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EVALUATION OF THE
PUBLIC SECTOR ORS SUPPLY SYSTEM
IN PAKISTAN

A Report Prepared By PRITECH Consultants:
CHRIS OLSON
JIM BATES

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TABLE OF CONTENTS

	<u>Page</u>
I. Scope of Work and Level of Effort	1
II. Executive Summary	2
III. Background	4
IV. Structure of the Health Care System	5
V. The Drug Supply System	5
VI. The Public Sector ORS Supply System	6
VII. ORS Supply in the Commercial Sector	7
VIII. Analysis of Problems in the Public Sector ORS Supply System	8
IX. Principal Conclusions	18
X. Recommendations	18
XI. Bibliography	21

Annexes

Annex 1	Places Visited	23
Annex 2	Organigram of Distribution Pipeline	28
Annex 3	UNICEF and NIH production Organigram of Pipeline	29
Annex 4	Products Available to Public and Commercial Sector	30
Annex 5	Supplying ORS to the Public Sector Tables A&B	34
Annex 6	Intermediate Storage Points	35
Annex 7	Supply of ORS in the Commercial Sector	36
Annex 8	Sample of Sites Visited	37
Annex 9	ORS Pipeline Analysis	38
Annex 10	Decomposition of ORS Packets	46
Annex 11	House to House Survey	48
Annex 12	Interview questions to Health Care Providers	49
Annex 13	Scope of Work for NDFC Commercial Sector Study	51
Annex 14	Commercially Available Products used in Diarrhea	53
Annex 15	ORS Distribution Improvement Program	55

I. Scope of Work and Level of Effort

A. Scope of Work

1. Review the present public sector ORS supply system in terms of the following operational areas and note areas of constraints:

Selection

- * Labeling
- * Size
- * Formulation

Procurement

- * Recurrent costs
- * Needs estimation
- * Quality control

Distribution

- * Determining allocation
- * Province by province pipeline analysis
- * Information system
- * Storage conditions
- * Inventory management

Use

- * Prescribing practices
- * Volume measurement

2. Discuss implications of the problem areas noted in the system and suggest solutions for overcoming them.
3. Recommend the resources and expertise required to put suggestions and recommendations into practice.

B. Level of effort

1. Two Supply/Logistics specialists:

Chris Olson - Five weeks
Jim Bates - One week

II. Executive Summary

At the request of the government of Pakistan, the United States Agency of International Development sponsored a consultancy team consisting of two supply and logistics specialists to come to Pakistan for a combined effort of six weeks, in August 1986. The team was asked to review the functions and the principal component of the ORS supply system, identify existing and potential constraints, recommend solutions for these problem areas and develop a plan to carry out these recommendations.

Field visits were conducted in Punjab, North-West Frontier Province, Northern Territory, Baluchistan, and Sind. Data were collected from administrative and clinical health care facilities in urban and rural areas. Additionally, surveys were undertaken at chemist shops and private homes to complete the overall understanding of the system.

It was the general impression of the team that the National Institute of Health (NIH) ORS supply system is reasonably effective in supplying ORS to clinical facilities. The NIH is to be commended for what has been achieved in a short period of time. However, there are a number of constraints that are preventing the ORT program from realizing its supply related goals. Some of the problems that now appear minor will emerge as significant as the program carries out its ambitious plan for expansion. In the next 2-3 years there will be an increase in the number of RHCs and BHUs from 2950 to 4262. There will be a greater use of the EPI outreach teams for distribution of ORS. The quantity of these teams will double during this time period. With this in mind the primary areas of concern are:

- * Lack of standardization in product size and label
- * Inability to procure based on needs
- * Recurrent cost of ORS procurement
- * Allocation methods not sensitive to needs at national, provincial and district levels of the distribution system
- * Unreliable and underutilized information system
- * Lack of coordination in supply ORS between District Health Offices and clinical facilities.
- * Inadequate storage facilities at provincial, divisional, and district level
- * Quality control procedures not practiced at provincial level
- * Lack of knowledge and practice of basic stock management and inventory control procedures
- * Underprescribing of ORS
- * Irrational prescribing of antidiarrheals and antibiotics
- * Multiple messages for mixing and measuring the ORS solutions

(3)

Issues of product standardization, recurrent costs and mixing and measuring practices will require comprehensive studies that should fit into the overall plan for the ORT program. Plans for training and education of health care providers are already underway. Detailed recommendations for research and training in these areas was not the focus of this consultancy.

The majority of the issues requiring attention in the ORS supply system are in the distribution operations. A program for systematic correction of deficiencies will require staff that are directly responsible for ORS supply management at the national and provincial level. Creating and funding new positions will give the best results. An alternative would be to provide additional resources to existing personnel that take on new responsibility. The tasks to be undertaken are:

- * Refine the needs estimation model
- * Implement a quality control plan
- * Implement a simple supply information system
- * Utilize the information system for rational distribution of supplies
- * Define more clearly transport arrangements
- * Find or build additional storage space
- * Implement stock management strategies

Naturally, the relative importance of this program must be considered as it relates to the ORT program as a whole.

III. Background

Pakistan's infant mortality rate of 119/1000 live births is one of the highest in South Asia and is suggestive of the disadvantaged health status enjoyed by the country's mothers and children. Reliable information on childhood mortality rates are hard to come by, but one source provides the following estimates for causes of death among children under 5 years of age annually.*

	<u>Number</u>	<u>Percent</u>
Diarrhoeal Diseases	313,400	34
Measles	170,000	19
Neonatal Tetanus	138,000	15
Acute Respiratory Infections	80,000	9
Pertussis	58,000	6
Malaria	50,000	5
TB/Polio/Diphtheria	43,800	5
Others	<u>57,100</u>	<u>7</u>
Total:	910,300	100

To combat the leading cause of death among children, Pakistan's Diarrhoeal Diseases Control Program began in 1983 with a 3 year plan administered by the National Institute of Health. The principal elements of the plan included the following points:

- * Production of ORS by NIH
- * Distribution of ORS through government outlets
- * Training health workers in administration and promotion of ORT
- * Media promotion of ORT through radio, television and newspapers

A second plan was begun in 1985 and has been augmented by the Accelerated Health Program (which began in 1983) and continues through the present.

The purpose of this report is to evaluate the second point of this ambitious agenda: How effective is the Diarrhoeal Diseases Control Program in distributing ORS through the public sector's health services delivery system? What problems are encountered in carrying out this distribution?

* The estimates, admittedly rough, were compiled by UNICEF staff based on the following sources: Sirajul Haq's Diarrhoea Survey; Protecting the World's Children, 1st Bellagio Conference, 1984; and Pakistan's Population Growth Survey 1971. No estimate was made for deaths caused by malnutrition as this is an under-lying cause of the great majority of child deaths, in particular, those caused by diarrhoea and measles.

IV. Structure of the Health Care System

At the national level, the health policies and services structure is directed by the Ministry of Health. In the execution of those policies, however, considerable administrative discretion is enjoyed by the provincial and/or territorial health offices. These include Punjab, NWFP, Sind, Baluchistan, the Northern Territories and Azad Kashmir.

Operating under the direction of provincial health offices is a network of about 600 public teaching district and tehsil (subdistrict) hospitals. These facilities are located almost exclusively in urban areas and are generally out of reach for the 72% of the population that lives in rural areas.

Serving the rural areas are about 450 Rural Health Centers, 2,500 Basic Health Units and about 5,500 small health care outlets such as dispensaries, Mother/Child Health Care Centers and MCH subcenters., It is intended that the RHC's act as referral points for the lower level facilities, plus provide planning, management and supervisory support for preventive and promotional programs in their respective areas. Current plans call for increasing the number of RHCs and BHUs by 1312 between now and 1990, so that the total number of these facilities to be served will rise from 2950 to 4262.

Within the context of this network must be considered the resources of the Expanded Program on Immunization which, like the CDD Program, is managed in vertical fashion by the NIH. EPI maintains 1,740 fixed vaccination centers located in the Ministry's clinical facilities and it has 1,921 outreach teams that operate out of the fixed centers. By 1988 these units are expected to expound by 2425 fixed centers and 2025 outreach teams. This will make totals of 4192 centers and 3946 teams, if current plans are realized.

As coverage provided by the network of rural health care facilities is currently quite limited there are development plans in progress now which provide for a Basic Health Unit for each Union Council which will serve on the average 10,000. Despite this facility utilization is low, with daily outpatient attendance averages at 25 for BHUs and 85 for RHCs. ¹⁶ According to a report published by the National Institute of Statistics this network provides health care to only 16% of the population.

V. The Drug Supply System

Pakistan's Ministry of Health has a drug supply system whose structure follows the lines of the health services delivery system.

Budget Allocation: The provincial director of health services allocates a budget to each district health office according to the number and type of clinical facilities within their jurisdiction.

Selection: For purchases through the provincial medical stores (50-85% of the budget) there is an approved list of medications for the district health office to select from which is particular to each province. For "emergency drug purchases" (15-50% of the budget) product selection is generally without restriction.

Procurement: Provincial medical stores obtain pharmaceuticals through tendering processes with local manufacturers and distributors. Emergency drug purchases are conducted individually by each district health office through local distributors and wholesalers.

Distribution: Provincial medical stores receive the medications from their suppliers on an annual or semi-annual basis. The medications are then distributed to medical stores at district health offices. In the case of emergency drug purchases the medications are delivered from the supplier directly to the district health office. At the provincial and district level medications are usually stored separate from ORS and often under the responsibility of a different storekeeper. From this point drugs are distributed to all clinical facilities.

Use: At the clinical facility medications are either administered to patients or dispensed on prescription for home use.

VI. The Public Sector ORS Supply System

The physical structure of the ORS supply system is parallel to the drug supply system. It is important to stress, however, that the ORS supply system is separate from the Ministry of Health drug supply system. It is managed vertically by the NIH through its EPI/CDD program. The supply system organization is shown in annexures 2 and 3. In brief, the system functions as follows.

Product Selection: At present, the CDD Program uses WHO formula ORS in 2 packet sizes, 500 and 1000cc. Technical specifications are given in annexure 4.

Procurement: The NIH procures ORS from 3 sources, that is, from its own production facility, UNICEF and a commercial manufacturer. At present, Wilson Pharmaceuticals of Rawalpindi holds the commercial contract. The quantities of ORS provided by these sources for the current and preceding 2 years are shown in annex 5. Table A.

Distribution: The NIH production facility and commercial manufacturer ship ORS from their plants to storage facilities at the Provincial Health Offices. UNICEF ships to the same points from its port facilities in Karachi. An exception to this plan is the Punjab; for this province the commercial manufacturer, Wilson Pharmaceuticals, ships the product directly to the eight divisional health offices (storage at divisional health offices have yet to be established in the other provinces). Additionally the commercial manufacturer absorbs the cost of shipping to the provinces and divisions whereas in the case at NIH Production and UNICEF the responsibility of shipping lies on the receiver. From this level the ORS is transported to storage points at district health offices and in many cases to the large district hospitals. The responsibility of collecting the ORS and shipping costs is that of the receiver. From the district health office the ORS moves directly to clinical facilities: hospitals, RHCs, BHUs, dispensaries, MCHCs, EPI centers and EPI outreach teams. The expense of transport is taken by the DHO. There is generally no standard of whether the ORS is delivered by the DHO or picked up by clinical facility personnel. Annex 6 shows for each province (or territory) the number of intermediate ORS storage points.

Use: Staff at clinical facilities and EPI outreach teams dispense ORS to patients (more properly, parents of patients). In principal dispensers are supposed to explain to recipients how to mix the ORS and administer the solution. To date an estimated 5,500 doctors and paramedical workers have been trained in Punjab province in ORT and the correct use of ORS packets. ORT training programs have been conducted in the provinces with the assistance of UNICEF and the WHO.

VII. ORS Supply in the Commercial Sector

Commercial sector production and distribution of ORS was discussed in both the May and June 1984 PRITECH reports (pp 10-15 and 5-14, respectively). Further detailed treatment of these subjects is beyond the scope of work of this consultancy, however, comment needs to be made concerning the relative roles being played by the public and commercial sectors. Comparison of data shown on annexures 5 and 7 shows that, at present, vastly more ORS passes into the public sector distribution system than into the commercial sector. For fiscal year 1985/86, NIH procured 10,162,000 packets for distribution, while for calendar year 1985, the commercial sector distributed 2,047,000 packets. Though the dates do not line up exactly, it appears that public sector distribution of ORS for 1985 was roughly 5 times the volume of the commercial sector. This however is distribution and not consumption or dispensing. The inherent differences in the design of the two systems may be distorting the appearance of these two figures. For example, it should be considered that the public sector currently has over 6 million packets in provincial Medical Stores.

The 2 systems also differ in the extent of their geographic reach. The public sector system dispenses ORS through its network of about 8,500 urban and rural clinical facilities. The commercial sector sells ORS through about 10,000 retail chemists located in 350 cities and towns. Paradoxically, the commercial retail network, distributing the lesser quantity of ORS, serves an estimated 30% of the population.* The public sector, distributing the greater quantity, serves an estimated 18%.

In November 1986 the National Development Finance Corporation will undertake a UNICEF financed study into the commercial production and distribution of ORS. A proposed scheme for the potential expansion of commercial marketing of ORS will be developed. (see Annex 13).

VIII. Analysis of Problems in the Public Sector ORS Supply System

A brief overview of the ORS supply system in the public and commercial sectors has been presented. An in-depth understanding of the operations of the public sector system was gained during three weeks of field visits. Annex eight shows the sample of sites visited by geographic area and level in the supply system. (The names of these sites were listed in the first annex of this report.)

As data were collected and analyzed, a list of current and potential problems emerged. These problems are reviewed in the four tables that follow; one table each for the operational areas of product selection, procurement, distribution, and use. In the first column problems are described objectively. In the second column their implications are discussed. Finally, in the third column, solutions are proposed. These tables generalize about problems and solutions for the system as a whole. Discussions of the specific situation in each province visited will be found in Annex 9. Furthermore Annex 10-12 illustrate various problems and issues cited in the tables.

* Figures for commercial sector outlets and coverage were taken from the October 1985 PRITECH report. Their provenance is the Marketing Department of Ricketts and Coleman.

A. SELECTION

1. PACKET SIZE:

OBSERVATION	DISCUSSION	SOLUTION
The vast majority of the ORS supplied to the public sector is the one liter size. The remaining 1% is produced by the NJH production unit in 500ml packets (as shown in annex 5).	In terms of proportion of the total supply the 1 liter packet has become the standard. Adoption of one packet size will reduce the risks of over and under concentration and simplify communications strategies.	Adopt a standard packet size. If this is 1 liter stop the use of the 500 ml.

2. PACKET LABEL CONTENT:

OBSERVATION	DISCUSSION	SOLUTION
The public sector packet label describes ORS mixing and ORT practices in written text. The majority of the mothers of children with diarrhea are illiterate.	A label illustrating the written instructions using pictures or drawings will likely improve the proper implementation of ORT by illiterate mothers	Labels the ORS packets with illustrations as well as written text

3. UNIFORMITY IN LABEL TEXT AND DESIGN

OBSERVATION	DISCUSSION	SOLUTION
There are currently three manufacturers supplying ORS to the public sector. Each uses its own idea of appropriate label text and design. (i.e. two packets say to boil water and the other does not)	Labels that differ from one packet is to another cause confusion in conveying the various ORT messages (mixing, administration, breast-feeding and nutrition).	Once the combination of messages has been agreed upon they should be incorporated into a standard label of text and illustrations to be used on all products

4. FORMULATION

OBSERVATION	DISCUSSION	SOLUTION
<p>Pakistan has a particular problem with product decomposition as noted in Annex 10. The decomposed products are all of the ORS-bicarbonate formula. NIH recently began procuring only ORS-citrate from UNICEF and Wilson Pharmaceuticals.</p>	<p>It is clear that the ORS-bicarbonate is not withstanding the harsh climatic conditions in Pakistan. Although the new supplies of ORS-citrate have not been in the distribution system long enough to assess their relative stability, it is known that the ORS-citrate does not decompose in hot humid climates like the ORS-bicarbonate. Clinically, the ORS-citrate corrects acidosis at the same rate as the ORS-bicarbonate and may additionally reduce fluid loss due to the effect of trisodium citrate in increasing the intestinal absorption of sodium. One further point illustrated in annex 11, suggests that dispensing the discolored ORS-bicarbonate may cause the mothers to lose confidence in the product and possibly the public health care system.</p>	<p>Continue to procure only the ORS-citrate formula to assure efficacy, minimize product decomposition and maintain public confidence.</p>

B. PROCUREMENT

1. DETERMINING NEEDS

OBSERVATION	DISCUSSION	SOLUTION
<p>NIH's decisions on how much ORS to procure and when to procure it is based on:</p> <ul style="list-style-type: none"> * budget allocation * previous experience <p>Information on quantities of ORS at various levels of the system is not available to NIH at the time procurement decisions are made</p>	<p>Without consideration of current stock available there is a danger of procuring too much or too little at any given time.</p>	<p>Develop a simple monthly or quarterly method of reporting to NIH the current stock position at the provincial and divisional levels.</p>

2. PROCURMENT FROM NIH PRODUCTION UNIT

OBSERVATION	DISCUSSION	SOLUTION
<p>There are several interrelated issues to consider concerning procurement from NIH production unit.</p> <p>A. packet size (See preceding table A.1.)</p> <p>B. packet cost(Annex 5)</p> <p>C. The production unit may be operating at a loss(Annex 5-B)</p> <p>D. The production unit is still producing the bicarbonate formula (Annex 4)</p> <p>E. The production unit has not been able to supply NIH with contracted amounts. (Annex 5 Table A)</p>	<p>These issues do raise questions concerning the relative efficiency of NIH's production capacity. It was not however within the scope of this consultancy to examine the question in detail</p> <p>Hans Faust, ORS production specialist from the W.H.O. is coming on Sept. 28 to determine feasibility of purchasing a new machine and changing the formula to Tri-Sodium Citrate.</p>	<p>Await the recommendations of Hans Faust and consider them within the context of NIH's overall operatives</p>

PROCUREMENT (cont.)

3. QUALITY CONTROL

OBSERVATION	DISCUSSION	SOLUTION
The responsibility of quality testing of the ORS packets lies with the provinces. This responsibility is generally ignored.	Lack of quality control increases the possibility that a substandard product will be used, resulting in inappropriate therapy. In the same manner products may not be of a standard that will withstand the extreme heat and humidity encountered in many areas of the country.	Quality testing should be implemented to include checks for: A. Moisture content B. Proper seal C. Qualitative chemical analysis D. Quantitative analysis

4. COST OF PUBLIC SECTOR PROCUREMENT

OBSERVATION	DISCUSSION	SOLUTION
On the basis of the Planning Commissions program expansion objectives for the Accelerated Health Program they have projected costs for procurement of ORS as follows: * 1986-87 17 million rupees * 1987-88 26 million rupees This will allow for procurement of approximately 18 million packets 86-87 30 million packets 87-88	While this report did not undertake a detailed financial evaluation of recurrent cost implications for the ORS supply in the proposed expansion of the health care system (see section IX), they are likely to be substantial. Plans for expanded promotion should also increase demand and therefore recurrent costs of supply. Further discussion is presented in Annex 5.	1. Conduct a recurrent costs analysis of the of the costs of financing the ORS supply. Likely this would be part of a broad study of the costs of child survival activities. 2. Optimize the balance between public and commercial sector distribution systems. Marketing studies are needed to assess the potential role that the commercial sector should play in meeting increased demand for ORS.

C. DISTRIBUTION

1. ORS CONSUMPTION REPORTS

OBSERVATION	DISCUSSION	SOLUTION
The current system of ORS consumption reporting is inconsistent and unreliable.	Information from the ORS consumption reports is currently of little use for making procurement decisions or distribution and re-distribution of stock.	Develop a simplified and uniform system for monthly or quarterly information reporting to include: <ul style="list-style-type: none"> * Received * Distributed * Current balance Monitor the systems reliability and usefulness.

2. DISTRIBUTION QUANTITIES

OBSERVATION	DISCUSSION	SOLUTION
Allocations of ORS at provincial and district levels appears to be determined solely on population or numbers and size of clinical facilities.	This method of stock allocation is not sensitive to demand as expressed by real dispensing/consumption at clinical facilities in a given area and off take reports from the facilities that serve them.	Use information from the reporting system mentioned above to allocate stock in terms of real need by geographic zone and level of supply system.

3. DISTRIBUTION RESPONSIBILITIES

OBSERVATION	DISCUSSION	SOLUTION
There is no clear understanding of who is responsible for distribution of ORS between the District health office and the clinical facilities.	The lack of coordination that results from this is a common cause of oversupply and under-supply of ORS.	Responsibility for distribution needs to be clearly defined between the DHOs and clinical facilities.

4. STORAGE SPACE

OBSERVATION	DISCUSSION	SOLUTION
Storage space for ORS at provincial, divisional, and district levels is generally too small or non-existent. As a result ORS is often stored under very unfavorable conditions.	ORS packets are needlessly decomposing because of poor storage conditions.	Depending on local conditions, employ a combination of the following strategies: 1. Decrease the size of shipments and increase the frequency of deliveries to prevent overfilling of limited storage space 2. Find or build additional storage space.

5. PRODUCT DETERIORATION

OBSERVATION	DISCUSSION	SOLUTION
Health care personnel and the public do not know how to evaluate the suitability of ORS packets for consumption.	This may cause waste of suitable products and utilization of unsuitable products. Additionally, valuable storage space is being taken up by packets that are not used.	Put in place a simple quality control scheme that will enable storage or clinical facility personnel to easily evaluate the condition of stock and quickly withdraw unsuitable products from circulation.

6. STORAGE PRACTICES

OBSERVATION	DISCUSSION	SOLUTION
At the storage facilities ORS is always stocked directly on the floor and tightly crammed into a small space.	Lack of ventilation between and under boxes leads to more rapid deterioration and increases the chances of water damage in flooding.	Implement storage practices that include spacing between boxes and stocking on timbers or other suitable platforms.

7. STOCK ROTATION

OBSERVATION	DISCUSSION	SOLUTION
There is a tendency particularly at clinical facilities to use the ORS packets that are from the <u>most recent</u> shipment.	This practice causes substantial amounts of stock from previous shipments to remain on shelves for unnecessary long periods of time increasing the possibility of outdating and deterioration of the ORS.	Educate personnel on the practice of first in first out stock rotations. (FIFO)

8. INVENTORY CONTROL

OBSERVATION	DISCUSSION	SOLUTION
There is no clear approach to inventory control within the current ORS supply system. Annex 9 illustrates the wide variation in stock levels	Lack of inventory control procedures is causing: <ul style="list-style-type: none"> - wastage - stock-outs - high inventory costs 	Inventory control procedures should be developed for each level of ORS storage within the supply pipeline. Recommended inventory control procedures include: <ul style="list-style-type: none"> A. Stock record keeping within storage points B. Periodic reports from storage points on quantities - received/distributed/balance. C. Stock level reorder points D. Standard order quantity

D. USE

1. PRESCRIBING PRACTICES - ORS

OBSERVATION	DISCUSSION	SOLUTION
Data compiled from facility visits showed that utilization of ORS is low. Annex 12	Program targets cannot be met until health care providers use the ORS in every case of diarrhea except those where it is contra-indicated.	Utilization of ORS needs to be addressed through communication strategies including training and media promotion.

2. PRESCRIBING PRACTICES - ANTIDIARRHEALS

OBSERVATION	DISCUSSION	SOLUTION
Results from interviews with 19 prescribers at clinical facilities showed that Anti-diarrheals are being prescribed in 80% of childhood diarrhea cases. Annex 12	While the sample size used in this study was small it appears that the pattern of indiscriminate use of antibiotics and anti-diarrheal drugs seen in other countries also holds true in Pakistan. These drugs are not warranted for most cases of diarrhea and do not treat dehydration. Use of these drugs needlessly increases the cost of treating diarrhea.	Train and educate prescribers on the use of ORT and ORS as the drug of choice in treatment of diarrhea. Also convey the limited utility and cost implications with the use of antibiotics and antidiarrheal drugs.

4. VOLUME MEASUREMENT OF ORS

OBSERVATION	DISCUSSION	SOLUTION
Interviews with health care providers at clinical facilities and mothers at private homes showed that there are several different methods being used to measure 1 liter. (annex 11 & 12)	It was not determined in this limited study what implications these multiple methods have on the overall ORT program. Can one method be adopted country wide? Are current communications strategies correctly addressing this issue? What is the best approach to the volume measurement question?	Conduct KAP and measuring/mixing studies to obtain an adequate data base on how mothers mix and measure one liter for ORS now.

5. DISTRIBUTION OF A ONE LITER CONTAINER

OBSERVATION	DISCUSSION	SOLUTION
NIH is considering the distribution of a one liter container to be used in mixing ORS solutions.	Comments from interviews with personnel at various facilities as described in annex 12 reveals that such an undertaking has the potential for solving some problems and causing others related to: <ul style="list-style-type: none"> - Transportation - Storage - Ability to meet demand 	A feasibility study on the use of standard mixing containers should be undertaken before implementation is considered. Areas to be covered related to supply management should include: <ul style="list-style-type: none"> A. Product design B. Packaging C. Needs estimation D. Transportation E. Storage F. Dispensing practices

IX. Principal Conclusions

1. At present, despite a number of specific problems in product selection, procurement, distribution and use, it does appear that the NIH ORS supply system is reasonably effective in supplying ORS to clinical facilities. This is a notable achievement and its value for child survival activities in Pakistan should not be underestimated.
2. Plans for the next 2-3 years call for dramatic expansion of the ORS supply system at its base:
 - * Greater use would be made of EPI outreach teams for distribution of ORS and the number of teams would increase from 1,921 to 3976
 - * RHCs and BHUs would increase from 2950 to 4262

This does not include what may happen with dispensaries and MCH centers, but even so, it represents a dramatic expansion in the number of outlets dispensing ORS to patients.

This expansion may be expected to occasionally, at the very least, see the following problems.

- * Substantial rise in the recurrent cost of financing the ORS supply
- * Greater difficulty in estimating needs
- * Greater difficulty in allocating stores by geographic area and level of the supply system
- * Substantially more serious storage problems

In sum, it is questionable whether or not the public sector ORS supply system could maintain its present quality of service in light of plans to increase the number of outlets dispensing ORS.

X. Recommendations

A. Public Sector ORS supply system

In section XIII of this report, various operational problems of the ORS supply system are reviewed and specific technical recommendations are made. In general, these recommendations fall into 2 categories:

Implement Improvements

- * Standardize packet size
- * Develop pictorial instructions
- * Refine needs estimation model

- * Implement quality control plan
- * Implement supply information system
- * Distribute ORS stocks more rationally
- * Define more clearly transport arrangements
- * Improve storage conditions
- * Implement stock management strategies
- * Provide more training in ORT for care providers

Undertake Studies

- * Conduct recurrent cost analysis of ORS supply
- * Conduct KAP and mixing measuring tests
- * Conduct feasibility on providing measuring containers

THE QUESTION IS, HOW SHOULD THESE ACTIVITIES BE UNDERTAKEN?

1. Concerning the studies, it is recommended that the NIH develop a general research plan for all aspects of the ORT program and that supply related studies be part of this plan. PRITECH's Technical Director, Dr. Northrup, can assist in development of an overall research plan during his upcoming October 1986 visit to NIH.
2. Concerning the list of activities to implement, it is recommended that NIH adopt a clear program for improving the ORS supply system and carry out specific improvements in the contrast of that program. Attached as annex 15, is a draft program for improvement that includes:

- * Inputs Required
- * Strategy Statement
- * Scopes of Work
- * Schedules of Activity
- * Discussion of Possible TA Requirements
- * Budget

It is worth noting here that carrying out this program for improvement requires making staff directly responsible for ORS supply management at the NIH and provincial levels. This may mean that new positions should be created and funded or it may mean that existing personnel should be provided with the resources to take on new responsibilities. In the view of the consultants, creating and funding positions especially for supply management will give the best results.

B. Balancing Public and Commercial Sector ORS Distribution

As noted in section VII of this report the commercial retail pharmaceutical sector represents a substantially under utilized resource for distribution of ORS to the public. Although it appears that the commercial sector distributes only 1/5 the amount of ORS distributed by the public sector (2,047,000 Vs. 10,162,000), secondary sources indicate that the retail pharmacy network actually serves a greater segment of the population than the Ministry of Health services delivery system.

Furthermore, in section VIII of the report, attention was called to the recurrent cost implications of a greatly expanded ORS distribution program. Towards minimizing costs to the Government of Pakistan and to maximizing use of the commercial distribution system, the following recommendations are made:

1. As suggested, carry out an analysis to obtain a clear view of the recurrent cost implications of successive increments of program expansion over the next 3 years.
2. Undertake market research to determine the absorptive capacity of the pharmaceutical market place for ORS. This research should take into account the potential impacts of alternative promotional strategies. This and several other points are within the scope of work of a study undertaken by the National Finance Development Corporation. The proposed scope of work is shown in Annex 13.
3. Formulate an overall national ORS distribution strategy that sets targets for both the public and commercial sectors.

Naturally, these recommendations should be pursued within an overall ORT strategy taking into consideration not only promotion and distribution of ORS but also training of health providers and social marketing of ORT.

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PLACE VISITED

Islamabad

1. National Institute of Health
General Burney, Executive Director NIH
Col. Mohammad Akram Khan, Program Manager EPI/ORT
Dr. Wahid, Assistant Program Manager EPI/ORT
Zafar Ali, Principal Scientific Officer and
and Acting Chief of Biological Production Division
Mrs. Najeeba Salim, Senior Scientific Officer
Dr. Witjaksono, WHO advisor for EPI/NIH
2. UNICEF
Julian Lambert, Health/Nutrition Officer
4. Wilson Pharmaceuticals, Rawalpindi,
Mohammad Yusuf Sheikh Partner

PUNJAB

Lahore

1. Director Health Services,
Dr. Elahi Bux Soomro
Mr. Remohd Ratiq, Provincial Storekeeper
2. Lahore Divisional Stores
3. Lahore District Health Office
Mohammad Ebrahim, Storekeeper
4. Maraco BHU, Dr. Saqib Javaid
5. Chong RHC, Dr. FAiz Ahmad
6. Okara District Health Office,
Dr. Khurshid Ahmad Khan, Medical Superintendent, DHQ Hospital
Dr. Mohammad Sadiq, DHO
7. Mayo Hospital Pediatrics Department,
Dr. Tawab, Assoc. Professor of Pediatrics
8. Lahore Chemical Co.
9. Fazal Din and Sons Ltd., Chemist & Druggist
10. Pharma, Chemist & Druggists

Multan Division

1. Multan Divisional Health Office.
 Mohammad Kurthvel, Divisional Health Officer
 Muhammad Iqbal, Divisional Education Officer
2. Multan District Health Office
 Dr. Ghulam Sarwar Mirza, DHO
 Dr. Salmat Ullah, Assistant DHO
3. Qasim Bela BHU

 Dr. Mohammad Khan, M.O.
 Ifad Fahim, LHV
4. Shershah Rural Dispensary
 Dr. Mansoor Jafri
5. Flood Relief Post

Bhawalpur Division

1. Bahawalpur Divisional Health Office
 Mohammad Iqbal Hussain, Assistant DHS
2. Chak # 47 Feteah BHU
 Dr. Mohammad Tahir Alvi
3. Bahawalnagar District Health Office
 Sardar Mohammad Rafiq, Storekeeper
4. Chishaian MCHC, Lady Health Visitor
5. Chak Abdula Medical Store

NWFP

Peshawar

1. Director of Health Services,
 Zamin Gul, Management Analyst USAID, PHC Project
2. Inspectorate of Health Services
 Mrs. Kamil
3. EPI Stores
 Dr. Sarwar, Assistant Director
 Shaidi Mohammad, Storekeeper
4. Medical stores Depot
 Adul Aziz Khan, Officer in charge
5. Kamran Medical store

6. Galaxy Medical Store
7. Medicine Store
8. Boy Selling Medicine in Bazaar

Mardan District

1. Shergarh BHU EPI Unit
Gohar Ali, EPI Technician

Malakand District

1. District Health Office
Abdul Samat Khan, DHO
2. Agency Headquarter Hospital
Abdul Samat Kha, Acting Agency Surgeon

Swat District

1. District Health Office
Dr. Zain Ulahmad, Assistant, DHO
2. Nawakaly Dispensary
Mr. Khalilurrahman, Dispenser
3. Talegram Dispensary
Mr. Faizuraman, Dispenser
4. Beshband, BHU
Mr. Sairagu Dina, Medical Technician
5. Hadi Medical Store, Barikot
6. Saidu Sharif, 5 house visits
7. Seer village, 5 house visits

Sind

Hyderabad

1. Director of Health Services
Dr. Sajjan Memon
2. DHO Hyderabad
Dr. Iqbal Ahmed Shaikh, Assistant District Health Officer
3. Tando Jam RHC
4. EPI Outreach Team - Zubair Ahmad Vaccinator
5. Tando Jam Village, 5 house visits

Karachi District

1. Government Importation Inspection,
Provincial Medical Stores
Dr. Khwaja Rasheed, Officer in charge
2. DHO Karachi
3. Olo Thana Maternity Home
Dr. Fozia Ashraf
4. Sheeki Goth Dispensary
Ran Mohammad Safdur, Dispenser
5. Dumba Village Dispensary
Sikaner Ali, Dispenser
6. SEARLE Ltd.
Afeet Khan, Advertising Manager
7. Pakistan Chemist and Druggist Association
Syed Mohammad Idrees, Secretary

Northern Territory

Gilgit District

1. Aliabad Civil Hospital - Dr. Shukurullah Baig
2. Karimabad, Civil Hospital - Dr. Johar Ali
3. Karimabad, 2 house visits
4. Gulmit, Aga Khan Health Center

Baluchistan

Quetta

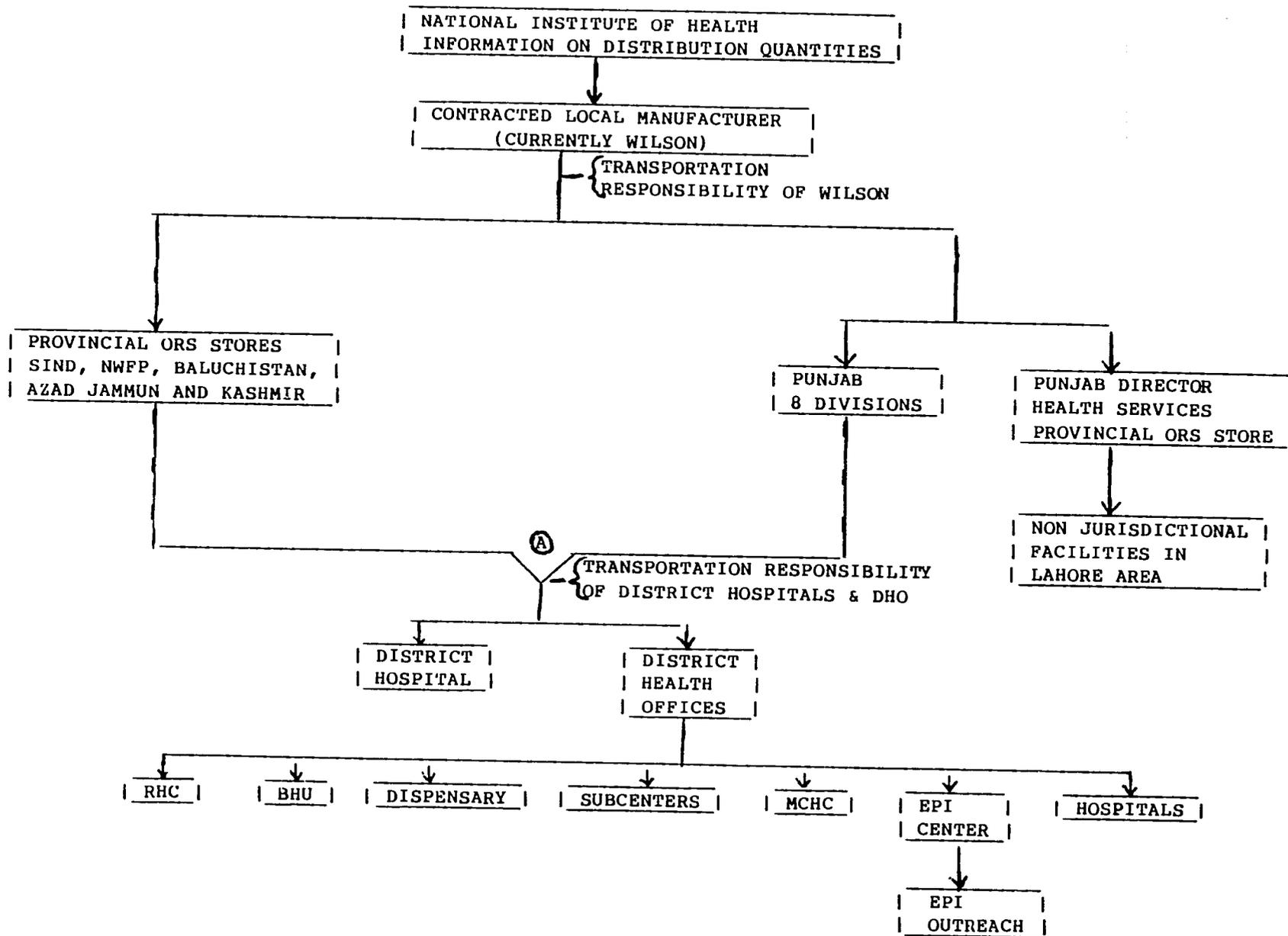
1. Director of Health Service
Dr. Dur Mohammad, Assistant Director of Health Services
Dr. Sanaullah Malik, Project Director Basic Health Services
2. EPI Center Provincial Stores
3. Quetta District Health Office
Mohammad Riaz, Senior Clerk

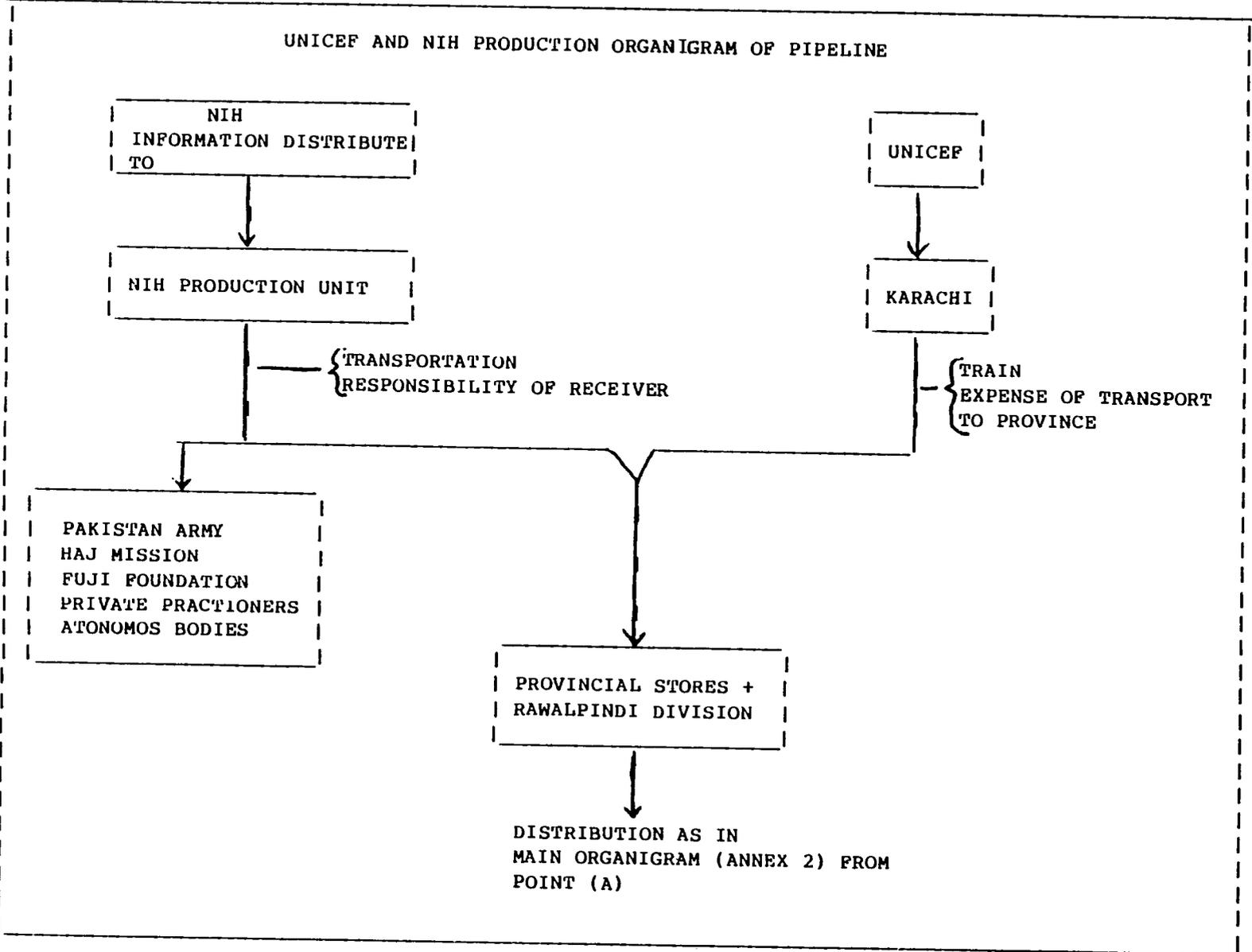
4. Pashtoon Abad BHU,
Abdul Sattar, Medical Technician
5. Kaci Road, MCHC - Lady Health Visitor
6. Pashtoon Abad Village, 5 house visits
7. Babar Medical Store
8. Ditu Medical Store
9. Quetta Medical Stores

Kalat District

1. Kalat DHO - Dr. Shamim Durani
2. Pringabad BHU - Dr. Mosim
3. Mustong Civil Hospital
4. Pringabad Village, 3 house visits

ORGANIGRAM OF DISTRIBUTION PIPELINE





PRODUCTS AVAILABLE PUBLIC SECTOR

NAME:	NIMKOL	ORASAL- F	HOWARDS	UNICEF
MANUFACTURER:	NIH, ISLAMABAD	WILSON, RAWALPINDI	LAHORE CHEMICAL, LAHORE	VARIOUS
SIZE:	500 ml	1 Liter	1 Liter	1 Liter
FORMULA	WHO: SODIUM BICARBONATE ANHYDROUS GLUCOSE	WHO: SODIUM BICARBONATE ANHYDROUS GLUCOSE (Recently changed to Trisodium Citrate)	WHO: SODIUM BICARBONATE ANHYDROUS GLUCOSE	WHO: SODIUM BICARBONATE ANHYDROUS GLUCOSE (Recent Contracts for Trisodium Citrate)

COMMERCIAL SECTOR

NAME:	HYDROSOL	ORASAL -F (FLAVOURED)	REHYDRATE (O.R.S.)	PEDITRAL	ORS
MANUFACTURER:	STAR - LAHORE LABS	WILSON, RAWALPINDI	FAKMA PHARMA, LAHORE	SEARLE, KARACHI	SOMA LABS
SIZE	1 Liter	1 Liter	1 Liter	250 ml+1 liter	1 Liter
FORMULA:	WHO: GLUCOSE SODIUM BICARBONATE	WHO PLUS FLAVOURINGS ANHYDROUS GLUCOSE TRI SODIUM CITRATE	WHO SODIUM BICARBONATE GLUCOSE	NOT WHO LOWER SODIUM FLAVORS ADDED	WHO
Price		3.75 RPS	3 RPS	2.5 Rps/250l 8 Rps/1 Liter	

(30)

Annex 5

SUPPLYING ORS TO PUBLIC SECTOR

A. Estimating ORS Requirements

1. Service based approach

A rather detailed estimation of ORS requirement using a variation of the service based approach has been carefully explained in the paper on the Second National Plan.⁴ This method considers:

- * Access to the health care system
- * Utilization of the health care system
- * Reduction in mortality through program success
- * Plans for expansion as in the Five Year Plan

This method assumes:

- * 2 episodes per year
- * 1 packet per year for <1 year old
- * 2 packets per year for 1-5 year old

This method concluded that the annual requirement would be 31.5 - 42.7 million packets/year by 1988.

2. Population based approach

A population based approach was calculated by consultants in a 1984 report.¹⁰ This method assumed:

- * 3.4 million children < 1 year old
Treated with 1 liter
- * 13.6 million children 1-5 year old
Treated with 2 liters
- * 2 episodes treated with ORS per year per child

The ORS requirement to treat 100% of the children under 5 was estimated at 61.3 million liters.

We can use this figure to make estimates considering current plans for ORS distribution through EPI and health care facilities We can make a low, medium, and high estimate.

61.3 million x 80% coverage = 49 million liters
61.3 million x 65% coverage = 40 million liters
61.3 million x 50% coverage = 30 million liters

B. Supplying ORS requirements

The preceding estimates are 3-5 times the quantities supplied in previous years. (see following table A). Wilson pharmaceuticals has been the main supplier to the public sector since April 1985. They are planning to continue to win the contracts with NIH. Wilson now has seven packaging machines. They claim to have the ability to supply 35 million packets per year. Wilson has set commercial sector sales targets at 5 million packets for 1986 and 7 million packets for 1987. Inspection of documents and ledgers at provinces and divisions allowed an analysis of lag time between notification to supply and actual delivery. The longest lag time from order date to delivery was two months in the case of Quetta. In most other cases it was less than a month and often one week. This rapid response is a particular advantage that NIH can use in maximizing the efficiency of their supply to the system. Currently Wilson supplies the entire contract amount to the system in 2-3 months.

Lahore Chemical Co. has not supplied ORS to NIH since their 1984-85 contract. They currently have 2 packaging machines and one on order. They are building a new ORS production room. With the 3 machines operating they claim to be able to produce 15 million packets per year. Should the AHP require the highest estimate of 49 million Liters, this could theoretically be fulfilled by Wilson Pharmaceuticals and Lahore Chemical Co. The remaining three companies that usually participate in the bidding process were not visited in this consultancy.

The figures for NIH production supply of ORS were calculated by the EPI/ORT Stores officer. These are in conflict with figures in another NIH document. At the time of the visit to the NIH Production Unit records were not available for clarification. In either case the supply from NIH production has been quite small compared to the total. Using the figures in table A NIH production supplies roughly 1% of the total number of packets yearly.

C. Recurrent costs of ORS

Table B illustrates the costs of the ORS as laid out in the AHP document. The NIH production Unit is still supplying the ORS 500ml packets at .65 Rp/packet. According to verbal information from the production Unit Cost Accountant the current production cost is 2 Rp/packet including all materials, labor and other costs.

Since the time of the AHP document the NIH has been successful in negotiating lower prices with Wilson Pharmaceuticals. Wilson has been supplying the ORS-citrate 1 liter packets for 0.786 Rps/packet. During a discussion with partners at Wilsons headquarters in Rawalpindi they stated that there will be no

problem continuing to supply at the same price. Based on this NIH can actually purchase more ORS than planned in their budget. The difference is as follows:

	<u>Current Plan</u>			<u>Possible Alternative</u>		
	Packet	Price/ packet	Total in million Rps	Packet	Price/ packet	Total in million Rps
1986-87	16 million	.90 Rp	14.4	18 million	.786 Rp	14.15
1987-88	26 million	.90	23.4	30 million	.786 Rp	23.58

Based on this consultants' impressions from field visits it is reasonable to assume that 18 million packets will easily fulfill the requirements for 1986-1987. The previous estimations of ORS requirement for 1988 were:

Service Based 31.5- 47 million liters per year
 Population Based 30-49 million liters per year

The fact that these two estimates fall into the same range should be taken as coincidence and not confirmation of validity. They are in fact based on similar assumptions. Using the current budget allocations it may happen that the purchase of 30 million packets from 1987-1988 will not be sufficient. Additionally what are the plans for maintaining these recurrent costs in the years that follow? These are questions that will require further research.

TABLE A

QUANTITIES OF ORS SUPPLIED TO THE PUBLIC SECTOR

	NIH PRODUCTION (500 ML)	STAR LABS	LAHORE CHEMICAL	WILSON PHARMA- CEUTICALS	UNICEF	TOTAL SUPPLIED BY YEAR
April 1983- March 1984 CONTRACTED SUPPLIED		5 million 5 million				5 million
April 1984- March 1985 CONTRACTED SUPPLIED	N/A 0.154 million		10 million 10 million		3 million 3 million	13.154 million
April 1985-March 1986 CONTRACTED SUPPLIED	2 million 0.162 million			10 million 10 million		10.162 million
April 1986-March 1987 CONTRACTED SUPPLIED	2 million 0.021 million			10 million 7 million	3 million 3 million	10.021 million
TOTAL SUPPLIED BY MANUFACTURERS	.337 million	5 million	10 million	17 million	6 million	38.337 million

TABLE B
COST OF ORS
FROM AHP, PC-1 PLAN

	NIH PRODUCTION (500 ML)	PRICE/PACKET	COMMERCIAL CONTRACT	PRICE/PACKET
1985-1986	2 million	0.65 Rp	18 million	.90 Rps
1986-1987	4 million	0.65 Rp	16 million	.90 Rps
1987-1988	4 million	0.65 Rp	26 million	.90 Rps

Intermediate Storage Points

	<u>PUNJAB</u>	<u>SIND</u>	<u>NWFP</u>	<u>Baluchistan</u>	<u>Northern Area</u>	<u>Azad Kashmir</u>	<u>Total</u>
Province	1	1	1	1	1	-	4
Divisions	8	-	-	-	-	-	8
Districts	29	15	13	17	3	4	92

These storage points Tranship ORS to an Estimated

- 600 Urban Hospitals
- 450 Rural Health Centers
- 2,500 Basic Health Units
- 5,500 Dispensaries and Mother/child health Care Centers
- 1,921 EPI Outreach Teams

SUPPLY OF ORS in the Commercial Sector

	FAKMA PHARMA	WILSON'S	SEARLE	PHARMEDIC	TOTAL
1985	1.279 million	.483 million	.281 million	.004 million	2.047 million
Ist.Quarter 1986	.077 million	.113 million	.114 million	.005 million	.335 million
TOTAL:	1.356 million	.596 million	.425 million	.005 million	2.382 million

SAMPLE OF SITES VISITED

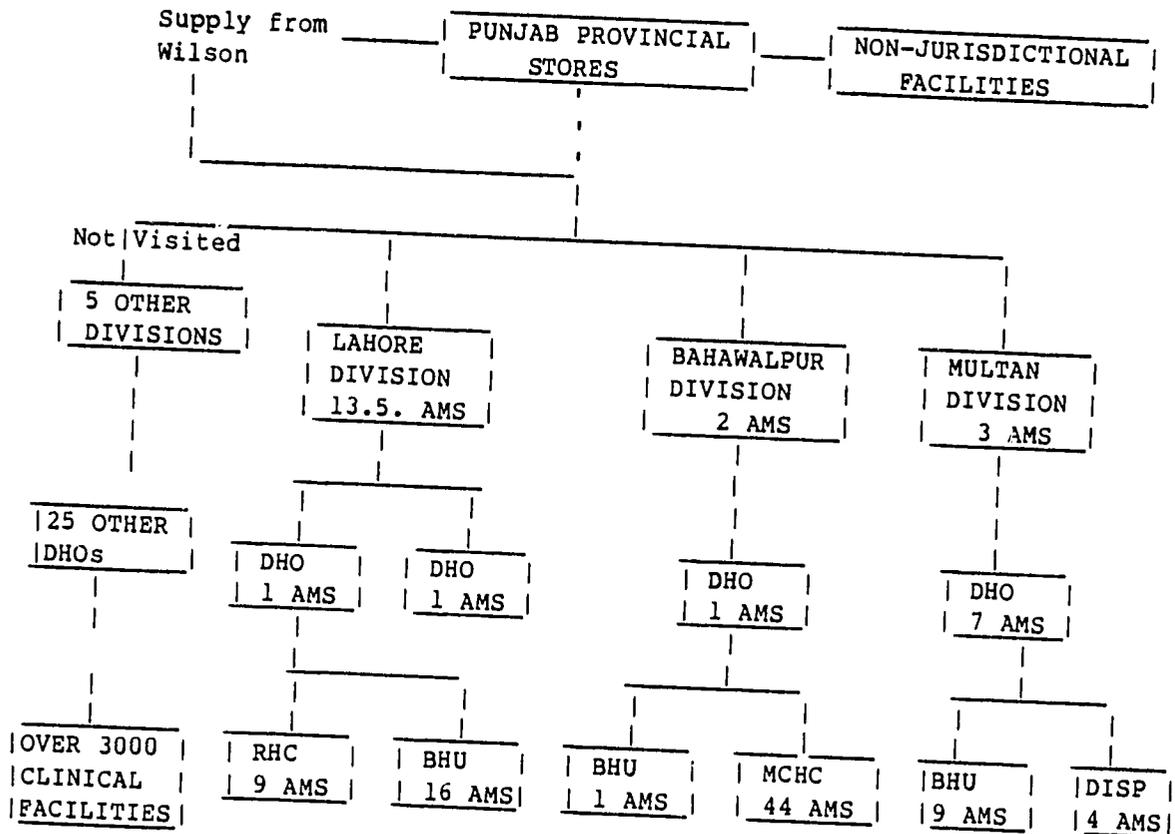
<u>Administration Level</u>	<u>Province</u>					<u>Total</u>	
	<u>Punjab</u>	<u>NWFP</u>	<u>SIND</u>	<u>Baluchistan</u>	<u>Northern Territories</u>		
Provincial Health Office	1	1	1	1	-	4	} 17 storage facilities
Division Health Office *	3	-	-	-	-	3	
District Health Office	4	2	2	2	-	10	
<u>Clinical Facilities</u>							
Hospital	1	1	-	1	2	5	} 30 clinical facilities
Rural Health Center	1	-	1	-	1	3	
Mother/Child Health Center	1	-	1	1	-	3	
Basic Health Unit	3	1	-	2	-	6	
Dispensary	4	2	2	-	2	10	
EPI CENTER	-	1	1	1	-	3	
<u>Other</u>							
CHEMIST SHOP	3	5	1	3	-	12	
PRIVATE HOME	-	10	5	8	2	25	

(37)

ORS Pipeline Analysis

Data from field visits was used to construct structures of distribution systems on a province by province basis. Calculations for Average months Supply (AMS) are used as an indicator for efficiency of the system. This was calculated by dividing average stock levels in 1986 by monthly consumption. For example a facility averaged 100 packets of ORS in stock during a given time period. During the same time period they dispensed on the average 10 packets per month. Therefore they usually average a 10 month supply instock. The organagrams illustrate the number and type of facilities visited in each province to give the reader an idea of the relatively small size of the sample compared to the system as a whole.

PUNJAB PROVINCE
ORS PIPELINE ANALYSIS



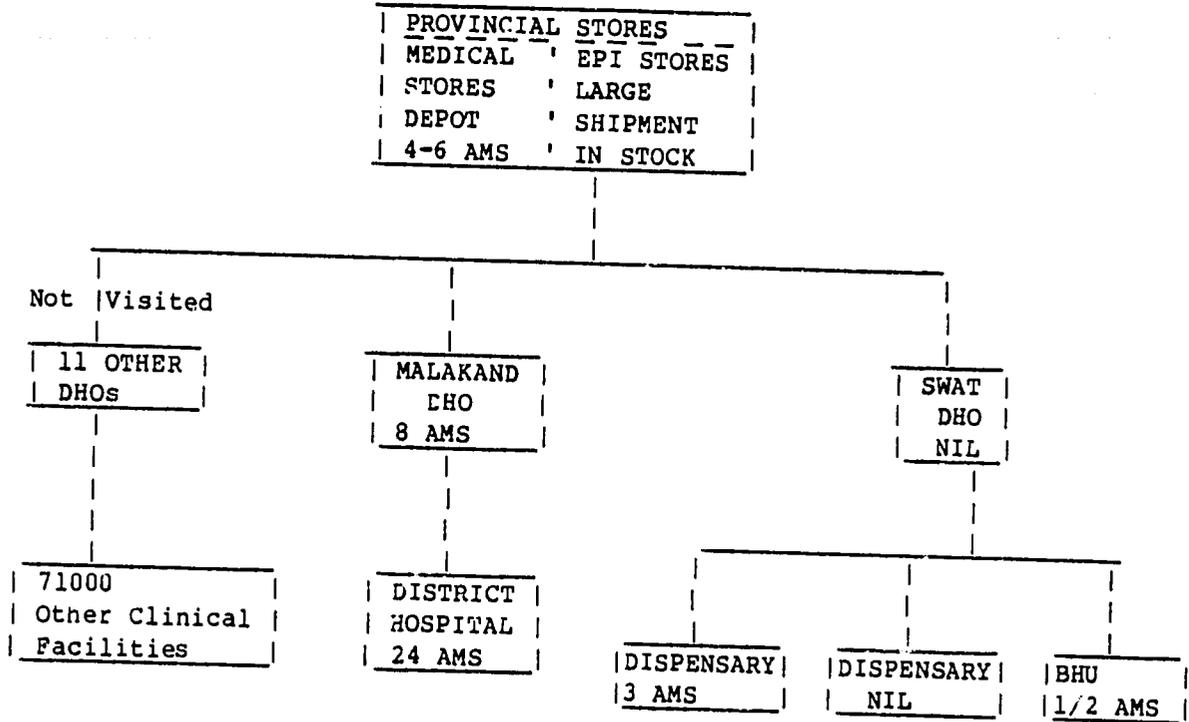
AMS = AVERAGE MONTHS SUPPLY

Punjab is the only province to have fully implemented the divisions. In terms of supply the ORS is delivered from Wilson's directly to the eight divisions. At the time of the visit Lahore division had 1.24 million packets of ORS, a 21 month supply calculated from previous distribution history. It was all stocked outside a building in the sun. The other divisions have storage problems as do the districts. Bahawalpur division temporarily has their ORS stored in one mechanics garage Multan division has 1/2 a million packets on the third floor of a hospital and another 1/2 million out back on a porch. Bahawalpur and Multan adjust for this problem by quickly shipping out their ORS. Stock records show a level of NIL 50% of the time. Three of four DHO's visited followed a similar practice as reflected in their Average Monthly Supply of 1.

The clinical facilities show a wide variety of inventory management policies. The two extremes are illustrated in Bahawalpur. The medical officer at the BHU picked up a 1-month supply of ORS every month when he picked up his pay check. The Lady health visitor at the MCHC picked up her allocation of ORS

everytime she received notification from the DHO. Her utilization wasn't low. Records showed dispensing of 600 packets per year with 280 diarrhea cases. But, her annual allotment was about double her use so inventory kept growing until she had reached about a 4 year supply at the time of the visit. She also had a complicated system using 3 different ledgers for ORS. In Punjab EPI outreach teams are carrying ORS packets and distributing them during their home visits.

Stock management practices at clinical facilities in Punjab are an example of what is seen throughout the country. When a new supply of ORS arrives it is put on top of the existing supplies. The thought is that since there is so much supplied it is better to use the fresh packets. This lack of first in first out stock rotation has resulted in ORS decomposition as the older packets are not being used. Then the staff will not use them but also not discard them.

North Western Frontier ProvinceORS Pipeline Analysis

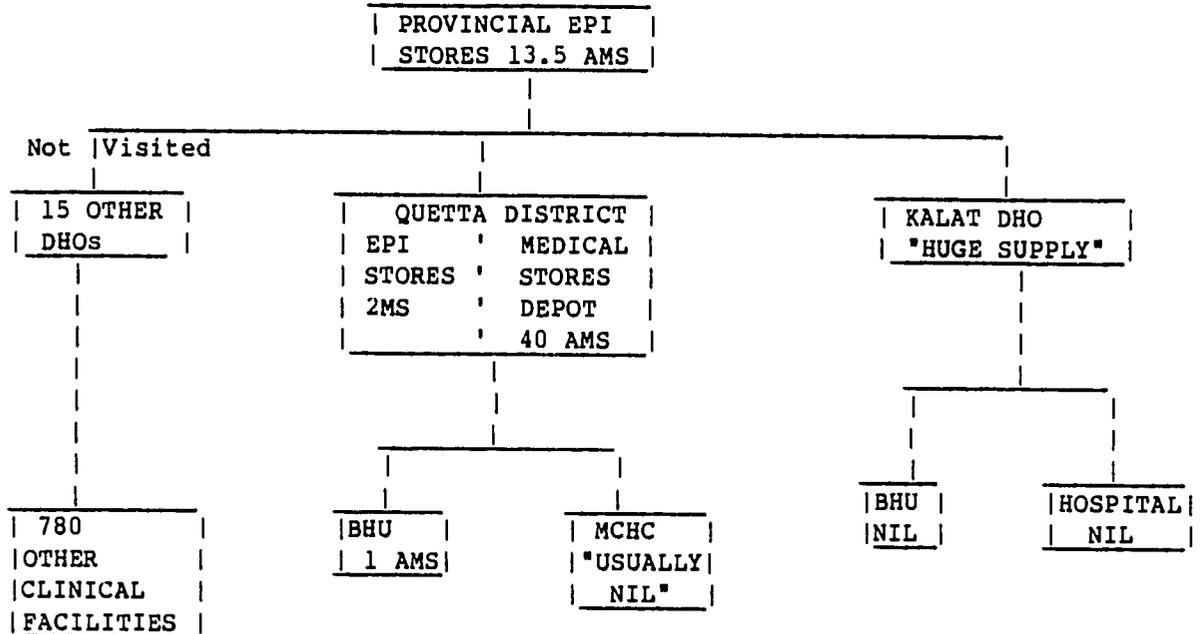
AMS = AVERAGE MONTH SUPPLY

At the time of the visit to NWF² the upper levels of the supply system were in the process of change. The changes are not likely to improve the problems discovered. In this province as in others provinces decisions are made for allocation of each large shipment of ORS received. In the two districts visited there was a clear case for improper allocation. The two districts visited receive equivalent allotments for ORS though Swat has 4 times the population and 3-4 times the number of health facilities of Malakand district. The results are illustrated with the oversupply of ORS in Malakand and the under supply in Swat. The system attempts to adjust. The DHO in Malakand dispenses 2,000 to 5,000 packets to each RHC and BHU. In Swat the DHO dispenses 50-500 to the same type facilities. One dispensary in Swat received 300 packets in January, the first shipment in 5 years. Prescribing practices at this dispensary reflected the shortage of supply, 200 packets had been dispensed for 257 diarrhea patients. Another dispensary received the same supply, made no such adjustment, dispensed 2 packets per patient and has been out of stock for 2 months now.

During this time of shortage the stock of ORS at the provincial level has never gone below 400,000 packets and no attempt has been at the Provincial or

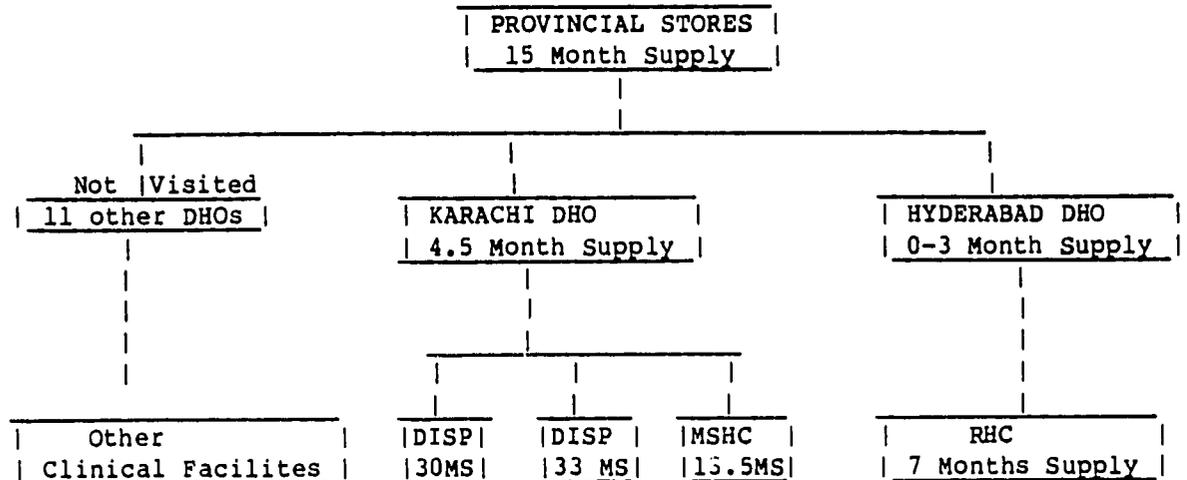
district level to correct the shortage. It was interesting to note that Swat DHO had spent 70% of their total 1985-86 drug budget in emergency purchases with local wholesalers. Eight percent of the emergency purchases were used to buy large quantities of antidiarrheals at retail prices. Five houses were visited in a small village three km from one of the dispensaries in Swat. Three of the houses had previously used ORS or were currently using ORS. All three stated they used 4 teacups (500ml) for their measure of water. One liter packets were identified in their homes. Further research found that 500 ml Nimkol packets were supplied to this area in 1983 and 1984.

Decomposition of packets was noted at Malakand DHO and Malakand District Hospital. It is likely that oversupply to the district without consideration of consumption has contributed to this problem.

BALUCHISTAN PROVINCEORS PIPELINE ANALYSIS

AMS = AVERAGE MONTHLY SUPPLY

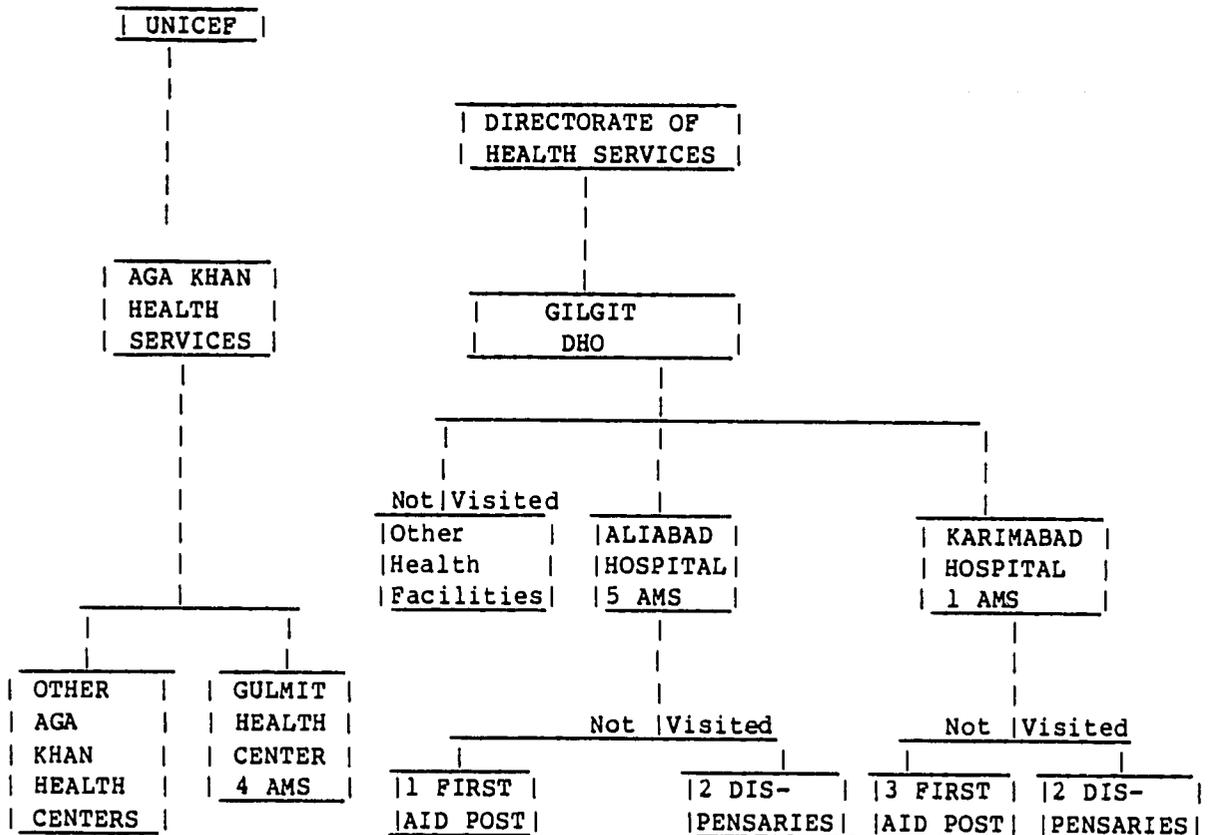
In Baluchistan the EPI program takes responsibility for ORS supplies at the provincial level. The DHOs in the remote areas reportedly have a difficult time to arrange for transport of the ORS. This study did not reach into the remote areas. Distribution from Quetta DHO was somewhat confusing. It wasn't clear who was really responsible for distribution. In any case between EPI stores and Medical Stores Depot, they distribute to 50-60 clinical facilities. In 1985 Medical Stores depot distributed 5,600 1/2 liter packets and EPI had no records. In the first 7 month of 1986 EPI distributed 11,000 packets and Medical Stores Depot had no record available. On a visit to a MCHC the lady health visitor stated the EPI mobile team occasionally came by and gave her 50 1/2 liter packets but she usually had NIL. There was no understanding of who was responsible for the supply of ORS and no motivation to do anything about it. The general impression followed during the majority of the contacts in Baluchistan. At a BHU in Quetta the Medical Technician went to pick up packets monthly from Medical Stores Depot because they never gave enough. Both facilities stated they gave one 1/2 liter packet per patient if it was available. Neither kept any kind of recording system. At the Kalat DHO the Medical Stores were closed but the newly appointed DHO stated they had a huge supply of ORS. Four of the dependent facilities were visited but two were closed. The other two had Nil ORS for approximately one month now. On visits to local chemist shops one chemist stated that he had several contracts to sell Wilson flavored ORS to area Civil hospitals, Refugee hospitals and clinics. Time did not allow for verification of this claim.

SIND PROVINCEORS PIPELINE ANALYSIS

The Director of Health Services is located in Hyderabad and the provincial medical stores are located 160km away at the Government Import Inspection depot in Karachi. This store is the largest stock pile of ORS packets in Pakistan and a lot of the stock has carmelized. At the time of the visit there was 2.87 million packets in stock which calculates to a 2 year supply. 10,000 of the packet were from Star laboratories received in 1983 and 595,000 from UNICEF received in March of 1984. All packets had moisture beads between them. Both DHOs visited had very limited storage space for ORS and therefore kept low inventories by picking up supplies only as necessary and pushing them out to the clinical facilities. The high figures for calculated months supply at clinical facilities attributed to the fact of low utilization of ORS. One dispensary averaged 90 diarrhea patients per month and ORS dispensing calculated to 10 packets per month. The dispenser stated he gave one ORS packet to every diarrhea patient. Another dispensary had UNICEF packets manufactured in 1981. The same dispensary was able to show copies of monthly reports of ORS consumption and stock levels but he kept no stock register. The quantities on the consumption report were not even close to what he had in stock.

This observation is a typical example of the information system seen in other provinces as well. Provincial and district offices are able to show very impressive monthly reports for morbidity and ORS consumption. Inspection of the clinical facilities included in the scope of the reports reveals a different picture. The facilities commonly report inaccurate data or no report is compiled at all. It should be noted that rural areas were not visited in Sind. All facilities were within 5 miles of either Karachi or Hyderabad.

NORTHERN TERRITORIES
ORS PIPE LINE ANALYSIS



Visits to the Northern territories were conducted during the Eid holidays and therefore offices at the upper levels were closed. The area is serviced by two health care systems. The structure of the government health care system is different from other provinces in that hospitals supply to dispensaries and first aid posts. Private chemist shops are non-existent except in Gilgit town. People do not have private sector as an option in their health care needs. Seasonal variations and transport problems become a big factor in supplying the facilities and the public. Attendance at clinical facilities decreases dramatically during December through February. Patients from outlying areas are usually supplied with four packets of ORS to compensate for difficulties of access.

ANNEX 10

DECOMPOSITION OF ORS PACKETS

SAMPLING: ORS packets were inspected at all facilities visited. On the spot checks were made of the condition of the ORS powder. If the ORS showed any sign of decomposition a sample packet was collected. At some facilities the ORS was not available for inspection. In Baluchistan many of the facilities had no ORS.

METHOD: In the case that a sample was taken careful notations were made at the storage site and from the stock ledgers. Information included: Manufacturer, Manufacturer date, date received, estimated temperature and humidity, availability of storage space, storage practices, stock rotation, and inventory control.

DISCUSSION: As noted in the WHO book on ORS production¹⁷, the degree of decomposition of the ORS-bicarbonate parallels the amount of discoloration. ORS that is dark brown has reached an advanced degree of decomposition (up to 40% or more) and is not suitable for consumption. In this study only three locations had packets that were not suitable for consumption. The interesting point is that one site was a District Health Office and another was a provincial store. The provincial stores in Karachi have 2.87 million packets in stock. It was estimated that at least one third of these are not fit for consumption.

The design of the study does not allow for an analysis of the quality of each manufacturer's product. Therefore all conclusions are speculative. Based on information gathered from these field visits and data from the following table some general conclusions seem obvious. ORS is needlessly decomposing due to:

1. Lack of stock rotation (First in first out) primarily at the level of the clinical facilities
2. Incorrect allocation resulting in oversupply
3. Lack of adequate storage space at Provincial, Divisional and District level
4. Lack of knowledge and practice of basic principles in stock management and inventory control

DECOMPOSITION OF ORS PACKETS

SAMPLE SITE	MANUFACTURER	MANUFACTURE DATE	DEGREE OF * DECOMPOSITION	MORE THAN 2 YEARS PAST MANUFACTURE DATE	POSTULATED REASONS FOR DECOMPOSITION					
					TEMPERATURE HUMIDITY	STOCK NOT ROTATED	OVER SUPPLY	POOR STORAGE PRACTICES	LACK OF STORAGE SPACE	
<u>Punjab</u>										
Chaf + 47 BHO	UNICEF	April 1984	Slight	Yes	X					
Chiswick MRC	UNICEF	Dec. 1981	Heavy	Yes	X	X	X			
<u>Rajasthan</u>										
PROVINCIAL EPI STORES	WILSON	March 1985	Slight		X				X	X
<u>Northwest Territory</u>										
Forimbaso Hospital	NIH	N/A	Moderate							
Aliabad Hospital	NIH	N/A	Moderate							
Gulistan Health Center	UNICEF	July 1985	Slight							
<u>Sindh</u>										
PROVINCIAL MEDICAL STORES	Star, Lahore UNICEF, WILSON	Various	Light Moderate Heavy	Yes/No	X	X	X	X		X
<u>Pakistan DHO</u>										
Lahore DHO	Lahore	March 1985	Moderate	No	Just received from provincial stores					
<u>Punjab Village Dispensary</u>										
Punjab Village Dispensary	UNICEF	Dec. 1981	Slight	Yes	X	X	X			
Lahore	Lahore	July 1984	Slight	Yes						
Old Thani MCHC	Lahore	March 1984	Slight	Yes	X	X				
Sheedi Goth Dispensary	Lahore	May 1984	Slight	Yes	X	X	X			
Tando Jam RHC	WILSON	July 1985	Slight	No	Just received from DHO					
<u>NWFP</u>										
Malakand DHO	Lahore	April 1985	Heavy	Yes		X	X			
<u>West Bengal District Hospital</u>										
West Bengal District Hospital	WILSON	Dec. 1985	Slight	No				X		X
Lahore	Lahore	April 1985	Slight	Yes				X		X

* The degree of decomposition is determined by the amount of discoloration of the product.

Off White/Light Yellow = Slight decomposition
 Yellow/Light tan brown = Moderate decomposition
 Amber/dark brown = Heavy decomposition

Annex 11HOUSE TO HOUSE SURVEY

Twenty-five private homes were visited in a mixutre of rural and urban areas. None of the homes were more than 3 km from a health facility or Medical Store.

By province they were: 10 NWFP
 5 Sind
 8 Baluchistan
 2 Northern territory

The following questions were asked:

1. Do you have a child under five years of age?
2. When was the last time your child had diarrhea?
3. What did you do for the diarrhea?
4. What was recommended to you? By who?
5. Do you have ORS in the house now?
6. Where did you get ORS?
7. How did you measure the solution to mix the ORS?

Results: The sample size was very small. At most these results should be viewed as raising issues rather than offering conclusions.

1. 32% of the homes had children that were currently experiencing diarrhea. All homes had children who had diarrhea in the last year.
2. The first action taken by the mothers was to seek advise at:
 - 36% Public health care facility
 - 32% Private practitioner/clinic
 - 16% No action taken
 - 8% Medical Store
 - 8% Unqualified practitioner
3. ORS was used in 68% of the cases.
4. Other drugs were used in 76% of the cases.
5. ORS was in 24% of the homes
6. 80% of mothers in result # 3 could correctly explain how to measure one liter as follows:
 - 80% 4 glasses
 - 20% 1 kg/Liter milk measure or 4 milk bottles
 - 20% 4 tea cups

note the 3 mothers who stated 4 tea cups were all from same village. Previously the 500ml Nimkol was available in this area. Now the 1 liter packets were being used but no change in method.
7. 32% of the ORS was supplied by a public facility and 68% was purchased at Medical Stores.
8. Four of the 17 mothers that use ORS stated that the ORS from the hospitals is of poor quality compared to that at the medicine shops.

Interview questions to health care providers on USE

During field visits to health care facilities questions were posed to the health care providers to determine standards of treatment for diarrhea. The sample used for this analysis was 19 facilities in 5 provinces including RHCs, BHUs, Dispensaries, Hospitals, and MCHCs. Persons interviewed included 10 paramedicals and 9 medical officers. The questions asked are as follows:

1. Of 100 children patients under 5 years old with diarrhea/dysentery what percentage are given ORS? On the average how many packets do you give them?
2. Is the O.R.S. administered in the health facility or is it to be administered at home?
3. How do the mothers measure one liter of water?
4. The government is considering the free distribution of one liter containers with the ORS packets. What is your comment?
5. Of 100 children patients under 5 years old with diarrhea/dysentery what percentage are given or prescribed other drugs? Please list these drugs in order of prescribing preference.

Data from questions 1 and 5 were compiled and compared to data from patient registers and O.R.S. dispensing registers. Specifically the number of diarrhea/dysentery cases was compared to quantities dispensed during specified time periods.

Results: Considering sample size the following should be viewed as raising issues rather than offering conclusions.

1. Health care providers stated that they supplied ORS to 70% of children with diarrhea/dysentery Range = 20% -100%.
2. On the Average 2-liter packets are supplied to each child. Quetta facilities only supplied one 500 ml packet because supplies were small and received infrequently. Mountainous areas in the north often supplied 4-1 liter packets because people live far from the health facilities.
3. Based on registers and ledgers 70% of those persons interview supplied less than 1/2 of the O.R.S. packets they stated. For example: A Medical Officer states he issues 1 packet to all children with diarrhea/dysentery. Registers and ledgers show that in 6 months he saw 1000 children with that diagnosis and only 400 packets were dispensed during the same time period.
4. 95% of the O.R.S. packets are given to the mothers to be administered at home. Note large hospitals were not included in study.

5. Mothers measure 1 liter using the following methods in decreasing order of prevalence.
 - 4 X 250 ml glass
 - 1 X 1 kg (Liter) milk measure
 - 4 X 250ml baby bottle
 - 8 X Tea cup
 - 4 X 250ml stainless steel cup

6. In 70% of the interviewees responses to distribution of a free 1 liter container were against the idea. The most common comment was "They will not be able to supply an adequate quantity for everyone and it will cause problems of who to give them to." Other responses in decreasing order of prevalence:
 1. Transportation Problems
 2. Storage Problems
 3. They must supply 1 container with each packet
 4. Mothers do not have a problem measuring 1 liter
 5. It's a good idea
 6. Glasses do vary in size

7. On the average 80% children with diarrhea/dysentery are either given or prescribed drugs other than ORS. Only 2 of 19 prescribers stated a percentage less than 50%. The antibiotic/Kaolin Pectin combinations were the first choice for half of those interviews. Products in decreasing order of preference were:
 - Streptomagma
 - Furoxone
 - Furadil
 - Intestopan
 - Flagyl
 - Kaolin Pectin
 - Sulfa antibiotics

8. All above data did not differ significantly when grouped differentiating for Medical Officer or Paramedicals.

Annex 13

Assessment of Oral Rehydration Salt Manufacturing and Marketing in the Private Sector

- I. Assessment of Current Private Sector Involvement in Oral Rehydration Salt (ORS) Packet Production and Distribution
 - A. Identify companies currently manufacturing ORS packets in Pakistan and list the brand names used for the products.
 - B. Quantify the total yearly production of each company.
 - C. Determine the formula and packet size (1 liter or 1/2 liter) of each manufacturer.
 - D. Describe the method and extent of distribution of ORS packets of each manufacturer.
 - E. Determine to what extent the manufacturer's ORS sales are represented in public sector (government) and private sector (trade consumer, etc.) purchases.
 - F. Compare pricing structure of each of the commercially manufactured ORS products.
 - G. Describe the brand-specific and general product-promotional activities undertaken by the companies manufacturing ORS packets.
 - H. Determine the source and cost of raw materials used in ORS manufacturing, including packaging.
- II. Assessment of Existing and Potential Demand for ORS Products Distributed through Commercial Channels
 - A. Estimate demand and potential growth of demand for ORS products when distributed through existing commercial outlets handling ORS.
 - B. Estimate the same variables if other commercial outlets could be incorporated into a distribution system.
 - C. Estimate the potential for demand growth if alternative product-promotion activities were employed.
- III. Assessment of Existing Interaction of Public Production and Distribution of ORS with Private-Sector Production and Distribution
 - A. To what extent are the two systems interrelated?
 - B. How much of the total production and distribution of ORS is handled solely by the private sector.
- IV. Identification of Interventions which could Enhance the Sale and Use of ORS through Private Sector Activities.

Design of a Donor-Financed Scheme for Increasing Oral Rehydration
Salt Sales and Distribution Coverage through the Private Sector

1. Define specific actions or inputs which would increase ORS sales and distribution.
2. Determine if there are opportunities for financing of additional brand-specific ORS production-promotion and generic oral rehydration therapy promotion.
3. Determine if the companies currently manufacturing ORS could be assisted in a cooperative fashion or individually to achieve the subject goal.
4. Identify and describe a mechanism for funding the needed actions.
5. Identify appropriate organizations to implement or manage the parts of the scheme proposed and describe their responsibilities and relationships to each other.
6. Define the extent and purpose of any technical assistance required.
7. Prepare an estimated budget for the possible actions for a five-year period.

53'

COMMERCIALLY AVAILABLE PRODUCTS
USED IN DIARRHEA

<u>BRAND NAME</u>	<u>GENERIC</u>	<u>MANUFACTURER</u>	<u>RETAIL PRICE</u>
1. ANTAMIZOLE SUSPENSION	METRONIDAZOLE 200mg/10 ml DILOXANIDE FUROATE 250ml/10ml	BOOTE	18 Rps/60ml
2. ENTAMIZOLE TABLETS	METRONIDAZOLE		1.2 Rp/TAB
3. ENTAMIZOLE DOUBLE STRENGTH TABLETS			2.4 Rp/TAB
4. FUROXONE SUSP	FURAZOLIDINE 100 mg KAOLIN/PECTIN	SK +F	8 Rp/120ml
5. ENTEROX TABLETS	FURAZOLIDINE 100 mg		.2 Rp/Tab
6.	OLLIDOHYROXYGOINOLINE 650 mg/Tablet	SEARLE	.43 Rp/Tab
7. FLORAMEX	NITRAZEPAM 1000 CHLORHYDROXY QUIN Phanguone Oxyphenonium	ZAPA	.23 Rp/Tab
8. FLAGYL TAB TAB SUSPENSION	METRONIDAZOLE 200mg 400mg 200mg/5ml	M+B Pakistan	.55Rp/Tab 1Rp/Tab 15.6Rps/60ml
9. ENTERO STREP SUSP	STREPTOMYCIN DIIDOYDROXYQUIN KAOLIN		4.75 Rp/60 ml
10. KAO PECTATE	KAOLIN/PECTIN		5.65 Rp/120ml
11. KAO STREP SUSP	STREPTOMYCIN KAOLIN PECTIN ALUMINUM HYOROXIDE	LISKO	5 Rp/60ml
12. KALTIN	KAOLIN/PECTIN BELLADONA NEOMYCIN SODIUM LACTATE KCL SODIUM ACETATE	ABBOTT	7 Rps/30ml
13. KALTIN WITH NEOMYCIN			

(54)

14.	IMODIUM SUSP CAPSULE	LOPERAMIDE	JANSEN	6.5 Rp/30ml 13 Rp/Capsule
15.	INTESTOPAN TABLET	BROBENZOXADINE BROXYGUINSLINE	SANDOZ	.4 Rp/Tab
16.	INTESTOPAN FORTE			1.17Rp/Capsule
17.	LOMOTIL CAPSULE SUSPENSION	DIGHENOXYLATE	SCARLE	.25 Rp/Capsule
18.	LOMOFEN SUSPENSION	DIGHENOXYLATE FURALOLIDONE		7 Rp/
19.	METODINE SUSP	DIIDOHDORXY QUINOLINE METRONIDUZOLE	SEARLE	17.5 Rps/60ml
20.	PEKTOMYCIN	STREPTOMYCIN KAOLIN/PECTIN ALUMINUM HYDROXIDE		
21.	POLYMAGMA	POLYMYXIN B STREPTOMYCIN AHAPULGITE PECTIN ALUMINUMHYDROXIDE	WYETH	12.75 Rps/90 ml
22.	RESOL	CHLORAMPHENICOL PHTHYSULPHA + IMAZOL DIIDOHDROXYQUINOLINE KAOLIN/PECTIN		6.8 Rp/60 ml
23.	REOSOL CAPSULE			.5 Rp/Cap
24.	STREPTOMAGMA	STREPTOMYCIN KAOLIN/PECTIN ALUMINUM HYDROXIDE		10 Rps/90 ml

ORS Distribution Improvement ProgramOverview

In section VI, Analysis of constraints in the ORS supply system, a number of specific programs in the operational areas of product selection, procurement, distribution and use were identified. If these sets of problems are broken down in terms of the administrative level at which they must be solved, the following configuration emerges.

<u>Problem Area</u>	<u>Level of Re- construction</u>	<u>Nature of Reconstruction</u>
Product selection	NIH	Policy decision on product standardization
Procurement	NIH	Executive decisions on structuring contracts
Distribution	Provincial and sub-provincial	Systematic correction of deficiencies
Use	Clinical Facilities and EPI outreach teams	Training in ORT and follow up supervision

Concerning problems of selection and procurement, the management of NIH can resolve these as it sees fit, without elaborate plans or additional resources. Resolving problems of distribution and use of ORS, however, requires an outreach capacity that extends from NIH headquarters in Islamabad, through each Provincial Health Office, the respective District Health Offices, and on down to the clinical facilities and ambulatory programs that dispense ORS.

In order for NIH to resolve problems in distribution and use of ORS, in all likelihood substantial additional resources will be required. These are discussed in the following sections of this annex.

Inputs RequiredPersonnel

National ORS Supply Manager	(1)
Provincial/Territorial ORS Supply Managers	(4-6)

Equipment

1. Vehicle for each Provincial/Territorial Manager (4-6)

Training

2-Week workshop for Provincial/Territorial Manager

2-3 day workshops for District level staff in charge of the ORS supply.

Strategy

This plan is based on the following assumption:

WHILE THERE ARE THEORETICALLY MANY WAYS TO IMPROVE ORS DISTRIBUTION, SUSTAINED PROGRESS IS UNLIKELY UNLESS PEOPLE WITH ENOUGH TIME TO DO THE JOB ARE PUT IN PLACE AND MADE RESPONSIBLE. Accordingly, the following steps are proposed.

1. Hire a NIH level ORS supply Manager (Scope of Work attached as Enclosure 1)
2. Develop a 1-2 year systematic plan for overcoming distribution system deficiencies. (see Enclosure 2)
3. Hire provincial level ORS supply Manager. (Scope of Work attached as Enclosure 3).
4. Develop workshop for provincial ORS supply Manager (see Enclosure 4).
5. Carry out improvement of the ORS distribution system in accordance with the plan developed in point 2, above. Instructively, the plan could have the following elements, applicable in each province.
 - * Conduct district by district evaluation of problems
 - * Formulate prioritized list of problems to resolve
 - * Conduct short training course for District personnel responsible for ORS; course would target storage and stock control problems to resolve
 - * Monitor progress on district by district basis
 - * Implement simple ORS offtake reporting system. Monitor progress.
 - * Conduct periodic reviews of ORS utilization at clinical facilities/with outreach teams. This activity would be carried out in co-ordination with ORT training activities for clinical facility and ambulatory program staff.

Possible Need for Technical Assistance

Technical Assistance is a delicate subject. In general, substantial amounts of TA would not be required to carry out this plan. Some TA input might be useful, however, to assist NIH in developing the 1-2 year plan for upgrading the distribution system (strategy step 2) and in developing the workshop for provincial ORS supply managers (strategy step 4). TA participation in a mid term evaluation of the progress of the plan overall might also be useful.

Budget

An illustrative budget is attached as Enclosure 5.

Final Note

Pending feedback from NIH staff concerning this proposed program all of the enclosures have appended should be considered to be for ILLUSTRATIVE PURPOSE ONLY.

Enclosure 1

Scope of Work for NIH ORS Supply Manager

General

1. Assist the ORT Program Manager by developing and co-ordinating policy and procedures concerning product selection, procurement distribution and use of ORS in the public sector
2. Co-ordinate public sector ORS supply management activities with other major elements of the National ORT Program including
 - * Case Management Policy
 - * Training of Medical/Paramedical Personnel
 - * Promotion/Social Marketing of ORT and ORS
 - * Commercial Sector Distribution of ORS

Specific

1. Assure that ORS procurement strategies are in line with current Program needs
2. Develop a 1-2 year plan for overcoming problems in the distribution and use of ORS.
3. Supervise provincial and subprovincial ORS supply management in both routine operations and in carrying out the plan for improvements.
4. Develop training plans for provincial and sub-provincial staff and supervise their execution.
5. Make frequent observational/supervisory visits to all levels of the ORS supply system.

Enclosure 2

Plan for overcoming Deficiencies in the Public Sector ORS Supply System

Activities	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	1	2	3	4
1. On site review of ORS supply system problems	[Horizontal line across all columns]																							
2. Prioritize problems	[Horizontal line]																							
3. Develop Program of specific improvements in storage, transport, information recovery and use of ORS			[Horizontal line]																					
4. Develop worksno for provincial ORS Supply Manager				[Horizontal line]																				
5. Hold workshop/put Managers in place					[Horizontal line]																			
6. Provincial supply mangers survey their province and identify weak and strong district						[Horizontal line]																		
7. Develop traning course for district personnel								[Horizontal line]																
8. Hold training course									[Horizontal line]															
9. Monitor progress in improvement make on the spot corrections										[Horizontal line]														
10. Conduct ORS utilization reviews and provide result prvincial and NIH Officers											[Horizontal line]													
11. Hold mid term progress reviews and establish priorities for the remainder of the 2 year period														[Horizontal line]										

Enclosure 3

Scope of Work for Provincial ORS Supply Managers

General

1. Assure that ORS supply Management Policy and Procedure as defined by the NIH are carried out in the province.
2. In collaboration with NIH assist within the province in carrying out a program for improvement of the ORS supply system.

Specific

1. On an ongoing basis, survey the status of ORS supply management at all levels of the system.
2. Train and supervise personnel managing ORS supplies at Division, District and Facility Levels.
3. Make frequent observational/supervisory visits throughout the province.
4. Correct specific deficiencies in storage, transport, information recovery and use of ORS.
5. Make frequent reports of deficiencies noted and progress made.

Enclosure 4

Contract of Workshop for Provincial ORS Supply Managers

Note: The workshop would last 2 weeks with the second week being taken up by observation tours to various levels of the ORS supply system to become familiar with various problems .

1st. Week

1. Overview of CDD/EPI Programs
2. Review of ORS Supply System with respect to selection, Procurement Distribution and Use
3. Presentation of the basic objective of pipeline management: How to move substantial amounts of ORS in a timely fashion down through the system to the end user
4. Estimating ORS supply needs; with special attention to the information that must be supplied by the supply system
5. Problems of storage: Adequacy of Storage space, stock rotation, product deterioration, appropriate stock levels
6. Transport
7. Stock Control and Information Requirements
8. Monitoring compliance with case treatment policy. Reviewing drug utilization for treatment of diarrhoea.

2nd Week

Site visits by the group to all levels of the ORS supply system in 2 different Provinces.

Enclosure 5

Illustrative Budget

Note: This budget assumes that no resources are now in place for carrying out this program. Resources which might, in fact, be available can be subtracted from the bottom line shown here.

1.	<u>Personnel</u>		<u>(\$)U.S.</u>
	NIH ORS supply Manager, 1 person @ \$/month x 24		10,000
	Provincial ORS Supply Manager, 4 persons @ \$/month x 24		7,100
		Subtotal	17,100
2.	<u>Vehicles</u>		
	5 all terrain vehicles @ \$15,000 each \$75,000		
		Subtotal	75,000
3.	<u>Operating Expenses</u>		
	<u>Per Diems</u>		
	5 persons x 12 days/month x \$ 11.83/day x 24		17,000
	<u>Gasoline</u>		
	400 liters/month x 5 vehicles x 24		21,700
	<u>Air Fares</u>		
	NIH Manager: 1 Airfare/month x \$ 65 x 24		1,560
	Provincial Manager: 2 Airfares/years x \$ 66 x 2		130
		Subtotal	40,390

4. Training Cost

Costs of training Provincial
ORS supply managers would
be subsumed under their salaries
and per diems

For district personnel, assume that
altogether 6 training courses each lasting
2-3 days must be conducted at on average
cost of \$ 650course.

\$ 15,600

Subtotal \$ 15,600

TOTAL: \$ 148,090

Technical Assistance

Note: TA is estimated at an average cost of \$ 15,000/month including salary, overhead, international airfare and per diem.

1.	Assist in development of ORS Supply System improvement plan	
	1 month	\$15,000
2.	Assist in development and presentation workshop for ORS supply managers*	
	2 months	\$30,000
3.	Participate in mid term progress review	
	1 month	\$15,000
	Total:	\$60,000

* It is assumed that NIH and Provincial staff will develop training course for district personnel out of materials prepared for this workshop. Local training specialist probably required.