



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

RESTRICTED

16750

DP/ID/SER.A/986
22 March 1988
English

EXPERT ASSISTANCE FOR THE ESTABLISHMENT OF A PESTICIDE PILOT PLANT
UNDER A SOFT LOAN ADVANCE FROM THE ITALIAN GOVERNMENT

SI/URT/86/875

UNITED REPUBLIC OF TANZANIA

Technical report: Up-dating of market survey*

Prepared for the Government
of the United Republic of Tanzania
by the United Nations Industrial Development Organization,
acting as executing agency for the United Nations Development Programme

Based on the work of K. Szabo, expert in market survey

Backstopping officer: B. Sugavanam, Chemical Industries Branch

United Nations Industrial Development Organization
Vienna

* This document has been reproduced without formal editing.

Table of Contents

1. Explanatory notes; Abbreviation
2. Conclusions and Recommendations
3. Introduction
- Part I
4. Review of progress in project implementation
5. Third Coordination meeting with Tecnimont
- Part II
6. Market survey for pesticides
7. Market survey
8. The size and composition of present pesticide consumption and demand
9. The impact of farm size on pesticides consumption
10. Pesticides in public health
11. Demand projection; General aspects
12. Demand for non-crop applications
13. Principal determinants (past and future)
14. Annexes

Explanatory notes

Abbreviation:

NCI	: National Chemical Industries
TCM	: Tecnimont, Italy
UNIDO	: United Nations Industrial Development Organization
TISCO	: Tanzania Industrial Studies and Consulting Organization
AISCO	: Agricultural and Industrial Supplies Co.
NAPCO	: National and Food Corporation
TFA	: Tanzania Farmer's Association
TCMB	: Tanzania Cotton Marketing Board
IMF	: International Monetary Fund

Conclusions and Recommendations

1. The Third Coordination Meeting between NCI and TCM on the implementation of the pesticide project in Moshi discussed NCI's doubts about the quality of technologies and know-how offered by TCM and concluded that the copperoxychloride technology is not acceptable to NCI. NCI also requested a full package of pesticide formulation know-how, including application related development work, testing and trouble shooting.
2. The meeting concluded that TCM shall look for and acquire alternative copperoxychloride production technology and propose a solution for all problems discussed within a reasonable time, preferably within one month.
3. In the second half of the assignment the mission undertook to carry out and update a market survey and analysis on pesticide consumption and demand, to be used as a reference in the techno-economic (financial) evaluation and analysis of the Moshi pesticide project, reduced in scope to the formulation units only in its first phase of implementation. This work was done at the request of the Government since the expert originally envisaged for this post could not take up the assignment in time to coincide with this mission.
5. The size of the pesticide market in Tanzania is in the range of ten thousand tons a year, more than US\$20 million in value. With the introduction of the new National Agricultural Policy (1984) and the Economic Recovery Programme (1986) the use of up-to-date inputs, (e.g. pesticides) in agricultural practices is on the increase. Local estimated forecast the doubling of pesticide demand by 1988/89 and the potential mid-term demand between US\$60 to 100 million.
5. Cash crops (coffee, cotton) and smallholders' farmers take up the overwhelming majority of pesticides which all are practically imported at present. This one-sided dependence of the demand on the two largest cash crops, particularly in the case of cotton which is annually planted, could have a undesirable fluctuating effect on the whole industry. However food crop (maize, rice, seed-beans) production grows fast and the use of agrochemicals is picking up in this area too.
6. Financial constraints in acquiring and providing the most important pesticides to the farmers are still clearly present, although a gradual improvement is detectable. As regards to the use of insecticides in malaria vector control, this process is yet to begin.
7. The further development of the extension services and education of farmers demonstrating the benefits of the use of pesticides, should be pursued vigorously accompanied with the introduction of a workable season-credit system, allowing the farmer to acquire the inputs required in time. This chain of action should lead to substantial gains in crop yields and agricultural production, as well as in pesticide demand.

INTRODUCTION

The preceding UNIDO mission related to this project was to Italy, last September, with the objective to evaluate the technology and know-how offered by TECNIMONT (TCM), the Italian engineering firm contracted by the National Chemical Industries (NCI) to erect a pesticide manufacturing and formulation plant at Moshi, Tanzania. The findings of that mission clearly indicated serious weaknesses in the know-how offered by TCM.

The main task of the current exercise was to provide technical advice to NCI on how to deal with TCM, concerning the technical uncertainties and deficiencies in the contractor's offer, during their third coordination meeting scheduled for the beginning of November, 1987, in order to reshape or rephase the project so that the risk of a failure in its execution could be eliminated or minimized.

A second, but equally important objective of this mission consisted in making a new techno-economic study on the rephasing of the project, which became imperative not only because of deficiencies in the technology offered by TCM, but also because of shortages in the capital investment funds caused by constraints imposed through foreign exchange fluctuations, galloping inflation and restrictive austerity measures recommended by IMF. This task was to be based, among other things, on an updated pesticide market survey and analysis to be simultaneously carried out by a pesticide marketing expert. Unfortunately the assignment of the pesticide marketing expert has been delayed and the mission was requested by the Government to deal with this subject, too. UNIDO agreed to this change in the scope of the mission, however the objective of completing a techno-economic assessment on the rephasing the project had to be abandoned because of the very limited time available to the mission reduced to one person. This exercise will have to be done subsequently as a follow up to this mission.

Part I

Review of progress in project implementation

The inspection of the reference units of the know-how suppliers of TCM, last September, revealed a number of inadequacies concerning the reliability of the copper oxychloride and some formulation technologies. In view of this NCI became reluctant to proceed with the further implementation of the project, unless TCM could provide unquestionable evidence and assurances of relevant proven know-how during their third coordination meeting scheduled for early November, 1987. Thus, this meeting took an utmost importance concerning the continuation of the contract between NCI and TCM and the further implementation of the project. This is why NCI requested the participation and assistance of the UNIDO pesticide adviser at the meeting.

Third Coordination meeting with Tecnimont

The mission provided NCI with an unofficial advance copy of the report on the inspection of the reference units of TCM's know-how suppliers in Italy. In addition the subject has been dealt with in several briefing sessions and preparatory discussions. Their result has been condensed in the minutes of the Preparatory Meeting held on 11/11/1987 (Annex 1), which summarized NCI's stand point on the most important issues to be discussed and settled with TCM at the Third Coordination Meeting. Among them prominent:

- 1) the lack of proven copper oxychloride production technology
- 2) deficient know-how supply for flowable and granular formulations

- 3) inadequate effluent and pollution control
- 4) failure on part of TCM to cooperate in testing local carriers and in developing formulations based on them.

The agenda prepared by NCI for the meeting obviously emphasized the same points, however these should not have more as a surprise to TCM, as NCI raised the same points already in a letter of 29 September, 1987 to TCM. In spite of this the composition of the TCM team delegated to the Third Coordination Meeting was technically fully incompetent for providing adequate answers and assurances to the questions raised by NCI. This is well reflected in the minutes of the meeting drafted by NCI (Annex 2). According to this document the contractor

- a) failed to prove the availability of a reliable copper oxychloride production technology.
- b) his know-how is deficient in some of the formulation techniques, thus it is questionable if adequate training could be given to future staff.
- c) ignored responsibilities to test local raw materials and develop formulations based on them and continues to be reluctant to live up to this responsibility.
- d) their planning did not envisage adequate effluent and pollution control.

As no solution on these points could be reached, mainly because of the technical incompetence of the TCM team, the partners agreed that TCM shall make urgent efforts to find acceptable solutions to the problems raised by NCI and to make appropriate proposals within a short time, preferably within a month. These new proposals shall be discussed and evaluated at the next coordination meeting to be potentially held during January or early February, 1988. Should no proposals acceptable to NCI emerge during this period, NCI seems to be justified and inclined to cancel the contract rather than take an enormous risk. In such a case it is likely that other Italian companies will be contacted by NCI by tender, requesting offers for the stepwise construction of the Moshi Plant, giving first priority to the formulation units.

Part II

Market survey for pesticides

There have been several market studies carried out during the last ten years to assess the requirements for pesticides in Tanzania. Two early exercises were undertaken by UNIDO missions in the late 70'ies, which have been updated in 1985 by TISCO, a local consulting firm. All these studies concluded that there was a very substantial pesticide consumption, and a potentially much larger demand for pesticides, that would amply justify the establishment of a national pesticide production and formulation industry. This task has been assigned to the National Chemical Industries (NCI), Dar es Salaam. However, the implementation of the project ran into financial difficulties, until the Italian Government provided a soft loan in 1984 for the execution of it. Unfortunately the instability of the international money markets expressed in wild currency rate fluctuations, and the internal rampant inflation further aggravated the situation, which was capped by restrictive austerity recommendations by IMF. In the light of this NCI decided to assess a stepwise implementation of the project. The

original plans called for the erection of a copperoxychloride production plant with a 3000 t/yr capacity and formulation facilities with a total of 8000 t/yr capacity. The copperoxychloride plant represented more than half of the cost according to the contract NCI signed with TECNIMONT, an Italian engineering firm. In addition good reason emerged to believe, that the technology offered for the production of the copper fungicide by the Italian firm was not proven and reliable.

Under these circumstances NCI decided rephasing the implementation of the project giving priority to the formulation facilities, which would require a much lower capital investment than the originally conceived entire project and should provide a relatively quick and high return on their operation. IN order to assess the potential profitability of the envisaged first phase of the project, it appeared necessary to update the previous market surveys and ascertain current and projected pesticide requirement and potnetial demand in the country.

Market survey

The market survey exercise was carried out as follows:

- a) the size and composition of present pesticide consumption and demand
- b) market segments identified by:
 - i) end-use (e.g. consumers)
 - ii) consumer groups
- c) demand p ojections of the overall market and of the segments over a certain period
- d) the market penetration ratio that the (proposed) project is expected to achieve.
- e) a broad pricing structure on the basis of which projections of growth and market penetration are made.

The size and composition of present pesticide consumption and demand

According to the Tanzanian Agricultural Research Organization (TARO) the number of products registered under provisional, restricted and experimental category are quite impressive:

- i) pesticides for general use for 2 years (provisional):
 - (a) insecticides 124, (b) fungicides 37, (c) herbicides 69,
 - (d) acaricides 4, (e) nematocides 3, (f) rodenticides 3,
 - (g) molluscicides 1 and (h) avicides 1 (Total 242).
- ii) pesticides registered for experimental use:
 - (a) insecticides 41, (b) fungicides 30, (c) herbicides 21
 - (d) acaricides 3, (e) nemotocides 2, and (f) rodenticides 2
 - (total 99)

However, one would expect about 50 compounds belong to econometrically important category.

The marketing boards and co-operatives purchase their pesticide supplies through tender invitations (Annexes). These figures in tender invitations alone do not reflect the market size. For coffee production 1987/88 season requirement of pesticide is US\$26.3 million but only a value of US\$ 17.7 million has actually been tendered.

However, in general the pesticide imports have steadily grown during the years (1981-1985) through the figures are somewhat erratic (table I).

Table I

<u>Year to year</u>	<u>Rate of growth of pesticide inputs (%)</u>
1981 - 1982	45
1982 - 1983	15.5
1983 - 1984	13
1984 - 1985	40.7
Average of 1981 - 1985	28.55

The statistical information on the local production (formulation) of pesticides collected by the mission is even less specific and covers only a couple of years (1985 and 1986). It shows the production figures only by type of formulation, indicating that solid formulations were a much larger volume than liquid formulations and the former estimated to grow during the reference years, while the output of local liquid formulations has drastically declined.

This could be explained by the fact that while local carriers (Kaolin and Raw mill, a cement factory by product) are available for solid formulations in ample quantity and suitable quality, solvents for liquid formulations, with the exception of petroleum fractions, would have to be imported. Therefore formulation units of multinational companies (Hoechst, Shell, ICI) formerly locally producing liquid formulations, have discontinued operation.

Making use of the information on the type of formulations (solid/liquid) in annex table II gives information on the formulations and their actual proportion in the pesticide consumption in Tanzania.

Table II

Distribution of Formulations

<u>Formulations (MT/%)</u>	<u>1985/86</u>	<u>1986/87</u>	<u>1987/88</u>	<u>1988/89</u>
Solid (WF/D):	5011 (60%)	4878 (56%)	8271 (61%)	9700 (60%)
Copper products	4585	4535	7300	8700
Others	426 (5.1%)	343 (3.9%)	971 (7.2%)	1000 (6.2%)
Liquid (FW/EC):	3327 (40%)	3835 (44%)	5288 (39%)	6349 (40%)
Others (granular, etc.)	negligible	negligible	negligible	negligible
G. Total (MT)	8338	8713	13559	16049
Rate of growth (%)		4.5%	55.6%	18.4%

Another aspect of the consumption of the pesticide market demand according to the three major functional type of products is shown in table III based on the forecast prepared by the Plant Protection Section, Ministry of Agriculture.

Table III

Distribution of market demand as per functionality*

Product (MT)	1985/86	1986/87	1987/88	1988/89
Fungicides	4943	5036	8140	9706
" change %		1.8	61.6	19.2
Insecticides	2483	2515	3281	3936
" change %		1.3	30.4	20.0
Herbicides	912	1162	2138	2352
" change %		27.4	83.9	10.0
Total (MT)	8338	8713	13559	15994
" change (%)	-	4.5	55.6	18.0

* Based on pesticide supply and demand data and forecast prepared by the Plant Protection Section, Ministry of Agriculture.

In spite of irregularities due to various reasons, a number of valid observations can be made.

- a) fungicides will firm up their leading market position
- b) the use of insecticides shall grow at an equal rate to that of fungicides
- c) herbicides will grow most dynamically in relative terms.

One interesting piece of information, not evident from the data tabulated, is that the use of pyrethroids will stay rather stable, representing 25 to 30% of the total insecticides market during the four years surveyed.

Identification of market segments

The following segments were considered:

- (1) Crops (2) Size of farm (3) Non-crop applications.

1. Crops are divided into cash crops and food crops:

i) Cash crops

Cash crops are coffee, tea, cotton, tobacco and cashewnuts.

Following pesticides are used in coffee and cotton which are the important cash crops taking major portion of fungicides and insecticides.

Table IV Proportion of pesticides used in coffee and cotton production

Product	1985/86		1986/87		1987/88		1988/89	
	MT	%	MT	%	MT	%	MT	%
Fungicides	4835	97.8	5028	99.9	8030	98.6	9576	98.6
Insecticides	2140	86.3	1722	68.5	2206	67.2	2648	67.3
Herbicides	89	9.7	149	12.8	919	43.0	1093	46.5

Almost 100% of fungicides and about 2/3rds of insecticides and half of herbicides are used in these two cash crops. In tea, for instance, only herbicides are used (annex 15)

ii) Food crops

Food crops consisting of maize, rice and sugarcane take a little share of the pesticide consumption. But attempts to increase yield per unit area, increasing cultivable land area and possibly increase in the use of labour will all contribute to substantial increase in demand in this sector.

The impact of farm size on pesticide consumption

Small farm holders exist in large numbers compared to big estate owners. While the latter contribute to the production of sugarcane and tea, the former surprisingly have control on coffee and cotton production. Therefore the unusual situation exists in that small farmers are using the bulk of pesticides given in table IV.

Agricultural and Industrial Supplies Co (AISCO), National and Food Corporation (NAFCO) and Tanzania Farmer's Association (TFA) serve various farms requirements.

AISCO sells 80% of their turnover to small holder: in 0.25 to 5 kg/lit package units, NAFCO and TFA supply larger outfits in 1 to 250kg or lit. containers. AISCO is expanding their operation faster than NAFCO and TFA.

In addition Ministry of Agriculture (KILIMO) provides regularly pesticides for emergency uses against out break of insect and bird invasions. They supply about 500-200 tons of mainly insecticides but their supply is not all that consistent.

Pesticides in public health

Tanzania for vector borne disease such as malaria, schistosomiasis etc. has proposed US\$16.4 million for the five year period 1985-1989. this includes 1000 t/y DDT, most of the requirements are provided by foreign aid. The animal health outlet is very small around US\$0.5 million.

Demand projection; General aspects

In a country like Tanzania, there are number of unpredictable parameters involved making it very difficult to project future demand with any accuracy.

The plant at Moshi when operates at full capacity will provide 41% of W.F. and 28.4% liquid requirements.

Taking into consideration optimistic and conservative projection, it is anticipated an annual increase of 3 to 10%. Taking demand by segments, cash crops are expected to remain in a dominant position. A study by MDB shows the inputs required for US\$100 worth output and is illustrated in table V.

Table V

Cash Crop	Import inputs, US\$	Pesticide component
Hard coffee	8	little
Cashewnuts	10	"
Tea	21	limited, herbicides
Cotton	28	significant
Mild coffee	29	dominant
Tobacco	67	very limited
Sisal	67	limited, steady

Based on the data it is logical to concentrate on the first five crops. The same study also provides break down of pesticide requirements and table VI gives an example for coffee Arabica (mild coffee).

Table VI

Pesticide input	Unit	Qty/ha/yr	Provided/paid by TCMB
Sumithion	L	6	Yes
Dieldrin	L	2	"
Blue copper	Kg	27.5	"
Red copper	Kg	25	"
Captafol	Kg	4.4	"
Dithianon	Kg	3.3	"
Roundup	L	1	No

According to this the theoretical demand of pesticides for mild coffee alone in Tanzania would be around 16,608 t/yr.

In the case of cotton where a figure of 2.5 kg/ha per season is projected for endosulphan would require 1750 tons for the 700,000 ha grown in the country. But the actual requirements forecast is less than 50% indicating great potential in future demands for cash crops.

Food crops

On the same MD5 study table VII gives inputs required for US\$ 100 output.

Table VII

Staple Foods	Import inputs, US\$	Pesticide component
Maize	68	little
Rice	52	"
Cassava	103	negligible
Sugar	103	modest
Wheat	106	incipient

This shows projected growth for food crops will be low. Nevertheless increased land area of cultivation should promote increase in demand.

Demand for non-crop applications

A. Public health

Government programme allocated nearly US\$ 3 million a year for malaria vector control by pesticide from 1986 and 1989 and in addition local funds of 16 - 20 millions Tsh. are likely to be spent. This will amount to 1500 t/year of DDT as 75% or its equivalent amounting to 10% increase in pesticide consumption.

B. Animal health and household applications

As clearly stated the market is only US\$ 0.5 million and will have no effect on pesticide market.

Principal determinants (past and future)

A. Availability of foreign exchange

As typical of any developing country especially least developed country, availability of foreign exchange is the chief determinant. The ideal requirement would be around US\$ 50 to 60 million the Government expects this figure at US\$ 100 million. The current consumption figure is around US\$ 21-25 million.

B. Awareness of cost/benefit ratio

Application cost/benefit ratio by early warning systems and watching the threshold limit for economical pest damage might have had effect on reducing the pesticide consumption. This system of extension worker organized in collaboration with FAO might have had greater influence in the use of pesticides but difficult to quantify.

C. Financial status of farmers

In addition to financial status of farmers and the financial stability of the country as always played a determinant role in the demand/supply of pesticides.

D. Future development of determinants

The future determinants looks positive because the current economic policy of market regulation has vitalized the economy and agricultural production. If the goal is for food self sufficiency, and boost cash crops a 35% increase in pesticide consumption is not unrealistic in the next 10 years. However, taking into account increase in cultivable area, greater importance to tea, public health, the annual demand could rise at 6-7% between 1986 to 1996 (see table VIII).

TABLE VIII

PROJECT OF PESTICIDE DEMAND FOR THE NEXT TEN YEARS

Crop	Total are '000 ha		Pesticide	Requirement Kg/ha	Demand (MT) and Area (%) Treated					
	1986	1996			1986/87		1991/92		1996/97	
Coffee	274	300	I, F, H	69.2	5790	30.5	7482	39	9670	51
Cotton	700	700	I, H	8	1680	28	2171	38	2805	50
Tea	20	30	H	2	5	8	9	14.5	15	24
Sugar cane	25	25	H	40	705	70.5	705	70.5	705	70.5
Tobacco	30	25	I, H	2	6	10	10	18	10	20
Maize	1200	1500	H, I	3.5	462	11	708	15	980	18.5
Rice	90	120	H	4	88	22	110	25	134	28
Wheat	65	100	H	2	45	35	60	38	84	42
Beans	50	65	I (H)	2.5	10	8	18	12	24	15
Other crops	2500	2300	F, H, I	-	30	-	40	-	50	-
Emergency	-	-	F, I, FU	NA	324	-	350	-	350	-
Govt. Provisions	-	-	I	NA	20	-	500	-	500	-
Public health	-	-	I	NA	20	-	500	-	500	-
Animal health	-	-	I	NA	35	-	50	-	60	-
Total					9200		12213		15387	

I = Insecticides; F = Fungicides; H = Herbicides; Fu = Fumigant

PESTICIDES PROJECT
3RD CO-ORDINATION MEETING

MINUTES OF PREPARATORY MEETING HELD ON 10-11-87

PRESENT:

MR. PARESOTI	-	GM
MR. KITILYA	-	DEF
MR. NSANGI	-	PDO
MR. NDOE	-	CE
MRS. UNDIRI	-	PDO
DR. SZABO	-	UNIDO

TECHNOLOGY:

(a) Formulation plants:

An evaluation of the technology to be supplied by TECHNIMONT for the formulation plants was highlighted by Dr. Szabo and Mrs. Undiri basing on their recent visit to Italy.

The following was observed:

- TECHNIMONT's knowhow is to be supplied by BASLINI.
- BASLINI is mainly a chemical plant with no granular formulation facilities no adequate development and training facilities.
- BASLINI formulates wettable powders and herbicide flowables for other companies on contract on given specifications.
- Technology for the formulation of herbicides and wettable powders could be accepted but the training aspect should be followed up more carefully as it appears it might not be adequate.
- Although the representatives visited a granular formulation plant -(SARIA)-this plant is not part of the Montedison group and has no contract with TECHNIMONT for supply of know how to our project.

- Within the Montedison group Farmoplant have the technology for pesticides formulation and have also adequate facilities for training. It is surprising why TECHNIMONT should contract other incompetent companies outside their group.

(b) Copper Oxychloride Plant:

- TECHNIMONT are going to use technology from GARBATO for the manufacture of Copper Oxychloride.
- GARBATO do not have proven technology for the manufacture of Copper Oxychloride and therefore they are not competent enough to offer a dependable technology to our project.
- The proposed GARBATO process does not appear in any literature and there is no indication that it is used anywhere in the world. Surprisingly they have listed the Moshi project as one of their technology reference units already in existence.
- All guarantees given on this particular unit are therefore questionable as they are not based on practical experience anywhere due to lack of reference plants.
- It is not clear why TECHNIMONT chose to supply the GARBATO process whereas there are other more economical, and less expensive technologies offered by more competent companies in Italy i.e. N/S CAFFARO. There are processes that do not require the use of much HCl which has undesirable environmental effects. One such process uses Sodium Chloride, air and chlorine and another one uses minimum HCl as a catalyst.
- It was therefore observed that, given the limited facilities and lack of proven technology, GARBATO will not be able to supply the required technology and besides this they will not be able to train production personnel as agreed in the contract.
- The two options were proposed as a way to get out of the problem:
 - (a) TECHNIMONT should be given a time limit to contract another know-how supplier for the Copper Oxychloride Plant.
 - OR
 - (b) If TECHNIMONT does not accept the above condition NCI should cancel the order for the Copper Oxychloride Plant and also for the HCl captive plant.

or

- (c) If TECNIMONT makes it a condition that the other formulation plants will be supplied only if they supply the Copper Orychloride plant, then there is no other option but to cancel the whole order which appears to be of an advantage to NCI.

Pollution: It was also observed that the effluent specifications appended to the contract are 30 to 40 times higher than the limits set in Italy according to information given by Farmoplant (which is a sister company of TECNIMONT). The specifications should therefore be revised drastically.

Civil Works: Review of civil works designs will be done after discussions on know-how supply have been completed.

Raw materials: Locally available raw materials should be tested to ascertain their suitability for pesticides formulation. This is a common practice for most companies and Tecnimont should therefore not be an exception to the rule

G. S. MSAVGI

11/11/1987

Jsk....

PESTICIDES PROJECT - MOSHI

3RD IMPLEMENTATION CO-ORDINATION MEETING HELD IN DAR ES SALAAM FROM 11TH
TO 12ND NOVEMBER

MINUTES OF DISCUSSIONS

MOI proposed 2 main items for the Agenda to be discussed in the meeting as follows:-

- (1) Review of the know-how to be supplied by TECHNIBIT to the Moshi Plant.
- (2) Review of civil works designs.

TECHNIBIT:

Following their review of TCI's know-how supply MOI made the following observations:-

- (a) TCI's know-how for the copper oxychloride plant and granular formulation unit is not supported by proven technology since there is no plant anywhere in the world working with GARBATO's process.
- (b) Training of personnel to be conducted by BASLINI, a company with no pesticide programme apart from some custom formulation, will not be adequate due to inadequate research and development facilities and the lack of field testing to ascertain the applicability and effectiveness of products formulated. BASLINI only formulates products for customers on given raw material and final product specifications and has no granular formulation facilities or experience in performing such formulation work.
- (c) Testing of local raw material samples sent to TCI has not been done and so it cannot be ascertained whether they are suitable for pesticide formulations or not. Baslini has no proper facilities and methodology to test and develop formulations based on new components, such as local Tanzania raw materials.

- (d) Effluents from the copper oxychloride and HCl plants is going to be a big problem since TCI has not given any specific attention to how to dispose of them. Furthermore the effluent treatment limits appended to the contract according to available information are about 30 to 40 times higher than the limits allowed in Italy.

after lengthy discussions the following position was reached:-

- (i) HCl will not accept know-how supply from GARBATO as there is ample evidence that it has never worked anywhere successfully. TCI should therefore look for another licensor with proven technology.
- (ii) For the formulations HCl wants a complete package of know-how which includes not only the operation manual but also application related development work, testing and trouble shooting.
- (iii) Discussion on items (c) and (d) above and also on Agenda item No. 2 will depend on solution to items (a) and (b) being found by TCI.
- (iv) TCI were asked if they wanted to proceed with implementation of the remaining part of the contract but they said this was not possible because of the inter-relationship of activities and services to be performed in implementation of the project.

TCI and HCl therefore agreed to postpone further work on the project until after one month when TCI promised to come up with alternative proposals for new licensors for the copper oxychloride unit and also solutions to the other problems discussed.

Signed:

.....

M. P. OLE PARESCHI
GENERAL MANAGER

.....

F. JANDOLO
TECHNICAL

Date: 12th Nov. 1987

**TANZANIA: TOTAL FOOD PRODUCTION BY YEAR
AND CROP, 1974 - 1986/87**

Crop/ Year	Total						Total
	Maize	Rice	Wheat	Cassava	Sorghum/ Millet	Beans	
				'000 MT.			
1974/75	1271.6	161.3	48.8	985.9	435.4	217.5	3076.4
1975/76	1660.8	197.0	77.9	1181.9	525.2	249.4	3892.4
1976/77	1701.3	237.1	59.0	1342.6	554.0	188.0	4086.7
1977/78	1610.6	251.2	86.4	1312.5	860.4	204.3	4325.4
1978/79	1898.4	235.1	70.5	1561.2	1156.9	220.0	5132.1
1979/80	1854.9	204.1	86.8	1207.5	860.4	306.5	4520.2
1980/81	1853.6	234.2	90.2	1407.7	742.4	264.9	4578.8
1981/82	1954.1	277.9	95.0	1624.1	970.4	274.7	5196.2
1982/83	1740.1	274.1	70.5	1967.2	988.9	291.9	5796.6
1983/84	1939.0	342.5	75.5	1947.6	1157.5	540.0	5898.1
1984/85	2093.0	277.9	83.0	2052.0	850.0	441.0	5518.0
1985/86	2210.0	355.6	72.0	2031.0	943.0	321.0	5932.6
1986/87	2358.0	431.6	72.0	1709.0	954.0	425.0	5949.6

Source: 1974 - 1983/84 Kilimo, Statistics Unit, Dar es Salaam
1984 - 1986/87 Crop Monitoring and Early Warning Systems.

Annex 4

CROP AND AREA GROWN*

<u>Crop</u>	<u>Area (HA)</u>
Maize	1,200,000
Cotton	700
Coconuts	530
Bananas	500
Sorghum	300
Coffe	300
Sisal	100
Cashewnuts	100
Rice (paddy)	90
Wheat	65
Seed-beans	50
Tobacco	30
Sugar cane	25
Tea	20
Other crops	2,500.000
Pastural land	14,090,000
Total cultivated and pastural land	<u>20,600,000 HA</u>

* Source: Shell Chemical Company (E.A.) Ltd - 1987

DAILY NEWS, Thursday, April 10, 1986, 7

For Sale or Long Lease

Godown and Administrative block at Chang'ombe industrial area. Goods storage area 5000 sq. ft. Offices? Residential area 2000 sq. ft. including all facilities. Also 30,000 sq. ft. of open space, surrounded by built up walls with full security. Interested party can also apply for long term lease. Write: Manager, P.O. Box 2113 Dar es Salaam.

TANZANIA COTTON MARKETING BOARD

Tender for Supply of Cotton Agricultural Inputs 1986/87 Season

Tenders are invited for the supply of the following Agricultural inputs for the 1986/87, production season.

A. INSECTICIDES

(i) Western Cotton Growing Area

A total of 1,106,000 (One million and one hundred and eight thousand) litres only amongst the following recommended insecticides for the areas:

INSECTICIDES	CONCENTRATION (active ingredient g/ha).
1. Endosulfan	625
2. Cypermethrin 1.8 ULV	45
3. Cypermethrin 2.5% ULV	62.5
4. Fenvelerate 3% ULV	70
5. Permethrin 5% ULV	125
6. DDT 35% plus Methidathion 15%	875
ULV	375
7. DDT 35% plus Phenthoate 25% ULV	875
8. DDT 40% ULV	625
	1000

To be delivered to the following destinations by 31/10/86

Quantity (In litres)	Delivery Point
1. 400,000	Nyanza Co-operative Godown Mwanza
2. 400,000	Godown Shinyanga SHIRECU
3. 100,000	Mara Co-operative Godown Musoma
4. 60,000	Kagera Co-operative Godown Biharamulo
5. 70,000	Tabora Co-operative Godown Nzega
6. 18,000	Singida Co-operative Godown Manyoni
7. 60,000	Buha Co-operative Godown Kigoma

ii) Eastern Cotton Growing Area

a) ULV Insecticides

A total of 150,000 (one hundred fifty thousand) litres only from amongst the recommended insecticides for the area listed below to be delivered to TCMB Kurasini Godowns by 31/10/86

Insecticide	Concentration (On gm of Active Ingredient per ha.)
1. Cypermethrin 2.5% ULV	62.5
2. Deltamethrin 0.5% ULV	12.5
3. Endosulfan 25% ULV	625
4. Permethrin 5% ULV	125

b) Wettable Powders

30,000 acre packets of DDT 75% plus Dimethoate 40% CLV also to be delivered to Kurasini Godowns by 31/10/86.

c) E.C. Formulations 60,000 Litres

Delivered to Kurasini Godowns from the following insecticides:

- i) Deltamethrin 2.5% EC i.a. 7.5 g/ha.
- ii) Permethrin 25% EC i.a. 75 g/ha.
- iii) Cypermethrin 10% EC i.a. 45 g/ha.
- iv) Fenvelerate 20% EC i.a. 75 g/ha.

B. Herbicides:

To be delivered to Kurasini Godowns by 31/10/86

- 1) 20,000 litres of Fluometuron 500 FW in 5 litre plastic containers at a rate of 500 gm. active ingredient per hectare.
- 2) 20,000 Litres Atrazine 500 FM in 5 litre plastic containers at rate of 500 gm a.i. per hectare.

C. Sprayers

To be delivered to TCA Kurasini Godowns by 31/10/86

- 1) 20,000 pcs. ULV sprayers plus 25% worth of spares
- 2) 40,000 pcs. one litre plastic bottles for ULV sprayers
- 3) 2,500 pcs. Knapsack sprayers plus 25% worth of spares

D. Bactericide

100 tons of Bronopol 10% to be delivered to Kurasini godowns by June 30th, 1987.

All interested bidders should note that:-

- 1) ULV insecticides must be packed in strong 200 litre steel drums painted BLUE on the outside and with year of supply 1986/87 clearly indicated.
- 2) The following price quotations should be given for each item:
 - (a) FOB
 - (b) C & F Dar es Salaam
 - (c) Free delivery to respective destinations with and without tax
- (3) Bidders MUST bring samples.
- (4) Bids in plain sealed (with sealing wax) envelopes marked "TENDEK FOR THE SUPPLY OF COTTON INPUTS 1986/87 SEASON" should be deposited in the Tanzania Cotton Marketing Board's Tender box on the ground floor of Pamba House Dar es Salaam not later than 3.00 p.m. on 7th May, 1986.

Alternatively bids marked as above may be addressed to the:-

The General Manager,
Tanzania Cotton Marketing Board,
P.O. Box 9161,
DAR ES SALAAM.

To reach him not later than the above date. Telegraphic addresses may not be accepted. The Board is not bound to accept the lowest or any tender.

TANZANIA COFFEE MARKETING BOARD
P.O. BOX 732
MOSHI

Telegram:

'COBOT'

Telex 43088

43000

Ref. No. B-1-15/87/88

Telephone:

General:4011/2/3-3033

General Manager:2284

June 1987

TANZANIA COFFEE MARKETING BOARD
TENDER NO.348/I.P 87/88 FOR THE SUPPLY OF
COFFEE INPUTS
SPECIFICATIONS AND SPECIAL PROVISIONS

A. ITEMS AND TECHNICAL SPECIFICATIONS:

Manufacturers and/or Suppliers are invited to tender for the supply of the undermentioned coffee inputs.

(1) 185,000 LITRES OF CHLOROTHALONIL 500 W.P

Should be of agricultural grade conforming to C.I.P.A.C. and WHO tests for content and susceptibility. The product must have been tested and recommended for the control of Coffee Berry Disease (COLLETOTRICHEM COFFEANUM). Manufacturers recommended rates of application to be stated.

(2) 100 M.T. CUPRIC HYDROXIDE 50 % W.P.

Should be of agricultural grade conforming to C.I.P.A.C. and WHO tests for content and susceptibility. The product must have been tested and recommended for the control of Coffee Berry Disease (COLLETOTRICHEM COFFEANUM) and Leaf Rust (HEMILEIA) in Tanzania. Manufacturers recommended rates of application to be stated.

(3) 1590 M.T. CUPROUS OXIDE 50 % W.P.

Should be of agricultural grade conforming to C.I.P.A.C. and WHO tests for content and susceptibility. The product must have been tested and recommended for the control of Coffee Berry Disease (COLLETOTRICHEM COFFEANUM), and leaf Rust (HEMILEIA VASTRACIEN) in Tanzania. Manufacturers recommended rates of application to be stated.

- (4) 40,000 LITRES OF ANILAZINE 48 EC
Should be of agricultural grade conforming to C.I.P.A.C. and WHO tests for all physical and chemical properties. Suitable for the control of Coffee berry disease (*COLLETOTRICHA COFFEBLANCA*) in coffee. Manufacturers recommended rates of application to be stated.
- (5) 120 N.Y. DITHIOPHOS 75% W.P.
Agricultural grade fungicide conforming to C.I.P.A.C. and WHO tests for all physical and chemical properties. The product must have been tested and recommended for the control of Coffee Berry Disease (*COLLETOTRICHA COFFEBLANCA*), and leaf Rust (*HEMILEIA VASTATRIS*) in Tanzania. Manufacturers recommended rates of application to be stated.
- (6) 50 N.Y. TRIADIMFOP 25% W.P.
Agricultural grade systemic fungicide conforming to C.I.P.A.C. and WHO tests for all physical and chemical properties. Tested and recommended for the control of Leaf Rust (*HEMILEIA VASTATRIS*) in coffee. Manufacturers recommended rates of application to be stated.
- (7) 5000 LITRES PROPICONAZOLE 250 EC
Should be of agricultural grade conforming to CIPAC and WHO Tests for content and suspensibility. The product must have been tested and recommended for the control of leafrust disease (*HEMILEIA VASTATRIS*) in Tanzania. Manufacturers recommended rates of application to be stated.
- (8) 20,000 LITRES CHLORPYRIFOS 48% E.C.
Insecticide suitable for the control of Antestia (*ANTESTOPSIS ARBITALIS BUCHHANA*) and leaf Miner (*LEUCOPERA* sp) in coffee. Manufacturers recommended rates of application to be stated.
- (9) 6,000 LITRES PROFENOPOS 720 EC
Should be of agricultural grade conforming to CIPAC and WHO Tests for content and suspensibility. The product must have been tested and recommended for ANTESTIA and leafminer in Tanzania. Manufacturers recommended rates application to be stated.
- (10) 87,000 LITRES DIELDRIIN 18% E.C.
Agricultural insecticide of 18% emulsifiable concentrate suitable for the control of White Stem Borer in coffee. Manufacturers recommended rates of application to be stated.
- (11) 50,000 LITRES ENDOSULFAN 35% E.C.
Agricultural insecticide of 35% emulsifiable concentrate suitable for the control of Coffee Berry Borer in coffee. Manufacturers recommended rates of application to be stated.
- (12) 25,000 LITRES GLYPHOSATE 48% SALT SOLUTION, HERBICIDE
Herbicide containing 480 glyphosate isopropylammonium recommended for control of annual and grass weeds in coffee. Manufacturers recommended rates and method of application to be stated.
- (13) 15,000 LITRES OF ETHYLAN TT 15
Ethylan TT 15 agricultural adjuvant specially formulated for use with specific formulation of Glyphosate, to enhance its activity in controlling noxious weeds such as couch grass, cyperus e.t.c.

TANZANIA COFFEE MARKETING BOARD
SUMMARY OF CRITICAL INPUTS REQUIREMENT (ORDERED AND RECEIVED: 1983/84 - 1987/88)

ITEM	UNIT	1983/84		1984/85			1985/86			1986/87			1987/88		
		Ordered & Rcd.	Ordered & Rcd.	Ordered	Received	Shortfall	Ordered	Received	Shortfall	A. Tendered	B. Requirement	C. Difference			
(A) CBD CONTROL															
1. Chlorothalonil	Lts.	360,000	360,000	373,000	-	373,000	573,000	373,000	200,000	570,000	570,000	-			
2. Cupric Hydroxide	MT.	860	1,170	1,755	585	1,170	2,420	1,170	1,250	2,000	2,000	-			
3. Cuprous Oxide	MT.	1,419	790	1,330	1,330	-	2,100	1,340	760	2,350	2,350	-			
4. Antiazine	Lts.	-	-	-	-	-	40,000	40,000	-	80,000	150,000	70,000			
- Japtafol	MT.	303	240	-	-	-	-	-	-	-	-	-			
5. Dithionon	MT.	60	204	90	-	30	120	120	-	120	120	-			
(B) LEAF RUST CONTROL															
6. Copper Oxychloride	MT.	1,495	1,060	1,410	470	940	1,440	940	500	1,500	2,370	870			
7. Propiconazole	Lts.	-	-	-	-	-	-	-	-	5,000	40,000	35,000			
8. Triadimefon	MT.	-	-	50	18	32	102	32	70	120	120	-			
(C) INSECT CONTROL															
9. Chlorpyrifos	Lts.	-	-	20,000	-	20,000	300,000	20,000	280,000	300,000	560,000	260,000			
10. Profenofos	Lts.	-	-	-	-	-	-	-	-	6,000	80,000	74,000			
11. Fenitrothion	Lts.	966,000	513,000	600,000	600,000	-	550,000	550,000	-	320,000	500,000	180,000			
12. Deltamethrion	Lts.	-	-	-	-	-	2,000	-	2,000	2,000	2,000	-			
13. Carbofuran	MT.	-	-	-	-	-	60	60	-	60	60	-			
14. Dieldrin	Lts.	87,000	86,000	87,000	-	87,000	150,000	87,000	63,000	150,000	200,000	-			
15. Endosulfan	Lts.	28,000	43,000	44,000	-	44,000	94,000	44,000	50,000	100,000	200,000	-			
(D) HERBICIDES															
16. Paraquat	Lts.	19,400	8,000	35,000	-	35,000	100,000	35,000	65,000	65,000	65,000	-			
17. Glyphosate	Lts.	9,770	6,000	14,000	-	14,000	39,000	14,000	25,000	50,000	75,000	25,000			
18. Ethion	Lts.	-	-	-	-	-	10,000	-	10,000	25,000	25,000	-			
19. Goal	Lts.	-	-	-	-	-	-	-	-	-	40,000	40,000			
20. Cardopat	Lts.	-	-	-	-	-	-	-	-	-	80,000	80,000			
Coffee Production (clean coffee)	MT.	49,700	50,100	55,000			42,100			50,000 (estimated)					

Notes (1) Figures for annual coffee production (last line) clearly indicates a drop in production for 1986/87, which is largely due to lack of chemicals during 1985/86.

(2) SHORT FALL, i.e. Quantities rcd too late for the season and/or pending orders carried forward to next season.

(3) 1987/88: A. Tendered i.e. chemicals and q'ties approved by TCMB Board based on available funds.

B. Requirement, if one could disregard the costs!

C. Difference between B and A.

COPPER OBLIGATIONS FOR 1987/88 - SEASON

ITEM	SUITABLES FORM	REQUIREMENTS		SCHEDULED		BEFORE PAID	
		Q.T.Y.	VALUE	Q.T.Y.	VALUE	Q.T.Y.	VALUE
1. BRAVO	EDG. INCOGNIA WSA	570,000	USD 3,938,700	370,000	USD 3,938,700	-	-
2. ECHOS	GRUWYLE WSA	2,000	USD 3,280,000	2,000	USD 3,280,000	-	-
3. RED COPPER	BERDOK NORWAY	2,370	NOK 26,437,500	2,350	NOK 26,437,500	-	-
4. AERLACIE	BAUER VS GERMANY	150,000	DM 1,800,000	80,000	DM 960,000	70,000	DM 840,000
5. HEMAN	UTLAWAKE V. GERMANY	120	DM 3,232,100	80	DM 2,168,000	40	DM 1061,000
6. BALESTON	BAUER V. GERMANY	120	DM 5,700,000	50	DM 2,375,000	70	DM 1325000-
7. BLUE COPPER	BAUP V. GERMANY	2,300	DM 567,065	1,300	DM 369,825	870	DM 214,500
8. DORSEAN	DOT CHEMICAL U.S.	280,000	USD 2,210,800	20,000	USD 158,800	260,000	USD 2056,600
9. PROPESTOCOS	CEMA CHEM SWITZ/ED	80,000	SFR 1,856,000	6,000	SFR 137,700	74,000	SFR 1606,000
10. PROPESTOCOS	CEMA CHEM SWITZ/ED	40,000	SFR 2,928,000	5,000	SFR 366,000	35,000	SFR 2562000
11. DEDDIE	CECEL CHEMICAL	15,000	USD 780,000	87,000	USD 432,400	63,000	USD 327,600

IMPORTS OF PESTICIDES IN TANZANIA FOUR YEARS 1980 - 1985

YEAR	1980		1981		1982		1983		1984		1985	
	TONS QUANT.	IN '000' VALUE T. SHS	TONS QUANT.	IN '000' VALUE	TONS QUANT.	IN '000' VALUE	TONS QUANT.	IN '000' VALUE	TONS QUANT.	IN '000' VALUE	TONS QUANT.	IN '000' VALUE
Fungicides	1,335.5	40,309.8	1,753.3	44,252.8	4,218.4	106,504.8	6,241.4	154,630.7	1,961.8	219,651.5	2,447.1	202,478.5
Insecti- des	3,440.4	84,629.1	1,105.1	26,088.1	559.3	12,584.8	1,123.7	30,997.1	2,045.7	81,243.8	6,546.7	175,261.4
Herbici- des	208.5	7,010.0	108.9	3,934.6	142	6,851.2	67.1	3,679.9	94.6	8,680.0	168.5	16,862.8
Total	4,984.4	132,026.6	2,967.3	74,975.7	4,919.7	125,940.8	7,432.7	189,307.7	4,102.1	309,575.3	9,162.3	394,602.7

NOTE: Figures for 1983 - 1985 are provisional

Source: Customs office

Imports of Pesticides in Tanzania (1980 - 86)
in terms of US Dollar, allowing for the effects of
inflation and depreciation of the Tanzanian Shilling 1)

Year	1980		1981		1982		1983*		1984*		1985*		1986*0	
	Total \$ '000	\$ kg	Total \$ '000	\$ kg	Total \$ '000	\$ kg	Total \$ '000	\$ kg	Total \$ '000	\$ kg	Total \$ '000	\$ kg	Total \$ '00	\$ kg
Fungicides	4,975	3.7	5,416	3.1	11,094	2.6	12,370	2.0	12,135	6.2	12,346	5.0	7,904	3.9
Insecticides	10,329	3.0	3,143	2.8	1,307	2.3	2,480	2.2	4,489	2.2	10,686	1.63	7,557	8.1
Herbicides	856	4.1	474	4.3	714	5.0	294	4.4	480	5.0	1,028	6.12	874	2.3
Total average	16,100	3.6	9,033	3.41	13,115	3.3	15,144	2.87	17,104	4.47	24,060	4.25	16,335	4.77

* Provisional values

0 Incomplete data

Source: Customs office, Dar es Salaam

1) For conversion rates refer to Table 1

Annex 11

Agrochemicals ordered and distributed by the
Tanzanian Tea Authority (TTA)
between 1983 and 1988

Year	Chemical	Supplier	Quantity	Cost (CIF)
1983/84	Dalapon	Welcross Ltd, UK	9925 kg	US\$ 30,767
1984/85	"	Inkemex, UK		T.Shs218,064
1984/85	Gramoxone	" "		" 305,341
1984/85	"	Twiga Chem	2000 lts	" 62,580
1986/87	"	Hageco, UK	5350 kg	US\$ 16,450
1987/88	Dalapon	Van Lecuwen Holland	3000 kg	GD 16,500

CROP	ITEM	COMMON NAME (TRADE NAME)	QUANTITIES BY REGIONS					KGS/LTS.	T.S.S. COST/VALUE	GRAND TOTAL T.S.S.		
			ARUSA	MOSHI	IRINGA	MBEYA	DODOMA					
WHEAT	<u>HERBICIDES</u>	24 D Ester (Farmesta 60)	6,000 ltr	3,000 ltr	-	1,000 ltr	-	10,000 ltr	500,000/=	500,000/=		
GRAPES	<u>INSECTICIDES</u>	1. Malathion	-	-	-	-	2,000 ltr	2,000 ltr	100,000/=	800,000/=		
		2. Phosphamidon (Dimcron)	-	-	-	-	1,000 ltr	1,000 ltr	100,000/=			
		3. Endosulfan	-	-	-	-	1,000 ltr	1,000 ltr	100,000/=			
		4. Aldrin	-	-	-	-	10,000 kgs	10,000 kgs	500,000/=			
	<u>FUNGICIDES</u>	1. Sulphur	-	-	-	-	11,000 kgs	11,000 kgs	200,000/=			
		2. Blue Copper	-	-	-	-	5,000 kgs	3,000 kgs	100,000/=			
		3. ZnMn Carbonate	-	-	-	-	10,000 kgs	10,000 kgs	600,000/=			
		4. Red Copper	-	-	-	-	5,000 kgs	5,000 kgs	100,000/=			
VEGETABLES	<u>FUNGICIDES</u>	1. ZnMn Carbamate (Dithane)	2,000 kgs	2,000 kgs	1,300 kgs	1,000 kg	500 kg	7,000 kgs	500,000/=	1,000,000/=		
		2. Metiram (Poliram Combi)	2,000 kgs	2,000 kgs	1,000 kgs	1,500 kg	500 kg	7,000 kgs	500,000/=			
	<u>INSECTICIDES</u>	1. DDVP (Nogos)	750 ltr	750 ltr	200 ltr	200 ltr	100 ltr	2,000 ltr	200,000/=			
		2. Formothion 37% (Anthio)	1,000 ltr	500 ltr	200 ltr	200 ltr	100 ltr	2,000 ltr	200,000/=			
		3. Dimethoate 40% (Rogor)	400 ltr	300 ltr	200 ltr	100 ltr	-	1,000 ltr	200,000/=			
		4. Diazinon	300 ltr	200 ltr	200 ltr	300 ltr	-	1,000 ltr	200,000/=			
	WHEAT	<u>HERBICIDES</u>	1. Propanil 39%	1,000 ltr	-	-	4,000 ltr	-	5,000 ltr		300,000/=	300,000/=
	SEED DRESSING	1. Aldrin 40%	4,000 kgs	500 kg.	-	-	-	4,500 ltr	300,000/=		700,000/=	
2. Lindane /Thiram		3,000 kgs	500 kgs	-	500 kgs	-	5,000 kgs	400,000/=				
RODENT CONTROL	<u>POTENTICIDES</u>		3,000 kgs	3,000 kgs	2,000 kgs	1,500 kgs	500 kgs	10,000 kgs	400,000/=	400,000/=		
STORAGE AND RAISING OF CROPS	<u>INSECTICIDES:</u>	1. Aluminium Phosphate	1,000 kgs	500 kgs	250 kgs	250 kgs	-	2,000 kgs	400,000/=	1,200,000/=		
		2. Malathion Dust	20,000 kgs	10,000 kgs	10,000 kgs	10,000 kgs	5,000 kgs	55,000 kgs	300,000/=			
		3. Permethrin Dust	6,000 kgs	5,000 kgs	5,000 kgs	4,000 kgs	5,000 kgs	25,000 kgs	500,000/=			