MILLET TRANSFORMATION PROJECT

(685-0250)

FINAL EVALUATION REPORT

Dr. Clyde E. Stauffer

12 May 1984

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EXECUTIVE SUMMARY

This mid-term evaluation of the Millet Transformation Project (685-0230) addresses technical and marketing aspects of the effort, keeping in mind that the final product of the project is a Feasibility Analysis of the manufacturing/marketing/financial aspects of a millet-based food enterprise. The customer for the analysis is a potential investor in such an enterprise.

The bias of the evaluator is that of a technical person (Ph.D. in Biochemistry) with over 20 years experience in executing and managing food product development projects in major U.S. companies. His outlook is to get the job done: a) well; b) without wasting resources; c) on time!

I. CURRENT STATUS, PROJECT PAPER LOGFRAME ASSUMPTIONS

A. Input - Output Assumptions. Availability of USAID and GOS and Title III funding. Ability of ITA to attract and retain satisfactory personnel. Funding has not been any particular problem. While there were some initial misunderstandings about the source of funds for specific areas, these have been resolved and no delays have been experienced due to funding. ITA has had personnel problems, due to: a) red-tape delaying hiring; b) reluctance of people to accept limited-term employment; c) relatively low pay; d) limited pool of technically-qualified people from whom to draw.

B). Output-Purpose Assumptions. Study (and technical) methodologies are adequate. While true, other factors (GOS procurement policies, sub-optimum communications and managerial skills) have worked against maximum effectiveness in applying available technologies.

C). Purpose - Goal Assumptions. Market potential is realizable; an entrepreneur will implement the plan. Not assessable at this point, but these assumptions rest on the quality of the market test and on the ability of the Feasibility Study (a quality-dependent factor) to convince an entrepreneur to invest money in a millet-based food enterprise.

II. PROGRESS, PROBLEMS AND SUGGESTIONS

A. At this point the project is at roughly the May-July 1983 milestones envisioned in the work plan elaborated shortly after the Resident Advisor began his tenure.

B. Delays were experienced in certain aspects of input acquisition, notably in getting technically-competent contractors to carry out studies. The Millet Supply study was poorly executed and will have to be redone. The selection of a competent Market Research Study contractor was accomplished ten months behind schedule.

Other inputs, such as finding adequate packaging for certain products and in obtaining enough millet to make products for the test market were also delayed.

Managerial problems, in the areas of detailed tactical planning and execution and communications with contractors outside of ITA have also caused delays.

2. Suggestions for limiting future problems include: a) Remember the needs of the customer (potential investor); b) Focus on the purpose of this project; c) use PERT techniques to rationalize planning and communications; d) Take steps now to start the rest of the input studies necessary for the project; e) Recognize the reality and possible desirability of follow-on projects, but don't confuse them with the purpose of this project; f) Recognize the USAID contributions in terms of money and technical management and marketing skills.

III. PROBABILITY OF SUCCESS

In terms of contribution to the successful attainment of this project's goal, one product (farina from millet) is judged to have a high probability of success, and three products (cracked grain, millet semolina, and millet flour for bakery sweet goods) are judged to have medium probabilities of success. All the other products in progress are judged as having low probabilities of making significant contributions to a convincing Feasibility Analysis, within the time constraints of the project.

The overall project is seen as having a medium chance of success. If two or three of the products achieve a successful test market the technical goal will be met. If the studies envisioned (millet supply, market test, previous case studies, plant location and financial analysis) are properly monitored and well executed the Feasibility Analysis should be of high quality. The ability to attract an investor depends in part on governmental policy and world grain trade factors three years hence, and is not assessable at this time by the present evaluator.

IV. RECOMMENDATIONS

A. Input Studies

1. Redo the Millet Supply study.

2. Institute a case study on previous attempts to commercialize millet transformation products in Senegal and reasons for failure.

3. Begin the process immediately of selecting contractors for all studies still to be done to ensure completion before the scheduled end date of the project.

B. Planning

1. Apply PERT network planning to the detailed execution of the market test.

2. Develop detailed written agreements with the market test contractor (ENDIR) regarding all deadlines and responsibilities for action to achieve the market test.

3. Make clear in advance to DEGIR what kinds of data and information are required from the market test. Apply this same principle to the management of the other studies still to be executed.

4. Develop ways for delegating more authority to ITA personnel subordinate to the Director General so that day-to-day decisions can be made when he is unavailable.

C. Additional Inputs

1. Extend the life of the project 12 months, to 30 September 1983.

2. Retain the Resident Advisor and present technical personnel for the additional time.

3. Purchase a back-up Entoletor for use at ITA. No other equipment purchases are required to achieve the purposes of the present project.

4. USAID shall negotiate requisite additional funding with ITA and Experience Inc. to cover the recommended extension of time.

EVALUATION

This mid-term evaluation of the Millet Transformation Project, USAID 685-0250, is written in four parts:

I. The current validity of the assumptions (explicit or implicit) in the logframe of the Project Paper;

II. The progress made thus far in execution of the project, problems which have caused delays, and some suggestions for avoiding future problems;

III. An estimation of the probability of success for each state of the project (technical, consumer, market test, and overall);

IV. Recommendations regarding the future conduct of the project to bring it to a successful conclusion.

While this organization of the evaluation is not precisely that outlined in the terms of reference of the PIO/T (1) all the points listed in the Scope of Work will be addressed.

I. CURRENT STATUS, PROJECT PAPER LOGFRAME ASSUMPTIONS

In addressing this point, I found it useful to modify the original logframe presentation (2) to show the causative connection of assumptions with the progress from one step to another in the GPOI structure (3, p. 103).

Inputs

* USAID Technical Assistance Funding
* USAID Title XII millet/sorghum project advisors and services
* GOS PL 480 Title III funds for local costs
* GOS product/process development facilities and personnel at ITA

Assumptions

* Availability of USAID and GOS and Title III funding
* Ability of ITA to attract and retain satisfactory personnel

Outputs

* Food habits and attitudes study
* Product/process development program generating one or more transformed millet products; validation of consumer acceptability
* Marketing and distribution study
* Millet supply study
* Plant location study
* Financial analysis

Assumptions

* Study (and technical) methodologies are adequate to provide reasonably significant results in admittedly difficult and uncertain areas.

Purpose

* Establish: a) cultural acceptability
  b) technical feasibility
  c) economic viability

  for production and sale of transformed millet foods.
* Develop a manufacturing/marketing/financial plan to help attract investment capital which will support a venture to make and sell transformed millet foods.

Assumptions

* The market potential is substantial and realizable. Annual volume will be ca. 50,000 tons by 1995-2005.
* An entrepreneur or public enterprise will successfully implement the plan.

Goal

* Demonstrate that Senegal's balance of payments and cereal production can be improved by partial (ca. 10%) replacement of rice and wheat imports with nutritious, acceptable, reasonably priced foods based on millet.

A. Input - Output assumptions

These assumptions relate to the ability of the project participants to take available funds and turn them into good quality outputs in an efficient manner. The main concern is with the word "efficient".

There was no reported problem with the USAID funds. The technical assistance and services contracts have been provided with a minimum of delay (4-9).

The availability of Title III funds for the project has been adequate to the needs. There have been some misunderstandings (responsibility for Resident Advisor's local support, lack of formal approval for the present Title III operating budget (10)) but these have not caused delays in execution of the work required.

The executor of the project as per the Project Paper (2) and the agreement with the Government of Senegal (11) is the Institut de Technologie Alimentaire (ITA), an administrative arm of the Ministry of Research, Science and Technology (MERST). They have had problems recruiting enough satisfactory technical personnel for the project.

1) Official procedures prolong the hiring process. It can take up to six months to receive approval to hire an appropriate person for a position.

2) People with adequate training and experience are reluctant to accept positions with a limited duration project, i.e. lacking promise for long-term stability of employment.

3) Positions at ITA have been relatively low-paying, leading to morale as well as recruitment problems. This has been addressed by a recent governmental action.

4) In general, the pool of technical human resources is relatively limited.

All of these factors have led to rapid turnover of personnel on the project, as well as less-than-optimum manning of available positions. As an example, the original Project Coordinator proved to be unsatisfactory after a few months on the job, but he could not be removed because no technically-qualified replacement was available until recently. The change was made 1 April.

The system as a whole does not support efficient utilization of inputs. Delegation of authority downwards is not encouraged. Management practices at ITA could be improved (12), but this requires a re-orientation of thinking by everyone concerned (from the Minister of MERST down to the lab technicians) vis-a-vis responsibility and authority. Presently every decision of any consequence requires the concurrence and signature of Dr. Ousmane Kane, the Director of the Institute. When he is not available because of other responsibilities, delays in project implementation occur.

The availability of funding has been adequate and timely. A clearer initial statement about the local support usage of Title III funds could have prevented some minor friction.

The assumptions regarding availability and efficiency of ITA personnel overly optimistic. The technical competence of the personnel in general t in question. Difficulties in recruitment plus constraints arising from system and current management styles reduce efficiency to roughly one-t that generally found in similar endeavors in developed countries.

tput - Purpose Assumptions

Presupposing that funds can be translated into secondary inputs ipment, facilities, materials, auxiliary expertise, etc.), the assumption his step is that outputs (studies, products) can be generated and applied ulfill the purpose of the project.

Adequate study methodologies to accomplish the purpose of the project t. They have not been used in all instances, and some false starts vitable in any research project) have been made.

A study of consumer food habits and attitudes was initially planned. ew of existing documents (13,14) showed that the information needed was ady available, hence no further time was spent on this output. This was a t decision.

The initial project planning team envisioned development of product totypes in the United States, using U.S. state-of-the-art technology (2, p. and Annex D; 6, 7, 15). The Technical Proposal from Experience Inc. (4) and first time-scaled plan for the project (16) both assumed the duct/process development work would take place at ITA. One principal of ID project design, that a project should maximize foreign institutional lvement and development (3, p. 17), would support the change in project action. A question has been raised as to when and why this change was made , and there does not seem to be any record of a formal action taken to ove it.

Other factors in favor of such a change would be the proximity of a supply nillet for experimental work and the availability of average consumers for ting and giving feedback on millet-based foods (it would be difficult in the , to obtain qualified taste panel members for critical evaluation of a scous product).

Nevertheless, it would seem that in making the decision to change the chnical capabilities of ITA relative to the requirements of the new product velopment projects planned were overestimated. The level of knowledge of real technology required of the leader of the specific new product velopment projects, as well as the sophistication of the equipment needed to y out the various ideas and possibilities, is quite high. The personnel and e equipment available to ITA within the time frame of the project plan were t up to the demands of the new product/process developments envisioned.

The methods of planning for product process development, with the uidance of the Resident Advisor, seemed adequate to the needs of the project 6, ITA. While some possible improvements will be discussed in the next ction in Progress, Problems, and Suggestions, the methodology is not inferior t that often found in such projects in developed countries.

The study on Millet Supply as performed by the contractor was a waste time and money. Of four original submissions, two were thrown out for bureaucratic reasons. Of the other two the proposal by Afrique Audit (18) was of a lesser technical quality, but also a lower cost. Acceptance of the least-cost bid was forced by the government committees involved. The resulting study (19) fully justified the qualms of USAID and ITA. It is nothing more than an outline for establishing another government agency to try to force the farmer to grow millet as a cash crop. It has been thoroughly scrutinized and improvements suggested (20) but Afrique Audit is disinclined to make the effort to improve the study.

A number of reports exist which show that it is possible to assess the effect of agronomic factors, government policies, and market demand on the amount of millet in the supply pipeline (21,22). Since any potential investor will want to know the probable status of his raw material supply, this study must be redone properly before the final feasibility study can be written.

The proposed market study methodology looks good. The ten-month delay in signing the contract was largely due to disagreement between ITA USAID and the financial members of the approval committee as to whether the over-riding selection factor should be technical competence of the proposal or the cheapest bid. Ultimately a competent contractor, CEGIR, was found at an acceptably low cost, but the delay puts the whole project behind schedule.

The proposal from CEGIR (23) outlines a soundly-based marketing study which will develop the required information as to consumer acceptance of the proposed millet-based foods (from both quality and price standpoints) as well as market test data which will be of great interest to a potential investor. The first report (24) shows good progress in planning and focus group activities, as well as making good use of the input from other project consultants [illegible].

There have been problems in coordinating the scheduling of stages of the market-testing between CEGIR and ITA (25). Part of this has been caused by the delays in getting SENTENAC to make an acceptable run on 25 tons of millet to prepare the various millet commodities for further processing by ITA into test samples. This delay puts serious time constraints on the market testing (compounded by Ramadan, vacations, etc) which will put the whole study even further behind the project schedule than it is now. This has induced a certain strain between the two organizations.

Since close, effective collaboration will be necessary for the successful completion of the market test (and the project) CEGIR and ITA must develop more effective communications. At the least, this would entail mutual agreement on the timing of each and every step in the market test; agreement on responsibility for each action, and the date by which the action will be completed; and a written record of all such agreements, available to both organizations. Such an approach will enhance cooperation and the efficient performance of the market test.

The initial project paper assumption about the adequacy of available study methodologies was justified. When the change in location of new product development work was made from U.S. contractors to ITA, the ability of ITA to supply the sophisticated cereal technology required was overestimated. But even given the probable lack of success in this one portion of the plan, there is no reason why, in principle, the study outputs should not coalesce to

pose - Goal Assumptions

he manufacturing marketing financial plan described in the Project Paper
e is the same thing as the Feasibility Analysis described as the end
of the project in various documents [illegible]. The assumption is
his document will be a major factor in convincing an investor private or
to undertake the implementation of the plan, providing foodstuffs for
enegalese consumer based on Senegalese-grown millet and so enhance the
sufficiency of the local economy.

The soundness of this assumption rests mainly on the quality of the
bility Analysis. Interviews with representatives of SOMEPI and the
try of Industrial Development gave the strong impression that the
nment will encourage such an investment. This is supported by a 1981 law
details tax breaks and incentives for companies engaged in such
prises (26).

The Feasibility Study as the product of this project has as its consumer
otential investor. It must answer that customer's needs as fully as
ble. While most such answers are planned as part of the project
ities (input supplies, market tests, plant location considerations,
cial factors) one question frequently asked is not addressed: "If this is
a good idea, why isn't someone already doing it?"

The project paper identifies seven previous attempts to commercialize
et-based foods and briefly gives reasons for their failure (2, Annex E).
he interest of having a more convincing product to "sell", a more complete
y of these cases should be made, showing how the factors which contributed
heir downfall have been overcome in the present project. Such a frank
ssion of the difficulties encountered in this business will enhance the
ibility of the Feasibility Analysis.

The project assumption also contained a numerical goal: 50,000 tons of
et-based foods sold annually by 10-20 years after the end of the project.
assumption is not presently testable. The results of the market test will
cate the probability of replacing 10% of imported grains with millet-based
s. The actual assumption about 50,000 tons p.a. by 1995 constitutes a
rospective benchmark which can only be evaluated for validity when we reach
indicated sales volume or the date (whichever comes first).

The project paper assumption is that the market is available to be tapped.
additional assumption needs to be added: the quality of the project product,
Feasibility Analysis, will be high enough to induce a potential investor to
in the money and time necessary to tap the market and so reach the goal of
reased food self-sufficiency for Senegal.

II. PROGRESS, PROBLEMS, AND SUGGESTIONS

The central point to an evaluation is to seek answers to three questions:

1) How far have we progressed in accomplishing our original plan?
2) What problems have come up during the course of the project?
3) How might we minimize problems in the future?

These questions and answers have been alluded to in discussing the project paper assumptions in the previous section. In this section I will give brief answers to the three questions, as they appear to me.

A. Progress thus far

If one refers to the revised work schedule as presented in the Resident Advisor's second Quarterly Report, April 1983, the project generally is at about the stage predicted for May-July 1983, i.e. about ten to twelve months behind schedule. I will discuss progress under the headings and using the benchmarks as laid out in that plan.

1. Methods of milling and evaluation of product stability. "Development of the decorticated millet grain and flour with stability equal to rice and wheat flour" (May '83); "Stability testing in chosen packages" (June '83); "Continuation of the stability testing under high temperature and high relative humidity" (July '83).

The studies have been accomplished on decorticating millet to an acceptable level and producing acceptable quality grain. It was shown in the first quarter of 1984 that running the grain or flour products through the Entoleter at ITA reduced insect egg and larvae levels such that in plastic bags the flour has acceptable keeping quality (June '83 benchmark). Shelf life studies at elevated temperature and humidity have not yet been done. The heavy plastic bags available from a local supplier give reasonable protection to these products.

2. Product development - Instant couscous - weaning food - new products. "Testing the quality of millet and development of prototypes" (April '83); "Products development and organoleptic evaluation" (May '83); "Product improvement based on results of evaluation" (June '83); "Stability testing of chosen products in chosen packages" (July '83).

A number of new product prototypes have been made on the labaoratory scale. These include: instant couscous, weaning food powder, butter and peanut butter cookies, crepes, a drink (Mil M'Bou), M'Bourake (a snack food of mixed couscous, ground peanuts, and sugar), and a pretzel. Of these, only the prototype instant couscous has been evaluated by a focus group. The weaning food has been shown to some mothers for feedback on flavor and texture. The lab-made instant couscous has been stability tested in plastic sacks. Packaging for the other new products is not yet chosen.

3. Packaging of products for consumer testing. "Selection of package material for testing product stability and consumer acceptability" (May '83); "Specifications for packaging material" (August '83).

Work with a local supplier (SIMPA) has resulted in selection of a thick polyethylene bag as the most appropriate material for packaging the various millet grain products and the instant couscous. It was not the choice for weaning food, where a recloseable container is desired. For the latter, locating a source of a moderately-priced package has been a great problem (although a recent contact may have resolved this question, at least for the market test).

The actual packages for the test market will be printed with product identification, instructions for use, etc. Writing these specifications has not been possible until now, because of lack of input from a contractor for the test market. However, placing the contracts, with specifications, for packaging should occur soon.

4. Marketing Development Studies. "Choose the firm to do the study" (January '83); "Start negotiations with selected firm. Plan the tests with the expert and local firm" (March '83); Begin implementation of the tests" (May '83). These three steps occurred in, respectively, December '83, February '84 and March '84. The bureaucratic reasons for the ten-month delay were mentioned in the Assumptions Analysis, and will be addressed again below.

The beginning of testing is considered here to be the focus group tests, run with dishes based on the three millet grain products and instant couscous. The first larger scale consumer testing (home placement tests) now appears to be delayed until September or October '84 for its beginning.

The focus group tests run thus far seem to be well planned and executed, and good information was obtained from them. The experience gained will be of value in future consumer testing, whether of this project or in others.

The overall market test design, developed by CEGIR, ITA, and Mr. Roger Bognar (EI consultant) should give the desired market information if it is executed accurately. This means that not only the personnel of CEGIR, but also the people at ITA will have to take great pains to fulfill their parts of the workplan completely and on time. Communications and commitment will be essential.

5. Millet Supply Study. "Final report" (May '83). One was received October '83 which is useless. This will have to be redone, but fortunately its execution (or lack thereof) does not hold up any other project stages except the final feasibility study.

6. Process Engineering Study. "Produce products for the test market and delivery to distribution outlets" (May '83); "Prepare preliminary process flow of products and choice of equipment for production" (January '84).

None of the work envisaged under this project heading has yet been accomplished. In a sense acquisition of certain equipment which may be applied to preparing products for test market (ribboon blender, dehuller, sifter) could be considered as being in the realm of the Process engineer.

The production of product for test market has been contingent upon getting millet decorticated and ground at SENTEMAC. They are quite willing to cooperate in this matter, but extreme difficulties in purchasing enough millet (2 tons at the government-controlled price) has held up matters. That problem is resolved, and the benchmark of May '83 will probably be accomplished in

7. Plant location study, financial analyses study. "Choice of firm to do the study" August '84. Given the delay in the rest of the schedule, it might seem that these could be safely ignored for at least a year. However, the lesson of the first two contractors should be remembered: it will probably take a long fight to convince the governmental committees involved to go with competence rather than the cheapest bid. It might not be too early to start planning a campaign to get high-quality work rather than low-cost trash for these studies.

B. Problems to Date

Problems causing project delays have come in three areas: Input and funding delays; Technical problems; and Management-type problems.

1. Input delays were mainly due to GOS procurement policies. As one example, 25 tons of millet was needed for preparation of materials for the market test. ITA was limited to going through government channels, i.e. CAA (Commissariat a l'Aide Alimentaire), to purchase it. CAA is only authorized to pay the official farmgate price of 65 CFA/kg, and farmers were reluctant to sell at that price. The search started in October '83, and the full amount needed was finally located in April '84. There was plenty of millet available on the open market, at the market price of 115 CFA/kg, but ITA, as a government agency, was limited to official channels and purchase price.

Another delay was experienced in dealing with GOS customs. Equipment ordered from overseas for the project was exempted from customs. Yet, even once it had arrived, there was often a several weeks wait before the customs officer would get through the red tape for releasing it.

A factor which has caused numerous delays is ITA's status as an administrative agency. One of the consequences of this is that each and every purchase order must be approved by the GOS Finance Office before it can be placed, even though the money is in ITA's approved budget. The delays due to red-tape are obvious. MERST (the Ministry over ITA) is trying to get the status changed to an industrial and commercial agency (e.g. ISRA) so that the Finance Office control will be after-the-fact, and ITA can move more expeditiously in meeting its day-to-day requirements.

For finding contractors for the various studoies USAID/ITA must go through a two-level approval process which has caused difficulties and delays. After the initial public anlnnouncements and receiving of proposals, the judgements of the project managers are taken before the GOS Comite de Selection. This committee is weighted about 4 to 2, financial vs. technical types. The majority concern is to spend as little money as possible, with little regard for the technical competence of the competitors for the conctract.

If a choice does happen to be made which is satisfactory to the technical contingent of the Comite, it must be approved by a still higher bureau, CNCA, Commission Nationale de Contrats Administratifs. Here again the tussle between the desire for the highest technical quality and the lowest cost bid must be performed. However CNCA's agreement must be obtained for any contract which totals more than 3 million CFA [illegible].

2. Technical delays of various sorts have put the project behind schedule. I do not include equipment difficulties in this category; the delays in acquisition were mentioned above, while breakdowns etc. are part of

any operation and are normal difficulties, not "problems". Delays in technical personnel performance will be discussed below.

The two main technical delays appear to have been with regard to packaging, and the arrangements with SENTENAC to produce millet products for the project.

A food product development enterprise in Senegal is not in the fortunate position of one in the U.S. with a dozen or more vendors eager to work with them in testing and choosing the best packaging for each product. However, a local vendor, SIMPA, does seem to produce a good grade of plastic sacks for food. Samples showed good ability to protect commodity products in storage tests.

For the home placement and market tests it is necessary to specify sizes and the printing (product identification, use instructions) for each product. Due to the delays in choosing the test market contractor and getting that test underway, only now can the specifications be written and given to the manufacturer. Since the quantities ordered will be minuscule (1000 pkgs. for each product, where 50,000 pkgs. is a normal order), the execution of the orders by SIMPA may take some time. They seem to be cooperative, but these small runs may be difficult to fit into their regular production schedules.

Another delay was in finding reclosable protective packaging for the weaning food. Metal canisters (used by Nestle) are too expensive. The cardboard cartons with an overwrap (Bledine) do not give adequate protection, in the estimation of project personnel. Plastic sacks are not reclosable. Inquiries in France were ignored. A local pharmaceutical house uses plastic containers with foil seal and a screw cap. They are willing to supply ITA with a few thousand from their stock in order to do the testing. However, this delay means that as of this time stability tests on the package of choice have yet to be performed.

The other technical problem of producing some 17 tons of millet in various forms (cracked, semolina, and farina) appeared to have been solved last October when the millet line at SENTENAC was found to be adequate for the purpose, and the company expressed its willingness to cooperate. The technical problem was cleaning the equipment which had stood idle for 1 1/2 years. A series of mis-communications and assumption about how this would be done by one party (ITA) were not shared by the other party, and resulted in a six-month hiatus. When the issue was finally resolved by an agreement to run 20 tons of grain through the line and discard it (use for animal feed) the question of purchasing the sacrificial grain again caused a month-long delay. This has finally been resolved, so that the production of millet flours by SENTENAC will take place soon. But this has delayed the start of the in-home market testing, from May (as seen in the original planning by CEGIR) to September or later.

3. Managerial problems of various sorts have caused delays. I will mention three, two of which have been discussed in some detail in the section on project paper assumptions.

Personnel problems have put the project behind schedule. These were dealt with under the input - output assumption that ITA would muster satisfactory personnel to carry out the project. In reprise, the problems are: recruiting red-tape; limited-term employment; low pay; and inadequate pool of technical competence. All these factors slowed down the rate of accomplishment.

Communication problems with contractors were detailed under the output - purpose assumptions. While the relationship with DEGIR was the main point there, similar breakdowns contributed to the problem with SENTENAC and to the poor quality of the Afrique Audit study.

The third managerial problem seems to be internal to ITA. There appears to be insufficient detailed tactical planning within the project group. Even more serious, the persons responsible for achieving day-to-day results do not seem to be committed to meeting deadlines along the way, or to taking initiatives which would hasten the attainment of project goals.

It was recognized in May '83 that the millet flours became rapidly infested during storage, due to maturation of insect eggs and larvae inherent in grain. The standard technology for overcoming this is to run the grain or flour through an Entoleter which destroys eggs and larvae before packaging. It was only in January '84 that this experiment was finally done and the resultant stability confirmed.

Again, the nutritional value of a weaning food is important. The formula developed at ITA was sent to Kansas State University where results from a rat-feeding test showed a PER (Protein Efficiency Ratio) equivalent to casein, the nutritionists's standard, an excellent result. Now ITA is setting up a small rat-feeding study at ORANA, using a great deal of time (and money) to test millet PER versus that of rice and wheat. The results have <u>no</u> significance for the present project; they will make no contribution to the final Feasibility Analysis.

The stability of the various products being proposed for the market tests needs to be tested at elevated temperature and humidity. An unused proof box in the bakery was identified a year ago as being adequate for the test. Despite several requests by the Resident Advisor, nothing has been done to date to carry out these tests.

C. <u>Avoiding Future Problems</u>

While future problems rank alongside death and taxes as regards their avoidance, still, from past experience (in this project and elsewhere) lessons may be drawn and applied which will ameliorate future problems. I will mention several items; consideration and judicious application of these comments will hasten the attainment of the project goals.

1. Remember the Customer! The consumer of the product of this project is the potential investor who will use the Feasibility Analysis (along with other information) in deciding to market (and make or have made) millet-based foods to the Senegalese consumer. A mill such as SENTENAC will probably not be a potential customer; they may well be a supplier of raw materials for the manufacturer/marketer.

The customer is interested in market potential and ROI (return on investment). He is <u>not</u> interested in: technical tours de force; reasons why it took so long to get a particular product developed; an interesting new idea which just needs more research to make it a reality; etc; etc.

The project thus far seems to have taken direction from technical experts (cereal chemists, nutritionists, market experts, etc.). While this is good at the early stages, it is time to re-direct attention towards the needs of the ultimate customer.

1. Focus. There are undoubtedly a great number of food-items which can be made from millet, given adequate amounts of time and product process development effort. But this project is beginning to run out of time. It is necessary to focus on those items which, with the limited amount of time left for product development effort, can contribute to the project purpose. It is time to be hard-nosed about these decisions.

Four products have been through focus group testing at ITA. Three of them (instant grain, semolina, and farina) are scheduled for market testing beginning August '[illegible] and are ready. For the fourth, instant couscous, there is no process available for industrial scale manufacture. While enough may be made by laboratory scale work for home placement tests, at this time this product does not look as if it will be convincing to the investor. Further work (effort, time, thought) on this product should not interfere with timely execution of market test preparations for the other three millet products.

Another new product, weaning food, is in the same situation as instant couscous. While enough can be made by laboratory methods for home placement tests, no industrial scale process is available. Thus this product is not likely to enter into the calculations of plant equipment and production costs for a potential investor.

The five new products (weaning food, crepe, drink, biscuit, and pretzel) have not yet been through focus group testing. For an off-the-shelf impulse-buy item such as crepes or cookies an eye-catching, bright, well-designed package is a necessity. The latest market test schedule assigns two months to achieve this; a U.S. product development team would take six to twelve months for the same assignment. Is it [illegible] to think that these products will make any kind of market-place [illegible] within the time constraints of this project which [illegible] interest in invest[illegible]. I think not.

Results of home placement tests with instant couscous, weaning food, and one or two of the other new products (e.g. cookies) may be an interesting annex to the feasibility study. But in the absence of data on equipment costs, processing costs, distribution costs, production rates, etc. these products cannot even be part of the financial study and hence of the feasibility analysis. Don't expend resources on them beyond that necessary for the home placement tests.

3. One practice which I found very useful in detailed management of product development is the PERT (Program Evaluation and Review Technique) network (3, p. 115ff). This makes it very clear to all involved in a project what activities must be finished before another one can be started. When used with time-scaled connectors, it also shows the lead time necessary to get to the end point or goal of the exercise. It is a great help in coming to grips with reality.

An advantage of this sort of planning is that when it is communicated to everyone who is part of the effort, they see how their activity (or lack thereof) contributes to the achievement (or failure) of everyone else in the project.

A PERT network, along with assigned and accepted responsibilities, is a motivator for effective work. It communicates clearly the expectations of the whole project team for each person, and also imports accountability. When team member A is delaying in an input from team member B in order to accomplish his (A's) task, if B fails to time through it is very clear where the fault lies

and A usually administers all the chastisement necessary . I would recommend that the Resident Advisor apply the concept to the preparations for the market tests.

4. The work plan envisages several contracted studies still to be accomplished. In the plan are a Plant Location Study and a Financial Study. If the recommendations of this evaluation are accepted, there will also be a Millet Supply Study (a repeat) and a Previous Millet Marketing Attempts case study (a new one).

Whatever the total number, the selection of the contractor for the study should be started soon. The work plan provides only three months for solicitation, selection, and completion of the studies. Based on the experience with the first two, at least 15 months should be allotted for the total exercise, in order to get a high-quality product.

Apparently the lessons from those two experiences are being learned. During an interview at MERST, the following process was put forward:

a) Bid for proposals. Look at all proposals for technical content only. If they are deficient in other ways (e.g. GOS bureaucratic requirements) give the submitter an opportunity to correct these shortcomings.

b) Rank all proposals technically. Forward them to the GOS Selection Committee with a cover letter from the Minister of MERST endorsing the technical rankings.

c) Go through the rest of the process, but now with much stronger support for choosing a technically competent contractor, rather than just the cheapest.

The plant location study should be based on two possible scenarios, both assuming that the plant needs to be near the source of raw material supply.

a) If the investor wants to put up his own line for cleaning and grinding millet, then the plant should be between the center of the millet-growing area and the population-weighted center of the market for finished products.

b) If the investor will be strictly a processor, depending on SENTENAC for his supply of raw materials, then the plant would be located in the Cap Vert region.

The financial study, too, should encompass both variations, and include the cost of a millet processing line in version (a).

Another major factor in the financial study is present and probable future GOS policies vis-a-vis foodstuffs, tax breaks, import subsidies and/or restrictions, etc. It will be more difficult to monitor the progress of this study than any of the others, but also more important to do so.

5. Follow-on projects. Any product development project I have ever seen also develops ideas for further work. This one is no exception. But one must take care to differentiate between further interesting and valuable work and achieving the goals of the project in hand.

The purpose of this project is to demonstrate the consumer acceptability, manufacturing feasibility, and economic viability of some millet-based food products. If the millet-grain products do that, then the purpose has been met; further product process development activities are not required within the scope of work of this project.

Follow-on work involving equipment acquisition for process development for an instant couscous, instant weaning food, or some of the other products conceptualized during the scope of this work may be justified. However, those projects should be planned, presented, and funded on their own terms. It is

not at all evident that they are required for success of the Millet Transformation Project.

A pilot plant for cereals processing at ITA may be useful in longer-term economic development of Senegal. It may be useful in transferring technologies of various sorts to industries which will help the Senegalese economy to grow, and may be a factor for technical cereal processing development for the West African countries. The ramifications of this sort of "institution building" are somewhat outside the scope of work of the present evaluation. I bring them up only because the topic has arisen in several conversations, and I want to reiterate that they are not necessary to successful completion of this project.

6. Unique contributions by USAID. The more general question has been raised, what has USAID accomplished with this project which has not been done by private concerns? I can make a few observations on this point, although many other items might be thought of by others.

The obvious first one is that research on millet transformation would probably not be taking place now without USAID support. A number of previous commercial attempts have been made and failed. No private concern is motivated to sink money into this sort of product development activity.

The project plan is probably new for this region, in that it explicitly recognizes the importance of good market research for successful product development. I would hope the example would not be lost on future enterprises.

The project has shown the technical capabilities of developing good processing specifications for the millet grain products, including good stability standards. This is a definite plus in the cereal technology picture in the region.

Finally, USAID involvement has hopefully given some examples of good management practices. While the effect of this is not evaluatable in any given project, over a period of time one would hope that the lessons of effective planning and commitment at all levels would take root.

III. PROBABILITY OF SUCCESS

One useful tool in managing a product development endeavor is to assess periodically the probability of success of each product project. This assessment is an informed estimate made by technically competent personnel. While results are sometimes given as percentages, I think that gives a false sense of quantitative accuracy. I prefer to use ranges: high, medium, and low.

The assessment is made for each stage of the product development process. The stages vary according to the development/marketing procedures of various companies. In the present context I will use four stages.

1) Technical. Development of a satisfactory prototype; methods for its manufacture; choice of packaging; storage stability.

2) Consumer. Taste panels; focus group approval; home placement tests.

3) Market. Sales in selected test markets; level of consumer acceptance.

4) Overall. Ability of the product, within the time and other constraints of this project, to contribute to a successful project product, i.e. a high quality Feasibility Analysis.

Product	Probability of Success			
	Technical	Consumer	Market	Overall
Cracked Grain	High	High	Medium	Medium
Semolina	High	High	Medium	Medium
Farina	High	High	High	High
Weaning Food	Medium	Low	Low	Low
Instant Couscous	Low	High	Medium	Low
Drink	Medium	High	Low	Low
Cookies, Pastries	High	Medium	Low	Medium
Pretzel	Medium	Low	Low	Low

A. Cracked Grain (grain brise, sanxal)

The production line at SENTENAC can produce this material to the specifications developed at ITA. Entoletor treatment at ITA gives a product with good storage stability in the packaging selected. Superior in quality to material now on the market, this should sell well if the price can be kept down.

B. Semolina (Semoule grosse, semoule fine)

Manufacturing, packaging, and stability factors are the same as for cracked grain. It is possible that two granulation grades should be market tested. Again, as a commodity-type product, price will be a major factor in market success.

C. Farina (farine de mil)

Technical factors are as for the previous two products. Farina with markedly inferior characteristics (stability, purity) has some market acceptability now; this product should sell well at a reasonable price. As the basic ingredient of couscous, farina has probably the largest market potential of the three commodity-type products.

D. Weaning Food (aliment de sevrage)

A powder with good nutritional characteristics has been formulated. Focus group tests are still needed. The product requires that the housewife disperse it in water, boil 3-5 minutes, then cool 15 minutes before feeding. All the other products on the market (Nestle, Bledine, etc.) are "instant"; the housewife adds warm water to the product in a bowl, stirs briefly, and feeds. Packaging is still a problem. A possible supplier of reclosable packages has just been located, and no storage studies have been carried out in the package. No industrial process has been identified for making the product as presently formulated, and ITA does not know how to manufacture an instantized product.

E. Instant Couscous (couscous instantane, rapide)

A laboratory-scale prototype has been made and received approval from focus groups. Packaging and stability are not problems. A manufacturing process, even at the pilot-plant scale, is not now available, and probably will not be even by the scheduled time for beginning the test market. This product could have a major market impact once process development is successfully completed. The length of time necessary to accomplish that is probably much longer than available within the constraints of this project, hence instant couscous will probably not be a major factor in the Feasibility Analysis issuing from this project.

F. Drink (Mil M'Bou)

There are a number of drinks which could be made using millet as a source of starch for body. They would use other ingredients (coconut, cocoa) for flavor. It is not clear how large is the market for this kind of beverage (as compared to soda, beer, etc.). Also, the percentage content of millet in the product would be low (5%). A beverage manufacturer interested in this market segment would undoubtedly be interested in the high-quality farina available as a result of this project, but the prouct itself is not compatible with the rest of the product line being prepared for the test market.

G. Cookies, Pastries (biscottes, patisseries)

Millet flour can be used to give unique desirable characteristics to certain kinds of baked goods (ones normally made from soft wheat flour in the U.S.). Some approaches to bakers of these products have been made, and interest has been expressed. While the idea is outside the test design of the project (i.e. it would not make sense to run a market test on cookies made by ITA), a sound assessment of the interest level (and probable use levels) of patisseries for millet flour would be a good contribution to the Feasibility Analysis.

H. Pretzels (bagels, pain de New York)

This is an interesting concept, with good long-range possibilities. There are a number of technical hurdles to be overcome. Once a successful prototype

is achieved, the concept of a chewy, doughnut-shaped bread would have to be "sold" to the Senegalese consumer. This would be a novelty in the market place, with all the risks and potential payoffs of food novelties. The time-frame for realizing this is much longer than the duration of the present project.

To summarize, it appears at this point that the products most likely to give market test results which will interest a potential investor are the three commodity items (cracked grain, semolina, and farina) and the use of millet flour by sweet goods bakers.

It should be remembered that this assessment holds as of the date of this evaluation. If tomorrow ITA should locate an equipment maker who manufactures a line for making good quality instant millet couscous, or they find a means for manufacturing instantized weaning food, then the probability assessments change. But until any such events occur, the assessment table presented above seems to be the most likely state of affairs.

I. Probability of Project Success

The above judgements are applied to individual millet-based products. There is also the question of the probable success of the overall project, i.e. the chances of convincing an investor to enter the processed millet food market in Senegal.

1) The first stage, set out in the first part of the project paper purpose and comparable to the technical stage of product development, is to: "Establish cultural acceptability, technical feasibilityk and economic viability for production and sale of (some) transformed millet foods". The probability of success for this stage is high.

Given one product rated high and three others rated medium as to overall probability of success, it seems certain that at least two of these will prove to be cultural, technical, and economic winners.

2) The second part of the PP purpose is: "Develop a manufacturing/marketing/financial plan to help attract investment capital . . " This is parallel to the consumer testing stage.

Accomplishment of success depends greatly on the quality of the inputs, the studies on: market potential, raw material availability, plant location factors, previous pitfalls avoided, and financial analysis. Of two such inputs in hand, one (millet supply) is a waste and must be redone, while the other (market research) seems to be well thought out. Hopefully the lessons learned from the process and results of choosing the contractors for these two studies will be applied when contractors for the other studies are being selected. In my opinion, the probability of success in arriving at a product (the Feasibility Study) which will interest potential investors is medium.

3) The final stage, comparable to a successful test market, is implicit in the PP goal and assumption: "Convince a private or public enterprise to invest money to make the plan a reality". There are a number of factors here which are outside the control of the project executors, and may change during the next few years. GOS policies enter into the picture.

Manufacturing costs include raw material price and availability, which is greatly influenced by government pricing policies. Add, to the price paid for millet, the costs of: processing, packaging, distribution, and RDI to arrive at a marketing price. To have acceptable levels of sales this price must compare favorably with the price of rice and wheat, prices which again are influenced by governmental subsidies, as well as world market trends.

Assessing the ultimate probability of success of the project, then, involves not only the product (the Feasibility Analysis) but government policies and world grain market trends some three years hence. The writer of this evaluation is not technically qualified to predict those factors and make an assessment; he leaves it to others to make that judgement.

IV. RECOMMENDATIONS

Recommendations for actions to be implemented are under three headings: A) Studies and Contractors; B) Market Test and Managerial Planning; C) Additional Inputs.

A) Studies and Contractors

1) The Millet Supply study needs to be redone completely. A lack of millet available at an acceptable price has been a factor in at least two of the failed attempts at marketing processed millet foods. The potential investor will need good, reliable information on this point. Seek a technically competent firm to repeat the study.

2) Case Study on previous failed attempts. In the interests of credibility with the customer, this analysis must be available. This would be an additional expense, not predicted in earlier budgets but it is justified. The local management school should be able to do a good job on this sort of thing.

3) The other studies, on plant location and financial viability, are already in the plan. I strongly recommend that the process for obtaining these studies begin no later than July '84. Given the experience with previous studies, this might yield the desired output in time to make them part of the feasibility analysis.

B. Market Test and Managerial Planning

1) I recommend that the Resident Advisor, along with personnel from CEGIR and any others who might be of asistance (e.g. from Experience Inc. or USAID) draw up a PERT network for the Market Test plan. This will bring into focus the necessary activities and responsibilities of all personnel involved at CEGIR and ITA.

2) Along with the PERT and the time-scaled plans for the market test, agree in writing what will be the decision points for each product (i.e. whether to continue with the product, to drop it completely, or to reformulate and try again) and what specific criteria will be applied at each decision point. This agreement needs to be reached during the next three months, before the home placement tests start.

3) Establish <u>now</u>, with the management of CEGIR, what kinds of information and analyses will be required in their final report. Look at the market test from the viewpoint of the Feasibility Analysis (and the customer) and consider what sort of market test data will be required. Doing this in advance ensures that the opportunities to acquire the relevant data are not lost.

4) The Director General and the Assistant Director General of ITA, with the help of the Resident Advisor, must work out methods by which more of the responsibility and authority may be delegated from the Director General to his assistant. This is not a simple task considering the constraints and systems which exist in the DGS in general but it is necessary in order to keep the project moving during the Director General's absences or involvement with other duties.

C. Additional Inputs

1) Time. I recommend that the project be extended beyond its present scheduled final date of 30 September 1984 by a period of 12 months, to 30 September 1985. While the market test plan put forth by the Resident Advisor envisaged the market test continuing until the end of June 1985, in my judgement the work applicable to achieving the goal of this project will be finished by the end of March. This allows six months for doing the final market test report and pulling together the other studies to give the final project product, a Feasibility Analysis which will interest a potential investor.

2) Personnel. The present cadre, including the Resident Advisor, should be retained for the additional 12 month period. The technical personnel not involved with data analysis and report preparation could be continuing product development work which would be useful in buttressing the final report.

3) Equipment. I recommend the purchase of an additional Entoletor for the laboratory at ITA. This will be a backup for the one already there. Treatment of the millet flours with this machine is important for shelf-life stability of the product. If the present one were to break down while samples were being prepared, everything would come to a halt. At an approximate cost of $6,000 this is cheap insurance.

No other equipment is needed to achieve the purpose of this project, within the time constraints of the market test plan.

4) Funding. Numerous factors enter into determining the exact amount of additional funds to be made available. Unilateral tentative proposals have been offered by ITA and USAID. I recommend that USAID negotiate the amounts needed to fund the proposed one year extension, considering that: a) no additional millet and little additional equipment is needed; b) contracted studies above and beyond original plans are required; c) salaries, support personnel, and other requirements can be readily agreed upon in the process of setting the detailed budget.

EVALUATION SUMMARY - AFRICA BUREAU QUESTIONS

1. What constraint did this project attempt to relieve? It addressed three constraints, one directly and two indirectly. There is a very limited variety of foods based on millet available in the market; this constraint is directly addressed by the project. Indirectly the project attempts to relieve two constraints: the lack of motivation for farmers to grow millet as a cash crop (because of an unreliable and/or unprofitable market); and the necessity to import cereal grains to provide adequate food for the population.

2. What technology did the project promote to relieve this constraint? It uses modern cereal technology, cereals processing techniques, and market research methodology to identify viable millet-based food products.

3. What technology did the project attempt to replace? It replaces the tedious hand-processing of millet presently in use.

4. Why did the project planners believe that the intended beneficiaries would adopt the proposed technologies? As the population becomes more urbanized convenience in food preparation becomes a larger factor. There is still a cultural disposition towards millet as a food, but an indisposition with regard to the traditional tedious method of preparation.

5. What characteristics did the intended beneficiaries exhibit that had relevance to their adopting the proposed technology? The housewife presently purchases some amounts of processed millet-based foods in the market, in spite of admittedly low quality in general. At the other end of the food chain, the response of the farmers to the government's promise to buy all their excess millet in FY 78/79 shows that they are willing to raise millet as a cash crop if the market for it seems assured.

6. What adoption rate has this project achieved in transferring the proposed technology? N/A

7. Has the project set forces in motion that will induce further exploration of the constraint and improvements to the technical package proposed to overcome it? Yes. The Institut de Technologie Alimentaire is considering a pilot plant and seeking changes in its charter which will allow it to continue exploitation of this technology after the termination of the present project.

8. Do private input suppliers have an incentive to examine the constraint addressed bhy the project and to come up with a solution? Yes - profit. Several attempts have been made in the past by private concerns to manufacture and market millet-based foods. The reasons for their failures have been taken into account in the design of the present project.

9. What delivery system did the project employ to transfer technology to intended beneficiaries? The project will produce a Feasibility Analysis which will be a major factor in convincing investors to implement the technology and develop a complete delivery system.

10. What training techniques did the project use to develop the delivery system? Working with ITA the Resident Advisor and short-term consultants guided them in application of cereal technology, planning techniques, and project management methodologies.

11. What effect did the transferred technology have upon those affected by it?
N/A

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