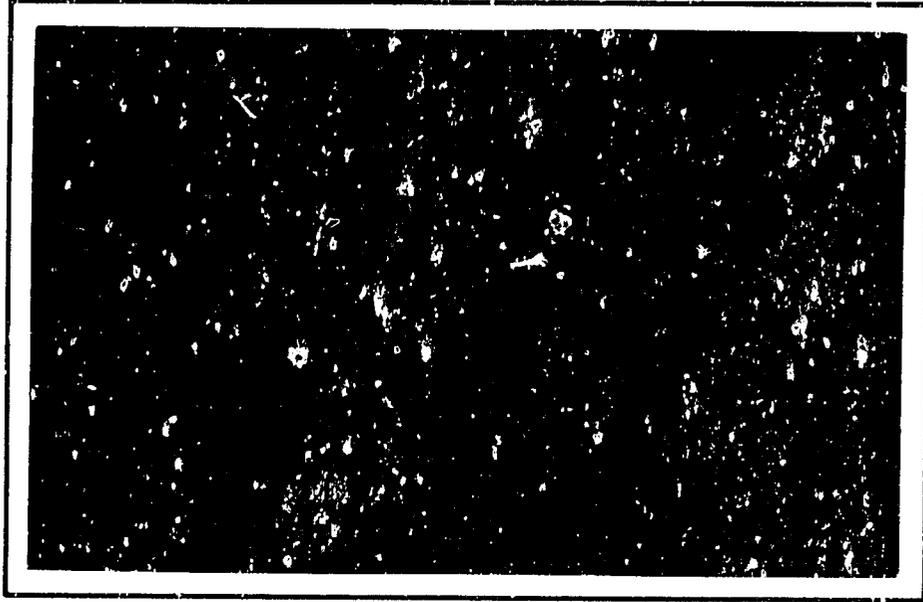


PA - HIGH 50%
PA 51011



PRITECH

Technologies for Primary Health Care

Management Sciences for Health
1655 North Fort Myer Drive, Suite 700
Arlington, Virginia 22209

PN-ABA-508

WMC-57374

SUPPLY OF ORAL REHYDRATION SALTS SACHETS
FOR THE
BANGLADESH SOCIAL MARKETING PROJECT

A Report Prepared By PRITECH Consultant:
STEVEN J. FABRICANT

During The Period:
DECEMBER, 1987

TECHNOLOGIES FOR PRIMARY HEALTH CARE (PRITECH) PROJECT
Supported By The:
U.S. Agency For International Development
AID/DPF-5927-C-00-3083-00

AUTHORIZATION:
AID/S&T/HEA: 4/6/88
ASSGN. NO: DC 370

A. INTRODUCTION, SUMMARY, AND RECOMMENDATIONS

To fill a recognized gap in the availability of oral rehydration salts in Bangladesh, USAID and the Bangladesh Contraceptive Social Marketing Project (SMP) have launched a program for promoting and selling a high-quality, WHO-formula ORS product through retail outlets. The underlying assumption of this project is that by informing rural practitioners of the benefits of ORT, making high-quality packaged ORS widely available at moderate cost through drugstores and other commercial channels, and by instructing consumers in correct use, major constraints to the effective treatment of life-threatening diarrheal episodes among children and infants will be removed. Prior to the project packaged ORS had only been available through free distribution at government health facilities or through pharmacies in limited quantities and geographic coverage. A significant number of households were also using home-prepared ORT (lobongur sarbat or LGS), but a recent evaluation of that program, which relies on face-to-face teaching of the method with decreasing contacts over time, suggested that usage dropped off precipitously after an initial period.

Drugs legislation by the Bangladesh Government in 1985 ruled out the possibility of importation of manufactured ORS sachets, as originally planned by SMP. A feasibility study by a local consulting firm was commissioned by SMP which established the technical and financial feasibility of a production facility with a maximum capacity of 15 million half-liter sachets per year. This production level was based on an earlier market study that assumed that SMP could fill part of a demand gap for 500-ml sachets estimated to be 50 million per year.¹ A PRITECH consultancy in January-February 1986² that reviewed the advisability of establishing such a facility recommended in effect that the decision to do so be postponed until: 1) a history of sales at the approved retail price through the the planned SMP channels could be established and 2) all likely alternative sources of local supply could be tried. The report also questioned several technical recommendations in the feasibility study concerning the plant design and choice of production equipment and, for financial reasons, strongly recommended that the project be reformulated so the ORS production unit would be part of a SMP multi-purpose facility.

The present consultancy was requested by SMP and USAID/B to re-examine the need and advisability of establishing an ORS production facility in the light of nearly two years experience with local

¹ Draft Proposal For The Purchase Of Land For SMP. (SMP, 1985 by Anwar Ali)

² Production and Distribution of ORS in Bangladesh: An Assessment of the Design and Implementation of the ORT Component of the Social Marketing Project. S.J. Fabricant. PRITECH Assgn. No. SS 115.

procurement, distribution, and sales of ORSaline brand of ORS by SMP. USAID/B has also expressed concern about the high costs of supporting the sales program, and the possible effects of emphasizing promotional efforts for selling ORSaline, rather than the generic promotion of oral therapy on the overall mortality-reduction objective. (Dr. Robert Northrup of PRITECH was scheduled to visit Dhaka at the same time to look at issues related to the promotional messages used and their prospective effect on the overall effective usage of ORT but has postponed his visit due to the current disturbances.)

Although this consultant's ability to gather information and discuss these issues with concerned parties has been limited by the present situation, the record established by SMP and other participants in the effort to promote the use of ORT in Bangladesh in the past two years lead to some fairly clear conclusions. In summary:

1. By even conservative criteria, SMP has established that it will be capable of achieving its sales target of 12 million sachets of ORSaline in FY89 and, given the financial resources to support expansion of its field sales efforts and adequate product inventories, of going on to reach the targets now proposed of 16 million in FY90, 20 million in FY91, and 24 million in FY92. Inasmuch as the maximum capacity through scheduled expansion of the present sources of supply cannot exceed 10 to 14 million sachets per year, a SMP production facility that will come on line in FY90 may be needed. While SMP continues to press for having its own ORSaline production to guarantee reliability of supply, some appreciation of the problems of ORS manufacture has now been experienced, and there is at least some degree of willingness to consider alternatives for reliable supply. USAID/B continues to have concerns that these high targets are unrealistic both in terms of the reliability of supply if this level of demand is generated, and the ability of a marketing program to promote large-scale correct use while not diluting its contraceptive marketing efforts.
2. There is little doubt that this increase in sales will have a direct effect on availability of ORS in the rural areas, and that the media-based and medical-detailing promotional campaigns will reinforce its correct use. An evaluation plan now under development will assure that the impact on ORT usage and on mortality of these twin measures will be measured. (In theory, there could also be an interaction with the distribution of free ORS packets by NORP, but the effects would be very difficult to predict since either a greater or lesser demand for the free packets could result from SMP ORSaline sales.)
3. Since SMP media messages about ORT and ORSaline are likely to be the most pervasive and effective in Bangladesh for years to come, the particular messages that will be employed for both brand and generic ORT promotion will have a very significant effect not only on ORSaline sales but on the overall successful use of ORT in treating and preventing cases of dehydration.

SMP staff has grasped the complexity of this problem and has been attempting to rationalize the messages to maximize effective ORT use. Media messages are pretested, but it may be advisable to develop an operational definition of maximized ORT usage and implement a mechanism for continuously evaluating the promotional efforts so they can be "fine-tuned" to achieve optimum results in terms of successful treatment rather than ORSaline sales. Nothing in the current SMP marketing plan suggests that ORSaline sales are to take precedence over effective ORT promotion, but at the moment there is no clear strategy for achieving the latter.

4. There are two cost-effectiveness issues which bear further study. Using the draft project budget projections, the costs of selling a sachet of ORSaline come down steeply from high levels by FY89, when 12 million sachets will be sold. As sales increase to 16 million and 20 million, the unit selling costs decrease further but at a slower rate. If there were any reason to believe 12 million represented some sort of "effectiveness-saturation" point, i.e., that the effective use of ORSaline started to decrease at this point, the argument could be made that the program would lose overall cost-effectiveness in spite of the sales cost per sachet continuing to decrease. However, there is no a priori reason to expect this, and proper evaluations will be necessary if a case is to be made to limit the project to this particular level.

ORSaline production is the other cost-effectiveness issue. If it is decided to proceed beyond FY89 with sales targets greater than 12 million, and further analysis of the present or potential additional external manufacturers of ORSaline fail to suggest conclusively that supplies can be guaranteed at reasonable cost, it will require very careful planning to guarantee that SMP's own facility will be as efficient as present sources. A techno-financial feasibility study has predicted production costs somewhat higher than those now being paid to current suppliers. It is likely that that study contained significant errors that would make actual costs still higher.

Recommendations:

1. SMP and USAID/B should agree quickly on an ORT budget through FY91 and set sales targets on this basis.
2. The necessary permissions should be obtained to purchase land to build the planned multi-purpose ORS/contraceptive stores/packing/production facility. Engineering plans should include a space of approximately 5,000 square feet that can be used for ORS production and quality control, and allow for storage of bulk materials and finished ORS in the storage areas planned

for contraceptives. This space would not be available for use until FY90.

3. If the USAID resources available permit sales beyond the 12 million level, a brief study should be carried out to reexamine possibilities for expansion of production capacity at EDCO, GPL, or other private sector manufacturers that could, in combination, supply SMP with the required amounts—possibly as much as 24 million sachets of ORSaline per year. Estimates of the cost of this expansion should be made.
 4. If the conclusions from the above studies continue to favor establishing the SMP production facility, a new financial analysis should be undertaken. The approach to this should be the minimization of investment and production costs. This and the above study can be carried out concurrently.
 5. If the conclusion from studies recommended in items 3. and 4. above is conclusively that SMP production is necessary and cost-effective, production equipment should be specified and ordered in FY89 so production can commence in FY90.
 6. Outside advice on the direction of the promotional campaign is essential, if for no other reason than to provide some reassurance that rural villagers do respond in certain ways to certain ORT messages. It would be particularly useful for USAID and SMP dialogue with people who have had direct experience with the NCDDP project in Egypt, where there is some commonality in rural belief systems and where commercial sales of ORS plays a major role.
 7. A monitoring/feedback system to assure that the ORSaline/ORT promotional messages are reaching the target community and are having the desired behavioral effect is being considered by SMP. Additional resources may be needed to implement this essential component.
- B. PROMOTIONAL MESSAGES AND THEIR EFFECT ON PRESENT ESTIMATES OF DEMAND FOR ORSALINE (SMP BRAND ORS)

The theoretical need in Bangladesh for oral therapy in all its possible forms is immense. The basic statistics of an under-five population of 20 million with an incidence of six "diarrheal episodes"³ per year and a requirement of one to two liters per episode suggest a possible need of 200 million liters per year⁴.

³ According to a 1987 WHO/UNICEF review in preparation of a national CDD program plan.

⁴ Such an estimate was made in an early survey of the market for ORS prepared for SMP by TESCON.

Adding the acknowledged requirement for older children and adults due to frequent epidemics of diarrheal disease could double this figure.

This is not a reasonable approach to determine the ORS requirements of the country. The estimates upon which the size of the potential commercial market are based assume that only 10% of diarrheal episodes place the child in danger of dehydration and that oral therapy involving electrolyte replacement will be required only in these cases. This would lower the ORT/ORS potential demand to approximately 40 million (half-liter) sachets for under-fives, perhaps 80 million for the entire population.

This is a good rationale for planning ORS requirements for a program based on prescribing at fixed clinical facilities, in that it relies on the accurate assessment of diarrheal symptoms and on the patient's condition. To the extent that rural patients are seen by trained practitioners, it will still be valid but may be inaccurate for the type of commercial sales program also planned here. In this case, the demand for marketed ORS will clearly not only depend on how effective the media messages are in motivating specific target groups to purchase ORSaline but also on the information conveyed about when ORS should be used.

At present there is some conflict in the messages projected to professionals as well as to the public: On one hand, some of the SMP-sponsored radio messages recommend that ORSaline (or lobon-gur sarbat [LGS]) be administered at the first loose movement to prevent dehydration, whereas the ICDDR,B protocol suggests that the child is at risk of dehydration and should be given ORT when it has diarrhea, explicitly defined as frequent loose or watery movements.⁵ A recent study commissioned by SMP has confirmed that villagers do recognize several distinct types of diarrhea in children, and that only those associated with watery stools or bloody, mucousy stools are considered to be life-threatening.⁶ The approach now being taken by SMP to the design of mass media messages is to educate the listener about dehydration and which types of diarrhea may lead to it, and how to use ORSaline or LGS to prevent it. (This is similar to the media component of the national campaign of Egypt.)

From the point of view of estimating demand for ORS to be used in the community, there is ample evidence that acute watery diarrheas account for a very high proportion of child mortality, but there is no consistent data (except for one study that suggests that these comprise 31% of all episodes) that indicates the proportion of

⁵ Manual on Treatment and Prevention of Diarrhea. ICDDR,B (1984)

⁶ Report on Qualitative Study on Oral Rehydration Therapy. Research Services Ltd., Dhaka (June 1987)

diarrheal cases that are of this type.⁷ Uncertainty at this level results in an extremely wide range of estimates of demand for ORS. Using a figure of 30% for diarrheas that may require immediate treatment with ORT yields a requirement of 60 million liters per year for children under five, rather than 20 million liters.

A further degree of uncertainty associated with estimates of community-based demand is whether or not the treatment-protocol message advises mothers to continue normal feeding and to give plenty of home fluids during all diarrheas, as recommended by WHO in its Treatment Manual, and reserving ORS for the more serious episodes. An argument in favor of this approach is based on several studies done in Bangladesh suggesting that when ORS is given routinely at home, often too little is actually administered to be useful if the child is more than mildly dehydrated.⁸ This factor has not yet been incorporated into the SMP media messages, but the staff is aware of its implications. If it can be successfully conveyed through the promotional message for community ORS use, it would have the net effect of reducing the demand for packaged ORS.

The point of this discussion is to show that the need and demand for packaged ORS can be highly sensitive to the promotional messages used, especially those which target the community or home users. While the sales targets for the first two years of the SMP program are based on the more predictable level of sales through drugstores and medical practitioners, sales projections for later years are based on an increasingly greater proportion of sales through outlets in villages where medical advice is assumed to be unavailable or unsought and, therefore, more subject to the nature of the mass media campaign. However, as difficult as it is to accurately forecast sales, given the modest market-share targets in the SMP marketing plan⁹ and the relative success in marketing contraceptives that SMP has had using similar strategies, the projected requirements for ORS sachets appear reasonable.

A further point is that an opportunity may exist for maximizing effective ORT usage by "fine-tuning" the media message. For the community as a whole, suboptimum treatment may result from (among

⁷ The Chandpur surveillance study and the findings of a 1986 UNICEF/GOB/WHO joint review team are cited by P. Osinski in a draft proposal for an evaluation strategy for the SMP ORT project (9/16/86).

⁸ Comments by Dr. R. Northrup on a January, 1987 paper in Lancet by B. Stanton, M. Rowland, and J. Clements. PRITECH Technical Literature Update (July 1987).

⁹ Increasing from sales of 3.5 million half-liter sachets in FY87 to 20 million sachets in FY91, represents 25.3% of all packaged ORS distributed.

other factors) 1) giving only food and home-available fluids after dehydration has advanced, 2) giving too little ORS to prevent dehydration because of limited purchasing power and too-frequent reliance on packaged ORS, 3) giving only ORS in cases of nonwatery and chronic diarrheas, 4) insufficient nutritional supplementation, and 5) incorrect preparation of ORS/LGS. It may be possible to relate all these errors to the messages conveyed. Even though promotional messages are being pre-tested, it is important to have a feedback mechanism in place (apart from the periodic three-tier evaluation scheme) that samples both the perception of and the behavior due to these messages in communities, and measures these effects specifically for this purpose so different aspects of the messages can be emphasized.

C. ORS SUPPLY SITUATION - FY87 THROUGH FY89

During 1986 SMP signed contracts for purchasing ORSsaline with both Essential Drug Company (EDCO), a parastatal that primarily supplies the public sector health facilities, and Gonashathya Pharmaceuticals, Ltd. (GPL), a private enterprise established specifically to provide low-cost, high-quality essential drugs. Both these companies had been producing WHO-formula ORS for several years and agreed, (with some reluctance, for different reasons) to supply SMP with ORSsaline. To date, EDCO has fulfilled contracts for 1 million and 2 million sachets. GPL has recently completed their first contract for 2 million and is starting production on the next 1 million of 3 million sachets.

Both of these producers have been behind schedule with their deliveries, causing much consternation and inconvenience to SMP. Demand from SMP outlets and stockists exceeded supplies on hand much of the time. Although both suppliers started to catch up toward mid-1987, the greatly increased demand due to the floods this fall depleted the inventory on hand.

Both suppliers have presented legitimate explanations for all of the delays. With the possible exception of a period during which GPL used its limited capacity to produce its own brand rather than ORSsaline, all the delays experienced so far have been the result of unavoidable circumstances rather than deliberate acts or incompetence. In the case of EDCO, the delays have been very minor and resulted from late arrival of ordered foil and delayed opening of the second production facility at Bogra. In the case of GPL, the major problem was due to a new machine intended for their own brand not achieving its specified production rate, and unforeseen incompatibility between the ORSsaline smooth foil and a new packaging machine intended to be used with it. Production schedules at both firms were also disrupted by unexpected increased demand for their own ORS.

Seen from the perspective of a marketing firm in need of product, this represents poor performance regardless of the reasons.

However, these problems could have arisen in any pharmaceutical facility trying to expand production and change packaging material. It is very much to the credit of both firms that they have apparently solved the problems for the moment, have managed to supply a very high-quality product at a low price, and consider the experience successful enough to entertain prospects of further contracts. Both firms believe that SMP's promotional efforts have been beneficial for them and the nation by boosting consumption of all ORS products.

EDCO has a combined capacity of approximately 8 million sachets per year already installed and supplies 6 million to the BDG. SMP has already signed an agreement with EDCO to provide an interest-free loan for the purchase of a second filling machine for the Dhaka plant which will be used exclusively for ORS_{saline}. This machine (Klockner-Wolkogon) has already been shipped from Germany and will provide a capacity of 5 million per year, with the possibility of extra production during the dry season. In serious emergencies, the 2 million spare capacity that now exists would probably be used to supply the government but could also be conceivably scheduled for SMP production under normal conditions.

GPL now has two Siebler machines with a total capacity of approximately 7 million per year and a third (Indian) machine that is currently not being used because it works only with a paper-foil laminate. The only machine that is suitable for ORS_{saline} production has a capacity of 4 million per year. They estimate a maximum market for their own ORS at 5 million per year. One option for increasing ORS_{saline} production is for GPL to order paper-foil for their own half-liter ORS and use the Indian machine at a rate of 3 million per year, thereby freeing some capacity for ORS_{saline} from the original two (somewhat troublesome) machines. However, GPL's General Manager has expressed willingness to return the Indian machine, use the other two machines for the GPL ORS, and to purchase a new filling machine which would be used for ORS_{saline} 50% of the time. GPL would do this if SMP offers a long-term (3 years was mentioned) contract for 5 million sachets per year and could have the new machine installed and operating by June 1988. This new capacity would be expandable, if needed, to 6 million per year by working a second shift.

Thus, the potential exists for expanding ORS_{saline} supplies using dedicated machines from established local manufacturers to an annual level of at least 10 million and potentially 14 million sachets per year on a regular basis. This will be sufficient to fill the SMP marketing pipeline through FY89. Referring to Table 1, "Installed ORS Production Capacity Capable of Supplying SMP," it can be seen that the SMP Sales Targets (bottom row) fall between the minimum and maximum installed capacity until the second half of FY89. The assumptions on which this projection is based are: 1) The new machine at EDCO/Dhaka is in full production by March 1988, and 2) a

Table 1

INSTALLED ORS PRODUCTION CAPACITY CAPABLE OF SUPPLYING SMP In Millions per Year - 500ml. sachets
--

	FY87/2	FY88/1	FY88/2	FY89/1	FY89/2	FY90/1	FY90/2	FY91/1	FY91/2	FY92/1	FY92/2	Totals
<u>Essential Drug</u> - Minimum	2.0	2.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	27.0
- Maximum	2.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	32.0
<u>G.P.L.</u> - Minimum	3.0	3.0	3.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	26.0
- Maximum	4.0	4.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	32.0
<u>SMP In-House</u> - Minimum						3.0	5.0	8.0	10.0	10.0	10.0	25.0
- Maximum						4.0	8.0	12.0	16.0	16.0	16.0	40.0
<u>Totals</u> - Minimum	5.0	5.0	8.0	10.0	10.0	13.0	15.0	18.0	20.0	20.0	20.0	78.0
- Maximum	6.0	8.0	10.0	12.0	12.0	16.0	20.0	24.0	28.0	28.0	28.0	104.0
<u>Sales Targets (Total FY)</u>	3.5		8.0		12.0		16.0		20.0		24.0	83.5
<u>Percent Total ORS Demand</u> (Estimated at 100 million liters)	1.8%		4.0%		6.0%		8.0%		10.0%		12.0%	
<u>Percent of Commercial Mkt</u> (Estimated at 50 million liters)	3.5%		8.0%		12.0%		16.0%		20.0%		24.0%	

new, high-capacity machine for half-time production of ORSaline can be put into full operation at GPL by September 1988.

As a matter of strategy, it is highly advisable for a buffer stock of sachets to be built up as soon as possible. This may be done most conveniently by placing an additional order with EDCO to commence as soon as the new machine is in operation—by working an extra shift during the dry season. It should be possible to produce an extra 1 million to 2 million sachets during this period. This could also be repeated (by GPL as well) during the first half of FY89, the last period in which minimum installed capacity will probably exceed demand.

In order for the provisional sales targets beyond the first half of FY89 to be met, it appears likely that SMP will need additional production capacity. Barring an unexpected willingness on the part of EDCO or GPL to further expand capacity for ORSaline, the only alternatives are other local firms with existing capacity and importation. The factors mitigating against the former choice are that none of the other firms that now produce ORS has demonstrated a consistent interest in the product, none have significant excess capacity, and none are known to have good quality control facilities.¹⁰ Perhaps equally dissuasive is the added complication of contracting and working with a third and perhaps even a fourth company.

Since UNICEF has recently started to supply ORS sachets of other than the standard one-liter size at reasonable cost, and since USAID may be able to do the same by the end of 1988 through central procurement, the importation option would be very attractive were it not for the opposition to this by the BDG. An accommodation might be found whereby USAID could procure ORSaline to be donated to SMP, with appropriate budget adjustments. This might be tried on a "one-shot" basis if no other way of building up a sizable buffer stock were feasible, but it is basically not a measure that is conducive to development of self-sufficiency.

D. FY90-FY92: SMP ORS PRODUCTION? A NEED FOR COST ANALYSIS

It has been fairly well established that it is technically feasible for SMP to establish and operate an ORS production facility. The feasibility study¹¹ prepared in 1985 suggests that the project would

¹⁰ This had been explored by SMP staff and documented in the TESCON Market Report. Circumstances did not allow these assertions to be verified, but this should be done in a followup consultancy.

¹¹ Oral Rehydration Salt Manufacturing Plant - Techno Financial Feasibility Study. By: Technical Services and Consultants Ltd. (Dhaka)

also be financially feasible in that it yields a positive Internal Rate of Return (IRR) over the first 15 years of the project.

The financial analysis made by TESCON was not carefully examined during the previous consultancy. This time enough of it was read carefully to say that it contains some significant flaws and should be redone before any decision to proceed is taken. The following points should be considered:

1. The sales revenues and selling expenses used in the financial analysis were based on the assumption of a sales/distribution system that is quite different from that actually used by SMP. In addition, the sales revenues were based on retail selling prices and discounts that are now out of date. These two points, in fact, make the notion of calculated IRR and break-even points almost irrelevant in the actual context.
2. The basic criterion for a decision should rather be whether the cost of production at the proposed facility will be the same or lower than the present ex-factory prices now available to SMP from GPL and EDCO. Referring to Table 2 (from an internal SMP report), "EX-SMP ORSaline COST COMPARISON Per Sachet", the actual price now paid for the finished, packaged ORSaline¹² is Tk.1.19 from EDCO, and Tk.1.25 from GPL.
3. TESCON projected the unit cost of production, operating at 80% of maximum capacity (12 million sachets per year), to be Tk.1.747. Deducting selling expenses (which had been added in as an administrative overhead) results in a production cost of Tk.1.255.
4. The TESCON financial analysis indicates that the initial capital investment will be recovered over the 15-year life of the project but does not consider the interest that is foregone by the investors or paid to a lending institution. A realistic analysis would include interest payments as a cash expense. Even if the interest rate were as low as 15%, the planned initial investment of Tk.33 million would add a substantial Tk.0.41 per sachet to the production cost at the assumed yearly output of 12 million. It is not known to what degree, if any, this factor is calculated into the prices charged by GPL and EDCO. Most likely, the total investment in the plant is amortized over the entire product range so when a new production line is added, less than the true cost of the

¹² The true ex-factory price is taken as the sum of lines 1, 3, 4, 5, 6, and 7. This eliminates: the excise duty since it is paid after production, the package insert because it is supplied by SMP and was not considered in the TESCON study, and the external quality control test since it is actually redundant (the price of factory quality control is built into the ex-factory price).

EX-SMP ORSaline COST COMPARISON

Table 2

Per Sachet (1988)

Sl. No.	Items	EDCL	GPL
1.	Receipt in SMP W/H	1.0000	1.2500
2.	Excise Duty (10% of M.R.P.)	0.2300	0.2300
3.	Dispenser (2.33)	0.1163	nil
4.	Shipping Carton (13.76)	0.0344	nil
5.	Labour	0.0400	nil
6.	Gummed Tape	0.0005	nil
7.	5 label on shipping carton (0.47)	0.0013	nil
8.	Each package insert (0.26)	0.26	0.26
9.	Quality Control test (Tk. 1500 per batch of 8000 sachets)	0.1875	0.1875
T O T A L :		1.87	1.9275

Per Sachet Procurement Cost vs Realisation Analysis
at MRP: Tk. 2.25

	<u>EDCL</u>	<u>GPL</u>
Cost at source	: 1.00	1.25
Cost ex-SMP	: 1.87	1.9275
(a) SMP price to stockist (20% discount)	: 1.80	1.80
Cost realisation (-)	: -0.07	-0.1275
(b) SMP price to retailer (15% discount)	: 1.9125	1.9125
Cost realisation (+-)	: +0.0425	-0.015

Note: The cost does not include promotional, selling, advertisement, school training programme, pharmacist training or administrative cost.

MAAn:mya.
01.11.87

incremental investment is reflected in the selling price of the new product.

5. The raw material prices shown in the feasibility study are comparable to those available from UNIPAC (often regarded as the benchmark for ORS materials). In the case of sodium chloride and the foil, prices are considerably lower. The price of packaging foil from Korean suppliers is half the price paid by UNICEF for European manufacture. In the case of sodium citrate, UNIPAC prices are about 15% lower, suggesting some potential saving for ORS saline. All materials costs need to be rechecked. Particular effort should be made to forecast the future price of the Korean foil since they seem to have a near-monopoly in Bangladesh and have not raised prices. There is the option of using a foil with a thinner aluminum lower to counteract a price increase for the specified foil.
6. A rather serious error was made in the TESCON study: The costs of cartons and tapes listed on page 44 was dropped from the "packing material" line item on page 64 (Table 3) resulting in an actual cost increase of Tk.0.115. The existence of errors of this nature emphasizes that the financial analysis must be re-done.
7. The TESCON plans call for a free-standing production facility for producing a single, low-value product in only modest quantities. This does not augur well for production efficiencies. Staffing and salaries proposed also seemed high. A breakdown of production costs (excluding selling costs) of this project should be compared with two similar projects.

Comparison of Production Costs of 3 Projects

Cost Category	<u>SMP ORS Project</u> ¹³	<u>Condom Production</u> ¹⁴	<u>O.C. Production</u> ¹⁵
Direct Materials	49.6%	62.8%	67.6%
Direct Labor	18.7	4.8	3.0
Other Direct Costs	5.6	6.7	8.1
Depreciation	15.4	18.3	9.6
Repair & Maintenance	2.6	1.9	7.9
Overhead Costs:			
Salaries	6.8	0.4	0.8
Other Administrative	1.4	5.2	3.0
Total Production Cost	100.1%	100.1%	100.0%

¹³ TESCON Feasibility Study, 1985 (80% capacity)

¹⁴ PIACT Feasibility Study, 1982 (50% capacity)

¹⁵ PIACT Feasibility Study, 1982 (15 million cycles/yr)

Table - 5

ORS (SODI-CITRATE)

PER UNIT PRODUCTION COST ANALYSIS

Manufacturing cost	Per sachet Taka	Cost (Average) cumulative	(%)	
o Direct Material	0.375	0.376	21.5	
o Packing Material	0.247	0.623	14.1	
o Direct labor	0.234	0.857	13.4	49%
o Factory over-head				
- Power & fuel	0.023	0.880	1.3	
- Stores & spares	0.014	0.894	0.8	
- Repairs & Maintenance	0.033	0.927	1.9	
- Rent, tax and insurance.	0.025	0.952	1.4	
- Depreciation	0.193	1.145	11.0	
- Miscellaneous	0.008	1.153	0.5	16.9%
o Administrative over-heads.				
- Administrative salary	0.085	1.238	4.9	
- General expenses	0.017	1.255	1.0	
- Selling expenses	0.492	1.747	28.2	34.1%
Total:-	1.747	-	100.0	100%
	=====	=====	=====	=====

Source: TESCON estimates as detailed in the relevant annexures.

Note: The above unit cost calculations are based on sodi-citrate used ORS sachets at 80% capacity utilisation. The work-in-process, being negligible, has been ignored. The average cost has been computed by dividing the total costs by the number of units produced during the year.

The above comparison suggests that labor and administrative costs would be much higher than those estimated for similar projects. EDCO has supplied the following information on their ORSaline production costs, which also provides an insight into standard cost accounting practices in the pharmaceutical industry:

EDCO ORSaline Production Cost Accounting

<u>Category</u>	<u>Cost per 100,000 sachets in Taka</u>	
Raw materials	35,039.93	
Packaging Materials	36,049.62	
Total Materials Cost	71,089.55	
<u>Direct Labor @ 2.97% of Materials</u>	<u>2,111.36</u>	
Prime Cost		73,190.91
Factory Overhead @ 7.10% of Prime Cost		5,196.55
<u>Administrative Overhead @ 15.30% of Prime Cost</u>		<u>11,198.20</u>
Total Cost of Production		89,585.66
<u>Profit @ 15% of Production Cost</u>		<u>13,437.85</u>
Selling Cost Ex-Factory		103,023.51

It is revealing to compare these costs (which are allocated according to a standard formula and based on materials cost rather than being true costs) with the projected costs in the TESCON study. The category Factory Overhead includes "Other Direct Costs" and "Repair & Maintenance" from the three-project comparison, and the category Administrative Overhead includes "Depreciation," "Salaries," and "Other Administrative":

EDCO ORSaline Production Costs vs. Projected SMP
Costs as Percentage of Total Production Costs

	<u>TESCON/SMP</u>	<u>EDCO</u>
Total Materials	49.6%	79.3%
Direct Labor	18.7	2.4
Factory Overhead	8.2	5.8
Administrative Overhead	23.6	12.5
Total	100.1%	100.0%

- It should be possible to lower the depreciation cost component (and the implicit interest cost) by reducing of the investment in equipment. If USAID is funding the equipment purchases, the possibility of using some U.S.-made equipment in place of European should be considered due to the present low dollar exchange rate. The TESCON study specifies one semi-automatic

machine and one fully automatic, but a detailed analysis of the initial and ongoing costs of various combinations of both types would be worthwhile. (Such a variety of filling machines is now in place in Bangladesh that there is no strong case for purchasing one brand or another in order to standardize.) The estimated cost of the quality control lab equipment is also elevated: a full complement of lab equipment was furnished by Project SUPPORT to an ORS plant in Ghana for \$18,000 rather than the \$40,000 in the study. There is no need for a Vee-type mixer (\$25,000), a single tray drier (\$17,000) would suffice rather than two, the expensive Fitzmill specified is probably not the best tool for the job, and there is no need for an air curtain (\$10,000). In short, the equipment list deserves a complete review.

Similarly, the building design can be modified to reduce costs as it will become a part of a larger stores-cum-packing building and can share some facilities, the expensive electrical installation, etc. with the other parts of the complex. The integrated nature of this facility, which may be built on land in Mirpur, offers the possibility of reducing administrative costs by shared responsibility for such tasks as procurement, accounting, and personnel. However, the potential for doing this is limited by the fact that SMP will be building new administrative offices in a different location.

9. In summary, the entire project should be redesigned, using the integrated physical plant as a starting point, the different nature of the SMP sales/distribution organization as a guide for revenue forecasting, and the present ORSAlone costs as a target for the design of the production operations.

E. SMP'S COST OF SELLING ORSALINE

An analysis of the selling costs for ORSAlone has been derived from the draft PSI/SMP Financial Plan - Budget (Table 4). As can be seen from the worksheet (Table 5) and graphs (Figure 1), total selling costs for ORSAlone reach a maximum level of \$2.7 million for FY88, drop in the following year, and rise again to a level of \$2.4 million by FY91.

On a unit cost basis, the cost of selling a single sachet drops to approximately US\$0.12 by FY91. If the average number of sachets used per episode of diarrhea is 2.5, the cost of sales per episode treated with ORSAlone will be about US\$0.30.

Looking at the graph (Figure 2), Cost of Sales Per Sachet (\$US), it can be seen that sales costs start leveling off to a reasonable unit cost by FY89, i.e., by that time sales cost is a modest multiple of product cost and equivalent to 60 cents per case of diarrhea treated. (Note: it would be informative to compare the sales cost per contraceptive distributed with the cost for ORS.)

The increase in Total Cost Of Sales after FY 90 seen in the upper graph is due mostly to a large increase in the research budget. It is not clear if this is for project evaluation, but if it is something of this nature, it would be fair to eliminate it from the cost of sales.

Since the SMP ORT budget will have to be revised to fit the resources available from USAID, a recalculation of the cost of sales was made based on lower costs and extending the projection to FY92. It would not be unreasonable to expect the cost per sachet to drop to the US\$0.10 cent level by FY91, and if the program continues to FY92 with a sales target is 24 million, the cost per sachet would drop to around US\$0.08.

When the cost of selling the product is so high relative to the actual cost of the product (Tk. 2.25 equals US\$0.07), one may well ask why it is so important to keep careful control over production costs. The only answer in this case is that there was an agreement with the BDG at the outset of the project that the actual retail cost of ORSaline would not be subsidized in any way. The Realisation Analysis at the bottom of Table 2, "EX-SMP ORSaline COST COMPARISON," indicates that at the established Maximum Retail Price of Tk.2.25 and with a total of 35% in discounts (profits) in the distribution chain, any production cost increase over the present ones will result in SMP in effect subsidizing this price.

Table 4

OFFSHORE SELLING EXPENSES - Total of FSI and SMP Budgets (\$US)									
FSI/SMP Budget Line Items	01/07/95 to						TOTAL ALL YRS		
	00/09/86	FY 87	FY 88	FY 89	FY 90	FY 91			
1. Salaries	\$100,360	\$348,000	\$421,500	\$457,400	\$500,000	\$546,500	\$2,374,360	19.5%	
2. Consultants		\$6,000	\$7,000	\$7,000	\$8,000	\$8,000	\$36,000	0.3%	
3. Fringe Benefits	\$8,350	\$11,000	\$13,000	\$14,000	\$15,000	\$16,000	\$77,350	0.6%	
4. Overhead	\$78,550	\$93,000	\$103,000	\$111,000	\$119,000	\$125,000	\$628,550	5.2%	
5. Travel and Transport	\$75,500	\$132,700	\$249,700	\$272,300	\$299,500	\$300,500	\$1,329,300	11.3%	
6. Allowance	\$6,540	\$9,000	\$9,500	\$19,000	\$11,000	\$22,000	\$76,140	0.5%	
7. Other Direct Cost	\$159,000	\$143,000	\$173,000	\$145,000	\$160,000	\$177,000	\$956,200	7.8%	
8. Equipment, Vehicles, Supplies	\$52,000	\$509,100	\$587,000	\$70,000	\$59,000	\$87,000	\$1,475,100	12.1%	
9. Training	\$12,000	\$11,000	\$12,000	\$10,000	\$10,000	\$11,000	\$66,000	0.5%	
10a. Ad. & Promotion	\$388,000	\$306,900	\$869,300	\$809,000	\$784,000	\$784,000	\$3,341,100	32.3%	
10b. Pkg-Product	\$23,000	\$24,000	\$48,000	\$60,000	\$70,000	\$70,000	\$295,000	2.4%	
10c. Research	\$60,000	\$201,000	\$93,000	\$195,000	\$96,000	\$248,000	\$893,000	7.3%	
TOTAL COST OF SALES	\$974,500	\$1,344,500	\$2,336,000	\$2,169,300	\$2,120,700	\$2,395,000	\$12,200,200	100.0%	
SALES TARGETS OR ACTUAL (SACHETS)	927,250	3,713,752	8,000,000	12,000,000	16,000,000	20,000,000	50,641,002		
SELLING COST PER UNIT	\$1.05	\$0.50	\$0.24	\$0.13	\$0.13	\$0.12	\$0.20		
SELLING COST PER DIARRHEAL EPISODE (mean = 2.5 sachets)	\$2.63	\$1.24	\$0.64	\$0.45	\$0.33	\$0.30	\$0.50		

14/6

Table 5

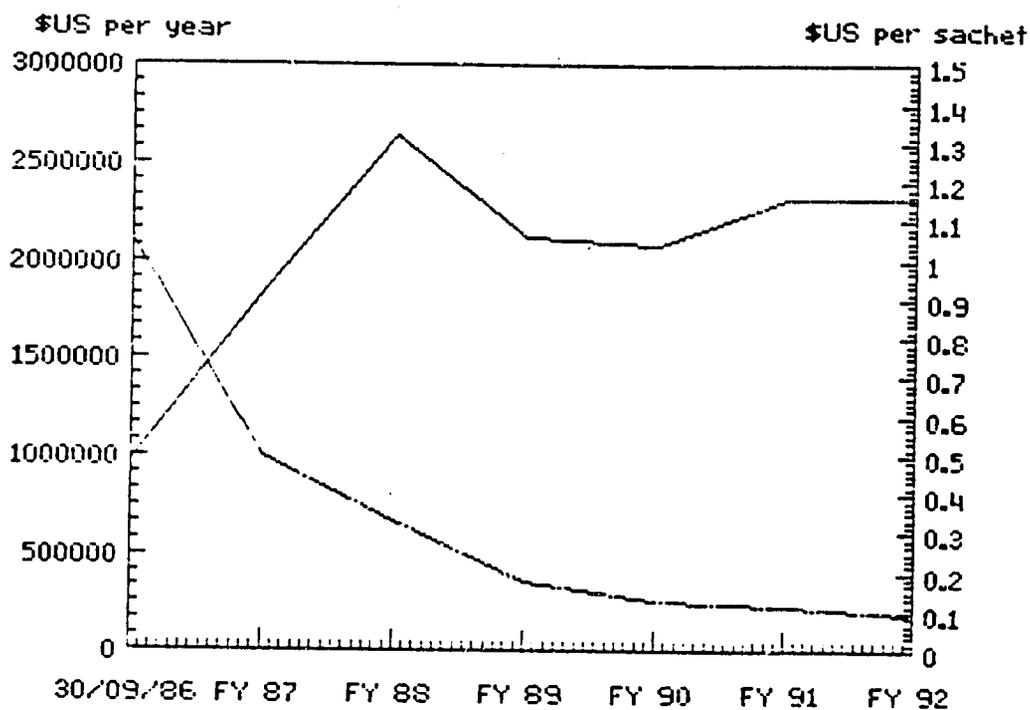
OFFSHORE SELLING EXPENSES - Total of PSI and SMP Budgeted (\$US) <u>REVISED AS NOTED ON FOLLOWING GRAPH</u>									
FBI/SMP Budget Line Items	01/07/88 to 30/09/88	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92	TOTAL THRU FY 91	
1. Salaries	\$100,950	\$248,000	\$379,350	\$411,660	\$458,000	\$511,400		\$2,208,370	18.4%
2. Consultants		\$8,000	\$7,000	\$7,000	\$6,000	\$8,000		\$36,000	0.3%
3. Fringe Benefits	\$8,950	\$11,000	\$13,000	\$14,000	\$15,000	\$16,000		\$77,950	0.7%
4. Overhead	\$78,550	\$93,000	\$102,000	\$111,000	\$118,000	\$125,000		\$626,550	5.2%
5. Travel and Transport	\$75,500	\$151,700	\$243,700	\$272,900	\$295,500	\$300,500		\$1,380,800	11.5%
6. Allowance	\$8,640	\$5,000	\$5,500	\$16,000	\$11,000	\$22,000		\$76,140	0.6%
7. Other Direct Cost	\$158,000	\$148,000	\$173,000	\$145,000	\$160,200	\$177,000		\$956,200	8.0%
8. Equipment, Vehicles, Supplies	\$83,000	\$505,100	\$687,000	\$70,000	\$59,000	\$87,000		\$1,475,100	12.5%
9. Training	\$12,000	\$11,000	\$12,000	\$10,000	\$10,000	\$11,000		\$66,000	0.6%
10a. Ad. & Promotion	\$388,000	\$308,800	\$688,000	\$809,000	\$754,000	\$784,000		\$3,941,100	32.9%
10b. Exp-Product	\$23,000	\$24,000	\$49,000	\$81,000	\$70,000	\$70,000		\$295,000	2.5%
10c. Research	\$80,000	\$201,000	\$90,000	\$195,000	\$95,000	\$195,000		\$840,000	7.0%
TOTAL COST OF SALES	\$974,900	\$1,944,900	\$2,149,950	\$2,120,560	\$2,080,700	\$2,313,900	\$2,313,900	\$11,961,210	100.0%
SALES TARGETS OR ACTUAL (\$BILION)	927,250	8,718,782	8,000,000	12,000,000	16,000,000	20,000,000	24,000,000	84,641,000	
SELLING COST PER UNIT	\$1.05	\$0.22	\$0.27	\$0.18	\$0.13	\$0.12	\$0.10	\$0.14	
SELLING COST PER SHAPPELL EPISODES (mean = 21.8 secrets)	\$1.63	\$1.24	\$1.83	\$1.44	\$0.83	\$0.15	\$1.24	\$1.25	

Note: In comparison with Table 4, Table 5 has been revised as follows:

- a - "Salaries" have been reduced by 10% to reflect fewer MSOs
- b - "Research for FY 91 has been reduced to the level of FY 89
- c - Sales of 24 million for FY 92 have been added

Revised Cost of ORSaline Sales

Total Sales Cost Unit Sales Cost

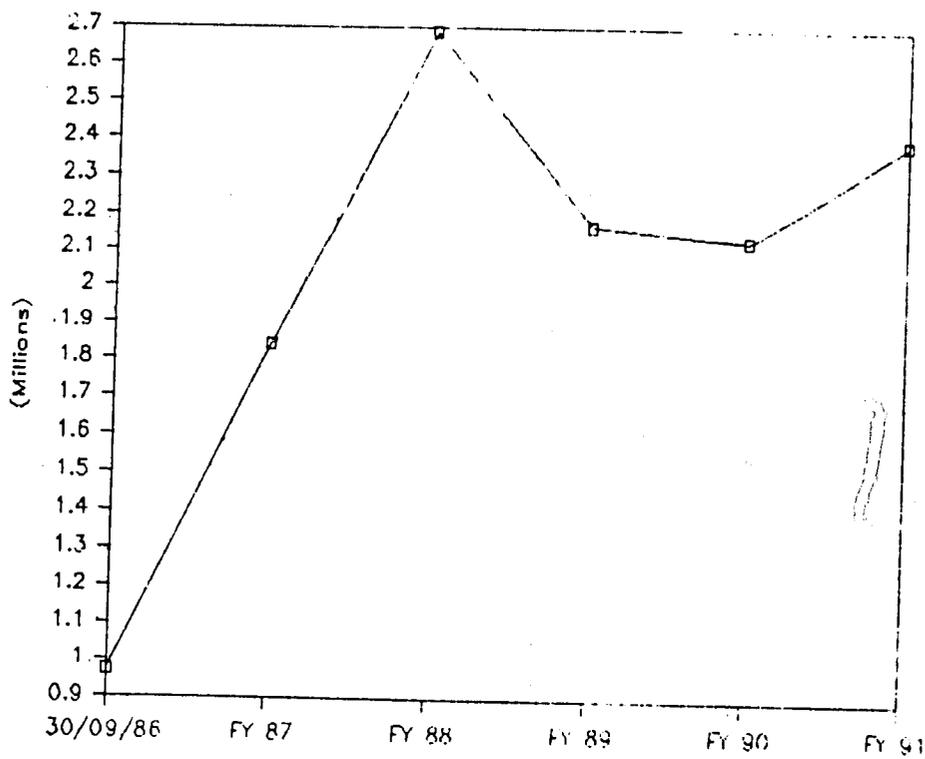


Note: The above graphs represent the data in the previous worksheet

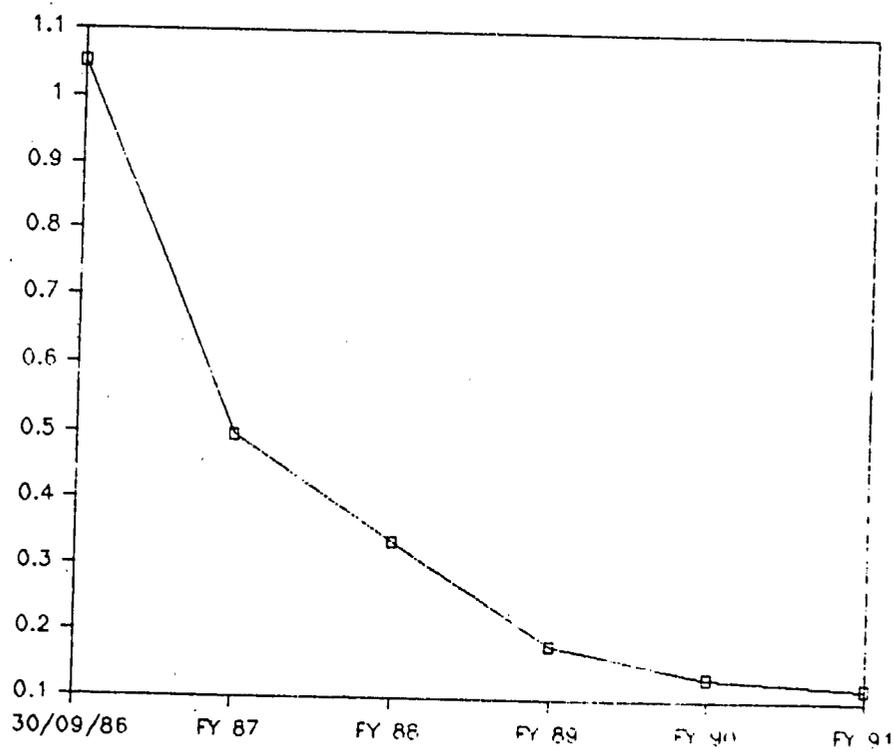
MC

Total Cost Of Sales (US\$ Millions)

Figure 2



Cost of Sales Per Sachet (\$US)



11/6

Persons Contacted During This Consultancy:

Social Marketing Project:

Mr. Matlub Anam, ORS Project Manager
Mr. Syed Anwar Ali, Exec. Dir.
Mr. Philip Hughes, PSI Representative
Mr. M. Anwar, Marketing Manager
Mr. Ashfaqur Rahman, Research and Communications Manager
Ms. Petra Osinski, Evaluation Consultant
Mr. Shahadat Ahmad, MIS and Finance Director

UNICEF:

Ms. Flora Sibanda, Health Programme Officer

Essential Drug Company:

Dr. Anisul Islam, General Director
Mr. Kazi Golam Moula, QC Manager
Mr. A. Mannan, Production Manager

Gonashasthya Pharmaceuticals Ltd:

Mr. Gholam Mohiuddin, General Manager

PIACT:

Mr. Abu Yusuf Choudhury

BRAC:

Dr. Mushtaque Choudhury

RPRI8769

DRAFT SCOPE OF WORK FOR ORS PRODUCTION CONSULTANTS

- A. The Bangladesh Social Marketing Project (SMP) is in the second full year of an ORT promotion and marketing project. Sales of ORS (500-ml sachets) are expected to reach 8 million in FY88 and 12 million in FY89. It is currently obtaining this product (ORSaline) through discrete quantity contracts from two local manufacturers, Essential Drug Co. (EDCO) and Gonashasthya Pharmaceuticals Ltd. (GPL). Both these firms had been producing ORS, for the public and private markets respectively, and had some excess capacity totaling roughly 5 million per year now being used for ORSaline.
- B. SMP has made a loan to EDCO for the purchase a new filling machine exclusively for ORSaline production, resulting in a capacity for making ORSaline at their Dhaka plant of 5 million to 6 million sachets per year. GPL has said that in consideration of a three-year contract from SMP, they would purchase a new machine that could be used half-time for ORSaline, giving them a capacity of 5 million to 6 million. Thus, between the two, these two firms would have adequate capacity for SMP's requirement through FY89.
- C. While some initial problems have interfered with timely deliveries, both firms now appear to have ORSaline production problems under control and are delivering a good quality product at a very reasonable price (500-ml citrate formula, packed in foil, boxed in 50s, for \$US0.04). Quality control in both firms is rigid and Good Manufacturing Practices are followed fairly closely.
- D. Project plans now call for sales targets to reach 16 million, 20 million, and 24 million in FY90, FY91, and FY92. SMP has proposed establishing their own production unit to fill the gap between available EDCO/GPL production capacity and these sales targets. A technical and financial feasibility was commissioned by SMP in 1985, which indicated a required investment of over one million dollars for a plant with 15 million per year capacity, and a production cost at 80% capacity of about US\$0.05. It has been recommended by PRITECH consultant S. Fabricant that this study be redone and the project reformulated along lines contained in his reports of February 1986 and December 1987 in order to keep costs to a more reasonable level.
- E. USAID/B now wishes to make certain that all alternate options have been adequately and impartially studied before authorizing an SMP production facility. The major options appear to be:
1. Further expansion of existing production facilities at EDCO and SMP.
 2. Exploration of the potential for doing the same for other private producers of ORS. (There are about four of these in Dhaka but had not been personally visited by USAID or PRITECH).

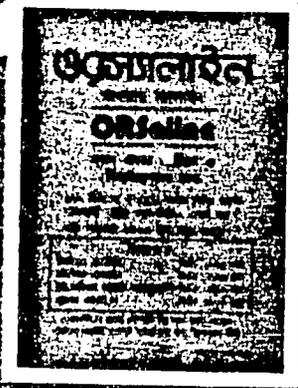
- F. For both of the above cases, using the incentive of annual minimum purchase contracts for SMP, the consultant will determine the interest of the firms, the technical feasibility, the capital investment required (internal or external), and will estimate the production cost of the finished product at the projected annual levels.
- G. The consultant will also review and revise the financial feasibility analysis submitted by TESCON in 1985. This should be based on a different physical environment (a new, integrated facility will be constructed by SMP) and should reconsider the choice of equipment, basing a final decision on maximizing cost-effectiveness. For the sake of realistic financial cost estimates, it will be necessary for SMP and USAID to have reached agreement beforehand as to how the integrated facility will be financed.
- H. The consultant will present USAID/B with a financial analysis of the three basic options taken in their various combinations, adding any subjective factors deemed to be relevant to a final decision, such as the probability of reliable production through each alternative.

S. Fabricant
December 10, 1987

11

ORSALINE
for the prevention and treatment of
diarrhoea-induced dehydration

**NEW
IMPROVED
FORMULA**



ORSALINE saves the lives of children.

"The discovery that sodium transport and glucose transport are coupled in the small intestine so that glucose accelerates absorption of solute and water is potentially the most important medical advance of this century (*Lancet 1978; ii: 300*)"

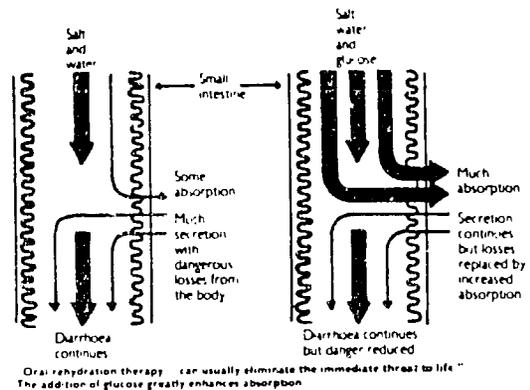
It has been known for a long time that 90% of deaths from diarrhoea are due to the loss of water and essential salts from the body and that accurate and timely replacement of that loss is life-saving.

However, it was only in the 1960s that a major breakthrough was achieved when it was found that an oral solution containing glucose and essential salts, or Oral Rehydration Salts (ORS), was easily absorbed by the intestine and could replace the fluid loss effectively. This method of treatment of diarrhoea-induced dehydration by Oral Rehydration Therapy (ORT) is undoubtedly one of the most effective methods for the treatment of diarrhoea.

DIARRHOEA-INDUCED DEHYDRATION IS BEST-TREATED BY A BALANCED GLUCOSE-SALT SOLUTION

The treatment of diarrhoea-induced dehydration requires the use of a balanced proportion of glucose-salt solution. As soon as diarrhoea commences, such a solution should be administered immediately to make up for the loss of water and essential salts due to loose and watery motion. The glucose is essential because it accelerates absorption of salts from the intestine.

Fig. 1



SYMPTOMS OF DEHYDRATION

The first step in Oral Rehydration Therapy is to recognize the symptoms of dehydration and to act accordingly. An example of a severely dehydrated child is presented in Fig.2. We offer below an account of the signs and symptoms that allow one to assess the degree of dehydration and fluid transport:

Mild Dehydration

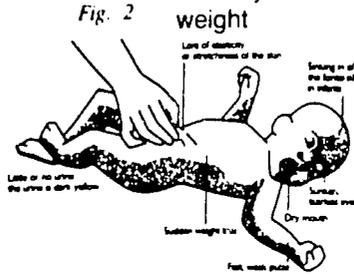
Up to 5% loss of body weight : Dry mouth, thirst, restlessness, less urine secretion, patient is alert.

Moderate Dehydration

5%-9% loss of body weight : Sunken eyes, reduced and dark urine, rapid and weak radial pulse, low blood pressure, sunken fontanelle in babies, loss of elasticity of the skin, dry tongue, hoarseness/faint voice, no tears while crying, patient is drowsy and weak.

Severe dehydration

More than 10% loss of body weight : Deep sunken eyes, no urine for several hours, cold clammy extremities, muscle cramps, thready/absence of pulse, low or absence of blood pressure, coma or unconsciousness.



- * Infants and young children may lose more than 10% of body weight as watery stool without showing signs of severe dehydration.
- ** In marasmus or kwashiorkor it is difficult to elicit signs of dehydration.

The Rational Response to Dehydration is Orsaline

Patients with severe diarrhoea or excessive vomiting may initially need intravenous therapy. In all cases, dehydration can be treated by Oral Rehydration Salts (ORS), made on the basis of the standard WHO/UNICEF recommended formula. ORSaline is one such form of ORS. It has an optimally balanced content of glucose and electrolytes. It is also the only ORS with citrate formula currently available in the market.

With it a solution can be made which readily makes up for the loss of essential salts during acute diarrhoea.

Each sachet of 13.75 g ORSaline contains:

Sodium chloride	:	1.75 g
Trisodium citrate dehydrate	:	1.45 g
Potassium chloride	:	0.75 g
Glucose	:	10.00 g
		13.95 g

To be dissolved in 500 ml of drinking water.

This composition almost replaces the electrolytes lost in the diarrhoea stool, example of which is presented in Table 2.

Table 2. Comparison of electrolyte composition of diarrhoea caused by different organisms and the oral rehydration solution recommended by WHO.

Aetiology	Electrolytes (mMo1/1)				mOsmols
	Na ⁺	K ⁺	Cl ⁻	HCO ₃ ⁻	
Cholera	88	30	86	32	300
Rotavirus	37	38	22	6	300
ETEC	53	37	24	18	300
Oral rehydration solution	90	20	80	30	330

Glucose 111 mMo1

Studies show that patient, especially children, suffering from repeated bouts of diarrhoea suffer from lower blood level of sodium and potassium. ORSaline thus contains these salts in sufficient quantities to make up for the loss. The citrate is needed for the treatment of acidosis which occurs frequently with dehydration. Citrate is far less hygroscopic than Bicarbonate, which results in a longer shelf life. The glucose, as has been pointed out above, is used principally to help the absorption of salt and water.

The solution made by pouring the contents of ORS packets into water is acceptable and effective in all age groups.

ORSALINE IS A SAFE METHOD OF TREATMENT AND PREVENTION OF DEHYDRATION

ORSaline should be used carefully in patients with diabetes, cardiac defects, high blood pressure, or with impaired renal functions. In all other cases, ORSaline is the safest and most convenient way to treat dehydration induced by diarrhoea.

ORSaline is safe even for the newborn and does not result in any harmful side effects. However, during the following circumstances ORSaline may not be useful:

- In severe dehydration
- Unconscious patients
- Incessant vomiting
- Children with convulsion or severe systemic disease.
- In case of excessive rate of purging (e.g. 10 ml/kg/hr).

RECOMMENDED DOSAGE

- a) For children less than a year old:
After every loose motion administer with a tea spoon 10 to 20 spoonful of ORSaline solution.
- b) For children 1-5 years old:
After every loose motion administer half a poa to 1 poa of ORSaline solution.
- c) For over 5 year olds:
After every loose motion administer 1 poa to half a seer of ORSaline solution. Continue to administer the solution till the loose motion stops.

OTHER ASPECTS OF DIARRHOEA MANAGEMENT AND THE TREATMENT OF DEHYDRATION

Diarrhoea is caused by pathogenic bacteria, viruses and parasites in various ways. Fig. 3 illustrates the degree of invasiveness of different diarrhoea causing organisms.

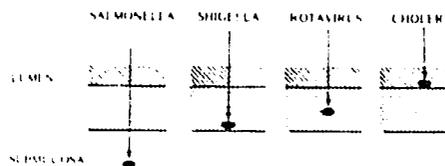
Regardless of the causative agent or mechanism, however, it is now established beyond doubt that an ORT Solution made from ORSaline can replace fluid and salt losses which result from diarrhoea. ORT does not stop the diarrhoea, but it



ORSaline

Social Marketing Project Bangladesh

Fig. 3



corrects dehydration, and electrolyte loss, improves appetite and diarrhoea usually continues for only a limited time. Experience has thus shown that an ORT solution is the best form of the treatment of acute diarrhoea.

IMPORTANT: CONTINUE NORMAL FEEDING WHILE ADMINISTERING ORSALINE

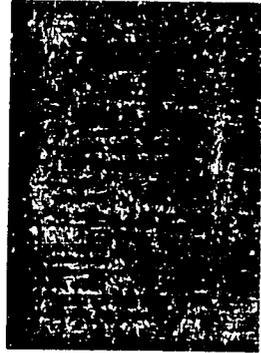
But effective treatment of diarrhoea includes not only administering ORSaline but also adopting normal feeding. Food should not be withheld from the patient, in fact, children should receive breast-milk or milk feeds or appropriate locally available foods (e.g. cereals) as soon as initial rehydration therapy with an ORSaline solution has been completed which usually should not take more than 4-6 hours. Studies have shown that feeding helps in reducing the severity of diarrhoea and everyday the appetite and the amount of food consumed improve. At the end of recovery 30-40% extra food is consumed by the patients. Therefore, extra food should be given after recovery.

Selected antibiotics should be judiciously used for the treatment of severe bacillary dysentery and cholera. Otherwise, there is no need for other pharmaceutical agent in the routine treatment of acute diarrhoea and the dehydration that it causes. Injudicious or inappropriate use of antibiotics may even cause harmful effect particularly in children.

ওয়েস্যালাইন

খওয়ার স্যালাইন

ডায়ালিসিস বা পাতলা পায়খানা জনিত
ডিহাইড্রেশন থেকে জীবন বাঁচায়



ORSaline

I always
keep it
handy.

Careful mothers keep **ORSaline** handy. Your child may suffer from diarrhoea or other forms of loose motion at any time. So, be prepared - keep several packets of **ORSaline** at home.

ORSaline - Very effective in the prevention and treatment of dehydration or loss of body fluid caused by diarrhoea or loose motion.



Oral Saline
saves the lives of
children

ওস্যালাইন

খাদ্যার স্যালাইন

ORSaline

সকল প্রকার ডায়রিয়া জনিত
ডিহাইড্রেশনের জন্য

৫০০ সিসি বা ২ পোয়া খাবার পানির সাথে
প্যাকেটের সবটুকু ওষুধ মিশিয়ে খেতে হবে।
প্রতি প্যাকেটে ১৩.১৫ গ্রাম ওষুধ রয়েছে।

উপাদান :	
সেডিমেন্ট সেরাইট	মি.সি. ১.৭৫ গ্রাম
পটাশিয়াম সেরাইট	মি.সি. ০.৭৫ গ্রাম
ট্রাইসোডিয়াম সাইট্রেট ডাইহাইড্রেট	মি.সি. ১.৪৫ গ্রাম
সুক্রোজ একসাইট্রোস	মি.সি. ১০.০০ গ্রাম

সোল্যাল হার্বোর্টিং প্রকল্পে বাংলাদেশের জন্য বিশেষভাবে তৈরী।
ডায়. পাইপল নং ০৬০ প্রক. ১১ ডি. এ. স্টেট। নং ১৫৭-৪৯-৬৯

SOCIAL MARKETING PROJECT
DHAKA BANGLADESH

Diarrhoea or loose motion causes dehydration...
Take immediate and effective measure with

ORSaline

Packaged Oral Rehydration Salts with Improved Citrate Formulation.

Diarrhoea or loose motion can cause serious dehydration.

Dehydration is dangerous because loss of water and essential salts from the body can lead to death. That is why diarrhoea induced dehydration must be prevented or treated immediately so that the fluid balance of the body is restored.

ORSaline—The effective treatment and prevention of diarrhoea—Induced dehydration

Dehydration caused by all types of loose motion can be easily treated with ORSaline. Orsaline is an optimally balanced mixture of glucose and electrolytes based on the World Health Organization's formula for the effective prevention and treatment of diarrhoea related dehydration. A solution made of ORSaline and potable water replaces the lost salts in the body and is excellent Oral Rehydration therapy.

Composition and Preparation

Each sachet of ORSaline contains :	
Sodium chloride	1.75gm
Potassium chloride	0.75gm
Tri-Sodium citrate di-hydrate	1.45gm
Glucose Anhydrous	10.00gm

ORSaline is easy to prepare. Just pour the contents of a sachet into 500 cc or half a seer of drinking water. Stir till the medicine is fully dissolved and then serve the recommended dosage. ORSaline having 'Tri-sodium citrate dihydrate' improves the stability of the pack and can be stored for longer period.

Also the citrate is beneficial in the treatment of acidosis which occurs frequently with dehydration.

Recommended Dosage

a) infants less than a year: $\frac{1}{2}$ seer ORSaline solution should be administered at frequent intervals in small doses within 12 hours with the help of a spoon. ORSaline should be administered till loose motion stops.

b) Children 1-5 years:

$\frac{1}{2}$ seer ORSaline solution should be administered at frequent intervals in small doses within 6 hours, with the help of a spoon. ORSaline should be administered till loose motion stops.

c) Children 5-12 years:

After every loose motion $\frac{1}{8}$ seer to $\frac{1}{4}$ seer of ORSaline solution should be taken till the loose motion stops.

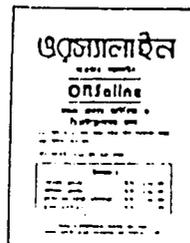
d) Adults

After every loose motion $\frac{1}{4}$ seer to $\frac{1}{2}$ seer of ORSaline solution should be taken till the loose motion stops.

Caution:

ORSaline once dissolved in water can be used for 12 hours. Any remaining solution after 12 hours should be thrown away and fresh solution made.

Important: Adopt normal feeding
During ORSaline therapy, infants should be breastfed, children and adult should continue with their normal food intake.



ORSaline is available in Sachets for 500cc/ $\frac{1}{2}$ liter Solution.

SOCIAL MARKETING PROJECT

DIIAKA BANGLADESH

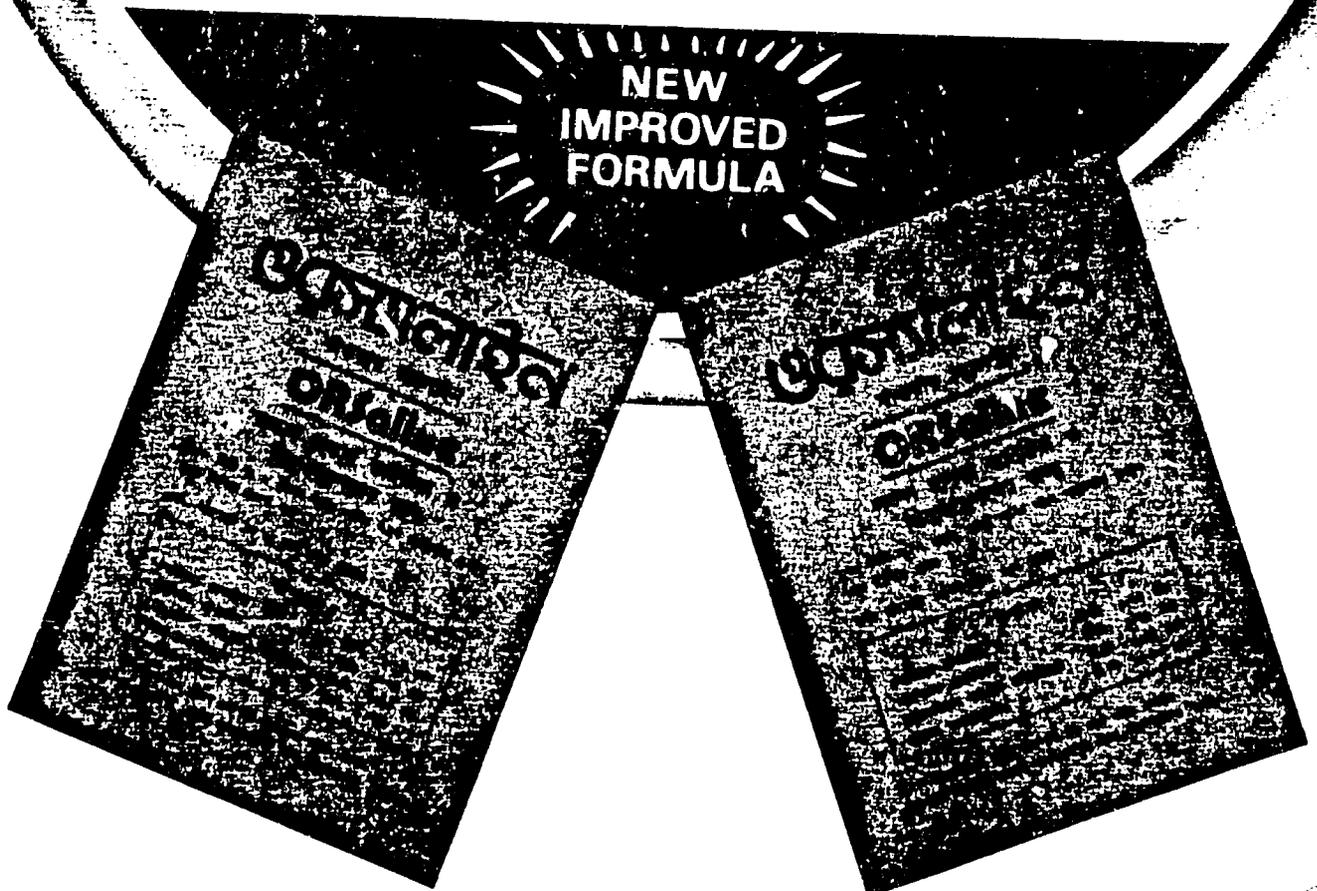


ORSaline

Oral Rehydration Salts

**For effective prevention and treatment of
dehydration related to Diarrhoea and Loose motion.**

**NEW
IMPROVED
FORMULA**



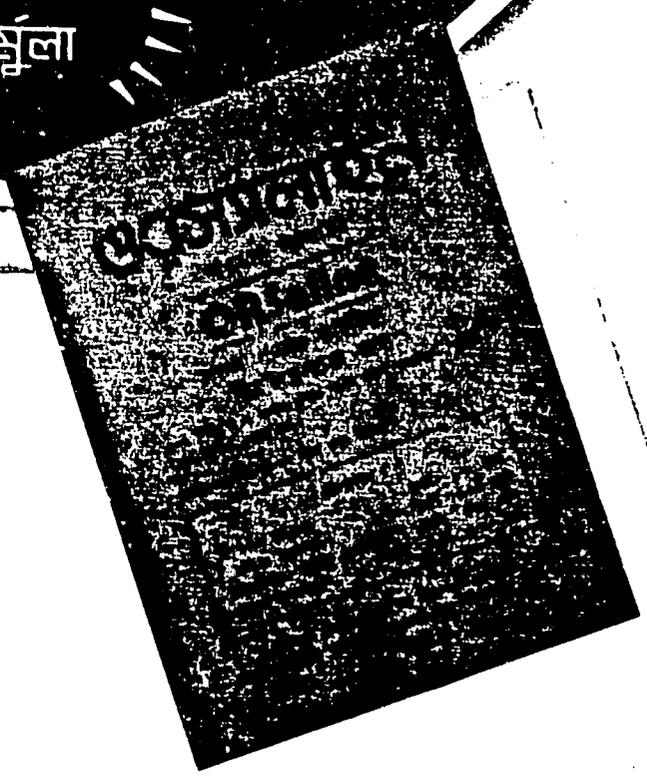
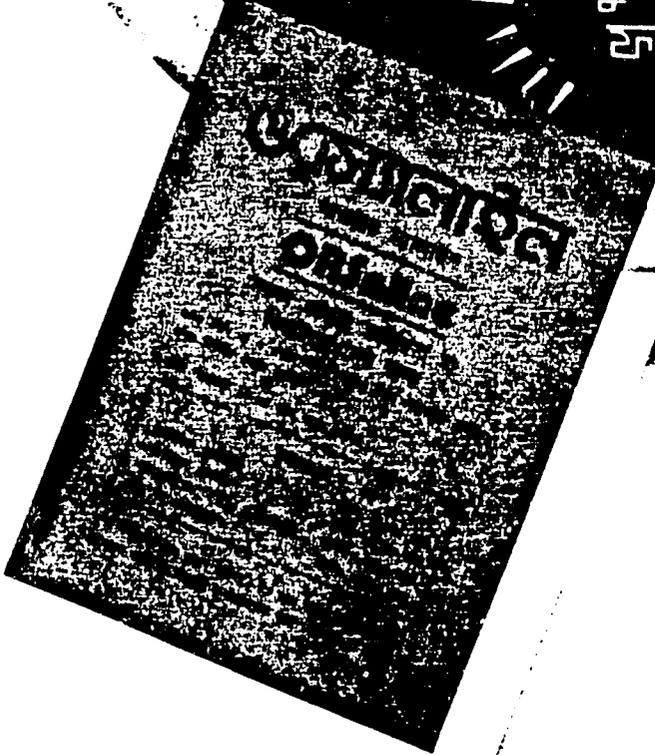


ওয়েস্যালাইন

খাঁওয়ার স্যালাইন

ডায়রিয়া তা পাতলা পায়খানা জনিত
ডিসাইড্রেশন থেকে জীবন বাঁচায়

নতুন উন্নত
ফর্মুলা



25