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DEVELOPMENT OF PROTOTYPE MOBILE SEED DRESSING APPLICATORS
SUITABLE FOR AFRICAN COUNTRIES

US/RAF/88/273

Technical report: Findings and recommendations*

Prepared for the Governments of the Republic of Zambia
and the United Republic of Tanzania,
by the United Nations Industrial Development Organization,

Based on the work of J.E. Elsworth,
Chief Technical Advisor

Backstopping officer: B. Sugavanam, Chemical Industries Branch

United Nations Industrial Development Organization
Vienna

* This document has not been edited.

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1. Background

The mainstay of the economies of the PTA countries is agriculture. Regional and national strategies accord the highest priority to attaining self sufficiency in food. The policy on pest control is to use Integrated Pest Management, of which Seed Treatment is an important component.

The project is to develop a mobile Seed Treating machine to be available to rural farmers for effective, safe and affordable treatment of their home saved seed. Initially, it is focusing upon Zambia and Tanzania.

The first visit by the C.T.A. was made in Sep/Oct 1992 for familiarisation of the context for the machine. Broad recommendations for the design approach were made during that visit.

The second visit was in Nov/Dec 93, to coincide with the Zambian planting season, for the treatment of trials seed. A European machine - the 'Rotostat' P500 - had been imported into Zambia as a basis for the project and to test the recommended principal with local seed varieties. Other aspects of the project were also progressed in both countries, particularly the choice of manufacturer.

The purpose of the current visit was to conduct similar tests with a second European machine - the Hege 11 - which had similarly been imported into Tanzania. A second purpose was to attend the first project workshop and to progress the design in both countries.

2. Summary.

2.1 Tanzania. A Hege 11 laboratory treater had been imported. It was demonstrated to T.P.R.I. staff. A detailed methodology for a comprehensive trial using the machine was agreed. The first project workshop was attended. A second biological institute, Selian Research Station, was visited.

2.2 Zambia. One of the Mt Makulu trial sites was visited and shows the marked benefit of treating the seed, and an absence of any damage caused by the imported machine. There are concerns among some TDAU staff that the contract sum of \$30,000 is inadequate for the requirements of the project. However, design is proceeding.

3. Recommendations.

- 3.1 That the methodology described in section 5.5 below for the testing of the imported machine in Tanzania be followed.
- 3.2 That consideration be given to the preparation of a leaflet to be handed out to farmers providing information on safety precautions and the appearance of treated seed.
- 3.3 That a trial on stored grain be conducted by TPRI at harvest 1993 comparing various rates of dust and liquid products applied in the imported machine. The standard practice of admixing dust with seed would be the control. (See section 8.1)
- 3.4 That a chemist from TPRI should be offered training in Europe, particularly in relation to recommendatin 3.5.
- 3.5 That consideration be given to the formulation best suited to use by rural farmers in the anticipated machines, with a view to making it available. (See section 9)
- 3.6 That a further visit be made in July 1993 to assist in the above trial, to progress the designs in both lead countries, and to prepare a test site in Zambia.

4. Acknowledgements.

Thanks are due to Mr Msolla for his persistent help with several visits to TPRI and for hosting the first day of the workshop. Dr Moshia attended the first day despite the misunderstandings and omissions of the past, agreed to join in with the project and cemented this by hosting the second day, and facilitating the agreement of methodology. Mrs Matemu obtained seed and chemical and facilitated test treatments with maize and beans. Dr Kwendakwema provided transport from his own over-committed resource as always. It is to be hoped that by the fourth trip both project vehicles will have at last arrived, and transport will not be such a problem.

5. Tanzania.

5.1 General.

The work was dominated by meetings with TPRI staff and with the actual working party meeting. These meetings will not be recorded here in detail - suffice it to say that TPRI attended the working party and agreed to co-operate fully in the project. The working party meeting will be reported separately in the official minutes. A two day public holiday to celebrate the end of Ramadan was used to develop design ideas for the Tanzanian machine. Prints of these were left with TEMDO and a discussion held on design and material options.

5.2 Machine Trials.

The Hege 11 machine had been received at TEMDO. It was assembled and tested and then transported to TPRI where it was used for test treatments of maize and beans. Those present during this exercise were: Mrs Matem. Dr Leiki. (TPRI) Mr Tango (TEMDO) Mr Lwegezva (Tanseed) Backstopping Officer (UNIDO) and the author.

The (understood) practice of Tanseed was followed, i.e. 3 kg 'Fernasan' D in 30 l water per tonne of seed. A single 1 kg sample each of Maize, variety: Kilima. (a popular composite variety) and Bean, variety: Canadian Red were treated. The methodology for the maize was to mix 3.5 g of 'Fernasan' D in 30 ml of water and pour it down a funnel onto the seed mixing in the machine. (The extra 0.5 g was to allow for the chemical which would inevitably remain on the walls of the mixing beaker and the funnel.) This gave a good standard of treatment, although it was clear that the seeds were very wet.

For the beans, 3 g of 'Fernasan' D were mixed with 30 ml of water (this time the beaker and funnel were already contaminated.) The remaining procedure was the same. The beans were not able to hold all the water, and some free liquid remained in the machine. At this point it was learned that Tanseed use the same slurry (3 kg of powder in 30 l of water) but actually apply it at a much lower rate. (Thus their beans apparently receive less than the recommended dose.)

The 'Fernasan' D did not mix readily with water and it was clear that this formulation is not intended for slurry. Indeed, the 'D' suffix represents 'Dry' meaning for application as a dust, whereas a formulation intended for slurry application would have a suffix 'WP' - wettable powder. (In Zambia the lead formulation is 'Thirasan' M, i.e. it does not have the WP suffix. However, the label shows the ingredients as Thiram 80 % WP - 84.5% and Malathion 50 % WP - 13.0%, indicating that it is indeed a slurriable formulation.)

5.3 Selian Research Station.

A visit was made to this station, accompanied by Backstopping officer and discussions held concerning their bean project. Previously supported by CIDA, this project is now funded from SADEC. Bean fly is the major problem in beans. The fly lays eggs on the seedling plant and the grubs eat into the stem. Endosulfan (Marshal, from FMC) is effective. In practice it is applied by stirring the seeds in a bucket with a slurry of Marshal and then dried on sand. (The sand which sticks to the seed acts as a partial protectant to the farmer who will sow by hand.)

Selian also has a programme of development with the products of the neem plant for protection against bean fly.

Selian could be a useful collaborative institute because they have experience in seed treatment.

5.4 Manufacturers.

In order to have a number of options available, a visit was made to Manik Engineers who manufacture hammer mills. The factory is clean and well organised, making a range of four hammer mills with various drive options. However, Mr Jagjeet Manik, the principal, was not enthusiastic about the idea of diversifying into a different type of machine. The conclusion is that this is not a good option for manufacture.

An attempt to see Mr K.S.Hanspaul of Dharam Singh Hanspaul & Sons Ltd. failed. This company have a much broader range of products and have expressed interest in adding seed treaters to it. Mr Ram, the workshop manager, confirmed this interest. The turning capacity was viewed to assess the capability of machining the rotor housing currently under consideration. The conclusion was that it would not be possible in house, but that it could be contracted out to a local company who had larger capacity. This would be United Engineering - related to Manik. This company should be viewed in it's own right on a future trip.

5.5 Trial.

Time did not permit the treatment of a trial on the imported machine, but detailed methodology was agreed with Mr Mwangira and Dr Orono. This will be written up officially by Dr Orono but is given here as a record.

5.5.1 Objective 1

To test the imported machine for treatment quality and mechanical effect on the seed.

Variables: 1. Visual effects on the seed viz: Scratches, Broken seed coat, Splits, Amount of treatment (difficult to assess until experience is gained), Distribution. (Even-ness of treatment from seed to seed.)

Factors: 1. Seed type and variety.
2. Machine - Speed, Batch size, Chamber (The Hege has three interchangeable mixing chambers of which the larger two were included in the current machine), Duration of chemical application, Duration of post application mixing
3. Chemicals.

5.5.2 Objective 2

To assess the effect of seed treatment in the imported machine on germination.

Variables: 1. Shoot. Collioptile. Root. Radical. (All assessed for length and normality).
Percent germination.

Factors: 1. 2. 3. As above.
4. Climate - Moisture. R.H.. Temperature. Light.
5. Soil.

5.5.3 Objective 3.

To assess the effect of seed treatment in the imported machine on early growth.

Variables: 1. Pest attack - Insects. Disease.) All assessed at 8 days after planting.
2. Percent germination.) 12 "
3. Vigour.) 16 "

Factors: 1. 2. 3. 4. 5. As above.
6. Altitude.

5.5.4 Objective 4.

To assess the effect of seed treatment in the imported machine on crop productivity.

Variables: 1. Height of crop
2. No of cobs per plant (Maize.)
3. Pest damage
4. Yield per plant and per hectare.

Factors: 1. 2. 3. 4. 5. 6. As above.

5.5.5 Crop Husbandry.

Should follow normal practice - identical on all treatments.

5.5.6 Experimental Design.

Two varieties each of Maize and Beans. (One a popular variety, one to be chosen as the most delicate variety available. For maize the delicate variety should be a hybrid, the popular one should be a composite type.)

Two sites to be chosen - at different altitudes. (At a later discussion with Dr Orono and Mrs Matem, it was suggested that three sites be used. However, discussion of the amount of time and money involved in the trial appeared to mitigate towards the original decision of two sites.)

Use one batch size only - the biggest possible in the largest chamber. (Probably about 5 kg.)

5.5.6 Experimental Design. (Cont.)

Use one chemical product only - 'Thirasan' M. This product is available from Zambia where it is the normal product for maize and beans. It is not registered in Tanzania, and its use in the trial must be conditional on its registration as an experimental formulation. It is believed that this will be forthcoming since both active ingredients are registered. The reasons for not using Fernasan' D are that it is in the process of de-registration, it contains the organo-chlorine insecticide Lindane, and it is not designed as a wettable powder. (See 5.2 above.)

Use one chemical rate only - the rate recommended on the label - i.e. 150 g per 100 kg of seed. (Same rate for maize and beans.)

Treatments: 1. Untreated control.
2. Treated
3. Mixed in the mixing chamber for the normal treatment period (say 20 seconds) but not treated.

Preparation of the slurry: In order to make sufficient slurry for 4 x 5 kg of seed at 1.5 g per kg, 37.5 g of 'Thirasan' M should be mixed into 150 ml of water. This should be applied to the seed at 35 ml per 5 kg batch of seed to both maize and beans, the slurry being re-agitated each time it is used. This will give a liquid application rate of 7 l per tonne instead of the 30 l used in the machine trial, and thus should not leave excessive water on the seed. This data is based on the test in Zambia where the density of slurry of the above strength was determined at 107 g/ml. That test also confirms that this strength is indeed possible. The formulation rate is 1.5 g per kg.

Planting: In randomised block - 4 replications. This gives 96 plots to be assessed each time. (3 treatments x 4 varieties x 4 replications x 2 sites.)

6. Malawi.

The opportunity of the presence of Mr Kumwenda of Chitedze Research Station, Lilongwe, in Arusha for the working group meeting was taken to begin the learning process regarding that country. Mr Kumwenda reported that the Malawi authorities - from the research station itself to both Ministries of Agriculture and Industry - are very keen on the project. It is seen in Malawi as multi-purpose, with both seed treatment and food grain storage of equal importance. Hybrid maize is being encouraged but is more susceptible to weevils. Mr Kumwenda suggested that a seed treater could have a relatively low capacity - such as the 10 kg being considered for Zambia, but that for food grains, a capacity of one bag (90 kg) would be ideal. Currently, 'Actellic' dust was used as a storage insecticide. Although there are tractors on larger estates, they would not, in practice, be available for this job. The seasons are similar to those of Zambia. In Malawi's case, the National Seed Company has already been sold. The buyer is Cargill who are very active in all countries visited so far.

7. Zambia.

7.1 TDAU.

At a meeting to discuss the work, at which Backstopping officer was present, TDAU said that the bare minimum of work for the first year would absorb the whole of the fee they were to receive from UNIDO. In fact, a much more comprehensive programme was recommended, including a farmer survey and the testing of a range of design options, before serious design work began. TDAU are, de-facto, operating like a commercial unit, and receive no actual support from public funds within Zambia. It was suggested that they approach PTA to make official representation to the Zambian government since under the agreement between PTA and the national governments, PTA sanctioned projects automatically receive governmental support in the form of the time and expertise of the relevant institutes.

At a second meeting, these matters were discussed in greater depth. The idea of approaching PTA was endorsed, and the point was made that, whatever funds were available, TDAU had the option of following the advice of the CTA in a fairly unquestioning way, or undertaking more detailed work to evaluate a number of alternatives. However there were a number of responsibilities throughout the two years of the project, which formed a minimum obligation.

Regarding the idea of conducting a farmer survey before commencing the design work, the current plan is for PTA to appoint an expert to conduct the techno-economic survey. TDAU could always apply to provide that expertise and are, in some respects, uniquely qualified to do so. It would mean bringing the survey forward from during after the field trial to before design.

During the discussion, a point arose which could represent a pitfall for the trials. Some farmers save the progeny of their purchased hybrid seed for replanting. This seed will not grow well - treated or not. However, if it was treated by the prototype machine, then this could provide a natural scapegoat and in the farmer's eyes, would be the cause of the poor growth. Thus the policy should be to refuse to treat hybrid seed. (All first generation hybrid is sold through the seed companies, and is all treated.) This point illustrates the value of conducting the survey before the field trial, or even before the design, since other such potential pitfalls may be discovered.

The Backstopping Officer explained the purpose of UNIDO's project and that TDAU is a beneficiary of the project and not a commercial partner.

7.2 Mt Makulu.

The trials on maize and sorghum, which had been treated during, and immediately after, the previous visit, had been planted on 22nd December at Chipata and 11th January at Golden Valley. The trial at Golden Valley was seen. The sorghum showed the value of treating since the P500 treated and Zamseed treated seed had grown noticeably better plants than the untreated and traumatised seed. Within each of those groups, there was no visible difference. In the case of maize, the differences were not obvious. Apparently the Chipata site shows a similar effect, but even more marked. The crop will be harvested during April and Mt Makulu will issue a report in May which will give complete data on all stages of crop growth.

7.3 World Food Programme.

Mrs Freda Luhila, in charge of the Programme Against Malnutrition, suggested a site for the testing of the prototype. This was one of those tentatively suggested during the last visit, Kafue Gorge. An NGO, Riverside Development Agency, is helping farmers to rehabilitate after the drought, e.g. with loans for inputs such as fertiliser, and the development of storage facilities. The trial of the prototype would fit well with this activity.

8. Food Grain Storage.

8.1 Tanzania.

The prevalence of the larger grain borer (*prostephanus truncatus*) makes this a particularly urgent problem. The normal method of control for rural people is to make a rough admixture of 'Actellic' Super dust with the grain, but this is crude and wasteful. TPRI already have a programme of research on the problem, and it suggested that the following tests be included at the harvest of July 1993.

That the imported machine is used to test the application of 'Actellic' Super dust at full, half, and quarter rates, and also the application of a mixture of 'Actellic' 50 EC and 'Decis' 50 EC * at equivalent rates. The control would be 'Actellic' Super dust applied by the normal recommended method.

* Product is from Hoechst and contains deltamethrin which controls the l.g.b. and is Codex cleared.

8.2 Zambia.

The insect problem is more confined to weevils and the normal protectant is 'Blue Cross' dust supplied by Shell Chemicals. The method of application is not known but is believed to be by sprinkling onto layers of grain as it is loaded into the storage vessel. The suggestion was put to Mt Makulu that a similar trial to that above be conducted, but with 'Blue Cross' as the standard and omitting the 'Decis'. There was no suggestion of conducting these trials during the imminent harvest, since there is insufficient time for proper preparation, but at 1994 harvest the TDAU prototype will be available and a trial should be considered.

9. Formulation considerations.

9.1 Current formulations.

In Tanzania, the two formulations used by Tanseed on maize, and beans are both dusts. The main one, Fernasan' D, is not even intended to be applied as a slurry, although this is the practice of Tanseed. It is only slurriable with great difficulty. Further, it contains the insecticide, lindane, which is toxic and persistent in the environment, and is being phased out in most countries of the world. The Tanzanian registration authorities are in the process of de-registering it. Thus Fernasan' D is inappropriate as a formulation for the project. The other formulation, 'Vitvax' Red, contains only fungicide, and so the Tanzanian biological trial is being planned with an alternative, not actually marketed in Tanzania.

In Zambia, the formulation used by Zamseed is 'Thirasan' M. This is better on two counts. Firstly it uses malathion as an insecticide, which is low in mammalian toxicity, and secondly it is slurriable. For these reasons, it is being used for the Tanzanian biological trial.

However, a wettable powder is not considered ideal for use with the project machines. The process of slurrying it (mixing with water) is messy and carries the likely-hood of contact, not only by the operator, but by anyone else around the mixing area - likely to include children. The mixing process provides an ideal opportunity for the operator to under-dose the seed - simply by mixing too weak a suspension. The slurry is unstable, and will quickly settle if not frequently agitated - another likely cause of undertreating.

These are major problems. The alternative formulation types are dry dusts, flowables, and true liquids. Dry dusts carry an unacceptable risk of inhalation and have been all but discontinued in Europe. (Actually banned in Germany.)

Flowables are widely used in Europe. They are normally water based, but could also use oil, or some other carrier. They are actually stable suspensions of very small solid particles of active ingredient. True liquids are occasionally possible, but most active ingredients are non soluble in water, so other solvents are used. These must be innocuous to the seed, to mammals and to the environment, must not attack the machine components with which they come into contact, and must be affordable.

9.2 A suitable formulation for the project.

The criteria for this formulation are as follows:

1. It should be of low toxicity to humans and non-target organisms, and benign towards the environment.
2. It should be efficacious to the target organisms.
3. It should be stable for the anticipated shelf life - under tropical conditions.
4. The machine and formulation should be compatible, and, as far as possible, the operator should not be able to under-dose the seed - either deliberately or accidentally. Likewise, over-dosing should not be possible. However, the dose must be varied with the seed quantity in a given batch, and seed type. (Sorghum needs more than maize.)

The following suggestions are made.

1. That a formulation is devised by TPRI which could be made at the Moshi plant and distributed throughout the P.T.A region.
2. That this formulation use thiram as a fungicide, and malathion as an insecticide.
3. That it is non water compatible in order to prevent the deliberate addition of water to economise on dose. This could mean an oil based flowable, or a solvent based true liquid.
4. That an optic type dispensing system be devised, appropriately marked so that a farmer can check that the correct dose is applied to his/her seed.

The formulation component of this work is outside the scope of the current project. It is suggested that, if recommendation 3.5 is accepted, consideration be given to the means by which it could be implemented.

10. Current Project Status and Immediate Plans.

- 10.1 Design work is proceeding in both African Engineering Institutes. Completion is scheduled for July 93 (Zambia) and August 93 (Tanzania).
- 10.2 Designers from both lead countries are scheduled to visit Europe, mid May to mid July, to inspect the tests being carried out by the sub-contractor and for training.
- 10.3 Some modifications to the designs may be necessary as a result of the sub-contractors tests. These will be made on the return of the designers, and prototype construction can then begin.
- 10.4 Tests on the Zambian prototype will be conducted in November 93, perhaps at Kafue Gorge.
- 10.5 The European sub-contractor is testing the novel design ideas put forward by the CTA.
- 10.6 TPRI will be conducting a biological trial on seed treated with the imported machine, starting immediately.
- 10.7 Mt Makulu will be harvesting their trial during April and will then prepare a report on it's findings.
- 10.8 Biologists from all four countries are scheduled to visit Europe, mid May to mid July, for training.
- 10.9 A chemist from TPRI should visit Europe, mid May to mid July, for training.
- 10.10 The CTA anticipates a further visit in July to see the Tanzanian biological trial, discuss further a grain storage trial, progress the designs in both countries, and plan the Zambian field test in some detail.

Appendix A-1

Institutions / Personnel Visited. (List of participants)

Tanzania - Arusha.

1. T.E.M.D.O. Mr G.Msolla, Director General. Contact person for the Project in Tanzania.
Mr K.Koshuma, Senior Design Engineer.
Mr M.Tango, Design Engineer.

2. T.P.R.I. Dr F.Mosha, Director.
Mr C.Mwangira, Chief Research Officer.
Mr J.Chogo, Head of Technical Services Dept.
Dr Orono, Principal Scientific Officer.
Mrs D.Matemu, Formulation Chemist.

3. Chitedze Research Station, Lilongwe, Malawi,
Mr W.Kumwenda, Agricultural Engineer.

4. T.D.A.U. Dr N.Kwendakwema, Manager.

5. P.T.A. Mr J.Opio, Senior Industrial Expert.

6. U.N.I.D.O. Dr B.Sugavanam, Backstopping Officer.
Mrs A.Kostian, Junior Professional Officer.

7. Tansed Mr M.Kibada, Production Manager.
Mr Lwegezya, Process Engineer

8. Twiga. Mr E.Ndemasi, Technical Representative.

9. Hanspaul Mr Ram, Workshop Manager.

List of Participants

Minutes of the First Working Group of the Project Development of Mobile Seed Treatment Applicators Suitable for African Countries. (US/RAF/88/273). Arusha, April 1-2, 1993.

I. Introduction.

Based on the approval of the project for developing Mobile Seed Treatment Applicators suitable for African Countries from the German contribution to UNIDO's Industrial Development Fund, UNIDO assigned a number of institutions for participation in the project from the South and Eastern African Countries of the PTA (Preferential Trade Area) sub-region. In order to have proper co.ordination and communication modalities and to discuss the progress of the project and come up with a work plan for future implementation, UNIDO organized a first working group meeting with the participation of concerned parties. This meeting was hosted by the Tanzanian Engineering and Manufacturing Design Organization (TEMDO), Arusha. and the Tropical Pesticides Research Institute (TPRI), Arusha, Tanzania. The Agenda for the meeting is attached to this minutes.

Those Present

Tanzania

Mr.G.Msolla	Director general	TEMDO
Mr.K.P.R. Koshuma	Senior design Engineer	TEMDO
Mr.M.S.A. Tango	Design Engineer	TEMDO
Dr.F.W. Mosha	Director	TPRI
Mr.C. Mwangira	Chief research Officer	TPRI
Dr.Orono	Principal scientific officer	TPRIO
Mrs.A.Kostian	Junior Prof. Officer	UNDP/UNIDO

Zambia

Mr.J.A.A. Opio	Senior Industrial Expert	PTA
Dr.N. Kwendakwema	Manager	TDAU

Malawi

Mr.W.F. Kumwenda	Agricultural Engineer	Chitedze Res. Station
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UNDP/UNIDO

Mr.B. Sugavanam	Sr. Ind.Dev.Officer(BSO)	UNIDO(Vienna)
Mr.J.E. Elsworth	Consultant(CTA)	UNIDO(Vienna)
Mrs.A.Kostian	Junior Prof.Officer	UNDP/UNIDO, Dar es Salaam

Observers -1st day only

Mrs.E. Underi	Finance, Moshi plant	National Chem. Ind.
Mr. Masangi	Manager, moshi Plant	National Chem. Ind.

II. Report on the Meeting.

The meeting was chaired by the Director General of TEMDO, Mr.G.Msolla and Mr.J.E. Elsworth the Chief Technical Adviser (CTA) for the project was elected as the Rapporteur for the meeting. In his opening remarks the Chairman welcomed every one to the first meeting of the working group of the project. He referred to the fact that a number of farmers have no access to treated seeds and this has adverse effect on crop yields. After the prototype is developed a certain number of machines will be made so that the farmers will be able to treat the seeds with consequent improvement in yield. He said that

higher productivity of food will have social and economic advantage to the countries concerned. He remarked that ideally the meeting should have been earlier and the two day meeting will provide everyone with a full understanding of the project. Following the Chairman's remarks brief statements were made by the representatives from UNDP/UNIDO, Dar es Salaam, Mrs. Kostian, the Preferential Trade Area (PTA) representative Mr. Opio and the back stopping officer of the project on behalf of UNIDO.

Mrs Kostain informed that the UNIDO Country Director (UCD) office in Dar es Salaam is co-ordinating the project in the Tanzania Region and this meeting was very desirable so as to clarify many issues due to the complexity of the project due to the involvement of a number of parties. The Backstopping Officer from UNIDO gave a brief account of UNIDO's technical assistance to the developing countries and cited the importance of the project as a safe and effective way of applying pesticides for the benefit of rural farmers in selected African countries of the PTA region. He thanked the Tanzanian Government especially TEMDO for hosting the meeting. He mentioned that the project was unique in the sense that it dealt with a multi-disciplinary area on a regional basis covering four countries classified as least developed countries by the United Nations. He specified that in a project of this nature co-ordination between various institutions and individuals was very complex and the meeting was intended to assist in establishing an accepted communication procedure and come up with a work plan for facilitating future implementation. He concluded that the project gave an excellent opportunity to promote environment friendly technology available to rural community in African countries and thanked the Government of Germany for making this possible by providing financial support through their contribution to UNIDO's Industrial Development Fund (UNIDF) and also thanked PTA for providing the logical support and in helping to organize the meeting.

The representative from PTA, Mr. Opio thanked on behalf of the Director General of PTA the German Government and UNIDO for their support and assistance for this PTA project. He said that food security is given highest priority in the PTA region and agro- industries constituted a corner stone of their economies. Hence the PTA industrial strategy always put emphasis to the agricultural sector. This being an R&D project he said that it should be implemented between institutes within and outside the region, The challenge was for the participating institutes to make use of the CTA and other experts in the project to design suitable machines. If the project turned out to be successful significant progress will be made in reducing pre- and post-harvest losses in the region currently believed to be running at some 30 to 40% .

The meeting adopted the agenda with some modifications (Annex.2) . The Back Stopping Officer reported that on leaving his former employer, ICI in U.K. he had met Mr. Elsworth, the current CTA and seen his attempts at developing a village scale seed treater for Africa. On joining UNIDO in 1984-85 he discussed the idea of a similar project suitably adapted possibly of a mobile type seed treater for small and medium sale farmers in Africa with the Natural Resources Institute (NRI) in U.K. However, no money was available from the Overseas Development Administration (ODA) at that time. Following the concept a preparatory mission funded by UNIDO was fielded consisting of two consultants Messrs. Macfoy and Nicholson. They visited five PTA countries in 1989 to determine the need and viability of the project and concluded that there was a need for such a project and that four countries should participate in the project at the start. Based on the preparatory mission, he said that

UNIDO prepared a project document which was then submitted to find suitable donors. Following UNIDO programming mission to the PTA countries during 1989 this project was included in their programme and was adopted by the PTA. UNIDO then searched for funds and the German government agreed to support the project through their contribution to UNIDO's Industrial development Fund.

Following the approval of the project the implementation started in 1992 with the return of the expert Mr. Macfoy to the Region. His report confirmed that the project should be initiated in two lead countries, viz Tanzania and Zambia and he identified a number of institutions which should be invited to participate. UNIDO then contracted with three engineering institutes, viz TEMDO in Tanzania, TDAU in Zambia and Silsoe research Institute in UK together with national and international experts.

After the resume of the project history the CTA of the project MR. Elsworth then continued by mentioning that he had been responsible for the development of seed treating machines for ICI in UK for 25 years and has developed different type of commercial and laboratory seed treaters and they all used the rotor/stator principle invented by Milik in 1968. The development of the village seed treater was inspired by a seed treating specialist from southern Sudan who was visiting ICI on study tour.

Following the request of the Backstopping Officer, he said that he took up the CTA post for the project. He said that he had made three trips to the project sites first in September 1992 to familiarize with the project and discuss the project with participating institutions and also discussed with the rural farmers. He concluded that there was a great interest in mobile seed treaters and the Milik principle was again the most appropriate for Zambia with a pedal power design whilst tractor powered machine was suitable for Tanzania. Based on his recommendations two seed treaters were purchased one from UK and another from Germany to start some experiments with some local seeds.

During the second trip in November, 1992 the CTA initiated trials in Zambia while in Tanzania late arrival of the machine delayed the tests but will be carried out during the April, 1993 season. The present visit- third in the series- was to attend the first working group meeting and conduct trials with maize and beans and follow the progress of the trials in Zambia.

Position of TPRI.

The chairman said that position of TPRI was included in the agenda since their position was not clear. Mr. Opio mentioned that under PTA agreement governments of member countries undertake to provide the services of relevant institutes and staff. Once a project is sanctioned those institutes are automatically allocated to that project.

Dr. Mosha said that TPRI was keen to participate because the project fell within its mandate of quality control and research into use and effect of pesticides. He said that the proposed arrangement with UNIDO on a reimbursable loan basis was not clear and wanted clarification of their commitment and responsibility for the project. Following the explanation by the Backstopping Officer regarding the requirements for National Expert recruitment and the mistake in not contacting directly the TPRI which caused the confusion and informed the meeting that the money will be paid to the Institute and not to the expert. He said that the intention was to help the Institute for providing the necessary services to the project.

Dr. Mosha expressed concern that UNIDO might not accept a report from the institute and might not pay. However, he was informed that it rarely happens except that UNIDO would ask modification of the report to required standards. He was also told that the project is R&D in character and consequently there was an element that it might also fail to meet its objectives fully.

Following the explanation Dr. Mosha reasserted his enthusiasm for the participation of his Institute and commented that it would be desirable to harmonize the methodology between the two biological institutes, Mt. Makulu and TPRI.

Co-ordination and future Links.

The CTA introduced the subject by stating that the communication system should be as rapid as possible whilst ensuring that all necessary parties had the information. Communication is one of the keys to success of a multi disciplinary co-operative operation especially demanded by this project.

The Backstopping Officer informed that UNIDO will use its field offices for administrative purposes and the technical co-ordination between parties need not follow this route. Communication in this region has been a problem but all correspondence should be copied to PTA, Lusaka. It was decided that principals in each of the two engineering institutes should act as the national co-ordinator in their respective countries and all correspondence should be routed through them.

At this point the meeting was adjourned for the day and resumed the next day at the TPRI and Mr. Opio chaired the meeting. He informed that the UNIDO office in Lusaka now carried responsibility for all PTA projects with UNIDO and all correspondence should be sent to the UNIDO Country Director, Lusaka who in turn will pass it on to PTA Office in Lusaka.

The reports will be sent to PTA through UNIDO office, Lusaka. Following comments from PTA the report will be translated into French and Portuguese and will be distributed by PTA to participating countries. The Project Performance Evaluation (PPER) report should be prepared every year prior to each tripartite review meeting. The meeting was informed that the first PPER had just been out but could not be distributed well in advance.

Sub-contractors Role

The Backstopping officer commented that the project had a sub-contract element. It was intended to have only sub-contractors from Africa and one from Europe. In Africa two institutions viz TEMDO in Tanzania and TDAU in Zambia were selected as sub-contractors in Africa based on the experts' recommendations. In Europe UNIDO sent an invitation for bidding and contacted more than 10 companies and institutions. Four organizations submitted their bidding. Three biddings from U.K. Germany and Hungary were selected for consideration. Following the requirements and the cost, the bidding from Silsoe Research Institute U.K. was accepted. The sub-contract included assistance in design, fabrication, testing, supply of equipment, training and techno-economic studies to be carried out in collaboration with PTA.

Mr. Msolla questioned the testing role opposite the design role required by his institute. The CTA replied that if time permitted the initial trials would be completed before design began. It was agreed that the TEMDO and TDAU will

start the design according to requirements and take it to Silsoe Institute for modifications and advanced training.

Training

The following training programme has been accepted.

i. Design of equipment: Two months (mid May-mid July) to discuss their design with manufacturers, seed treatment and research companies in more than one European countries. (Action by TEMDO;TDAU,CTA and UNIDO)

ii. Biologists: One from each institution dealing with biological testing would be sent during mid May-mid July was accepted. This would involve visiting one institute for 4-6 weeks and then visit a few institutions.(Action TPRI, Mt.Makkulu and institues from Rwanda and Malawi: CTA and UNIDO)

iii. Chemist: One formulation chemist during mid May-mid July in a formulation laboratory and seed treatment laboratory. TPRI would be able bear the air fare.

iv. Study Tour: Four senior officials from participating institutions in Tanzania and Zambia will go for two weeks instead of one month for two given in the project. This would cover Austria , Germany and U.K.

In case formalities could not be finished the training will be from Sept.to Oct., 93..

Work Plan for implementation with deadlines for starting/completion

	start	end	responsibility
Starting the initial design of prototype	Apr.93	July,93	TDAU/TEMDO
Fabrication of Prototypes, Zambia	Aug.93	Sept.93	TDAU
-----Do ----- , Tanzania	Aug.93	Oct.93	TEMDO
Initial Field Trials , Zambia	Nov.93	Dec.,93	Mt.Makulu
-----Do----- , Tanzania	March,94	April,94	TPRI
Training in Europe for 2 in Engineering design	May, 93	July, 93	TDAU/TEMDO
Training for 4 in biology/field trials	May ,93	July, 93	TPRI/Mt.Makulu Chiteze/Rwanda
Training in formulation chemistry	May, 93	July,93	TPRI
*Study tour for 4, two weeks each	June,93	July,93(?)	TEMDO/TDAU TPRI/Mt.Makulu
Purchase of necessary equipment/Chemicals	continuous		
Recruitment of biologist(Zambia)	Dec,93	Dec.93	Mt.Mmakulu
-----do------(Tanzania)	April,94	May,94	TPRI

*Dates will change depending on the availability of fellows

Techno/Economic studies	Oct.93,	July,94	PTA/Sub.contr actor.
Modifications to optimize performance, cost safety and farmer acceptability	Jan.94	?	all
Decision to the number of prototypes and fabrication of the machines(Zambia)	March 94	June,94	TEMDO
-----Do----- (Tanzania)	July, 94	Oct.94	TDAU
Introduction of machines to potential entrepreneurs and users: Zambia	July, 94	Oct.94	TDAU/ Mt.Makulu
Extended field trials(Zambia)	Nov..94	Dec.94	Mt.makulu
-----Do----- (Tanzania)	March,95	April,95	TPRI
Demonstration/Seminar on Seed Dressing as an outreach of the project	June -July 95		

* If training misses the May-July period it will be then during Sept.-Oct.

Reports

Sub.contractors progress report	End 93, End 94,
Sub.contractors final report	April,95.
Project Performance Report(PPER)	March,93, 94, 95
Future meetings	
Second Working group Meeting	June or July 94
Third Working group meeting	June95 or July 95 along with seminar
Demonstration/seminar	June or July 95.
Terminal Report	July, 95.

Equipment status

The Backstopping officer informed the meeting that two seed treating machines one from Uk and another from Germany had already been delivered. Two pick-up trucks have been ordered. The UK sub.contractors will provide some analytical equipment and parts for the proto-types. UNIDO also will supply chemicals, safety equipment, books, additional equipment for prot-type not included in the sub-contract. The meeting was informed that some of the small items could be purchased locally. Running cost of the vehicles would be the responsibility of the participating institutions using the vehicle.

Long term scope

The meeting looked at the project impact on a long term basis very beneficial to the countries and also further to countries within and outside Africa. A seminar during the time of the conference of the African ministers of Industry should be used to pulisize the project. The meeting strongly felt that a

library of pictures should be kept regarding various stages of development of the project so that they would be useful for any future presentation.

Date of the next meeting

The next working group meeting will be in Lusaka during June-July 94. which could be a TPR meeting with participation of the donor country.

Closing Remarks

Mr. Opio thanked the participants for their contribution to the meeting and commented that many countries of the region have not captured the majority of their population within their development. Hopefully this project will contribute to correcting this. The Backstopping Officer thanked the hosting institutes and the JPO, the CTA and the other participants for giving their time and contribution. He also thanked Mr. opio for his personal interest in the project and the PTA for the support.

FIRST WORKING GROUP MEETING

Arusha, Tanzania, from 1 - 2 April, 1993

US/RAF/88/273 - Development of Prototype Mobile Seed Dressing Applicators
Suitable for African Countries

Provisional Agenda

1. Election of Chairman and Rapporteur
2. Introductory remarks by Chairman
3. Brief statements from:
 - UNDP/UNIDO Dar es Salaam
 - PTA Secretariat
 - SADCC Secretariat
 - UNIDO Vienna
4. Adaption of Agenda
5. Position of T P R I
6. Co-ordination and Future Links (CTA to introduce topic)
7. Subcontractor's role(BSO, CTA, TDAU, TEMDO)
8. Training - Type, Location, Nominees, Timing
9. Work Plan for Implementation with deadline for starting/completion.
10. Equipment - Status
11. Long term Scope for the Project
12. Date of next meeting
13. Any other business.

UNIDO COMMENTS

The report gives in detail the work carried out by Mr. Elsworth during his third visit under the project. The author has specifically performed operation of two machines already sent to Zambia and Tanzania and treated selected seeds with pesticides. The report already provides ways and means of looking into the future in the development of seed dressing machines.

The author also provided adequate information to carry out field trials of treated seeds especially maize and beans. It is heartening to learn from the report that many organizations are looking forward to the results of the project and willing to take part.

The idea of making a suitable formulation (9.2) for the project clearly gives a long term view of the progress of the project.

The author's work culminated in the first working group which gave a very good opportunity for all parties (except Rwanda) to appreciate the usefulness of the project. The minutes of the said meeting is attached as annex to the report.