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DEVELOPMENT OF MOBILE SEED DRESSING APPLICATORS SUITABLE FOR AFRICAN COUNTRIES

US/RAF/88/273

Technical report: UNIDO/COMESA Conference in Africa on Seed and Stored Grain Treatment - Progress, Prospects and Problems Arusha, United Republic of Tanzania, April 1996*

Prepared for the Governments participating in the project (Kenya, Malawi, Rwanda, Tanzania, Zambia and Zimbabwe) by the United Nations Industrial Development Organization, acting as executing agency for the United Nations Development Programme

Based on the work of UNIDO/COMESA

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Chemical Industries Branch

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* This document has not been edited

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INTRODUCTION

One of the major problems faced by the African countries is food in security and with the population increasing at an average annual rate of 2.5%, the African continent will have to take serious measures to increase agricultural production. Taking this into account UNIDO and COMESA jointly proposed the programme on a regional co-operation to address the issues of increasing food production. The programme put emphasis on protecting seeds before planting and also in the preservation of harvested grains. Based on early UNIDO studies in four countries in the COMESA region it was revealed that more than 80% of the seeds are planted without any protection against seed and soil borne pests and diseases.

The seed dressing technology is well known for may decades, and now it has become a very important method of applying pesticides safeguard without doing any damage to the environment. The project proposal prepared by UNIDO and COMESA initially covered six countries namely: Kenya, Tanzania, Rwanda, Zambia, Zimbabwe and Malawi. The project as an objective included design and fabrication of prototype mobile seed treatment machines which could be used in the African villages that could produce quality treated seeds and at the same time taking into account the safety aspects both of applying to the seeds and also during the planting of the seeds.

The project was approved in 1991 supported by the German Government from its contribution to UNIDO Industrial Development Fund. For all practical purposes the project was conceived as a research and development project with the aim to develop skill and knowledge of African experts and in the transfer of technology.

One biological research institution and an engineering design and manufacturing organization were chosen in each country as counterpart institutions to participate in the project.

In Tanzania the focal institutions were Tropical Pesticides Research Institute (TPRI) and Tanzania Engineering and Manufacturing Design Organization (TEMDO) and in Zambia Technical Development and Advisory Unit (TDAU) and Mt. Makulu Research Institute. In Malawi Chitedze Agricultural Research Station took the leading role. The project was linked to a reputable institution in Europe called Silsoe Research Institute, U.K. for carrying out training in engineering design and fabrication of the prototype machines and also to make a prototype.

Initially one prototype pedal seed treater based on Milik principle was designed and fabricated with the participation of engineers from Tanzania and Zambia. At the same time senior officials of TEMDO, TPRI, Chitedze and TDAU were exposed to the latest developments in engineering design and seed treatment. After this with the assessment of the CTA the participating institutions were assisted in the design and the fabrication of mobile prototype seed treatment machines. In addition a tractor operated seed treater was also designed and fabricated at TEMDO in Tanzania. Further a number of field trials using maize, beans, sorghum and especially in Malawi, application of rhizobium on soya beans to increase nodulation, were successfully carried out. In parallel, techno-economic evaluation was carried out by COMESA. On-the-job training was also given to many extension workers, NGO organizations, engineering companies and above all, from the Ministries of Agriculture and Industry in the participating countries. Many more prototype machines were made to test the suitability of the machines.

Based on these activities, it was proposed that more emphasis be given to market and dissemination of the technology, and also discuss various issues to facilitate the use of the machines by engineering companies and farmer cooperatives. The proposal was to organize a International Conference in Africa to bring experts from developed and developing countries and discuss the various issues and in making necessary recommendations. This Conference was organized at Arusha hosted by the Tanzanian Government and was organized by UNIDO and COMESA. This report covers the topics discussed in the meeting and recommendations made by various groups. The full proceedings of the Conference will be published elsewhere.

UNIDO/COMESA CONFERENCE IN AFRICA ON SEED AND STORED GRAIN TREATMENT: PROGRESS, PROSPECTS AND PROBLEMS, ARUSHA 16 - 18 APRIL , 1996

PROGRAMME

DAY I

Tuesday 16 April 1996

9.00 - 10.30 OPENING CEREMONY:
Chairman : G. Msolla, DG-TEMDO
Welcome Remarks by Chairman
Statement by UNIDO
Statement by COMESA
Opening Address by the Principal Secretary, Ministry of Agriculture.
Key Note Address:
Prospects for Sustainable Seed Enterprises by Dr. M. Turner, University of Edinburgh, UK.

10.30 - 11.30 Coffee Break and Demonstration for Guest of Honour.

11.30 - 12.00 **Seed Treatment in Central and Eastern Europe.**
Prof. I. Gyurk, Univ of Godollo, Budapest, Hungary.

12.00 - 12.30 **Registration requirements for chemicals used for Seed and Stored Grains Treatment.**
Dr. E. Bode, Biologische Budesanstalt fur Land und Forstwirtschaft Braunschweig, Germany.

12.30 - 13.00 **Small Scale Seed Multiplication Project in Tanzania and Prospects for Seed Treatment.**
Mr Lujuo, Acting Assistant Commissioner, MOA, Tanzania

13.00 - 14.30 Lunch

14.30 - 15.00 **Use of Extension Worker to Promote Seed and Stored Grain Treatment in African Villages.**
Dr P. Golob, NRI, UK

15.00 - 15.30 **Commercialisation of Agricultural Tools Suitable in Africa for Small and Medium Scale Farm Holdings.**
Dr B. Clarke, Silsoe College, Silsoe, UK

15.30 - 15.50 Tea Break

15.50 - 16.45 Discussion on papers presented.

18.00 **Reception.**

DAY 2

Wednesday April 17 1996

9.00 - 9.30 **UNIDO's Programme on Risk Reduction in Pesticide Development in Developing Countries.**
Dr B. Sugavanam, UNIDO, Vienna.

9.30 - 10.00 **Why on-Farm Seed Production by Small Scale Farmers and Implications for Seed Treatment**
Dr Muliokela, FAO-WAE Consultant, Zambia.

10.00 - 10.20 **Role of Formulations in Seed Treatment.**
Dr P. K. Ramdas, Institute for Pesticide Formulation Technology, New Delhi, India.

10.20 - 10.30 **Introduction to UNIDO/COMESA Project.**
Dr B. Sugavanam

10.30 - 10.45 **The Project from a COMESA perspective.**
Dr J. Mwencha and / or Mr J. Opio, COMESA, Lusaka.

10.45 - 11.00 Coffee Break.

11.00 - 13.00 **Implementation of UNIDO/COMESA Project**
The Strategy and the Approach taken.
Engineering and Biological Aspects:

Tanzania:	TEMDO, Arusha
	TPRI, Arusha
Zambia	TDAU, Lusaka
	Mt. Makulu Research Institute, Lusaka
Malawi	Chitedze Research Station, Lilongwe

By

Mr Elsworth, UNIDO/CTA; Mr Msolla, Director General, TEMDO
Dr Mosha, Director, TPRI; Dr Kwendakwema/Mr Mwanza, TDAU,

Zambia; Mr Mulenga, Plant Pathologist, Mt Makulu, Zambia; Mr Kumwenda, Farm Machinery Unit, Chitedze Research Station, Malawi.

13.00 - 14.00 Lunch

14.00 - 14.20 **Market Study and Economic Prospects**
Mr Sichilima, COMESA, Lusaka.

14.20 - 15.30 **Demonstration of machines and Tea Break.**

15.30 - 16.30 **Discussion of papers and the UNIDO/COMESA Project.**

16.30 - 17.00 Arrangement and constitution of groups for day 3.

DAY 3

Thursday 18 April 1996

9.00 - 9.40 **Environment friendly strategies of Insect Pest Management at ICIPE and their Potential for Seed Treatment for African Farmers.**
Dr Sithanantham, Senior Advisor, ICIPE, Nairobi, Kenya.

9.40 - 10.10 **Development of Seed Multiplication/Certification Scheme in Malawi.**
Dr J. Luhanga, Ministry of Agriculture, Malawi.

10.10 - 10.30 Break

10.30 - 12.30 **Group Discussions.**

Group 1:	Engineering Aspects Including African design and fabrication.
Group 2:	Seed Treatment, Safety Regulations, Registration, Certification.
Group 3:	Economic Aspects and Marketing.

12.30 - 14.30 Lunch and preparation of group reports.

14.30 - 15.00 **Presentation of Group Discussions with Recommendations.**

15.00 - 15.30 Tea Break

15.30 - 16.00 Closing of the Conference.

DAY 4

Friday 19 April 1996

10.00 - 12.00 **Post conference meeting with limited participation.**

STATEMENT FROM UNIDO REPRESENTATIVE

Honourable Guest of Honour the Regional Development Director, Mr. Babu, Dr. Mwencha, Director of Industries, COMESA; Respected Delegates, Ladies and Gentlemen,

It gives me a great pleasure to come to ARUSHA to collaborate with COMESA in organizing this International Conference in Africa on Seed and Stored Grain Treatment.

On behalf of the Director General of UNIDO, Mauricio de Maria Y. Compos and on my own behalf I welcome you all to this conference which is intended to bring experts from within and outside Africa to discuss the progress, prospects and problems in the most important field of seed and stored grain treatment.

While enormous progress has been made in crop protection during the last twenty years, especially in the introduction of newer and highly active pesticides, the development countries are still dependant on older, less efficient and more toxic pesticides and their formulations. With the average increase in the population around 2.5%, the African continent faces the challenge of feeding the ever growing population. If agriculture is not given the priority the continent will face enormous adverse consequences. This COMESA region is blessed with vast natural resources, especially in fresh water, rain forests and wildlife. Obviously any revolution in agriculture should be in tune with the environment, biodiversity and the habitat of the people and the wildlife. While agriculture is the lifeline of the COMESA region, one should take into account all factors such as soil and water management, use of hybrid varieties, agrochemicals inputs and industrial inputs for crop protection, food processing, preservation and distribution. In agriculture, UNIDO along with other organizations is putting emphasis on risk reduction in agrochemicals development. In this we include both pesticides and fertilizers. In UNIDO we especially are linking agriculture with industry within the scope of ecologically sustainable industrial development.

We are taking the initiative in promoting risk reduction in agrochemicals development for the Afro-Arab region by setting up of a regional network similar to our network in Asia called Regional Network on Pesticides for Asia and the Pacific abbreviated to RENPAP. Our experience is that networking is the best way of exchanging information, experience, expertise and in capacity building. Such a network in the Africa-Arab region would cover the whole spectrum of agrochemicals development from market data, formulation, quality control, application technology, bio- and botanical pesticides,

occupational health and safety, disposal of obsolete pesticide waste to ecotoxicology and environmental monitoring. All these are aimed to minimize/eliminate risks out of production and use of pesticides so as to reduce the overall load of man made agrochemicals in the environment.

We are all well aware of the fact that seed dressing is one of the most efficient and environment friendly ways of applying pesticides to give the necessary protection at the early stages of crop's life from seed and soil borne diseases. UNIDO studies in the eighties revealed that in many African countries only a small portion of the seeds are treated by traditional seed treaters; and the rest planted, especially by the medium and small farmholders, without any protection. Therefore UNIDO proposed a project as early as 1985 to address to the needs of these farmers to develop proto-type mobile seed dressing machines. The German Government from its contribution to UNIDO's Industrial Development Fund supported the project which UNIDO in 1992 started implementing in collaboration with COMESA.

By means of this international conference which will discuss the results of the project, the organizers have brought experts from within and outside Africa to a common platform which will give an opportunity for a North-South interaction to assess the progress, prospects and problems of seed dressing and post harvest treatment and promoting the use of prototype machines taking into account safety and quality. We have still a few important areas to be optimized in the project. They are the availability of chemicals, reduction in the cost of the machines, government assistance in using extension workers or trained supervisors to monitor treatment of seed and stored grains in villages. We hope that this Conference will discuss all these aspects and make sound recommendations to UNIDO.

In this conference we are fortunate to have highly reputable experts from different parts of the world. Prof. Schwinn, a world renowned biologist was supposed to be delivering the key note address entitled "Seed Dressing - A panacea for Crop Protection?" It was very unfortunate and saddening that he died of heart attack two weeks back. He was very enthusiastic about participation in this conference and we will all miss him. It was very kind of Dr. Turner from University of Edinburgh, equally well known, in the field of seed technology who agreed, at a short notice, to deliver the Key-Note address entitled "Prospects for Sustainable Seed Enterprises". His lecture will be dedicated to the memory of Prof. Schwinn.

I want to take the opportunity to thank the Honourable Guest of Honour and Respected Regional Development Director, Mr. Babu, to give his valuable time to inaugurate the conference. Our thanks to the Government of Germany for financial supporting the project, and to COMESA for providing the linkages with the participating countries. I am very thankful to all the counterpart institutions for giving their full support to the project and to project personnel, especially to Mr. Elsworth for giving their expertise. Special thanks are due to TEMDO and TPRI for all the local arrangements.

I once again welcome you all to this conference and wish you a very successful meeting and a very happy stay in this beautiful town of Arusha in the Republic of Tanzania.

COMMON MARKET FOR EASTERN AND SOUTHERN AFRICA

COMESA: STRENGTHENING THE FRAMEWORK FOR REGIONAL ECONOMIC INTEGRATION

Statement by J.E.O. Mwencha,

Read on behalf of:

THE SECRETARY GENERAL OF COMESA
DR. BINGU WA MUTHARIKA
ON THE OCCASION OF THE OFFICIAL OPENING
OF THE SEED AND STORED GRAIN TREATMENT CONFERENCE IN
ARUSHA - TANZANIA

16TH APRIL 1996

GUEST OF HONOUR - Regional Development Director (Mr. Babu),
Mr. Chairman,
Prof. Turner - University of Edinburg,
Distinguished Representatives from UNIDO (Mr. Hegba) and GTZ,
Distinguished Resource Persons and Participants,
Ladies and Gentlemen.

Allow me first to welcome you to the meeting on the Development of Seed Treatment Applicators being held in this beautiful city of Arusha, the home of the recently revived East African Cooperation (EAC). I am confident that the very good weather in Arusha plus the excellent hospitality accorded to us by the Government and people of Tanzania will go a long way in making the deliberations at this Conference very fruitful.

Secondly, I should like to thank the Government and people of Tanzania for accepting to host this conference. This clearly testifies to Tanzania's unwavering commitment and support to cooperation and integration in Eastern and Southern Africa. I must also sincerely thank you, our Distinguished Guest, for taking time out of your schedule to officiate at the opening session of this important conference in the COMESA Calender for 1996.

This project on the Development of Seed Applicators was funded by the Government of Germany through special contribution to UNIDO (IDF) and therefore it is most fitting that I should pay special tribute to Germany and UNIDO for their support to COMESA programmes. Allow me also to thank Dr. Sugavanam for the excellent backstopping support and for his personal interest and commitment without which it would have been difficult to realize the objectives the project sought to achieve. It is our hope that this support will continue for many more years to come.

Honourable Guest,

As indicated by Mr. Hegba, this conference is the final event for the project which was intended to develop "Prototype Mobile Seed Dressing Applicators Suitable for small-scale rural African farmers". It was a project conceived when the PTA, the predecessor to COMESA, launched its operational phase in 1984 but was not concretised until 1989 when UNIDO undertook a preparatory assistance mission to countries in the region to assess the situation of

plant protection and seed dressing technology in these countries. It was then clearly established that there was a large proportion of different crops, particularly traditional crops grown by rural farmers that would benefit from seed treatment. In fact, it was found that the majority of staple and non-staple seed inputs were still farm saved. Hence the potential for mobile seed treatment technology was immense relative to the percentage of harvested crops resown in these countries. It was on the basis of these conclusions that Germany provided the funds to UNIDO to implement this project.

Mr. Chairman,
Distinguished Participants,

The main stay of the economies of COMESA countries is agriculture. Unfortunately, since the 1980's up to now agricultural production has been declining with the result that most member states of COMESA have to import significant amounts of food which means that food insecurity is rampant in our region. It is for this reason that National and Regional Strategies accord the highest priority to attaining food self-sufficiency. Hence agriculture and food production are accorded the highest priority in COMESA Programmes because for the majority of our member states, agricultural commodities remain the dominant export items, a major source of foreign exchange earnings despite worsening terms of trade. They are also the major source of supply of basic foodstuffs and provider of employment to both rural and urban populations.

The COMESA programmes for agriculture and agro-allied industries include, inter alia:-

1. Intensification of production of each of the staples in the COMESA areas best suited to their growth with regard to climate, agro-climatic factors and soil conditions;

2. Strengthening the capacity of the countries to intensify the production of the respective crops;

3. Development of appropriate technological packages, involving as much as possible the utilization of locally available raw materials and processing facilities; and

4. With regard to agricultural machinery, priority is accorded to the manufacture of hand tools, simple manually operated machines, animal and tractor drawn implements, and simple power operated machines.

Mr. Chairman,
Distinguished Participants,

It is for these reasons that the project had, as its objective, to increase agricultural production and to contribute to self-sufficiency in food production by minimising the risks of pre-harvest losses due to pests and plant diseases. Plant diseases and pests, including seed and soil borne ones cause significant yield losses of important crops in the COMESA region. Besides, seed treatment is being carried out on ad-hoc basis in most countries in the region. For example, in Malawi, Kenya, Tanzania and Zambia, farmers have until recently depended almost exclusively on one centralised seed company for the supply of treated seeds.

Consequently, the small scale farmers have to travel long distances to buy treated and certified seeds. In many cases some treat their own farm-saved seeds using inefficient and inappropriate methods such as plastic bags and hand mixing using gloves. These methods are unsafe to the operators and seed handlers. But most critically, the loading of the pesticides on the seed is usually not homogenous, a factor of extreme importance in any efficient seed treatment.

Distinguished Participants,

Pre- and post-harvest losses from pests and diseases currently reduce food availability by as much as 30 to 40 percent or more. Grain losses alone may amount to over 2 million tonnes per year. Reducing these losses will significantly cut on grain imports that have become almost a permanent feature in COMESA. The results of biological trials of the prototypes developed by this project indicate that these targets are achieveable.

As you are all aware, seed dressing over the years has proved to be one of the most effective and economic methods of plant protection. A wide variety of fungal and bacterial diseases such as mildew, rusts, busts, smuts, blasts and blights could be controlled in addition to a number of soil borne insects, nematodes and even birds. The destruction of seed or seedling by pests and disease may result in a plant stand that is insufficient to give an economic crop and in some instances there can be almost total crop failure. The other advantage of seed dressing is that smaller amounts of pesticides are used than when applied to furrows or broadcast, hence minimising pollution. Thus seed treatment as an important component in an integrated pest management strategy would be a formidable approach in Africa and our region, in particular.

Mr. Chairman,

This project was in no way intended to re-invent the wheel but to adapt models developed elsewhere, namely in the U.K. and Germany to suit the needs of rural small farmers in COMESA region and Africa as a whole. The main considerations were affordability, ease of maintenance and operation and safety to the operators. Bearing this in mind, the two counterpart engineering institutions namely, TEMDO (Tanzania Engineering and Manufacturing Design Organization) in Tanzania and TDAU (Technical Development and Advisory Unit - UNZA) in Zambia have successfully developed two models of the machines: Pedal and Tractor driven respectively. These will be demonstrated this morning, but I can say with satisfaction that they have been tried out and do work quite well. Trials have been undertaken by Mount Makulu Agricultural Research Station in Chilanga, Zambia; Tropical Pesticides Research Institute (TPRI) in Arusha and Chitedze Research Station in Lilongwe, Malawi. The results of these biological trials will be presented to this conference and I do hope that you will be able to appreciate the positive impact this could have on agricultural output in the region if the machines could be widely utilized in COMESA countries.

One other important aspect of this project is that it was a North-South cooperation venture between the Engineering Institutions in COMESA region and Silsoe Research Institute (SPI) in the U.K. One engineer each from TEMDO and TDAU were trained at SRI in the design of these types of machines and so the region now has the capacity to design these machines. This is a tremendous asset for the region.

Our Guest of Honour,

Mr. Chairman,

The project, as you can judge for yourself, forms an ideal link between industry and agriculture and this is exactly what we wish to vigorously promote in this region. However, our research and development institutions have not been very successful in commercialising technologies that they were able to develop and so the research results were often left to gather dust on shelves. We do not wish to see this technology suffer the same fate. Already some dissemination of the technology has been attempted but it is too little to have significant impact. It is therefore our ardent appeal that the Ministries of Agriculture from all our member states, some NGOs and UN Agencies, some of whom are represented here, will take up the challenge of disseminating this technology throughout the region. Ideally, the machines could be produced, bought and loaned to groups of farmers in the rural areas initially, who would then pay back the loan from the income they would generate at little interest. Alternatively, an entrepreneur could buy the machines and charge the farmers for treating their seeds or crops. The economics of this approach has been analysed and it is quite attractive.

Whatever approach the conference comes up with on the commercialization of this seed treatment technology, we are confident that the necessary technical back-up services will be available from the institutions that were involved in this project. In particular training of operators and technicians to maintain the machines can be provided by both TEMDO and TDAU.

In conclusion, I wish to appeal to FAO and GTZ representatives in COMESA countries to incorporate this technology in their seed multiplication and integrated pest management (IPM) programmes at the national level.

Mr. Chairman,

Before I conclude my statement allow me to make a few remarks on COMESA:-

1. COMESA stands for"Common Market for Eastern and Southern Africa", successor to PTA;

2. Has 20 countries with a combined population of approximately 300 million people and a GDP of US$ 80 billion. COMESA therefore makes it possible for companies to produce at high volumes and therefore benefit from economies of scale.

The major objective of COMESA is therefore to create environment for sustainable growth and development.

As indicated earlier, COMESA is the predecessor to PTA. The overall objective in this respect is to attain an Economic Community. We have adopted a stage by stage approach from a preferential arrangement to a Common Market and eventually an economic community. COMESA plans to set up a common external tariff for COMESA by the year 2000. COMESA also cooperated in development of other sectors of the economy including trade, transport and agriculture. Another area of importance is in the exchange of information.

Mr. Chairman,

In liberalized and globolized economy that we find ourselves in, COMESA offers an excellent stepping stone to regional producers to enter the global market by exploiting the abundant resource endowment.

Once again, we are most grateful, Sir, that you were able to grace the opening session of this Conference. Please convey our sincere gratitude to His Excellency President Benjamin Mkapa.

I wish all of you very fruitful deliberations.

Thank you.

SPEECH

BY

RAPHAEL MOLLEL

PRINCIPAL SECRETARY - MINISTRY OF AGRICULTURE

ON THE OCCASION OF THE OFFICIAL OPENING

OF THE

SEED AND STORED GRAIN TREATMENT CONFERENCE IN

ARUSHA, TANZANIA ON 16TH APRIL,1996

Mr. Chairman,
The UNIDO Country Representative,
The Director of Industry, Energy & Environment,
Distinguished Participants,
Invited Guests,
Ladies and Gentlemen.

It is my pleasure to welcome you all to Tanzania and Arusha in particular. I hope that you will find your stay in Tanzania comfortable and fruitful.

I should first of all pay tribute to the United Nations Industrial Development Programme, UNIDO and COMESA for organizing this important forum and the German government for providing financial support for the entire project. In particular I am grateful to UNIDO for continuing to be an all weather friend in the development efforts of our country and the region as a whole. We greatly appreciate and value your support and this is the reason why we totally reject the idea that UNIDO should be discontinued.

Mr Chairman,

We should realize that agriculture plays an important role to the economies of the COMESA Member States. It provides not merely food but foreign exchange, employment and industrial inputs for other sectors of the economy as well.

This forum is of critical importance in many respects. Firstly it is action oriented. It is aimed at ensuring that there is increased agricultural production in the region for the benefit of our people and for exports. It is saddening to find that in most countries in the region, including Tanzania, we have food deficits to the extent that we continue to import substantial food and yet we have abundant arable land which we can use to produce the food we need. We need not only to reverse this trend but we must bring an end to mass hunger and malnutrition in our region. The capacity of Member States to meet food requirements should be expanded through our own efforts and be able to reduce the mounting food import bill.

To start with there should be increased financial flows to the agricultural sector commensurate with the sectors contribution to GDP and application of suitable farming techniques. It is disheartening to note that whereas agriculture on average contributes about 30 percent to GDP to investment in sectors is hardly 10 per cent.

Secondly, the technology developed through this project is targeted at the rural small scale farmers who are the major producers of food crops in our countries. The deliberations at this conference are therefore, in line with our policy of eliminating poverty in the rural areas through increasing production levels of rural farmers and consequently alleviating hunger and malnutrition in the country side.

Thirdly, the region as a whole, and Tanzania in particular, is committed to ensuring that food security at household, national and regional levels is achieved. This cannot be achieved without appreciable increases in food production at the household level in the rural areas. In recognition of the relatively large untapped market for improved seed and the generally low key commercial seed operations, my government adopted a national seed policy realizing the importance of the on-farm seed production system to help meet the national seed requirements especially of disadvantaged small-scale food producers.
The government will assist and collaborate with informal farmer groups, Non-Governmental Organizations and other interested parties to launch informal seed production activities at the grass root levels to supplement seed supply efforts provided by the immature seed industry. My government is also vigorously supporting Integrated Pest Management (IPM) of which seed treatment is a vital component.

Here in Arusha there are individual efforts being exerted in various seed production of vegetables, fruit trees, commercial flowers and some cereals. These farmers need to be encouraged and assisted through credit, technology and necessary infrastructure to facilitate yields and earnings.

Fourthly, the acquisition of the technology is crucial, not only to growth but to the capacity to grow. I realise that the securely of technology is a worldwide concern since all countries have much to learn from each other. But clearly it is most important to our Member States, as it could even be argued that our principal weakness is the lack of access to technology or command of it. A cooperative approach adopted for this project is therefore most appropriate for the region.

Mr Chairman, Distinguished participants,

Increased production by rural small scale farmers has a number of advantages such as increased rural incomes. which in turn raises the standard of living of the people in rural areas and increases their purchasing power. Increasing the purchasing power of the population in turn creates demand for manufactured goods which is essential for development of industries at national and regional levels.

Furthermore, I am informed that the project has the potential for creating small scale business in the rural communities. Again this is encouraging because some of these small scale business will definitely expand into medium and large scale enterprises. However, it is essential that the technology related to the creating of small scale businesses should flow quickly both between and within COMESA Member States. I therefore, urge this conference to come up with a suitable mechanism to ensure that the target beneficiaries, the rural farmers, are fully informed on the existence of this technology and its business potential. It would be very sad indeed if this wonderful effort ended up on shelves.

Mr Chairman,

I am particularly glad that this conference will discuss results of this research and Development project which was conceptualized in 1988 and has culminated into the development of two mobile seed model prototypes to be used mainly for seed treatment by our rural small scale farmers. I feel encouraged to seed projects of this nature which aim at increasing output in agriculture, and in particular output per unit area of the crop planted because it maximises resource utilisation and makes us more competitive. The other advantages of this project are that indigenous technological capacity has been strengthened and wider participation in the development process would be encouraged.

As I pointed out earlier, agriculture is the mainstay of the economies of nearly all COMESA Member States and that the Authority agreed in the next 5 to 10 years our priority should be amongst others:-

- substantial increases in productivity in industry particularly manufacturing and agro-industries to provide competitive goods as a basis for cross-border trade and creation of wealth, jobs and incomes for the people in the region.

- Increased agricultural production, with special emphasis on joint development of lake and river basins so as to reduce the level of dependence on rain fed agriculture and introduction of new programmes on food security at the provincial or district, national and region levels.

Tanzania fully supports this decision of the Authority and thus its acceptance to host this international Conference is based on the fact that it addresses directly these priorities set by the Authority. I also believe that regional integration and cooperation offers to us a viable strategy for accelerated economic development and structural transformation amongst our countries. It would also support industrialisation and trade expansion and provide opportunities for multi-currency ventures such as this project.

Furthermore, it is through fora such as this one that Member States can "exchange pertinent research findings, as I believe you will be doing during the course of the symposium and research extension expertise for the benefit of the farming community within the Common Market" Your activities are therefore, in conformity with our aspirations and needs. It is for this reason that I would like to appeal to our co-operating partners such as UNIDO, FAO and others to continue promoting this type of activities.

At the national level, my government attached great importance to achievement of food security and self sufficiency and it is in this respect that we welcome any measure which enhances achievement of this important objective. We are geared to achieve appreciable increases in production of crops so that we don't only feed the fast growing population, but provide raw materials for our industries to process into consumer and export

goods.

We have therefore, instituted bold measures to stimulate agricultural production. Such measures include liberalization of prices. We are doing everything possible to rehabilitate the infrastructure especially rural roads and we have created an environment conducive for private sector participation in agriculture. I therefore, wish to urge potential investors both local and foreign to take advantage of the stable investment climate and the lucrative investment conditions in the agricultural sector and invest in this key sector of our economy.

Mr Chairman,

This conference addresses the issue of treatment of seed which is currently planted without treatment thereby, affecting the yield. Seed and stored grain which is not treated with protective chemicals prior to planting and storage is subject to attack by insect pests, soil borne and seed borne diseases. However the use of agro-chemicals for seed and stored grain treatment require greatest care to be taken to observe safety instructions in order to avoid risks to the operators, traders and consumers during handling, risks to seed and grain phytotoxicity, risks to environmental pollution and financial losses to the seed enterprises where seed becomes unutilized.

As I pointed out earlier, the region and Tanzania in particular would like to see a situation in which the output by our rural farmers per hectare is increased. Most of these farmers are unable to increase their output because they tend to use own farm saved seed, which is not treated and therefore not protected from attack during storage and once planted. For the foreseable future rural farmers will continue to utilise own farm saved seed for planting for some time to come for a variety of reasons. If we can improve the yield even by a small margin without increasing appreciably the cost to the farmer, we shall have done our people a great service. The efforts being made through this project and the symposium are therefore welcome and long overdue.

Mr. Chairman, Ladies and Gentlemen,

I have observed with deep gratitude the interest shown by the international and regional cooperating partners in this Conference. I am hopeful that this forum will be the foundation for more work to be done in this and many other areas in order to increase agricultural production. I would like to judge the success of this forum not by the number of people in attendance and excellent reports and recommendations of the forum, but by the number of small businesses which will culminate as a result of this forum and the number of machines which will be used by our intended targets. I therefore, urge you all to take seriously the discussions you will have during the course of the forum to ensure that the magnificent ideas you have started do reach their logical conclusions.

I thank you all for making this Conference possible and wish you success in your deliberations.

It is my pleasure to declare this Conference open.

Thank you.

ABSTRACTS

THE PROSPECTS FOR SUSTAINABLE SEED ENTERPRISES

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Over the past 25 years, organized systems of seed supply have been established in most developing countries. In common with other development activities, this has taken place under the auspices of 'projects' financed by external agencies, either bilateral or multilateral. Such projects have put in place the essential elements required for organized seed supply, notably processing plants, stores and quality control facilities. They have also undertaken the training of staff at all levels.

Projects of this kind are always negotiated at a government level and are implemented in close association with the host government, typically through a 'parastatal' company but sometimes as a unit within the Ministry of Agriculture itself. Consequently there has been a close involvement by government in the establishment of these 'national seed programmes'. Their objectives have often been primarily social and developmental rather than commercial. In many countries a substantial government presence in the seed market, often operating with the benefit of subsidies, has effectively deterred the entry of private companies.

Recent changes in the policy climate in development, combined with budgetary constraints in many countries, have prompted governments to withdraw from direct participation in productive activities (including seeds) and to encourage greater participation by the private sector. Demands for 'privatization' are heard increasingly but it is unclear how this should be best achieved in the case of 'seeds.

Seed production and supply are naturally 'commercial' activities which present opportunities for the private sector, particularly in high value crops such as vegetables and where hybrid varieties are readily available, as in maize. However, in many staple cereal crops and in legumes, the 'seed business' is not very profitable. Thus in practice, a large proportion of the national seed requirement is still supplied through 'informal channels' and this situation seems likely to continue. We now recognize the distinct roles of the formal and informal seed supply channels, and the possibility of integrating them in a complementary way in order to facilitate the diffusion of new varieties. Such an approach may also achieve the right balance between quality and price, which is essential

if farmers are to spend their scarce resources on seed.

Against this background, this paper consideshe current status of seed programmes/industries and the prospects for establishing more indigenous seed enterprises, particularly at a local level. This is a channel for increasing private sector participation in the seed industry level and also, potentially, for making seed supply more responsive to the needs of small farmers. However, such enterprises will have to survive in a market environment in which all their costs must be covered out of sales revenue. This is the challenge of 'financial sustainability'. The likely structure of such enterprises and their commercial affiliations are reviewed. Finally, the opportunities and risks of using seed treatments within their operations are considered.

SEED DRESSING - CENTRAL AND EASTERN EUROPEAN PERSPECTIVES

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Central and Eastern Europe's soil and climatic conditions are suitable for the production of a wide variety of agricultural and horticultural seeds. The practice of seed dressing found widespread applications in these countries after the turn of the century. Agriculture is now in the process of transformation in the former so-called socialist countries. As a result a number of new landowners have emerged, some of them joint co-operative farms. Some of the state farms have also survived. Research institutes, seed processing companies make the technological level of seed treating uneven, but it can be stated that seed dressing is a general practice in Central-Eastern Europe.

As for the technology and machinery the situation is mixed. The large seed processing companies employ multi-function and highly automated seed treaters. But simpler, low-output and less expensive machines are also marketed for smaller co-operatives, bigger private farms. Under the conditions of liberalized market competitions farms and seed companies obtain their seed treaters from different manufacturers. The manufacture of seed treaters always ranked high in Hungary. Several types of seed treater are produced to fulfill the different demands of farmers, seed processing plants of state farms, co-operatives and seed companies.

AUTHORIZATION REQUIREMENTS FOR CHEMICALS USED FOR SEED AND STORED GRAINS TREATMENT

Dr. Erdmann Bode

Biologische Bundesanstalt fur Land- und Forstwirtschaft, Abteilung fur Pflanzenschutzmittel und Anwendungstechnik - Federal Biological Research Centre for Agriculture and Forestry, Department for Plant Protection Products and Application Techniques; Messeweg 11 -12, D - 38104 Braunschweig (Germany)

Plant protection products are intended to protect plants (comprising living plants and parts of plants with fruits and seeds) and plant

products against harmful organisms (pests). According to the present German regulations, plant protection products may only be marketed or imported if they are authorised by the Federal Biological Research Centre for Agriculture and Forestry. To obtain an authorization the applicant has to submit detailed data and information to prove compliance with the authorization requirements. Important subjects to be dealt with are both for the active substance and/or the preparation:

Chemical and physical properties; analytical methods; proof of efficacy against target organisms; quality of the crop; phytotoxicity; toxicology; residues and the fate and behaviour in the environment (soil, water, air); possible fate in food chains; ecotoxicology (where appropriate), e.g. effects on the activity of soil microflora, on soil fauna (earthworms), effects on aquatic organisms (e.g. algae, Daphnia sp., fish); non-domestic mammals and birdlife, the latter being very important for seed treatment products.

An authorization will be granted if the assessment of data shows compliance with the authorization requirements and:

* if the plant protection product is sufficiently effective,
* if there are no adverse effects on human and animal health and on groundwater,
* if there are no effects on the environmeaw which are not justifiable in the light of the present state of scientific knowledge.

The authorization of plant protection products in the Member States of the European Union will take place according to the regulations laid down in the "Council Directive concerning the placing of the plant protection products on the market (91/414/EEC)".

Though there are some special regulations e.g. with respect to the approval and listing of active substances, the authorization for plant protection products may only be granted under similar conditions and prerequisites as described for the present German authorization procedure: The plant protection product has to be sufficiently effective, it may not exert unacceptable effects on plants or plant products, it may not cause unnecessary suffering or pain to vertebrates to be controlled. Moreover, there shall be no harmful effects on human or animal health, directly or indirectly, and no unacceptable influences on the environment.

By way of example authorization requirements for plant protection products intended to be used for the protection of stored grains and for seed treatment are presented in detail to give an overview on the West European standard of authorization.

PROTECTION OF GRAIN FOR STORAGE IN AFRICA

Peter Golob

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Once harvested, more than 70% of all grain is stored on the farm for home consumption. In areas where there is only a single rainy season every year, therefore, only one cropping season, grain can remain in storage for nine months or more. Whilst in store, this grain is subject to insect infestation and so loss of grain weight and quality can be severe. Two factors affect the degree of damage sustained during storage other than the length of the storage period itself: the type of variety grown and the type of insect present.

Until recently, African farmers relied on the production of their own seed. The resultant local varieties were very low yielding but also very resistant to pest attack, including to storage pests. With the advent of agricultural market liberalization, farmers have an inducement to produce more crop to be able to market the surplus and increase their incomes. Increased production can be most easily achieved by growing higher yielding hybrid and composite varieties. However, these varieties are very susceptible to insect pests and can sustain very high losses in store, even when kept for only a few months. Insect pests can be overcome, however, by the application of synthetic insecticides.

Only a relatively few chemicals have been approved for use as food grain additives. These chemicals must be made available to farmers in a form which is safe and convenient to apply, and relatively inexpensive. Such a formulation is available as the dilute dust. However, using dusts does create problems because they are difficult to manufacture into stable formulations and they are bulky, therefore expensive, to package and transport.

In recent years, the Larger Grain Borer has become established across Africa and, in countries where it is well established, it is the most important pest of farm-stored maize. LGB can be controlled by pyrethroid insecticide dusts but their application often necessitates a change to the traditional method of storage, from maize on the cob to shelled maize. Such an obstacle was encountered in Tanzania. A major extension campaign was undertaken to persuade farmers to change their method of storage. Traditional methods of extension were not appropriate because of the number and complexity of the messages which were needed to put across to the farmers. Instead, informal approaches were used, including drama, song and facilitated discussion. Such

methods could be used to convey other types of information and to other groups of people. For example, in Ghana, where trade in food commodities has increased markedly in recent years, information has been directed at traders in order to use them as front line extension officers; methods used have included storage board games and decision trees. The novelty of these methods has impact on both extensionists and farmers. In order to convince producers or traders to implement recommendations or to use new technology, the changes which will accrue have to be demonstrably cost-effective. These methods of providing information can facilitate this process.

COMMERCIALIZATION OF AGRICULTURAL TOOLS SUITABLE IN AFRICA FOR SMALL AND MEDIUM SCALE FARM HOLDINGS

Brian Clarke

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In the commercialization of machinery it is important to pay regard to several issues. This applies whether the technology is transferred from another country or developed in Africa. Firstly, the machine should be fully developed into a commercial format with all the teething troubles behind. It should preferably be made locally and given maintenance and other after sales support. It should be marketed through all the various stages of knowledge, persuasion, decision, implementation and confirmation but in a manner which suits the local target group of customers. Finally, the technology should be sustained by sufficient funds until it is able to survive on its own.

WHY ON FARM SEED PRODUCTION BY SMALL SCALE FARMERS - IMPLICATIONS FOR LOCALIZED SEED TREATMENT

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The paper briefly reviews the reasons which have entrenched seed production by small scale farmers at the village or at most community level. Examples are drawn from Zambia, but the scenario is no doubt similar to that obtaining in most of the Sub-Saharan Africa. Further the paper reviews some of the current practices of seed treatment in village communities. However, the paper states these practices would need further research and adaptation to modern seed treatment applicators.

ROLE OF FORMULATIONS IN SEED TREATMENT

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Seed treatment is regarded as one of the most efficient ways of crop protection. The efficiency and safety of chemical seed treatment depend not only on the pesticide being used but also on the formulation employed. The main disadvantage of dustable powder (DS) and wettable powder (WS) formulations include the hazardous dust cloud arising while handling, relatively poor efficiency and difficulty in handling. In this regard suspension concentrate formulations (FS) offers several advantages such as freedom from dust, handling ease and in many instances improved biological properties. Still better alternative may be the use of wettable granules as it empties out from the container minimizing the container disposal problem also. In this regard water soluble packaging also offers environmental acceptability. It is always advisable to switch over from the conventional formulations to the newer types whenever there is cost-efficacy advantage or significant safety aspects are involved.

INTRODUCTION TO UNIDO/COMESA PROJECT ON DEVELOPMENT OF PROTOTYPE MOBILE SEED DRESSING APPLICATORS SUITABLE FOR AFRICAN COUNTRIES

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It was during the mid-1980s the United Nations Industrial Development Organization (UNIDO) wanted to develop a simple methodology for assisting African countries to increase their food production. Obvious choice, among other things, was the seed dressing technology as a user and environmental friendly way of using pesticides protecting staple crops in Africa at their early stages of growth. After carrying out detailed preparatory studies in four countries it was found that in many African countries small and medium scale farmers normally used farm saved seeds and had no access to seed dressing. Therefore UNIDO in collaboration with the common market for Eastern and Southern Africa (COMESA), previously called Preferential Trade Area (PTA), proposed a project to develop a prototype seed dressing machine suitable for African villages. It was more an adaptation of existing technology but at the same time a new concept for African villages. In 1991 the German Government from its contribution to UNIDO Industrial Development Fund (IDF) agreed to finance the project. The implementation of the project started in 1992 with the participation of Tanzania, Rwanda, Zambia, Malawi, Kenya and Zimbabwe.

During the last 10 years with the increased concern over the normal and misuse of pesticides and with the importance given to volume and risk reduction in agrochemicals development, seed dressing has become an important aspect of crop protection. With mercury seed dressings banned, organochlorines under restricted use and with the introduction of broader spectrum fungicides and insecticides, seed dressing technology has become safer and more efficient. Therefore it could be a valuable tool for African countries if appropriate technology is available for the benefit of small scale farmers complementing big seed treaters. UNIDO in its project put emphasis on safety, mobility, quality seed treatment at a price affordable by the African farmers. The paper describes the methodology adopted by UNIDO and how UNIDO's funding as 'seed money' for the project brought human resource development and capacity building to design and fabricate prototype machines in Africa and catalyzed a great enthusiasm in the participating countries. The spin off into post harvest treatment makes the project a potential

contributor to resource poor African farmers. The paper highlights the prospects and further optimization needed to make full utilization of the project achievements. It calls for support from the governments to provide the necessary incentives, promote availability of chemicals, introduction of supervisory assistance through extension workers in order to promote the technology for greater food security in Africa.

THE PROJECT US/RAF/88/273 FROM COMESA PERFECTIVE

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The decline in agricultural production in COMESA region during the last two decades coupled with the high level of pre- and post-harvest losses being experienced in the region with the consequent food insecurity is of great concern to COMESA member states. It is shown that this project could contribute to the solution of this problem. Besides, the project would have impact in areas of technology transfer, skills development, R & D collaboration between institutions in the region. However, more effort is required in the optimisation, dissemination and commercialization of the technology. The extraneous impact of the project would also include development of entrepreneurs and creation of non-farm employment in the rural areas. The project in COMESA's view accomplished its objectives.

BIOLOGICAL TESTS OF SEEDS EMANATING FROM SEED DRESSING APPLICATORS SUITABLE FOR AFRICAN COUNTRIES

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Biological tests on maize (UCA var) and bean (Canadian Wander and Lyamungu 85 vars) seeds emanating from prototype mobile seed dressing applicators were conducted during the long rain growing seasons 1993-95 in three sites which included Babati, TPRI Arusha and Msufini Moshi. The main objectives were to investigate the efficiency of the developed prototype mobile seed dressing applicators which ultimately will be used by the small holder farmers in remote areas. In doing so availability of quality seeds will also create awareness of safe use of the seed dressing chemicals within their environment.

Seeds treated with Thirasam M at a rate of 150g/100kg using Hege, electric powered machine was compared with commercial seeds as standard control and untreated control in 1993. For 1994-95 both maize and bean seeds were treated with Fernasan D at a rate of 300g/100kg using tractor, pedal and the electric powered machines. In 1994 different batch sizes and mixing time was studied using tractor powered machine.

Maize and beans were planted at a spacing of 90cm x 30cm and 50cm x 10cm in rows with guard rows measuring 2m and 1m respectively. All agronomical practices were followed.

Randomized complete block design with four replicates was used. Parameters including chemical coating on the testa, percentage germination and early growth development, pest and disease incidence and yield were assessed. The results were statistically analyzed using ANOVA.

Throughout the study period, the developed machines showed high efficiency well above 85% in terms of uniform seed coating on the hilum, micropyle and on the seed coat. Change of batch size to 30kg from standard 25kg and mixing time to 30 seconds from standard 8 seconds did not add any advantage in the tractor powered machine.

There was no chemical damage on seed embryos as shown by high percentage germination of 86%. Significantly (P) better initial crop development indicated by higher growth vigour in treated seeds as compared to the untreated seeds was recorded. The observation reflected good control of soil borne insect pests and diseases that also result to a higher

yield. Treated seeds yielded 25-47% over the untreated seeds. Major insect pests of beans including Ophiomyia spp and Agrotis spp were significantly controlled by the treated seeds as compared to the untreated. Stem root incidences were comparatively low in the treated plots. Soil insect pests of maize including Agrotis spp., termites and black beetles, Tenebrionidae; Anrintus spp. were well controlled in the plots planted with dressed seeds. Fernasan D showed good performance in soil insect pests and disease control. The study recommended batch sizes of 25kg, 5-10 kg and 2.5kg mixed for about 8 seconds to be used in the tractor powered, pedal powered and electric powered machines respectively.

EVALUATION OF A PROTOTYPE MOBILE GRAIN/SEED DRESSING APPLICATOR IN MALAWI

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A pedal-operated Mobile Seed Dressing Applicator was tested at the Farm Machinery Unit at Chitedze Research Station in Malawi between June 1995 to April 1995. The machine was compared with Hand on performance and the results showed that the machine performed better than hand with an average capacity of 1800 kg/hr for (maize and beans) on seed dressing and soyabeans inoculation and 3600 kg/hr for storage maize dust actellic application. Hand treatment came second with an average capacity of 250 kg/hr for dressing chemical application and 500 kg/hr for crop storage chemical application. In terms of other tests such as durability, portability and ease of operation, the machine was rated ok by the farmers in several parts of Malawi.

In the case of biological evaluation, the use of the machine was found to have no adverse effect on seed germination, seed viability rate and seed defects. The machine performed alright in terms of inoculation application which was reflected in more nodules fixed, larger average nodules size, average plant height, nodule dry weight, and tops dry weight. Hand treatment came second and the control was the last.

SUMMARY OF THE ACHIEVEMENTS OF THE UNIDO/COMESA PROJECT AND SUGGESTIONS FOR CONTINUATION

Eur Eng Jim E. Elsworth C Eng, M I Mech E. (CTA to the project)
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The purpose of the UNIDO/COMESA project was firstly to develop and prove machines for application of seed treatments and food grain preservatives in rural situations, secondly to train relevant workers and conduct a market survey to prepare for dissemination, and finally to fully report on its activities.

Three types of machines were developed. All of them are based on the Milik mixing principle and operate on a batch basis. Two of them were tested and proven. The third is a very low cost machine - developed towards the end of the project.

Pedal driven machines of 1/2 to 10 kg capacity were built by Silsoe Research Institute in UK, by TDAU in Zambia, and by TEMDO in Tanzania. TEMDO also built a tractor driven machine of 2-60kg capacity. These machines were tested by biological trials on seed and food grains treated therein. A hand cranked machine which is anticipated to be of low cost, was developed in response to adverse comments received concerning the cost of the other two. This machine is not yet proven.

Training of 9 technical and managerial staff took place in Europe.

The use of all the machines was found to present difficulties and hazards, not easy to overcome without further costs. These arise firstly from the mixing of the wettable powder formulations currently available with water to make a slurry, and secondly the metering and transfer of the correct dose of this slurry to the machine. A suggestion for an alternative formulation based on thickened water, and a sachet packaging system, is put forward.

The author cannot see realistic dissemination possibilities in Tanzania or Zambia because the candidate organisations are not in a position to take commercial risk, and hence have not indicated a high level of enthusiasm. In Malawi, where tests on machines built elsewhere have also been conducted, a high level of interest has been demonstrated, and dissemination appears to be a distinct possibility.

The wide acclaim for the concept require that the current inertia is not lost. A continuation of some activity, without a significant time gap, is required. If the public sector can provide it effectively, then it should do so. However, a commercial organization,

operating responsibly and within the legal framework of the countries, but

unfettered with the detailed systems and accountabilities of the public sector, might be a viable alternative. Both types of organisation could operate in parallel, provided a level playing field was given by the authorities.

MARKET AND ECONOMIC PROSPECTS OF THE MOBILE SEED DRESSING APPLICATORS

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The paper briefly reviews hybrid seed multiplication, treatment and marketing practices in the Common Market for Eastern and Southern African (COMESA) countries. Also discussed is the use of farm saved seed crop as 'seed' and the reasons for the wide spread use of such seed.

The discussions are based on the information, data and discussions held with various people in the four countries visited, namely; Kenya, Malawi, Tanzania and Zambia. It is likely that there might be deviations in the region.

The use of mobile seed dressing applicators for seed treatment and other potential uses are discussed. An attempt is made to estimate the apparent demand for the applicators, particularly the pedal driven one.

The economic viability of utilising the seed dressing applicators to establish micro enterprise business in the rural areas is assessed. The financial analysis reveals that provided the cost of the applicators is kept to a minimum and some effort is made by entrepreneurs to market their business, the applicators can be used by rural farmers to generate extra income for themselves and provide an essential service for the rural communities at a profit. Results indicate that the venture is capable of achieving a surplus even in the first year. What is also encouraging is that profits in the subsequent years are extremely attractive.

An internal rate of return was computed to asses the viability of the project. A case is made that the rate of return is considerably good.

A cost benefit analysis for the rural farmer is also discussed.

ENVIRONMENT FRIENDLY STRATEGIES FOR INSECT PEST MANAGEMENT AND THEIR POTENTIAL FOR INTEGRATION WITH SEED TREATMENT FOR ADOPTION BY AFRICAN FARMERS

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Environment-friendly strategies for insect pest management include biological control, use of pest resistant/tolerant cultivars, choice of appropriate crop combinations and cultural practices, use of behaviour-modifying chemicals such as pheromones, attractants or repellants, besides developing habitat management strategies involving annual and perennial plant hosts. Several such options of relevance to African farming situations are being developed at ICIPE, besides other research institutions in the region. This paper discusses the scope for integration of seed treatment method as component for sustainable insect pest management for adoption by the African farming communities.

DEVELOPMENT OF SEED MULTIPLICATION/CERTIFICATION SCHEME IN MALAWI : PROBLEMS AND PROSPECTS FOR SEED TREATMENT

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The provision of quality seed that is capable of germinating and is disease free is essential for improved agricultural productivity. Past investments in the seed sector have led to the development of certification schemes and improvement in the supply of hybrid maize and tobacco. However, endemic shortages of seeds of other major food crops prevail. New initiatives in the seed sector include trade liberalization, promotion of small scale enterprise and community based programme. The potential for utilization of seed treatment is very large. Major perceived problems include cost of the inputs, poor adoption rate of the technology and environmental safety.

GROUP DISCUSSIONS

After the presentation of papers, detail discussions were organized in three different groups, viz. engineering aspects including of African Design (Group 1), Seed treatment, safety regulations, Registration and Certification (Group 2) and the commercial aspects including marketing (Group 3). The participants were allowed to opt the groups in accordance with their interest. The discussions are summurized as follows:

Group 1:Engineering Aspects Including African Design and Fabrication

Facilitator: Prof. Guyurk; Rapporteur: Mr. Mwanza

No. of participants: 17

The discussion group took into consideration the following topics:

How is the machine to be fabricated?

Further optimisation.

Locally available parts.

Maintainance and Service.

Training of Operators.

Cost of Production.

Safety aspects - Role of Industry

- Role of Government

Certification of Performance.

The group having agreed that the design, appearance of the machine was nice, clean and clear, agreed on bumps on rotor to have smoothened edges, use of properly selected plain-ball bearings which are available locally, reduction in weight consistent with strength requirements and use of wheels to the machines to give mobility to the machine.

Suggestion was made to involve as many companies as possible with supply of spare parts and service as part of the contract. The idea of involving too many companies were disputed and it was agreed that initially on a trial basis only a very few competent companies should be allowed to fabricate the machine.

Education and training of extension workers, potential manufacturers and operators is a must. Group wanted UNIDO should assist in quality control at regional and national level.

The group discussing the safety aspects felt that the slow speed and a few moving parts made it mechanically safe. The group felt that major hazard would be on handling of chemicals. Therefore it agreed use of slurry or liquid formulation, wearing protectives, lid of the machine well secured. It also suggested using separate machine for seed treatment and post harvest grain treatment. However, this would have to be related in terms of actual hazards of using one machine for both after cleaning the machine properly prior to use of post harvest grain treatment.

The group agreed that the present design as it stands with very little modification (provision of padlock, wheels etc.) is sound enough for marketing. Encouragement should be given to make cheaper and smaller machines.

Group 2:Seed Treatment, Safety Regulations, Registration Certification.

Facilitator: Dr. F.W. Mosha Rapporteur: Mr. Rwazo

No. of participants: 19

The group discussed the following topics:

Seed and Grain Treatment Process.

Training of Operators.

Chemical Availability.

Linkages with big seed treaters.

Use of extension workers.

Quality of treatment.

Introduction and Registration of new chemicals.

Non traditional methods.

Safety aspects - Application.

- Storage.

- Waste Disposal.

Role - Industry.

- Farmers.

- Governments.

- NGOs.

- Large seed companies.

Impact of Rural Seed Multiplication.

The group agreed separtion of treatment machines or suggested to treat seed immediately before planting (to avoid storing for too long) and grains immediately after harvesting. It also, as group 1, stressed on training of extention workers and machine operators both in operation and handling of chemicals and quality of treatment. It also wanted establishment linkage between extension workers and the research workers.

The group wanted operation instruction manual available in English and local language and UNIDO along with Government may facilitate this.

The availability of the chemicals was a problem but along with market liberalization, Government intervension would be needed.

Meeting felt that FAO Code of Conduct will be followed in the region for registration of pesticides but expressed fast track system of registration for pesticides that has same active ingredients but safer formulation types. The harmonization of requirements for pesticide registration would benefit availability of new chemicals.

As the chemicals companies would find greater market for their product, their interest should also be sought for promoting the machine. In addition the group felt that big seed treater should also be encouraged to use the machines for treating small to medium quantity seeds.

The group felt that the traditional methods of post harvest treatment such as use of ashes, botanicals and others should be scientifically studied and standardization work should be carried out before making any recommendations.

With regard to safety it was agreed training at different level would reduce the risk. In addition it was felt that the use machine in village co-operatives and farms will reduce

risks compared to existing practices and in the application of chemicals.

With regards to impact of rural seed multiplication the group felt the UNIDO/FAO/ Government co-ordination is needed to promote the use of machines in this very important and graving outlet.

Group 3: Commercial and Marketing Aspects

Facilitator: Mr. J. Opio; Rapporteur: Mr. Sichilima

No. of Participants: 15

The following topics were discussed in detail by the group:

Cost of machine - On Lease

- Outright Ownership

Cost of chemical

Cost of application

Availability of chemicals at the right time

Government support and incentives

Economic advantage to farmers

Marketing Strategy/Quality of service

Cost of quality and safety

Cost of disposal of waste

The group agreed that the project would go a long way in addressing food security at household, country and regional level, poverty alleviation and increasing rural incomes.

The group agreed that this phase should be considered as 'phase 1' of the project and hence the 2nd phase should be initiated using surplus funds from the project if availble, as a starting point within the next two months so as not to loose momentum.

The roles to be played by Governments, COMESA, Donors/ NGO's were identified as follows:

Government: Governments should play a lead role (through ministries of Agriculture

and Industry) and especially those present at the conference, in commercialization of the prototypes by;

i) Identification of interested parties to participate in phase 2 of the project at the national level including Donors, NGO's, Manufacturers, Recepients such as small scale farmers, farming groups, Co-operatives, Farmers associations, Chemical companies and Govt. implementing units.

ii) Govts. should convene a consultative meeting of interested parties to workout modalities on how to proceed.

iii) Govt. should educate farmers/entreprenuers on benefits treatments through extension.

iv) Govts. must incorporate the programme in their own national agricultural programmes.

COMESA: To ensure that Govts. in the region are made aware of the results of the project and the recommendations of the conferance. They should request the member states to incorporate the programmes in their national agricultural programmes. They also must initiate mobilisation of resources for the 2nd phase of the project immediately so as not to loos momentum.

Donors/NGO's: To assist in mobilization or provision of resources for phase 2 of the project which would include economic studies, commercial demonstrations and education of farmers and entrepreneurs etc. Specific request was made UNIDO and GTZ to play a lead role in this regard. UNIDO, FAO, GTZ, UNDP and NGO's should help to facilitate implementation of the 2nd phase at country level.

The group also recommended that more commercial demonstrations were needed, as market strategy, for promoting awareness of the technology and the benefit of seed and grain treatment, creating demand for the prototypes and for assessing health aspects if the prototypes are to be used for other purposes such as grain storage, innoculation, etc.

In addition to the above Dr. Golob raised the following points also for discussions:

Who will the seed tester be aimed at?

a) Government department, e.g. Extension, can buy from fabricator and then lease/rent to villages. Operations controlled by village extension officer.

Advantages: control over use of machine, pesticide used, applications rates. Machine and pesticide made available as a package.

Disadvantages: Where is the incentives, who makes a profit? How is delivery arranged, what if no extension officer available?

b) Entrepreneur who buys or leases from fabricator. Obtains bank loan to meet cost. Provides a service to farmers or more likely out to villages.

Advantages: strong profit motive to make work, entrepreneur takes care of ensuring availability.

Disadvantages: probably no control over operation, could supply as a package with pesticide. Villages must make contact with entrepreneur-no link through extension officer.

c) Group of farmers or cooperative of village. Could such a group afford to buy or lease a machine? Likely time of need for use very limited. Lease or rent for short period more acceptable. Payback more indirect; no obvious profit, other than improved seed performance. Unless group charges non-group members for service. Who will supervise operation, or control application and chemical used?

What is the market?

Do farmers want to treat their seed? Do they appreciate the potential benefits? Are they really likely to treat local varieties (saved seed)? Unlikely, unless they see obvious payback. Lab trials are not sufficient, now essential to undertake on-farm trials/demostration with farmers' participation.

Use for treating improved varieties. Therefore initially, a very limited demand. Improve demand by advertising campaign - UNIDO/Government responsibility.

Possible scenario: Fabricator borrows money from bank.

Leases out or sells machines to both private sector and government for seed treatments. Users of machines (entrepreneurs/government) must be trained and licenced-Government responsibility.

RECOMMENDATIONS

Following the presentation of the Group discussions of the various groups the meeting made the following recommendations:

1. Having taken into considerations of the design, appearance and performance of the prototype machine, having seen their demonstrations carried out and having discussed the future scope of the machine for seed treatment, the meeting recommended that only minor changes need to be done at the machine to make it more mobile, cheap and light weight, without compromising the performance and quality.

2. Having discussed the importance of the machine in improving the food security in the COMESA region, and having taken into consideration the use of the same machine for seed and post-harvest treatment to store grains and having noted the potential increase in the sale of chemicals for seed and post-harvest treatment, the meeting strongly recommended close co-ordination among various parties such as Ministries of Agriculture/Industries, NGO's, chemical companies and seed treatment companies for promotion of marketing and dessemination of technology in the participating countries.

3. Having discussed at length the quality and safety aspects of promoting the technology and also making available newer and safer pesticides and their formulations the meeting strongly recommended education and training of extension workers, operators and farmers in the proper use and handling of chemicals and also in the follow-up of harmonisation of requirements of registration of pesticides in the region.

4. The meeting agreed that the project would go a long way in addressing to food security at the national and regional level in promoting the poverty alleviation, increased rural income and identifying the role of Govt., COMESA, NGO's the meeting strongly recommended that COMESA would ensure that Govts. of the region are made aware of the resource of the project and request member states to incorporate the programme in their National agricultural programmes and initiate mobilisation of resources for the II phase of the project.

5. Having taken into consideration on the UNIDO's initiative in the first phase and the successful introduction and adaption of the technology in the participating countries the meeting strongly recommended UNIDO to take initiative to assist

other African countries in the introduction of the technology at regional and sub-regional levels under phase II. In addition meeting recommended UNIDO to coordinate with FAO to promote market for the machine in various outlets especially in the rural seed multiplication programme.

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UNIDO/COMESA Conference in Africa on Seed and Stored Grain Treatment – Progress, Prospects and Problems

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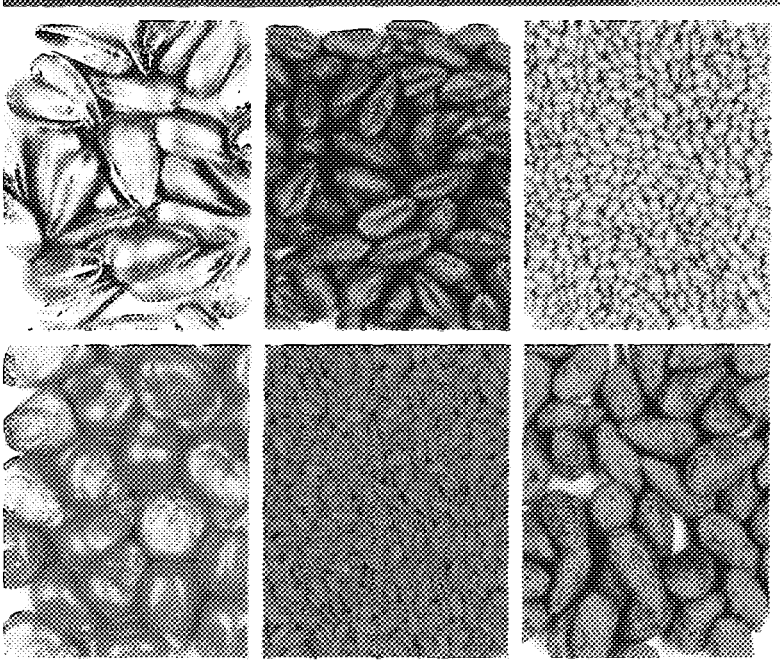

A Range of Seed Treating and Grain Machines

DESIGNED AND BUILT IN AFRICA
OPERATING ON A BATCH BASIS

Tractor powered, capacity 1.0 – 30 kg
Pedal powered, capacity 0.2 – 5 kg

Both machines treat food grains with powder against storage pests, and seeds with liquid or slurry against seed and soil-borne disease and soil insects.

Pedal powered machine
Designed by
Technology Development and Advisory Unit, Zambia

Tractor powered machine
Designed by
Tanzania Engineering and Manufacturing Design Organization

Very simple operation:

1. Load grain/seed into machine.
2. With rotor turning, inject liquid/slurry or add powder.
3. Mix for 10 seconds.
4. Open discharge gate and catch treated grain/seed in a bag.

For further information, please contact:

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These machines were developed as prototypes under a UNIDO project in collaboration with COMESA. Funding was provided by the Government of Germany under the UNIDO Industrial Development Fund.

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1 Pedal and tractor operated prototype machines

2, 3, 4 Supervised seed treatment trials in Zambia

5 Treatment of seeds by hand application which is inefficient and hazardous