be an essential component of a policy to centralize the supply of services to the rural dispersed population, as it has been in urban rareas.

/Conclusions

Conclusions

The programmes in support of the achievement of the goals of the International Drinking Water Supply and Sanitation Decade have been affected by the economic recession which has been felt in all countries of the region. The recession has made it difficult to dedicate a higher proportion of public investment to the provision of water supply and sanitation and has made it more difficult to expand sector activities. The recession cannot be used, however, as an excuse to abandon or scale down the objectives set for the Decade. It certainly cannot be used as the reason for the continuing abandonment of the supply of sanitary services to the rural dispersed population.

The financial needs are not that large. Moreover, in rural areas, self-help is the rule rather than the exception. The supply of services to the rural dispersed population requires institutional will and imaginative policies rather than the dedication of investment financing. Financial support is necessary, and must be forthcoming but the crucial factors are the focussing of institutional concern, the attraction of interested personnel to the problem, and the establishment of a systematic means of tackling the provision of services. This should be feasible since all the elements are present in most countries of the region even though in none have they been brought together in a package.

Annex 1

TAble 1

LATIN AMERICA a/ - RURAL POPULATION, 1970 - 2010

Country	1970		1980		Av. annual rate of change 1970-1980	1990		Av. annual rate of change 1980-1990	2000		Av. annual rate of change 1990-2000	2010		Av. annual rate of change 2000-2010
	Population '000's	% Total Population	Population '000's	% Total Population		Population '000's	% Total Population		Population '000's	% Total Population		Population '000's	% Total Population	
Argentina	5 111	22	4 970	18	-0.3	4 814	16	-0.3	4 636	14	-0.4	4 462	12	-0.4
Bolivia	2 673	62	3 081	55	1.4	3 550	49	1.4	4 222	43	1.7	5 060	39	1.8
Brazil	42 096	44	45 529	37	0.8	47 063	31	0.3	47 247	25	0.0	47 023	21	0.0
Chile	2 325	25	2 362	21	0.1	2 390	18	0.1	2 391	16	0.0	2 363	14	-0.1
Colombia	8 476	41	8 686	34	0.2	8 775	28	0.1	8 593	23	-0.2	8 420	19	-0.2
Costa Rica	1 060	61	1 202	54	1.3	1 314	47	0.9	1 372	41	0.4	1 383	35	0.1
Cuba	3 462	40	3 216	33	-0.7	2 777	26	-1.5	2 478	21	-1.1	2 190	17	-1.2
Dominican Rep.	2 743	61	3 163	53	1.4	3 403	45	0.7	3 546	38	0.4	3 663	32	0.3
Ecuador	3 600	60	4 432	55	2.1	5 437	50	2.1	6 424	44	1.7	7 269	39	1.3
El Salvador	2 169	61	2 678	56	2.1	3 293	51	2.1	3 968	46	1.9	4 530	40	1.4
Guatemala	3 513	66	4 611	63	2.8	5 871	61	2.4	7 247	57	2.1	8 400	52	1.5
Haiti	3 695	80	4 469	77	1.9	5 471	73	2.0	6 717	68	2.1	8 087	63	1.9
Honduras	1 762	67	2 259	61	2.5	2 770	54	2.1	3 279	47	1.7	3 766	40	1.4
Mexico	21 056	41	24 079	35	1.4	26 318	29	0.9	27 433	24	0.4	27 805	20	0.1
Nicaragua	1 044	53	1 261	46	1.9	1 496	40	1.7	1 754	34	1.6	2 039	30	1.5
Panama	765	52	848	45	1.0	886	38	0.4	910	32	0.3	924	28	0.1
Paraguay	1 442	63	1 945	61	3.0	2 463	58	2.4	2 999	55	2.0	3 471	52	1.5
Peru	5 648	42	6 448	37	1.3	7 419	32	1.4	8 412	27	1.3	9 355	24	1.1
Uruguay	507	18	470	16	-0.8	455	15	-0.3	447	13	-0.2	440	12	-0.2
Venezuela	3 059	28	3 714	24	2.0	4 321	20	1.5	4 736	17	0.9	5 070	15	0.7
Latin America	116 205	42	129 423	37	1.1	140 285	31	0.8	148 811	27	0.6	155 569	23	0.4

Source: CELADE, Boletín Demográfico, América Latina: Porcentajes de Población Urbana por países, 1970, 1985 y 2000, Año XIV, Nº 28, julio de 1981.

a/ Estimates of rural population are not available for the English- speaking Caribbean.

Table 2

LEVEL OF PROVISION OF WATER SUPPLY AND SANITATION, DECEMBER, 1980
AND TARGETS ESTABLISHED FOR THE IDWSSD

(Percentages)

Country	Drinking water supply				Sanitation		
	Rural		Urban		Rural	Urban	
	House connections	Reasonable access	House connections	Public tap	Adequate	With sewer connection	Septic tank, etc.
Argentina	(80) n/a	(19) 17	(80) 61	(20) 4	(50) 32	(70) 32	(n/a) 57
Bolivia	(20) 3	(40) 7	(60) 24	(31) 45	(60) 4	(40) 23	(40) 14
Brazil	(n/a) 51	(n/a) n/a	(90) 80	(n/a) n/a	(n/a) n/a	(65) 32	(n/a) n/a
Chile	(39) 17	(n/a) n/a	(100) 93	(-) 7	(n/a) n/a	(100) 69	(-) 30
Colombia	(60) n/a	(35) 79	(90) 74	(10) 26	(35) 4	(80) 61	(20) 39
Costa Rica	(74) 68	(n/a) n/a	(100) 95	(-) 5	(90) 82	(70) 43	(30) 50
Dominican Republic	(26) 10	(28) 23	(70) 60	(16) 25	(8) 4	(35) 25	(n/a) n/a
Ecuador	(50) 14	(20) 2	(85) 47	(10) 35	(60) 14	(65) 36	(20) 3
El Salvador	(n/a) n/a	(58) 40	(85) 52	(n/a) 6	(98) 26	(n/a) 48	(n/a) 32
Guatemala	(50) 18	(n/a) n/a	(76) 51	(24) 38	(80) 20	(78) 35	(n/a) 10
Guyana	(n/a) n/a	(95) 60	(100) 90	(-) 10	(95) 80	(22) 27	(78) 73
Honduras	(n/a) n/a	(90) 46	(90) 50		(80) 26	(60) 49	
Mexico	(n/a) n/a	(58) 43	(83) 62	(n/a) 2	(26) 12	(62) 50	(n/a) 1
Nicaragua	(n/a) n/a	(80) 10	(90) 67	(10) 24	(n/a) n/a	(50) 35	(n/a) n/a
Panama	(n/a) n/a	(85) 55	(100) 93	(-) 7	(90) 28	(99) 62	(1) n/a
Paraguay	(10) 2	(8) 8	(70) 39	(n/a) n/a	(95) 89	(34) 30	(n/a) 65
Perú	(n/a) 21	(n/a) n/a	(84) 57	(11) 11	(n/a) 94	(78) 55	(6) 2
Trinidad and Tobago	(n/a) n/a	(98) 93	(99) 100		(90) 88	(67) 24	(33) 71
Uruguay	(4) 2	(n/a) n/a	(95) 90	(n/a) 7	(n/a) 60	(15) 15	(n/a) 45
Venezuela	(n/a) n/a	(85) 50	(90) 67	(3) 10	(n/a) 70	(99) 60	(n/a) 30

Source: PAHO, Sector Digests.

a/ Figures in parenthesis refer to percentage of the population expected to be served at 31 December 1990. (n/a=not available)

b/ Targets for 1985.

Table 3

BRAZIL: WATER SUPPLY AND SANITATION

Household characteristics	Total	Urban	Rural
Total of households a/	25 210 639	17 770 981	7 439 658
Percentages	-	70.5	29.5
WATER SUPPLY			
Total of households b/	25 172 809	17 747 342	7 125 467
Internal piped supply	14 114 061	12 774 996	1 344 065
Percentages	56.1	72.0	18.1
From centralized piped system	11 977 045	11 739 827	237 218
Percentages	47.6	66.1	3.2
From well or spring	1 909 270	884 933	1 024 337
Percentages	7.6	5.0	13.8
From other sources	232 746	150 236	82 510
Percentages	0.9	0.8	1.1
Without internal piped supply	11 053 748	4 972 346	6 081 402
Percentages	43,9	28.0	81.9
From centralized piped system	1 865 700	1 783 511	82 189
Percentages	7.4	10.0	1.1
From well or spring	5 604 756	1 864 622	2 740 134
Percentages	22.3	10.5	50.4
From other sources	3 583 292	1 324 213	2 259 079
Percentages	14.2	7.5	30.4
SANITATION			
Total of households b/	24 759 301	17 407 444	7 351 857
Percentages	-	70.3	29.7
In house or lot	17 191 169	14 248 312	2 942 857
Percentages	69.4	81.9	40.0
Sewerage system	6 499 635	6 400 047	99 588
Percentages	26.3	36.8	1.4

Table 3 (cont.)

Household characteristics	Total	Urban	Rural
Septic tank	3 484 068	3 053 084	430 984
Percentages	14.1	17.5	5.9
Latrine	6 283 009	4 211 784	2 071 225
Percentages	25.4	24.2	28.2
Others	924 457	583 397	341 060
Percentages	3.7	3.4	4.7
Shared (communal)	2 058 233	1 874 456	183 777
Percentages	8.3	10.8	2.5
Sewerage system	490 281	484 971	5 310
Percentages	2.0	2.8	0.1
Septic tank	412 271	393 947	18 324
Percentages	1.7	2.3	0.2
Latrine	1 014 693	874 012	140 681
Percentages	4.1	5.0	1.9
Other	140 988	121 526	19 462
Percentages	0.6	0.7	0.3
Without sanitation	5 509 899	1 284 676	4 225 223
Percentages	22.3	7.4	57.5
Total of households a/	25 210 639	17 770 981	7 439 658
Percentages		70.5	29.5
Water supply			
Total of households b/	25 172 809	17 747 342	7 425 467
Percentages		70.5	29.5
Internal piped supply	14 119 061	12 774 996	1 344 065
Percentages	56.1	72.0	18.1
Without internal piped supply	11 053 748	4 972 346	6 081 402
Percentages	43.9	28.0	81.9

Table 3 (conc.)

Household characteristics	Total	Urban	Rural
Sanitation			
Total of households b/	24 759 301	17 407 444	7 351 857
Percentages	-	70.3	29.7
In house or lot	17 191 169	14 248 312	2 942 857
Percentages	69.4	81.9	42.0
Shared (communal)	2 058 233	1 874 456	183 777
Percentages	8.3	10.8	2.5
Without sanitation	5 509 899	1 284 676	4 225 223
Percentages	22.3	7.4	57.5

Source:.Brazil, 1980 census.
a/ Includes households "not declared".
b/ Excludes households "not declared".