GUIDELINES FOR EXECUTING AND DOCUMENTING SMALL-SCALE MILLING PROJECTS

Lignes directrices pour la réalisation et la documentation de projets de petites minoteries

Compte rendu du colloque tenu à Dakar, Sénégal, du 2 au 4 mai 1988

Report of the meeting held in Dakar, Senegal, 2-4 May 1988
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Guidelines for Executing and Documenting Small-Scale Milling Projects

Report of the meeting held in Dakar, Senegal, 2-4 May 1988
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ABSTRACT

This report summarizes the results of a meeting attended by researchers and development workers in Africa concerned with the development and use of small scale milling systems incorporating dehullers. The meeting, which was held in Dakar, May 2-4 1988, by the Post Production Systems Program of the International Development Research Centre (IDRC), involved individuals working on projects supported by IDRC, international organizations and governments.

Presented in this report are brief résumés of the activities of various projects and the areas of interest of various individuals involved in small scale milling. The main differences between the Western/Central and Eastern/Southern grain dehulling systems are discussed.

In order to improve the quality of results obtained, and to properly document them, one of the main objectives of the meeting was to agree on guidelines for use within the various research, development and testing activities. Detailed guidelines for research methodologies and for the documentation of results in the form of case studies are presented. They will be found useful by workers in the field to execute their research and for reporting results in a comprehensive manner. In addition they will be used by researchers and development workers in Africa to prepare for a workshop in the near future, where results of various activities will be presented.
This report is a result of the input of all the participants at the meeting; they are identified in Appendix A. Their involvement in discussions, as presenters, rapporteurs, chairman are acknowledged. The untiring help of Marie Elizabeth Turpin during the preparation of the manuscript is greatly appreciated.

The views expressed in this report are those of the authors and not of the International Development Research Centre.
INTRODUCTION

Background

Cereal and other grains are traditionally processed in Africa by women using mortar and pestle, which is a time consuming task. Several studies have suggested that quality of life can be positively changed if faster and less onerous methods of dehulling and grinding are made available to rural women.

Various types of grinders have been introduced in many African countries and have in many cases made a difference to the task of processing in villages and in the urban areas. However, in the case of dehullers, although several are available, it has been difficult to find one which can satisfactorily process the range of grains grown.

The abrasive disc dehullers which have been developed with by various Canadian and African researchers with support from the International Development Research Centre (IDRC) have the potential of making a significant impact in areas where dehulling of grains is practised. This dehuller consists of a metal barrel partly filled with grain, within which abrasive discs are made to rotate about a horizontal axis. The abrasive action of the discs rubs off the outer coating of the grain, rendering it more organoleptically acceptable to the user. As a result of its design, the dehuller can satisfactorily process a wide range of grains such as sorghum, millet, maize, cowpea, etc.

In order to fulfil the dehulling needs within various contexts, several of these dehullers have been developed as outlined below for small scale milling systems, i.e., for processing up to about 500 kilos of grain daily:

* MINI-PRL dehuller
  Developed by the Plant Biotechnology Institute (formerly the Prairie Regional Laboratory) of the National Research Council of Canada, this dehuller has been used as the basis for the other mini dehullers.

* MINI-CRS dehuller
  Developed by the Catholic Relief Services in the Gambia. They are presently being used in the Gambia, Mali and Niger.

* MINI-ENDA dehuller
  Two models have been developed in Zimbabwe by ENDA.

* MINI-SISHAR/ISRA dehuller
  Two models have been developed by both the Institut Sénégalais de Recherches Agricoles and SISMAR, a manufacturing company, in Senegal.
Experience with these dehullers have shown that they have a good chance of success, provided various stages of their development and testing follow systematic methodologies. In addition, the possibility of using results in future projects is directly related to the proper analysis of data and documentation of present research. Unfortunately, many of the projects on small scale milling systems are lacking in some of the crucial elements mentioned above.

In order to try and correct this situation, a meeting was organized in Dakar, Senegal, May 2-4, 1988, by the Post Production Systems (PPS) Program in the West/Central African Regional Office (WARO) in collaboration with that in the Eastern/Southern African Regional Office (EARO), bringing together about twenty participants, from ten projects supported in Africa by IDRC and other donors and from organizations with a strong interest in milling. (See Appendix A for the list of participants.)

Objectives of Meeting

The overall objective of this meeting was to encourage the execution of projects using methodologies that would allow useful results to be obtained and properly documented.

Specific objectives were:

(a) To evaluate the work being carried out within various projects using the mini dehullers in Africa;

(b) To re-orient research activities so that all projects use systematic methodologies for executing research activities, analyzing data and reporting results;

(c) To establish guidelines for the preparation of case studies which will form the basis of a workshop to be held in 1990, aimed at providing a comprehensive state of the art of small scale mills using the mini dehullers.

Methodology of Meeting

Participants were officially invited at least 6 months before the meeting and background documents outlining the aims and objectives of the meeting, guidelines for making presentations, the provisional agenda, etc, were subsequently sent. (The agenda for the meeting is shown in Appendix B). In addition, documents for guiding the sessions on research methodologies and the documentation of case studies were prepared in advance. The respective chairpersons were briefed in advance as to the expected outcome of their sessions.

The meeting was opened by Pierre T. Sane, Regional Director of the IDRC office in Dakar, who gave a global view of the social and economic problems in the region and the place of small scale
milling systems research within this context. This was followed by a presentation on the reasons for the meeting and the expected output from participants. Each participant was assigned duties as chairperson and/or rapporteur for various sessions of the meeting.

The meeting consisted of sessions on:
* the presentation of project reports from the projects,
* presentation by others of their interests and activities,
* discussion of the methodologies for research activities,
* discussion of the documentation of case studies,
* discussion on collaboration between projects,
* summary and closure of meeting.

The Agenda of the meeting is shown in Appendix C.

**SUMMARY OF PRESENTATIONS**

Each project presented a paper on the work done. Since they did not give a complete picture of the activities and results obtained, and since it is anticipated to have complete documentation in the near future, these papers have not been included in this report. Resumes of presentations by participants not directly working on small scale milling systems projects are also included.

**Processing of Maize and Sorghum Using Traditional Methods and Dehullers in Malawi by Wells Kumwenda.**

This project began formally in April 1986, but due to slow acquisition of equipment, completed its first effective year of applied research in March 1988. The presentation was well structured and informative. The project aims at problems in two different food systems:

a) The majority of Malawi’s 8 million inhabitants consider maize as their staple food. The introduction, several years ago of a high yielding maize variety, (characterized by a dent in the crown of the kernel) met with poor acceptance by the majority of small scale farmers. Due to the absence of an adequate amount of vitreous endosperm in the crown, this dent variety led to poor recovery rates when dehulled by mortar and pestle; substantial portions of the grain crumbled away. It is hoped that mechanical dehullers will give adequately high recovery rates while dehulling to an acceptable level, and thus can serve to remove the home pounding labour bottleneck (regardless of the maize variety) and might remove a major constraint to farmer adoption of the higher yielding dent variety in favour of the lower yielding traditionally grown flint varieties. Parallel research is seeking to compensate for the dent variety’s poor storage characteristics (pest resistance) on farm.
b) That proportion of Malawi's population which lives in the semi-arid areas, the valley of the Lower Shire River, has traditionally grown and eaten the more drought-resistant sorghum and millet. Planting patterns have begun to change, however. Farmers are taking the risk of recurring maize crop failures due to low rainfall, because of the lower amount of home labour required to render maize into a palatable form.

The project is introducing one RIIC dehuller and one MINI-ENDA dehuller to potentially compatible communities in the semi-arid Lower Shire Valley, and to a typical maize-growing area nearer the main agricultural research station. Training in Botswana and Zimbabwe of two researchers and two farm mechanization extension personnel was followed by a screening process to select potential pilot sites where the dehuller would be added to an existing hammermilling operation. The project aims to develop its skills of fitting existing dehuller designs to rural needs, rather than to evolve new designs.

The two RIIC dehullers were installed in the first part of 1988; the mini-dehullers will go into the field shortly. Steadily increasing rates of dehuller utilization for servicing the needs of individual customers are being reported for this, immediate post harvest, season.

The Zambia Grain Dehulling Research Project by Mandesi Kaumba.

Zambia's national cereal self sufficiency was severely affected by the droughts in southern Africa between 1984 and 1986. The previous policy of emphasizing production, processing, and marketing of maize to the virtual exclusion of drought-resistant cereals was reviewed in the face of these droughts. It was recognized that any policy to promote the drought-resistant grains, accompanied by the release of promising, improved cultivars of sorghum and millet, was facing the constraint of the absence of appropriate systems to render these grains into an edible form, both at the rural level (where the available subsidized maize meal has had its own effect on planting decisions) and at the urban level.

It is hypothesized that the presence of dehullers in rural areas will increase the production and utilization of sorghum and millet. A complementary test will seek to establish the degree of demand (entrenched preference) for coarse flours, or meal, for the traditional stiff porridge from dehulled sorghum and millet.

The initial rural visits, for the selection of 3 suitable sites of existing hammermilling installations, to be augmented by dehullers, are being planned now.

It is further hypothesized, given the sparse population in Zambia's substantial semi-arid areas, that the size of the Mini-Enda dehuller will be technically suitable to those areas. One large dehuller, of the RIIC (named after the Rural Industries Innovation Centre in Botswana) size, will be pilot tested in a peri-urban situation yet to be selected.
The project formally began in May 1987, and has been hampered by slow acquisition of equipment. The applied research aims to develop SIDO's capacity to identify and respond to rural grain processing bottlenecks, to characterize the constraints and opportunities inherent in the prevailing competition between maize and the drought resistant grains, and to develop a plan for wider scale diffusion of dehullers, if deemed desirable.

Part of the project's execution is a multi-disciplinary committee which will meet periodically to assess SIDO's progress. This includes representatives from the National Sorghum and Millet Improvement Programme, the National Food and Nutrition Commission, the National Council for Scientific Research's Food Technology Research Unit, the University's Rural Development Studies Bureau, the University's Technology Development and Advisory Unit, the University's Department of Agricultural Engineering.

Sorghum Milling II (Tanzania) by Lawrence Limbe.

SIDO has recently completed its second phase of research with dehulling of the drought-resistant grains. In that phase, four small scale grain processing enterprises incorporating a dehuller, a hammermill, and engines, were established, each under the management of a village committee, in the semi-arid regions of Dodoma, Singida, Tabora, and Shinyanga. This was being undertaken at the same time as a strong official campaign to increase the planting of drought-resistant grains, but in the face of a de facto official preference for maize (price differentials favouring drought-resistant grains over maize in low-rainfall areas were introduced for the first time in the 1982-83 harvest season).

Deteriorating economic conditions made the research team's progress very difficult. Located in the commercial capital of Dar es Salaam, the team faced problems of the fuel scarcity which delayed visits to the sites 500-800 km distant, and of understaffing in the regions, which made monitorship a rare occurrence. At the political and the policy level there was an increasing conviction that the introduction of dehullers would alone make a significant difference to the utilization and thus production of sorghum and millet. Village contact, and identifying the corresponding problems faced by villagers, did not receive the same intensity of attention.

The results for the four pilot sites indicated:

- rurally located hammermills were indeed needed and welcome;
- rate of village utilization of dehullers was approximately 10 percent of hammermill utilization in three of the sites, and zero in the fourth; a dehuller smaller than the RIIC size would be more cost effective:
it is hypothesized that a substantial need exists for dehullers located in rural areas: some to reduce home labour; but some to be introduced as novel techniques of removing the bitter tannins from those sorghum varieties with such soft endosperms for which no tradition of hand dehulling by mortar and pestle has existed; also there is an undetermined potential urban demand for flour, or meal, from dehulled sorghum and pearl millet.

- SIDO has written a brochure in Kiswahili, to be distributed to village communities in the semi-arid regions, explaining the existence of dehullers, and SIDO's preparedness to make them available;

- SIDO will propose a third phase of applied research aimed at wider diffusion of the technology, incorporating more disciplines in the work, and linking more closely to other national agencies.

The ENDA-Zimbabwe Experience by Arthur Dibi.

The majority of Zimbabwe's rural inhabitants live in drought afflicted, semi-arid areas characterised by rapid population growth and increasing land pressure, poor infrastructure, soil erosion and declining soil fertility. Attempts to grow high yielding hybrid maize (which, like sorghum and millet, is consumed in the form of a stiff porridge, sadza) in the semi-arid areas is very risky. Since the droughts of 1982-1984 greater attention has been paid to promoting the drought resistant cereals. In 1985 the official price policy included both sorghum and millet, providing the semi-arid dweller with an opportunity to obtain cash from the sale of the drought tolerant cereals.

In May 1985 ENDA-Zimbabwe, a local non-governmental development and research organization, began to investigate the application of grain dehulling technology in the communal (semi-arid) farming areas. The pilot project, supported by the Canadian High Commission and IDRC, aimed to enable ENDA to: install five mini dehullers at rural hammermill sites and monitor those locations for 12 months; verify that the dehuller is an appropriate response to the rural problem of hand pounding of sorghum and millet; determine the manufacturing capability of the informal sector; train a core national staff in technology transfer; prepare an action programme of nationwide dehuller dissemination.

Starting from the MINI-PRL dehuller, ENDA developed three designs: a MINI dehuller with a 10 kg barrel capacity; a dehuller with an 18 kg barrel capacity; a continuous flow dehuller with an 18 kg capacity, including aspirated removal of the bran. Since Zimbabwe is faced with severe foreign exchange restrictions, the supply of imported grinding stones was a problem. Thus, some effort went into testing the effectiveness of metal discs coated with a mixture of coarse grit and a bonding material, Trinepon.
The five village installations were selected by a process which included consultation with potential communities, advice from district administrators and agricultural extension personnel. Installations of dehullers took place between late October 1985 and early 1986, all in the South East of the country. These locations were affected by localized drought in the harvest seasons of both 1986 and 1987. Limited amounts of throughput data was therefore available at the installations. Urban demand for meal from sorghum and pearl millet was tested in late 1987, and promising data was obtained.

Results were promising enough to justify the generation of a proposal for wider scale diffusion of dehulling technology. An agreement between the donor (CIDA) and the Government of Zimbabwe was signed in late 1987, and ENDA began to assemble the needed staff in April 1988. The hiatus between the end of research funding in mid 1987 and the start of the diffusion project did affect ENDA's capacity to provide effective continuity of staffing on the dehulling activity.

The MINI-CRS Grain Dehuller by John Nance.

The different experiences which led to the development of the MINI-CRS dehuller were elaborated; the CRS had bought a MINI-PRL dehuller and tested it in a village for two years after which it was noted that the machine was not robust enough. In view of the popularity of the dehuller, IDRC supported a project which resulted in the development of the MINI-CRS dehuller suited for manufacture by artisans in the Gambia. The modifications consisted of: making the machine more robust, a simple clutch that can be manufactured using simple tools, simplicity in design and ease of manufacture. About a dozen of the dehullers have now been manufactured by a workshop for use in The Gambia, Mali, Niger, and Canada.

In The Gambia, an assessment of the dehuller is being carried out in four locations: in three villages using a diesel engine and in a semi-urban area using an electric motor. The presentation lacked details on the socio-economic aspects of the project as noted by several of the participants. It was pointed out that this aspect would be considered in detail in the future. However, it should be noted that the available socio-economic data shows that the semi-urban mill using an electrically operated dehuller is an economically viable activity. Village mills are on the other hand not processing enough grains due to poor management by the village committees, and lack of grains due to poor production.

Dehuller Development in Senegal by Hyacinthe Mbengue & Ibra Seck

This IDRC-supported project is being carried out by SISMAR and ISRA. Hyacinthe Mbengue began the presentation with the socio-historic context of introducing the dehuller technology in Senegal. He noted in particular that while rice is one of Senegal’s major staples, millet and sorgho are also consumed in
significant quantities. These grains require physical or chemical transformation before they can be consumed. However, a process which begins with dehulling of the grain and continues with a grinding process to produce flour. While Senegal has had milling technologies to transform already dehulled grain into flour since World War II, less attention has been paid to the dehulling phase which is traditionally done with mortar and pestle; a particularly onerous task as performed by village women. Previous experimentation with a dehuller produced by the Fonderie de L'Afrique de l'ouest, was unsuccessful because the mixture of grains at the village could not be accommodated by a single machine.

For the last several years, then, SISMAR and CNRA have been collaborating on the development and testing of several dehullers in a triangular approach involving the users and these two organizations. SISMAR has been responsible for the design and production of the prototypes tested by CNRA, first at their research station and then in conjunction with villages in their selected test sites. The results of this experimentation are then fed back to SISMAR where adaptations to the technology are made as necessary.

The first model tested by CNRA was the FAO/COMIA dehuller which proved to be technically effective but only when used to process larger quantities of grain. The minimum quantity necessary for correct dehulling was found to be 15 kg which automatically ruled out its appropriateness for village use where people process much smaller batch quantities (about 3 to 6 kg at a time). The high initial purchase cost of the machine (about 3 million francs cfa) meant that it would be almost impossible to amortize the cost of the machine at typical village use of 30-40 kg per day and a price of 25-30 cfa/ kilo. The project therefore decided that this technology, while potentially of interest to urban areas, was not suitable for promotion at the village level.

With this experience behind it, the project turned to the MINI­PRL dehuller developed in Canada. Three dehullers adapted from the first prototype have now been produced and tested by the project, each model incorporating changes as a result of testing either at the CNRA research centre in Bambey, or at one of the nine villages which have been selected as test sites. Two important pieces of information concerning user preferences have been identified. First, women will accept a degree of dehulling 20% for maize and 25% for millet. Second, they prefer to process their grain in batches of about 4-5 kgs. These preferences have very important implications for the technical and economic feasibility of the dehullers.

An immediate contradiction was observed between what people wanted the machine to do and what it was technically capable of producing since it was found that when smaller quantities of grain were fed into the machine, the rate of dehulling was reduced. Thus, at the minimum batch size of 3-4 kg, only 6% of the grain was dehulled, presumably because friction of the grains themselves was reduced and most of the grinding was as a result
of the grains coming into contact with the disc surface. This latter had a secondary round of economic effects since it was then found that the discs wore out considerably faster when small amounts of grain were processed than with a larger batch size, and larger quantities used proportionately less fuel than smaller batches.

With this information, the project put much of its effort into trying to resolve the problems which make processing of small quantities technically and economically unviable. Some of the other technical changes have resulted in three models, the two latter of which have been produced, i.e., the MINI-SISMAR/ISRA I and II. The earlier of these machines was similar to the MINI-PRL dehuller but it had a winnowing system using a sieve and aspiration. The MINI-SISMAR/ISRA II dehuller has two dehulling compartments where less than four kilos can be dehulled, the dehulling chamber does not have to be rotated in order to empty the grain, and is substantially reduced in cost. These dehullers use resinoid discs with aluminum oxide as the abrasive substance. The cost of the latest model with a 6 HP diesel engine is about 1.25 million cfa.

It was found more efficient to process small batches (up to 100 kg/day) with an electrical power source (15 cfa/kg) rather than with a gas or diesel engine (20-50 cfa/kg) but the absence of electricity in most villages necessitates reliance on the more expensive technology.

The project is not yet fully convinced that the dehuller will be economically viable at the village level; that is, whether the villagers will be willing to pay a price which covers both amortization and operation of the machine. Since the machines are now in the testing phase, villagers can set the price of dehulling at a level to cover minimum operating costs. This has often been found to be well below the 25-30 cfa/kg calculated by the project as the real cost of amortization (at 18% interest rate) and operation.

Given the information available to the project, it is estimated that the minimum level of operation for a dehuller to turn a profit is 200 kg/day (diesel) or 50 kg/day (electric) at the prices indicated above.

Questions on the presentation concerned the clarification of several technical points and a suggestion that modification of the machine so that bran was removed at an earlier stage in the process would improve efficiency. A request was made for more precise information to be provided on costs.

Dehuller Testing Project (Niger) by Lizabeth Edgar and Hadiza Alhassane.

This project which is being carried by the NGO, ISAID (Canada), and supported by IDRC, is aimed at improving the social conditions of the rural woman who is confronted with multiple
tasks of transporting wood, pounding of cereals, preparing meals, etc. It is in its early stages and will involve the testing of three MINI-CRS dehullers in Niger in three villages; Filingue (10856 people), Chikal (4328 people) and Louma (3365 people).

The criteria for choosing the three villages were the following:

* The village must present a request voluntarily;
* The village must have an adequate level of population;
* The community must have the will to be involved in the project activities;
* The women must build the building which will house the dehuller.

Since the project started less than a year ago, the following activities have taken place:

* A survey was carried out in the villages to identify various socio-economic conditions;
* Four field workers were employed;
* Studies carried out to assess the degree of dehulling done traditionally, time spent on dehulling, amount of grain dehulled per person, availability of money to pay for dehulling, etc.

The management of the mills will be by village committees. It will comprise a chairman, secretary, treasurer and two other members.

The first dehuller operated by a 3 HP electric motor has been installed in Filingue. It has been well received by the women users. Tests carried out to determine dehulling times and acceptable degree of dehulling showed that women preferred millet that had been dehulled for 6 minutes. Preliminary tests on traditional dehulling indicated that women take off up to 34% of the grain. On the other hand, machine dehulling using existing dehullers take off about 25% of the grain. Women often use hand pounding to obtain the required degree of dehulling.

A summary of the various comments made are:

* The 3 HP electric motor is not powerful enough to run the MINI-CRS dehuller;
* According to the report, manual dehulling gives lower yields. Also the machine dehulling times are too long. Yields of 15 percent would be more satisfactory. Yields obtained after 6 minutes of machine dehulling will cause wastage and nutritional losses. Taste tests should be done using millet that has been dehulled for 4 and 7 minutes; it is difficult to differentiate between food prepared using these products. Due to the higher level of tannins present in the millet grown in Niger, dehulling times may be substantially longer compared to other countries.
Experience in the Cotton Zone of Southern Mali by Jean-Pierre Derlon.

The Compagnie Malienne de Développement des Textiles (CMDT) was formed to exploit the production of cotton in southern Mali. There are presently about 70,000 hectares of land being cultivated, of which a significant portion is for food crops such as millet and sorghum.

As a backup to the cotton project, the CMDT initiated the development of the capacities of blacksmiths for the production of agricultural implements and to promote maize and other food crops for the cotton growers. Hand processing was identified as a constraint to the use of the cereal grains and grinders were introduced. Blacksmiths who had received electric generators for the operation of welding machines were encouraged to manage the grinders.

Experience with these mills showed that the grain brought for processing dropped if the fee was more than 10 cfa per kilo. Women have to provide all the money for grain processing which they do not have enough of. They would therefore have to be involved in some income generating activity. Another problem is the lack of an established price for locally produced grains. Local traders exploit villagers and it is difficult to compete with the price of imported grains.

The milling project is funded by the Fonds de l'Aide et de Coopération Français, within which it is anticipated to install 12 mills. Eight of these mills will be within the area managed by the CMDT whereas the other four will be under the Office de Développement Intégré des Productions Arachidières et Céréalières. There is at present only one mill in operation at Nampossela in the CMDT region of Koutiala. A second is being installed at Karangana, in the same region.

The mill in operation uses one of the family of abrasive disc dehullers, the NUHULL, made by NUTANA of Canada. This machine uses nine carborundum stones. Two 12 HP Lister engines are needed to power the dehuller, a hammer mill, and a rotary separator to separate the various fractions, from broken grain to fine flour. The various products are stored in sealed bags.

The village association organizes the operation of the mill, employs staff and sets prices (35 cfa/kg and 55 cfa/kg of processed flour in 1986 and 1987 respectively). The mill uses a staff of 6 persons: storekeeper, miller, accounts clerk, and three women for sorting, bagging and weighing.

The MINI-CRS dehuller has been introduced in Mali with funding from the Appropriate Technology International (ATI). It is intended that this dehuller will be produced by local blacksmiths. A malien has been trained by the CRS in the Gambia on fabrication aspects of the machine. Two dehullers were sent from the Gambia but got lost in transit. A third one was later sent and tests have been carried out to assess its performance.
Satisfactory products have been obtained for maize, sorghum, millet and cowpeas, dehulling times ranging between 2 and 5 minutes, depending on the grain and yields between 80% and 88% were obtained.

Some comments from the discussions:

* No measurement of the time spent by women at the mill to wait for their grains to be processed have been made.
* The 10 cfa/kg is the price to grind the grain.
* Processed grains can be stored for up to three months without any problem.

Interest of UNIFEM in Milling by Ruby Sanhu.

The United Nations Development Fund for Women (UNIFEM) is a source of funds and technologies, intended to benefit women in least developed countries. Support categories include human resource development, employment and income creation, planning, energy, and information. UNIFEM will support projects which are innovative, self-sustaining, catalytic and of two year duration. The ceiling is USD 200,000 per project; approval mechanisms are easier for projects costing USD 40,000 or less. One successful UNIFEM activity has been the development of Women and Food Cycle Technologies in which information has been disseminated through a series of source books, and in which technologies have been made available to women.

In the context of the present workshop on appropriate milling systems, the speaker raised a number of issues. The problem usually is not the finding of an appropriate technological solution. More difficult is to find the best way of making an improved technology available to women, to own and/or to use it; finding a source willing to provide credit is often a major problem. While a mill is recognizably a labour saving device, much of that saved time is often spent waiting at the mill.

Is the introduced technology really an improvement? The case of machinery for dehusking of paddy in Bangladesh is a classic example of an introduced technology marginalizing even further those poor women who earned a living providing this manual service to their wealthier neighbours. Much of the technology which is being described in this workshop is in some respects quite large scale. Has consideration been given to bicycle driven grinding mills or dehullers? Some previous speakers have indicated that the performance of introduced technologies can have the effect of changing the taste of the resultant food product. Such a change is very important to the household, and must be considered very carefully.

Interest of SODEFITEX by M. A. Salcedo.

Mr. Salcedo of the Société de Développement des Fibres Textiles (SODEFITEX) provided a paper entitled "Projet de Coopération Sénégal-Française de Transformation Villageoise des Céréales Locales".
This project resembled in outline and intent that presented by Mr. Jean-Pierre Derlon of the Compagnie Malienne pour le Développement des Textiles (CMDT), also supported by French Official Aid. The project conforms to Senegal's new agricultural policy of emphasizing local cereals, their processing and commercialization of finished products. In order to achieve that objective, the following means are proposed:

- to make available to rural populations processing technologies capable of producing shelf stable products;
- to find outlets for the processed products and to identify the most appropriate methods of commercialization with regard to impact and cost.

Five processing units will be established: two to be operated by the SODEFITEX, and three to be owned and operated at the village level. The units will comprise a grain cleaner (for sorghum and millet), a dehuller, a hammermill, a sifter to size-grade different milling fractions, a bagging and sealing facility, weighing equipment. Each unit will have a capacity of 150-200 kg per hour capable of generating 150-200 tons per year of finished product. A simple building, clean and enclosed, of 40-60 m² will be required. The document contains detailed a priori costing estimates for a typical processing unit. Given present producer prices, and an entrenched urban preference for rice over sorghum and millet, it is recognized that the margins will be tight.

The project will first test one unit in an urban location, and then move to village level. The relatively large size of the processing unit may require a joint venture of several adjacent villages. The project assumes that availability and collection of required raw materials will not present major problems.

Interest of Programme Sécurité Alimentaire (PSA), Commissariat à la Sécurité Alimentaire (CSA) by Abdoul Aziz Diédhiou.

The verbal presentation was accompanied by the distribution of a paper "Activités du CSA/PSA dans le domaine de la transformation des céréales locales au Sénégal". The CSA/PSA became involved with processing of local cereals in 1986 to support the commercialization of local cereals. The Food Security Commissariat (CSA) has three principal tasks: to regulate supplies of local grains (sorghum, millet, maize); to promote local grains (a GTZ-supported project is under way); to distribute food aid in case of disaster and famine.

Processing of local grains (millet, sorghum, maize) takes place at three levels in Senegal:

- industrially, by Les Grands Moulins de Dakar, SENTENAC and ITA (Institute of Food Technology);
- semi-industrially, but dealing with small volume, at the agricultural research station in Bambey, at ITA and some research work at the laboratory level;

- at the artisanal level, with the activities of IDRC, the Senegalese Institute for Agricultural Research (ISRA), the parastatal equipment manufacturer SISMAR, ENDA Tiers Monde, the Ministry of Social Development, etc.; a wide range of activities.

The CSA/PSA has concentrated on semi-industrial scale processing scouting, for dehulling machines, supplied nationally or internationally, in order to test the most promising of these in Senegal, after having examined their specifications.

The main body of this brief paper describes an evaluation test of a semi-industrial processing installation for millet comprising a grain cleaner and grader, a novel dehuller, a cylindrical grinding mill. The dehuller, designed by SERRIAL (Société d'Etude, de Recherche et de Réalisation pour l'Industrie Agro Alimentaire), has an abrasive cylinder made of polyester (the detailed manufacturing process has not been revealed). It was imported by two entrepreneurs. The grinder was also developed by SERRIAL. The system appears to have a capacity of 100 kg per hour. Preliminary cost figures are offered for the SERRIAL configuration. The organization SODAR/SDE (Société de Distribution et d'Équipement) operates the SERRIAL equipment, and is seeking to commercialize the end products.

The CSA/PSA are also monitoring two of SISMAR's most recent prototypes, incorporated with grain cleaners and hammermills at Gossas and Kaolack. Credit facilities through PSA/RFA appear to be available for the purchase of the grain cleaner and the dehuller.

The dehuller AB/DECO 150 has been installed along with a cleaner/grader in a private rice milling establishment in Tambacounda. The dehulling is done by a conical abrasive grinding stone, and in continuous operation can deal with 150 kg per hour.

It is intended to diffuse 20-30 of the most suitable of these units in 1989, with credit from Common Funds to one or two regions. Follow-up on technical and economic performance would occur through institutions already well established in those regions, such as the USAID Small Enterprise Loan Funds in the region of Sine Saloum.

**Interest of ENDA Tiers Monde** by Nicolas Bricas.

Countries in the Sahelian zone at a meeting in Cap Verde in December 1986 on grain policies decided to promote the consumption of local grains. CILSS commissioned Enda Tiers Monde to study the experiences of four countries: Senegal, Gambia, Mali, Burkina Faso. It was found that there is little real promotion of local grains per se, although variety of activities...
have had promotional side effects. We found fragmented, isolated activities with little information shared between them. Few people have been trained in food technology, promotion, and utilization of local grains. Some fragmentary surveys have been undertaken which seem to show that the per capita consumption of millet is declining. The size and type of market for local grain is unclear; businessmen have no access to reliable data on markets; potential investors in processing of local grains need business advisory services; the research organizations tend to ignore the businessman; perhaps more seminars like the present one will solve the information gap.

There are more than 100 metalworking establishments in Senegal capable of manufacturing mills; yet, imports from Italy, France, continue.

The aim of promoting local cereals can be achieved by bringing together workers who are knowledgeable on food processing potential; the price differential between local and imported cereals is also a problem. CILSS have initiated a programme, PROCELOS, the Regional Promotion of Local Grains. A newsletter, aimed at Sahelian countries, has been started.

**Interest of Ministry of Rural Development (MDR), Department of Methods, Studies and Plan (DEMP) by Bassirou Sall.**

The new agricultural policy in Senegal aims to strengthen food self-sufficiency. The Department of Methods, Studies and Plan had input into the 4 year development plan on which district and regional departments collaborated. DEMP is directly involved in local grain issues, and seeks to implement new agricultural policy and the recommendations of the CILSS meetings. A team, including ITA and the Department of Agriculture was formed to prepare a program of work aimed at obtaining concrete results. Three groups of actors were consulted: equipment manufacturers, users of the equipment and consumers.

Traditional manufacturers have the will, but often lack capital and organizational skills. Mill owners face problems of spare parts, of securing enough raw material, and of consumer resistance to changes in taste of products when certain processing equipment is used. The above team is preparing a document of its plan of work, to be released soon.

Commentary from the floor was critical of the degree of follow through of certain government programmes. Many local artisans do exist, and they manufacture agricultural implements. They are basically very capable, but there has been insufficient follow up. There is a need to establish a co-operative of artisans similar to the well established rural network of artisans. The establishment of many grinding mills was a good initiative; will the new agricultural policy follow up?
Interest of Consultant Socio-economist by Karen Schoonmaker-Freudenberger.

The consultant socio-economist described her experiences with a two-year extension project aimed to reduce the burden of rural women at the farm level. The thrust was to expand the range of choices of small scale technologies available to women. Information about technologies tends to be centralized, and the weakest link is in making that information widely available. Donors have a tendency to emphasize motor-powered technologies, and ignore the intermediate sized zones.

In the extension project, it was decided to provide village women with examples of a range of intermediate technologies (in the cost range of 400-25000FCFA), and to permit the women to choose what they felt was appropriate to them. The project had four phases:

- test the usefulness of candidate technologies with a sample group of women;
- train village blacksmiths in the manufacture of the acceptable technologies;
- present the technologies to rural communities in mobile rural technologies expositions;
- follow-up interviews on the women who had been exposed to the new technologies, and ascertain the degree of use some time later.

SIGNIFICANT DIFFERENCES BETWEEN WESTERN/CENTRAL AND EASTERN/SOUTHERN AFRICA REGARDING DEHULLING

The countries of Eastern and Southern Africa tend to have well-developed systems for handling, processing and distributing maize. The rural housewife, even in the sorghum and millet growing areas, often has a real alternative to home pounding of grain, if she has cash; she can buy industrially processed maize meal from a small rural shop. By contrast, the substantial rural targets whom projects in West African are working to reach seem to have no such viable alternative to doing the home pounding, if the family are to eat a meal.

Governments in East and Southern Africa are recognizing that the past policy emphasis, which led to the well developed maize system, has had an impact on the food preferences and the planting decisions of the farmers in the semi-arid areas. It is relatively easy to obtain cash from the sale of maize, and much more difficult to find a buyer for the drought resistant cereals.

In the face of population growth, and limited land suited to the production of maize, efforts are being made to promote the drought resistant grains, which have a potentially significant role for ensuring enough cereal production to feed the nation.
Such efforts do encounter the constraint due to the absence of suitable processing machinery for sorghum and millet, but they also have to seek to reverse the emphasis on the maize system. Thus, an intervention with dehullers in East and Southern African semi-arid areas is affected by the competition, in the rural domain, between maize and the drought resistant grains.

The severity of competition between cereal systems in the rural areas of West Africa seems less strong. The three IDRC-supported projects in West Africa identify household manual processing as a primary labour bottleneck which can be alleviated by rurally located dehullers. They do not put much emphasis (yet?) on generating urban demand for surplus production either through the deployment of dehullers in peri-urban areas or through marketing in urban areas the products of rurally located processing facilities. The two projects supported by French Official Aid in Mali and Senegal, however, are focusing on identifying and increasing urban demand.

Table 1: Some of the differences between West/Central and Eastern/Southern Africa

<table>
<thead>
<tr>
<th>Country</th>
<th>Main problem(s)</th>
<th>Applied Research Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gambia</td>
<td>Rural household labour bottleneck with dehulling of pearl millet</td>
<td>Dehuller development, and introduction beside existing grinding installations.</td>
</tr>
<tr>
<td>Niger</td>
<td>Rural dehulling labour bottleneck. Women as primary target.</td>
<td>Introduce Gambian Mini-dehuller to women's groups for pearl millet.</td>
</tr>
<tr>
<td>Senegal 1</td>
<td>Rural household labour bottleneck with dehulling sorghum, millet, maize</td>
<td>Dehuller development, and introduction at or near existing grinding installations.</td>
</tr>
<tr>
<td>Mali</td>
<td>Rural off-farm employment</td>
<td>Primary and secondary processing equipment to rural centres; products for urban sale; maize.</td>
</tr>
<tr>
<td>Senegal 2</td>
<td>Rural off-farm employment</td>
<td>Processing equipment to rural locations; products for urban sale; sorghum, millet, maize.</td>
</tr>
<tr>
<td>Country</td>
<td>Main problem(s)</td>
<td>Applied Research Actions</td>
</tr>
<tr>
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</tr>
<tr>
<td>Zimbabwe</td>
<td>Sustained survival of semi-arid area dwellers threatened; maize system is well established; home processing of drought resistant grains is one constraint to increasing the production and utilization of sorghum and millet.</td>
<td>Design mini-dehuller and introduce it at village level. Design larger capacity dehuller. National diffusion of both sizes to village and peri-urban targets. Demonstrate urban demand for coarse flours from sorghum and pearl millet.</td>
</tr>
<tr>
<td>Tanzania</td>
<td>Underutilization of drought resistant grains adversely affects national cereal self sufficiency; difficult manual home processing is one constraint; maize is the &quot;universal&quot; preferred cereal and has been promoted by past policies.</td>
<td>Introduce dehuller designs from Botswana at village level in semi-arid areas; no history of home dehulling of high tannin sorghum</td>
</tr>
</tbody>
</table>
| Malawi      | a) Improved hybrid maize varieties have poor characteristics for home processing, and constraint farmer adoption.  
               b) Farmers in semi-arid areas are switching to maize because sorghum and millet difficult to process manually. | Introduce dehuller designs from Botswana and Zimbabwe at village level.  
               Introduce dehuller designs from Botswana and Zimbabwe at village level. |
Country | Main problem(s) | Applied Research Actions
--- | --- | ---
Zambia | Underproduction of drought resistant grains adversely affects national cereal self sufficiency in drought years; difficult manual home processing is one constraint; maize is the "universal" preferred cereal, and has been promoted by past policies. | Introduce dehuller designs from Botswana and Zimbabwe at village and peri-urban level.

METHODOLOGIES FOR RESEARCH ACTIVITIES

The basic aim of this session was to agree on methodologies that can be used for various activities during the development and testing of small scale milling systems. Many researchers/promoters of technologies do not conduct various phases of technology introduction in a systematic way, thus preventing results from being fully utilized: it is difficult to assess the benefits of an activity, and to compare it to others, if the approach used and the information obtained are not properly analyzed and documented.

Using a flowchart which illustrated the applied research process for technology development in response to user needs, the chairman attempted to sensitize the participants to the mandatory steps that should be followed (see Figure 1). This presentation outlined the importance of interacting with the intended beneficiaries during all stages of the project; from needs identification, technology identification and development, laboratory and field testing, impact assessment, to widespread implementation. The importance of considering such projects within the socio-economic framework of the society was stressed.

Main Activities

Using a document prepared for the meeting, as a guideline, five main areas identified as those within which activities can be carried out are:

1. Identification of Need for Milling
2. Development of Equipment
3. Controlled Testing of Equipment
4. Field Testing
5. Widescale Dissemination
A closer look at this list shows that it is related to the activities elaborated in Figure 1. A particular project consists of part or all of the above activities. In addition, the extent to which they are carried out will depend on the availability of both material and human resources. Nevertheless, the methodologies used to obtain information will have some basic elements; these were fully discussed and agreed on by the participants and are outlined below. Projects taking these points into account should be able to accumulate useful information of use both to the project and others.

**Identification of Need for Milling**

* Survey to determine scope of milling problem
* Preferences of users
* Availability of money to pay for milling
* Location of mill
* Existing management structure
* Size of machine

In carrying out the above work the following should be taken into account:

enumerators should ensure that the right questions are asked and the right answers are given. Respondents often give answers that they feel the enumerator would like to hear;

enumerators should be people conversant with the rural problem, since it is often difficult for strangers to relate to the realities in rural areas;

it is advisable to have someone live amongst the rural people during the survey to understand their daily problems;

interdisciplinary teams consisting of technologists and socio-economists should be involved in the activities, the role of each member being well defined;

whenever possible, women should be interviewed by other women in groups;

the role of large questionnaires are dubious as they entail much resources for analysis of data;

regarding sampling size, it is advisable to choose people directly involved with the dehulling or grinding, e.g., two sample sizes from different strata.

**Development of Equipment**

* Change of existing design or create new design
* Interaction with users during development phase
* Involvement of manufacturer
* The choice of manufacturer
Some aspects to consider during this phase of the work are:

the design should be based on the identification of need; it may be appropriate to start with an existing design instead of developing a new design; the question regarding the size of the machine is of importance;

the quality of the product should be assessed at the very initial stages of the development of the dehuller;

user participation cannot be overemphasized; the project will not succeed if they are not satisfied;

potential manufacturers of the machine should be involved at the very beginning of the design and development stages; the most successful projects are those which consider this aspect; the question of when to stop development and start manufacture needs to be addressed; it is realistic to have a technically satisfactory and cost effective design manufactured, and to change designs based on field results.

Controlled Testing of Dehullers

* Effectiveness of machine on grains
* Ability of machine to produce processed grains required by users
* Optimization of performance
* Determination of energy consumption by machines
* Determination of possible technical changes (ergonomics, cost reduction, etc.)
* Determination of throughputs, batch size, maximum possible quantity processed per day
* Estimation of cost of processing in order to determine provisional economic viability
* Specification of grains which can be economically processed by the dehuller
* Comparison of traditional to machine dehulled products.

Consideration should be given to the following:

methodologies should be such that the experiments are repeatable;

tests under controlled testing cannot be dissociated from field testing since results from one are needed in the execution of the other;

optimization of the operation of the dehuller should take into account the types of grains that will be dehulled; it is at times necessary to dehull mixtures of grains;
**Field Testing**

* Setting up the mill
* Setting up management structure
* Introducing dehulled product
* Setting up pricing structure
* Determining hours of operation
* Maintenance evaluation
* User reaction and follow-up
* Assessing impact

In activities cited above the following should be considered:

the choice of sites should be made with the collaboration of local government and/or other development bodies knowledgeable in assessing the capabilities of village groups and the availability of grains to be dehulled;

choice of the sites should be based on the management structure in place, income generating activities of the women, etc;

dehulling prices should be set so as to make the mill economically viable, taking into account, amortization, interest rate, operating and maintenance costs.

**Widescale Dissemination**

* Manufacture of the dehullers
* Development of sound after sales service
* Provision of spare parts
* Access to credit for buying dehullers
* Publicity aimed at various groups within the society
* Involvement of various groups, institutions, etc

It is necessary to consider the following points within the above:

the person leading the dissemination of results should ideally be someone experienced in promotion of technology;

the team must be interdisciplinary;

government institutions should play a significant role in such activities;

the question of spare parts and support services for maintenance should be a central issue; the repairing activities for example, should be decentralized;

manufacturers who have the means to acquire spare parts should be encouraged to manufacture the equipment.
DOCUMENTATION OF CASE STUDIES

This session was concerned with the elaboration of a set of guidelines which can be used to effectively report the results of activities concerned with small scale mills. It was pointed out that in the absence of comprehensive documentation of studies related to small scale mills, it necessary to encourage the production of good quality reports that can serve as valuable reference material for others interested in the promotion of these milling systems.

Main Topics for Documentation

Considering the various activities which should be carried out during various stages of the research process, the documentation of small scale milling systems should report work in the following five areas:

1. Needs Assessment
2. Equipment Development
3. Equipment Performance
4. Field Testing and Socio-Economic Assessment
5. Widescale Dissemination

It was noted that a given project, as illustrated by those discussed during the meeting, may not be concerned with all the above five topics. However, for each of them, some of the information which is often needed by interested readers are outlined below. These should be regarded only as a guide and are not intended to be exhaustive.

Needs Assessment

* Background on the country situation on grains as food
* Country statistics on grains
* Marketing of grains
* Definition of target population
* Attitudes towards grain consumption
* Traditional dehulling process
* Production of local cereals
* Differences between eating habits of rural and urban people
* Average consumption of grains per capita
* Storage techniques
* Prices of the grain in the market
* Government policy with regards to grains
* Industrial scale of transformation of grains
* Bottleneck in processing
* Existing processing equipment
* Processing time and effort needed
* Overview of the foods prepared from processed grains
* Methodology of the problem identification study
* Discussion of results with a view to understanding the overall grain processing situation and determining specific needs
* Outline of the main conclusions of the study
Equipment Development

* Description of the starting point of the development phase; improvements to existing design or description of new design; the various models or prototypes developed
* Interaction with manufacturer; level of technology needed to produce the dehuller
* Clear and accurate description of technical design of equipment ... using diagrams, photos, engineering drawings and other illustrative aids
* Description of what technical, cultural, social factors caused the dehullers to be so designed
* Description of the operation of the dehuller
* Technical specifications of the equipment
* Cost of the machine
* Manufacture of the machine; problems encountered; positive aspects

Equipment Performance

* Basic operating characteristics of the dehuller
* Range of operation of the dehuller; disc speeds; capacity; types of grains processed; technical description of discs used
* Description of methodology of tests carried out to determine types of grain, operating speeds of discs, retention time, degree of dehulling, condition of the product, energy requirements
* Results of the tests carried out under controlled conditions
* Discussion of the results obtained with a view to describing the performance of the machine; emphasis placed on understanding the operation as a function of change in operational parameters, and optimizing performance
* Outline of the main findings of the tests and their practical use in the daily operation of the mill

Field Testing and Socio-Economic Assessment

* Description of choice of location; how and why was it chosen; involvement of the user
* Population density
* Transportation facilities; proximity of villages to mill
* Method used to identify location and user(s)/owner(s)
* Type of mill management structure and method used to put it in place; problems encountered; successes; improvements in the future;
* Physical installation of the machine; problems encountered; innovations; solutions of problems;
* Introduction of the mill to the user/population; methods used; determination of the quality of the milled product and acceptance; determination of price of processing
* Daily operational procedure; periods of operation; staff structure; collection of money
* Maintenance procedures; problems encountered; spare part
availability; number of breakdowns
* Quantity of grain dehulled per customer and over various periods; receipts; profits versus expenditure
* Economic analysis; payback period; viability of operation
* Socio-economic impact; changes in economic situation of the user population; their use of spare time; satisfaction/complaints; in-depth analysis of the field testing; other in-depth analysis
* Problems encountered in obtaining good data
* Participation of other villages
* Evaluation of level of utilization of the mill during the day
* Duration of field testing
* Training carried out during the field testing
* Attempts to change people
* Evolution of relationship within families, etc

Wider Dissemination

* Relationship between manufacturer/policy maker/user
* Role of manufacturer
* Setting up of credit system
* Changes in government policy
* Agricultural changes in various areas
* Spare parts and equipment
* Training of technicians
* Impact on manufacturers due to dehullers
* Involvement of other agencies
* Displacement from work of women who do traditional milling

Since such documentation will be used as an information source by various people, it is of interest to include:

an introduction at the beginning of the article in which the scope of the problem tackled is elaborated and a summary of the achievements of the work; this part of the document is important as it gives the reader an overall view of the work done and indicates its usefulness;

the readership should be stated, as well as the scope of the work reported and its limitations;

each chapter should outline the main conclusions of the activities carried out;

each chapter should stand on its own so as to maintain clarity;

it is useful to assume that the documentation will be read by technologists, social scientists, policy makers, development workers, extension workers, financial experts and entrepreneurs; it is thus necessary to include information that is free of ambiguity, given the diverse readership;
the use of graphs, tables, drawings, photographs, and other audio visual aids will help to clarify the text and in many cases minimize its volume;

appendices are important in documentation if they make the presentation clearer;

objective statements should be the main backbone of the document; but subjective statements, especially where it concerns lessons learned and interpretation of social issues should be incorporated in the text;

although it is understood that several countries may not have very comprehensive information, such as outlined under "Needs Assessment", efforts should be made to at least have some idea of the country situation, without which it is difficult to justify and carry out a viable project;

all methodologies used should be clearly stated, pointing out their limitations.

COLLABORATION BETWEEN PROJECTS

Given the composition of the participants of the meeting, the question of collaboration was discussed at length so as to foster the exchange of ideas between various projects.

Although collaboration was agreed to be desirable, the question was raised concerning what system should be put in place in order to make it viable. The role of regional institutions in such a venture was also raised.

Visit Between Projects

Since there is at present no one institution which has been successful in establishing the needed contact between projects on milling, it was suggested that the following three methods be used to arrive at solution:

1. The experience of established projects should be acquired by new projects through exchange visits;

2. Information exchange between projects should be made by correspondence;

3. A network of specialists in milling systems should be constituted.

It was pointed out that IDRC encourages this type of interaction and various cases were cited. For example within IDRC-supported projects, Senegalese researchers have visited the project in Botswana, personnel in the Gambia and Senegal maintain contact and share information, dehullers developed in the Gambia are presently being used in Mali and Niger within projects. IDRC is in close contact with other organizations and actively collaborates with them e.g., the Appropriate Technology
International. It is however necessary for this type of interaction to be expanded.

**Establishment of a Network**

Informal networks between individuals already exists but are based on mutual interests. A formal network will need certain prerequisites for it to function properly, these are:

- an organization should be willing to play the coordinating role;
- an individual within that organization should be willing to take a personal interest in making sure that the network works.

It was pointed out that there appears to be a proliferation of networks which do not work, and creating another network would be duplicating efforts.

**Publication of a Technical Journal/Bulletin**

This was identified as being a possible method of collaboration, but there are advantages and disadvantages.

**Advantages**

- The bulletin would allow all to receive information on projects existing elsewhere, problems encountered and successes, and failures. A researcher might find out that he/she is struggling with a problem which has already been solved elsewhere, and would thus only have to write for more information.

- Researchers have a basic interest in this type of liaison because they can learn from others how to solve a particular problem.

- This bulletin would be especially for African researchers.

**Disadvantages**

- Technical publications are not feasible without input from contributors.

- Many researchers are not enthusiastic writers, thus causing the bulletin to starve for information.

- The timeliness of receiving articles is also a source of concern. This can however be offset by having a publication which caters for a wide range of interests, e.g., one covering Post Production Systems (PPS).

It may be necessary to involve other organizations in such an activity in order to sustain it. The meeting discussed the possibility of using the publication PROCELOS, published by
ENDA/CILSS, as a medium for disseminating information from milling projects. This was not considered to be an appropriate method of sharing results for two reasons: articles for PROCELOS are prepared by a journalist who visits West African countries (IDRC REPORTS effectively does this); PROCELOS is limited to West African countries; articles written in PROCELOS are not technical.

The collaboration between nine countries in Eastern and Southern African countries (SADCC) was mentioned.

Given the variety of problems involved in the general area of collaboration, it was proposed that IDRC should act as a clearing house for information that is received. Projects wishing to present results for distribution are free to do so. Meanwhile IDRC will continue to pursue the idea of the PPS journal which has more of a chance of surviving.
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APPENDIX B. AGENDA OF MEETING

SMALL SCALE MILLING SYSTEMS MEETING

May 2-4, 1988 - Dakar, Senegal

Monday, May 2

0830 - 0845  - Formal opening of meeting
               - Opening comments - Pierre Sané

0845 - 0915  - Background information on meeting
               Michael Bassey

0915 - 0930  - Approval of Agenda

0930 - 1030  - Assignment of duties:
               Chairpersons and Rapporteurs -
               Michael Bassey

1030 - 1045  - Break

1045 - 1230  - Project report (The Gambia) -
               John Nance
               Chairman : Lawrence Limbe
               Rapporteur : Hyacinthe Mbengue

1230 - 1400  - Lunch

1400 - 1500  - Project report (Mali) -
               Jean-Pierre Derlon
               Chairman : Wells Kumwenda
               Rapporteur : John Nance

1500 - 1600  - Project report (Zambia) -
               M. C. Kaumba
               Chairman : A. Salcedo
               Rapporteur : Nicolas Bricas

1600 - 1615  - Break

1615 - 1715  - Project report (Tanzania)
               Lawrence Limbe
               Chairman : Bassirou Sall
               Rapporteur : Abdoul Diedhiou / John
               Nance

1715 - 1815  - Project report (Niger)
               Lizabeth Edgar, Hadizaa Alhassane
               Chairman : Ozzie Schmidt
               Rapporteur : Jean-Pierre Derlon
Tuesday May 3

0830 - 0930 - Project report (Zimbabwe) - Arthur Dibi
   Chairman: Ruby Sandhu
   Rapporteur: M. C. Kaumba

1030 - 1045 - Break

1045 - 1200 - Brief resume of activities and interest of other participants (10 minutes each):
   - Ruby Sandhu
   - A. Salcedo
   - Bassirou Sall
   - Abdoul Aziz Diedhiou
   - Karen Schoonmaker Freudenberger
   Chairman: Marie-Helene Collion
   Rapporteur: Ozzie Schmidt

1200 - 1330 - Lunch

1330 - 1530 - Methodologies for Research Activities
   Chairman: Ozzie Schmidt
   Rapporteurs: Michael Bassey
   Marie-Helene Collion

1530 - 1545 - Break

1545 - 1730 - Methodologies for Research Activities (Continued)

Wednesday May 04

0830 - 1015 - Guidelines for preparing case studies
   Chairman: Michael Bassey
   Rapporteurs: Ozzie Schmidt
   Karen Schoonmaker

1015 - 1030 - Break

1030 - 1230 - Guidelines Preparing Case Studies (Continued)

1230 - 1400 - Lunch

1400 - 1600 - Collaboration Between Projects
   Chairman: Ibra Seck
   Rapporteur: Lawrence Limbe

1600 - 1615 - Break

1615 - 1730 - Summary of Meeting and Closure
   Michael W. Bassey
   Ozzie Schmidt