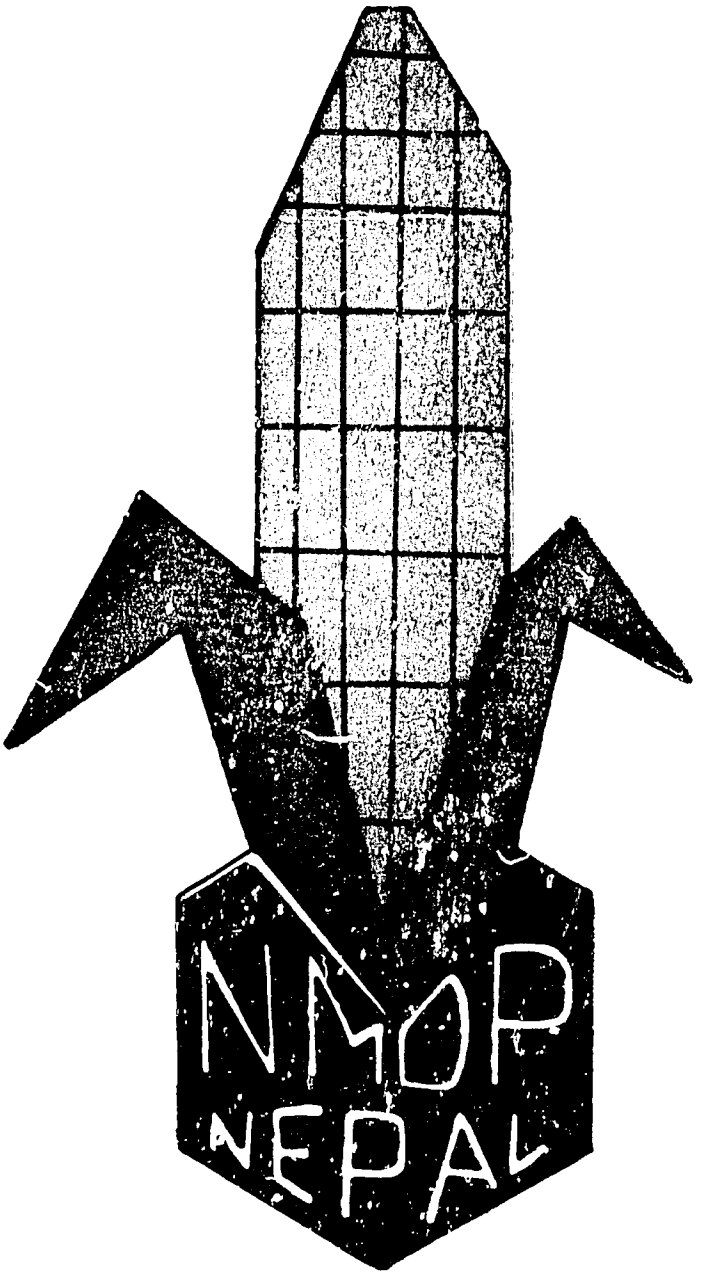
PN-ABC-759

HIS MAJESTY'S GOVERNMENT

DEPARTMENT OF AGRICULTURE



ANNUAL PROGRAM

1983-84
(2040-41)

National Maize Development Program
Rampur Agriculture Station

Rampur, Chitwan

NEPAL

PN AAC-759

HIS MAJESTY'S GOVERNMENT
DEPARTMENT OF AGRICULTURE

ANNUAL PROGRAM
1983/1984
(2040/2041)

NATIONAL MAIZE DEVELOPMENT PROGRAM
RAMPUR AGRICULTURE STATION
RAMPUR, CHITWAN
N E P A L

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NATIONAL MAIZE DEVELOPMENT PROGRAM (NMDP)

AGRI. STATION, RAMPUR, CHITWAN, NEPAL.

01.	Mr. G.R. Rajbhandari	- Maize Coordinator
02.	Mr. V.P. Sharma	- Acting Chief Officer
03.	Mr. D.B. Tamang	- Maize Development Officer
04.	Mr. K.K. Lal	- Asstt. Maize Dev. Officer
05.	Mr. S.P. Pandey	- Asstt. Soil Scientist
06.	Mr. T.N. Mishra	- Asstt. Maize Breeder
07.	Mr. G.P. Shivakoti	- Asstt. Entomologist
08.	Mr. D.N. Sah*	- Asstt. Pathologist
09.	Mr. M.M. Palikhe*	- Asstt. Maize Dev. Officer
10.	Mr. J.D. Rana*	- Asstt. Agri. Engineer
11.	Mr. B.K. Batsa	- Asstt. Pathologist
12.	Mr. K.N. Dahal	- Asstt. Prod. Agronomist
13.	Mr. R.B. Prasad	- Asstt, Prod. Agronomist
14.	Mr. I.B. Chaudhary	- Asstt Prod. Agronomist
15.	Mr. K. Adhikary	- Asstt. Prod. Agronomist
16.	Mr. K.P. Koirala	- Asstt. Maize Dev. Officer
17.	Mr. H.K. Upadhyaya	- Asstt. Agronomist
18.	Mr. A.K. Karna	- Asstt. Agronomist
19.	Mr. S.B. Shah	- Asstt. Agronomist

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* - On study leave.

PERSONNEL FROM:

A. Soil Science and Agricultural Chemistry Division
B. Agriculture Botany Division
C. Agronomy Division
D. Plant Pathology Division
E. Entomology Division
F. Agrisulture Station, Pakhribas
G. Agriculture Station, Tarahara
H. Agriculture Station, Jiri
I. Agriculture Farm, Kakani
J. Agriculture Station, Nepalgunj
K. Agriculture Station, Jumla
L. Agriculture Farm, Doti
M. Agriculture Station, Lumle
N. Gandaki Zone Agriculture Development Project
O. Agriculture Farm, Bhairahwa
P. Janakpur Zone Agriculture Development Project
Q. Oil Seed Project, Nawalpur
R. International Cooperators
   i) International Maize and Wheat Development Centre (CIMMYT)- Mexico
   ii) Philippines Maize Development Program - Philippines
   iii) Asian Regional Maize Program - CIMMYT, Thailand
   iv) All India Coordinated Maize Improvement Program - IARI, New Delhi
   v) ICRISAT - Hyderabad, India.

Project No. : 2040/2041 NMDP-1
Division : Maize
Section or Program : Coordinated National Maize Development Program
Line Project Title : Germplasm Collection and Introduction
Description of Work :

A. Origin and Brief History:

Plant breeder require variability to improve or develop varieties. New variability is identified within collections of existing local varieties, and introduced exotic varieties and is created by the recombination through hybridization of these two sources. The local varieties of Nepal may have many valuable characteristics that can be utilized, particularly, resistant to prevalent diseases and insects and adoptation to the variable environments to which they have been subjected to natural screening for many generation. Introduced materials from other countries represent elite germplasm that is the result of time and effort expanded by other breeding programs. Many unwanted traits have been selected which might be useful for Nepal.

B. Objective:

To utilize the local as well as exotic germplasms for the development of superior maize varieties.

C. Plan of Work:

Different germplasms will be collected and planting will be done with four rows of 5 meters length. Observation will be taken as regards to their traits. If some special characteristics is observed it will be selected for further use.

D. Estimated Duration (Years) Continuous

Location : a) Summer - Rampur
b) Winter - Rampur

Cooperation : Different Agriculture Development Offices, etc.

Project Leader : NMDP

Other Research Staff : Concerned staff of NMDP

Expenditures : 100 (Cloth bags, stamps, etc.)

Project No. : 2040/2041 NMDP - 2
Division : Maize
Section or Program : Coordinated National Maize Development Program
Line Project Title : Observation Nursery
Description of Work :

A. Origin and Brief History:

The new germplasm accessions are not necessarily all good. Therefore, they need to be evaluated for agronomic trials, disease and insect resistance and their adaptability to different agrocilamtic conditions. Out of many, only a superior materials will be kept for breeding purpose.

B. Objectives:

To study the different germplasms and find out the superior ones for the breeding purpose.

C. Plan of Work:

Materials will be planted at respective locations with 2-3 rows of 3 or 5 meter long. Materials will be studied for all the traits needed including their reactions with different disease and insects.

Data to be Recorded:

Include in Plant of Work:

01. Date of planting
02. Days to 50% silking
03. Plant and ear height
04. Root and stalk lodging
05. Disease rating
06. Insect damage
07. Plant stand
08. Husk cover
09. Moisture percent
10. Total number of ears harvested
11. Number of diseased ears
12. Yield weight
13. Net harvested area.

Entries:

01. CM 202 X CM 111
02. CM 600
03. Com. NLD
04. Popu. 44 (78) X CM - 400
05. Popu. 27 (20) X CM - 202
06. Rampur - 2 X ob. 8046
07. Rampur Comp. X Arun White
08. Rampur 8075 X Ganesh - 2
09. TL 8033
10. Khumal X Arun White
11. Accross 7741
12. Accross 7940
13. Accross 7941
14. Ob. 8045
15. Chuquisoca 7845
16. TL 8146
17. Japanese Sweet Corn
18. Rampur Comp. (Check)
19. Khumal Yellow (Check)

Estimated Duration (Years) Continuous

Location : a) Rampur, Khimaltar and Kakani
b) Winter - Rampur

Cooperation : Agri. Botany and Pathology Division, Khumaltar, Kakani Farm

Project Leader : NMDP

Other Research Staff : Concerned staff

Expenditure (Approximate):

a) Fertilizer Rs. 325.00
b) Pesticides Rs. 115.00
c) Labor for management Rs. 600.00
d) Enamel paint for selection Rs. 70.00
e) Labor for preparing trial materials Rs. 75.00
f) Miscellaneous Rs. 150.00

Land Required : 300 square meter.

Project No. : 2040/2041 NMDP-3

Division : Maize

Section or Program : Coordinated National Maize Development Program

Line Project Title : Seed increase, maintenance and utilization of potential germplasm.

Description of Work :

A. Origin and Brief History:

This is the 3rd step in the breeding program. Here superior materials from the observation nursery can be used in the varietal development program or in the special project program and might also be promoted directly to the varietal trials. Therefore, these must be seed increase and maintenance of those superior materials for the further use.

B. Objectives:

To increase and maintain the seed of promising genotypes for their further use and testing.

C. Plan of Work:

Materials will be planted and seed will be produced by controlled pollination. The number of entries are as follows:

Entry	Genotypes
01	TIWF (Pool 19)
02	TIYF (Pool 21)
03	Am. Cristalino PR 81B-503 # (Pop. 27)
04	Am. Cristalino PR 81B-503 A# (Pop. 27)
05	Temp. Bl.dent. (Rust Check) - (Pop. 47)
06	Rampur - 2 - Below 10% OMR Families (Bulk)
07	CM 202 X CM 111
08	CM 600
09	Comp. NLD
10	Pop. 44 (78) X CM 400
11	Pop. 27 (20) X CM 202

Estimated Duration (Year Continuous)

Location : A) Summer - Rampur
B) Winter - Rampur

Project Leader : National Maize Development Program (NMDP)

Other Research Staff : Concerned staff

Expenditure : (Approximate)

a)	Fertilizer	Rs. 150.00
b)	Pesticides	Rs. 65.00
c)	Tassel/silk bag	Rs. 2500.00
d)	Labour for management	Rs. 300.00
e)	Labour for crossing and detasseling	Rs. 100.00
f)	Labour for processing	Rs. 100.00
g)	Labour for preparing trials	Rs. 50.00
h)	Miscellaneous	Rs. 75.00

Land Required : 600 square metres.

Project No. : 2040/2041 NMDP - 4

Division : Maize

Section or Program : Coordinated National Maize Development Program

Line Project Title : Selection, Progency Testing and Recombination on:

a) Ganesh - 2 Yellow population for high hills
b) Manakamana - 2 Yellow population for mid-hills
c) Rampur - 2 Yellow population for Terai and foot hills
d) Rampur - 1 for Terai (White)
e) Arun - 4 Early yellow population
f) Arun - 1 Early white population
g) Manakamana - 1 (White population for hills)
h) S_1 families of Rampur - 2 (Downy mildew resistant families)

Description of Work :

A. Origin and Brief History:

Nepal has variety of climates and needs different varieties for Terai and Hills. Similarly, farmers have different varietal requirements, some need yellow varieties, some white, some early, some late and so on. Varieties developed during past few years have shown yield superiority of 50% or more. However, there are some plant characters, such as plant height, maturity, husk cover, level of resistance to different diseases, that need to be improved. As we know, downy mildew and stalk rot are the main problem in Terai and cob rot and rust in hills. Hence there is a need for utilization of the potential materials to develop varieties which are tolerant to different cropping hazards (more stable), adapted to the different agro-climatic regions and finally acceptable by the farmers.

B. Objective:

To develop maize varieties suitable to our agro-climatic conditions.

C. Plan of Work:

Materials will be planted in all respective locations with one row of 3 or 5 meter long. Materials will be selected based on their performance including diseases. Selection scheme used will be half sib selection system.

D. Estimated Duration (Year) - Continuous

Project Leader : NMDP

Other Research Staff - Concerned staff

a) Entries (in Ganesh - 2):

Locations: Rampur - Winter

Kakani and Lumle - Summer

Locations	
Kakani	Lumle
230 fam.	230 families

b) Entries (in Manakamana - 2):

Locations: Rampur - Winter

Khumal + Kabhre - Summer

Locations	
Kabhre	Khumal
480 fam.	480 families

c) Entries (in Rampur - 2):

Locations	
Rampur	Thailand
(Summer+Winter)	(Summer)
974 families	199 families

d) Entries (in Rampur - 1):

Rampur - 1 = Amarillo dal Bajio X 10 lines PD (MS) 6 X Phil. DMR = Mana*, (Suwan - 1 Mana*) Mana* (4%), (Mana* X Janaki) Mana*, (Mana* X Marcay - 7530) Mana, (Mana X Pool - 19) Mana* (2%), (Eto Blance X Pozarica - 7425) Mana*) Mana* (2%), (Mana* X Barbete white) Mana* (7%), Mana* X Ujala white (2%), Pool-23 X Mana* (14%), (Mana X Ilonga-7530) Mana*, (Sarlahi Seto X Mana*) Mana* X Turpeno drought selection.

	Rampur (Summer+Winter)	Suwan Farm (Summer)
1) Total number of male as well as female	214 families	214 families
2) Only female families	91 "	91 "
Total Nos. of families:	305 "	305 "
Male rows required (2:1)	154 rows	-
Total Nos. of Plot:	459	305 families

* - Mana = Manakamana.

- Male is the bulk seed of number 1 entry.
- In case of Thailand (Suwan Farm), a susceptible as well as resistant check need to be included every after a set of 20 or 30 rows/families.
- In Suwan farm, mainly, mildew screening work will be done.

e) Entries (in Arun - 4):

Arun - 4 = Arun - 2 (76%), (TC-1 early X Arun - 2) A*-2 (16%), (D741 X Suwan-2) A-2(1%), (D741 X A-2) A-2 (3%), (D741 X Suwan-2) A-2 (1%), (SS4 X D771) Suwan-2) Suwan-2 E) A-2 (2%), (Source-10 X A-2 (2%), (A-2 X Source 4) A-2) A-2 (1%), (TC-1 early X Meddok Pool-3) A-2) A-2 (1%), (D741 X B73) Pool-17) A-2 (4%), Pool 29 X A-2 (1%), (j 663 X Suwan-2) A-2, Dhading Yellow X A-2 (1%), D744 X A-2, Population 35 X A-2.

	Rampur (Summer+Winter)	Khumal
1. Total number of male as well as female selected families from Rampur --- --- --- ---	144 families	144 fams.
2. Only female selected from Rampur	133 "	133 "
3. Total number of male as well as female selected families from Rampur	190 "	190 "
Total Nos. of Families	467 "	467 "
Male rows required (2:1) --- --- ---	235 rows	235 rows
Total number of plots ---	702	702

f) Entries (in Arun - 1):

Location : Rampur (Both Summer and Winter)

- Male is the bulk seed of no. 1 and 3 entry

* A-2 = Arun - 2.

Arun-1 = Sathi Makai (23%), Arun (11%), Arun x Suwan-2 (11%), Arun x Pool-15 (11%), Arun x Barbote (11%), Arun x Suwan-2 (9%), Pool-15 (14%), Sathiya W-2, Arun (Early DMR-2 x CM 600 Pool-6 Sib), Koirali white, Thulo seto Makai, and Arun x Population-30.

1. Total selected male as well as female families	---	147 families
2. Selected female only	---	110 "
Total number of families	---	257 "
Male rows required (2:1)	---	130 rows
Total number of plots	---	387 plots.

- Male is the bulk seed of number 1 entry.

g) Entries (in Manakamna -1):

Location: Rampur - Winter
Pakhribas - Summer

Manakamana-1 = Amarillo del Bajio x 10 lines PD (MS) 6 Phil. DMR (Mana*.), Suwan-1 x Mana) Mana, (Mana x Janaki) Mana, (Mana x Maracay 7530) Mana, (Mana x Pool-19) Mana, Janaki x Mana, (Pozarica-7425 x Suwan-1) Mana, (Mana x Ilonga-7530) Mana, (Eto Blance x Pozarica-7425) Mana, (Mana x Barbote W) Mana, Mana x Ujala white, Mana x Turpeno drought selection, Pool-23 x Mana, Rampur-8075, Suwan-8075.

Entries:

1) Total families selected for male as well as female	---	173 families
2) Only female families	---	72 "
Total number of families	---	254 "
Number of male rows	---	124 rows
Total number of plots	---	369 plots

- Male is the bulk seed of number 1 entry
- Plant 2 seeds per hill and 12 hills/row.

h) Total number of families - 775 (selfed at Farm 775 Suwan) - Early and Late sets.

Contd.../...

Project No. : 2040/2041.NMDP - 5

Division : Maize

Section or Program : Coordinated National Maize Development Program

Line Project Title : Varietal Trials:

a) NMDP Varietal Trial,

b) Varietal Trial on hybrid maize, and

c) CIMMYT Varietal Trial.

Description of Work :

A. Origin and Brief History:

The elite materials developed either by the program or from introduction need to be tested under different agro-climatic conditions to evaluate their performance before release. These types of trials are usually conducted to identify the potential varieties that are better than those that are already recommended.

B. Objectives:

To test the different varieties to see whether they are superior to already recommended varieties.

C. Plan of Work:

The trials will be planted in 4 rows of 3 or 5 metres long. Genotypes will be evaluated for all the desirable trials.

Observation:

01. Date of planting
02. Days of 50% silking (most important)
03. Plant and ear height
04. Root and stalk lodging
05. Disease - specifically stalk rot, bob rot and downy mildew
06. Insect damage
07. Plant stand
08. Husk cover
09. Moisture percentage (most important)
10. Total number of ears or cobs
11. Number of diseased ears
12. Yield weight
13. Net harvested area.

Entries:

A. NMDP Varietal Trials:

01. Ganesh - 2
02. Manakamana - 2
03. Rampur - 2
04. Arun - 4
05. Arun - 2
06. Rampur - 1
07. Rampur Composite (Check)
08. Khumal Yellow (Check)
09. Sarlahi Seto (Check)
10. Farmer's Variety.

B. Varietal Trial on Hybrid Maize:

01. Pioneer - 6181
02. X - 440
03. X - 410
04. Z - 216
05. X - 6875
06. Khumal Yellow (Check)
07. Rampur Composite (Check)

C. CIMMYT Varietal Trial:

01. Accross - 7741
02. Accross - 7940
03. Accross - 7491
04. Ob. - 8045
05. Chequisaca - 7845
06. TL. - 8146
07. Rampur Composite (Check)
08. Khumal Yellow (Check).

Estimated Duration : Continuous

Location : a) NMDP varietal trial - Rampur, Kabhre, Surkhet, Jumla, Doti, Kakani, Kankai, Itahari, Nepalgunj, Dadapakhar, Khumaltar, Lumle, Parwanipur, Hardinath, Tarahara, Pakhribas,

b) Varietal trial on hybrid maize - Rampur and Khumaltar

c) CIMMYT varietal trial - Rampur, Khumaltar and Surkhet

Cooperation : All concerned Farms / Stations

Project Leader : National Maize Development Program (NMDP).

Other Research Staff: All concerned staff of all Farms / Stations

Expenditure :

a) Fertilizer	Rs. 350.00
b) Pesticides	Rs. 65.00
c) Labour for management	Rs. 400.00
d) Labour for preparing trial materials	Rs. 150.00
e) Miscellaneous	Rs. 125.00

Project No. : 2040/2041 NMDP - 6

Division : Maize

Section or Program : Coordinated National Maize Development Program

Line Project Title : Special Project
Hybrid Maize Development Program

Description of Work :

It is well known fact that the hybrid maize yields higher than most of the composite and local. That is why the acceptance of hybrid maize is increasing rapidly in some of the district of the Terai belt.

Farmers of those district do not even mind to buy costly seeds from India and from the private seed company in Nepal. Thus NMDP has visualized the need of the development of the hybrid corn. Though the development of the hybrid corn is not easy as NMDP has to face a lot of constraints. Inspite of this, NMDP is going to start the initial phase of the hybrid maize development by keeping the following objectives in the full perspective.

Objectives:

01. To increase the National Maize Production
02. To supply hybrid Maize Seed Development by NMDP
03. To check the flow of foreign currency to other countries.

Estimated Duration : Continuous

Location : Rampur (both Summer and Winter)

Project Leader : NMDP

Other Research Staff : Concerned staff.

Entries:

102 S_1 families of Khumal Yellow, 1000 S_0 families of Hetauda Composite. 194 S_1 families of Rampur Composite and 133 S_1 families of Arun - 2 will be advanced in S_2 during summer and further advanced in S_3 during winter 2040.

Expenditure (Approx.) :

a) Fertilizer	Rs. 250.00	
b) Pesticides	Rs 100.00	
c) Tassel bags	5000	(in numbers)
d) Silk bags	500	(")
e) Labour for all operations	Rs. 1000.00	
f) Miscellaneous	Rs. 200.00	

Project No. : 2040/2041 NMDP - 7

Division : Maize

Section or Program : NMDP

Project Title : Irrigation Trial on Winter Maize

Description of Work :

A. Origin and Brief History:

Irrigation in winter maize seems to be limiting factor in grain production, especially under Terai condition. It is therefore, necessary to find out the irrigation of winter maize.

B. Objectives:

To find out the growth stages for irrigation on winter maize for higher production.

C. Plan of Work:

Fifteen different irrigation treatments a combination of one or more irrigations at 4 leaf stage, knee-high stage, 50% silking stage and grain filling stage will be tested in RBD with 3 or 4 replications. Individual plot size will be 6m x 6m (8 rows 6m long) with a net harvest area of 5 x 3 m^2 (4 rows 5m long). Fertilizer dose will be 90:45:45: kg NPK/ha. Standard spacing and other cultural practices will be followed. A full season maize variety will be used as a test variety.

Treatments.

01. Irrigation at 4 leaf stage (A)
02. Irrigation at knee-high stage (B)
03. Irrigation at 50% silking stage (C)
04. Irrigation at grain filling stage (D)
05. Irrigation at A and B
06. Irrigation at A and C
07. Irrigation at A and D
08. Irrigation at B and C
09. Irrigation at B and D.

10. Irrigation at C and D
11. Irrigation at A, B and C
12. Irrigation at A, B and D
13. Irrigation at A, C and D
14. Irrigation at B, C and D
15. Irrigation at A, B, C and D
16. No irrigation.

Locations : Rampur, Hardinath and Parwanipur

Estimated Duration : 3 - 4 years.

Project Leader : NMDP

Cooperators : Hardinath Agri. Farm and Parwanipur Agri. Station.

Data to be Collected :

01. Number of plants at harvest (net harvest area)
02. Number of cobs at harvest
03. Date of 50% silking
04. Plant height at maturity
05. Lodging % at harvest
06. Disease and insects, if any
07. Grain yield kg/ha.
08. Irrigation dates
09. Date and stage at which moisture stress appears
10. Daily rainfall during the growth period
11. Daily evaporation pan reading during the growth period.

Expenditure :

Labour Recurring Expenditure / Site

a) Labour	Rs.	1,218.00
b) Fertilizers	Rs.	356.00
c) Pesticides	Rs.	90.00
d) Seed	Rs.	32.00
e) Miscellaneous	Rs.	200.00
f) Land required	Rs.	3,200.00

Project No. : 2040/2041 NMDP - 8

Division : Maize

Section or Program : Coordinated National Maize Development Program

Line Project Title : Effect of planting method, fertilizer level and weeding method on maize yield.

Description of Work :

A. Origin and Brief History:

Farmers usually hand weed their maize at early stage and later on weeding by local plow is followed. In general, hand weeding is both labour and time consuming. It is not clear whether effective weed control in maize is possible through plow weeding only. The intensity of the weed population and the effectiveness of weed control may also differ under different soil fertility levels and hence different weed control measures may be needed under different soil fertility conditions.

B. Objectives:

1. To study the effect of weeding by plow as hand weeding,
2. To study if soil fertility has any interaction with weeding method
3. To study if effective plow weeding is possible in a row sown crop (jabler or drill sown).

C. Plan of Work:

The trial will be laid out in split-split plot design having 4 replications with method of planting as main plot, fertilizer levels as sub plot. The gross plot will be 6m X 7m (rows 7m long) with a net harvest area of 3 X $5m^2$ (4 rows 5m long). The test variety will be Rampur Composite, a full season variety.

Treatment:

Main Plot: Method of Planting

1. Line sowing by hand jabler (75 X 25 cm)
2. Sowing behind plow app. at 75 cm spacing.

Sub-Plot : Fertilizer Level

1. No chemical fertilizer
2. Half recommended dose (30:15:15 kg NPK/ha.)
3. Recommended dose (60:30:30 kg NPK/ha.)

Sub-sub Plot: Weeding Method

1. Complete hand weeding
2. Complete weeding by plow
3. First weeding by hand (at 4-6 leaf stage) followed by plow at knee-high stage (or even a bit later).

Estimated Duration: 2 - 3 years.

Location : Rampur Agriculture Station (Monsoon season)

Project Leader : NMDP

Data to be Collected:

01. Plant stand at harvest
02. Plant height at harvest
03. Number of cobs at harvest
04. Lodging %
05. Date of 50% silking
06. Diseases and insect, if any
07. Grain yield kg/ha.
08. Weed control rating at harvest.

Expenditure : Recurring

01. Labour	Rs.	1,764.00
02. Fertilizer	Rs.	187.00
03. Insecticide	Rs.	113.00
04. Seed	Rs.	48.00
05. Miscellaneous	Rs.	200.00
06. Land required		4500 square metres.

Project No. : 2040/2041 NMDP - 9

Division : NMDP

Project Title : Economic thresh-hold determination of maize borer.

Introduction :

Maize Borer (Chillo partellus) is the most important pest of maize in Terai, Inner-Terai and Foot Hill of Nepal. The binomics of this insect shows 3-5 generation depending upon the climatic condition. However, the population peak, number of generation, other behavioural aspect of this insect, and type and time of chemical application for its control is already been determined during 1977 - 1980. But still its economic thresh-hold is yet to be determined. In pest management system economic thresh-hold of an insect is very useful tool to decide either the use of chemical is necessary or not. Because if the damage is below economic injury level it is no wise use chemical and vice-versa if the damage reach the injury level. With this reason this project is proposed in 10th summer crops workshop.

Objectives :

To find out the economic thresh-hold of strepped borer in maize.

Location : Rampur, Khumaltar (1983 summer)

Review : There is no such study in Nepal

Duration : 3 years

Plan of Work :

Design : RBD

Replications : 16 (Sixteen)

Treatments : 13 (Thirteen)

Plot Size : 3 m^2 (1 X 3)

Maize will be planted in screen-house with all required inputs. 29-30 days after germination plant will be infested by 1st instar larvae 2nd instar larvae and egg masses artificially, as follows:

Treatments

01. 4 plants infested with 4 first instar larvae
02. 4 plants infested with 8 first instar larvae
03. 4 plants infested with 12 first instar larvae
04. 4 plants infested with 16 first instar larvae
05. 4 plants infested with 1 second instar larvae
06. 4 plants infested with 2 second instar larvae
07. 4 plants infested with 3 second instar larvae
08. 4 plants infested with 4 second instar larvae
09. 4 plants infested with 1 egg mass
10. 4 plants infested with 2 egg masses
11. 4 plants infested with 3 egg masses
12. 4 plants infested with 4 egg masses
13. 64 plants will remain as control.

Apart from above treatments infested plants will be selected in the field condition and categorized in 1-9 basis. Rating will be done in two stages of the plant growth. First at 4th stage (4th leaf visible) and second at 5th stage (8th leaf visible). Those infested plants will be harvested and grain yield will be compared with equal number of normal plants.

Yield Record

1) Normal field yield (4 rows of 5 meter length)
2) Equal number of normal plants yield (50-100 plants/sample)
3) Categorized infested plants yield (50-100 plants in each category).

Data to be Collected :

1) General rating
2) Recovery of plants
3) Number of pupae, pupal cases, tunnel length in 2 plants per treatment
4) Plant height (normal versus infested)

Project Leader : NMDP

Expenditure :

Recurring : Not estimated so far.

Non-recurring :

Land required : 60 square metres.

Project No. : 2040/2041 NMDP - 10

Division : Maize

Section or Program : NMDP

Project Title : Post harvest losses at storage due to stored grain pest of maize under different storage structure.

Introduction :

The traditional method of storage practice is very common in Nepal. The storage structures like Thangro, Kunew, Suli, and long wooden poles around the house are the common practice of storing unhusked maize. After certain period the ears are shelled and stored in the structure like, bamboo bin, Kotho, Ghyampo. All these storing conditions are very easily approachable to store grain pests. It is universally accepted that if the pest attack the grain, a considerable loss could be there. When we speak of less of food crops, we refer to many different kinds of losses caused by variety of factor. This includes weight, loss, loss of food value, loss of quality or acceptability and actual loss of the seed themselves. It is estimated that about 15-20 percent loss there in post harvested storage system in Nepal. With these facts this project is continue from 1980 summer.

Objectives:

To determine the grain loss due to maize store pests under different storage structure.

To compare the loss in local storage structure versus modified storage structure.

Plan of Work

The different materials required as in the treatments will be arranged prior to maize harvest. In case of Suli and Thangro approximately 100 Jhuttas (800 ears) will be maintained. The Bhakary and Ghyampo 50-100 kg grain per treatment will be hanged stored in less than 14 percent moisture level. In Thangro and Suli husked cobs will be hanged at least 1½ metre above the surface so that the rats can not jump.

Replications : 3 (Three)

Condition of Store : Representative to farmers condition.

Treatments

01. Suli - Local structure
02. Suli - Local structure but covered with 300-500 gauge plastic
03. Thangro - Local structure
04. Thangro - Local structure but covered as in treatment no.2
05. Kunew - Local structure
06. Kunew - Local structure but covered with plastics in treatment #2
07. Bhakary - Mud plasticed outside and inner side and upper side
08. Bhakary - Mud plaster as in treatment no. 7 but use of Celphos after grain store.
09. Bhakary - No mud plastered and without Celphos treatment in the grain (as control)
10. Ghyampo - Grain stored without Celphos but covered with sealed lid
11. Ghyampo - Grain stored by Celphos treatment
12. Polylined bag - Sealed but without Celphos treatment
13. " bag - Selaed with Celphos treatment

Observation to be Taken:

a) Initial moisture % the time of storage
b) Initial % germination of maize
c) Initial infestation level of insect 200 grains
d) Grain sample from each treatment in a interval of one month and counting and weighing of infested and uninfested grain 200 grain sample.
e) Final germination
f) Second germination pest after 3 months of storage
g) Final moisture % } - 6 - 8 months storage time.
h) Final germination }
i) % infestation
j) Loss in weight
k) Species of damaging insects
l) Sample will be collected from farmers storages structure in each month and find out the % infestation, germination and loss in weight
m) Monthly weather report temperature R.H.

Location : Rampur Agri. Station
Project Leader : NMDP
Other Research Staff : All concerned staff
Expenditure : Recurring - Rs. 200 (Without cost of grain)
Non-recurring - Nil.

Project No. : 2040/2041 NMDP - 11

Division : NMDP

Section or Program : Maize

Project Title : Studies on relative susceptibility of some elite germplasm to the corn borer.

Introduction :

Insect resistant varietal development is the most important tool in the pest management system. It is very economical and safest method as compared to chemical control. Maize germplasm exhibit different, character to insect reaction. Therefore, there is chance on getting resistant gene in our present wide gene pool maintaining breeding program. Therefore it is necessary to screen the germplasm against borer for the development of resistant variety of maize. Because in chemical control National Maize Program has already developed the suitable technology for the farmers.

Screening maize genotype against borer was done in 1978, 1980 and 1981, in natural condition. From those 3 years observation it was confirmed that without artificial infestation varietal screening could not be developed, because insect infestation in nature was quite vandour cury year, with this reason this trial is proposed to screen same important genotype artificially.

Objective:

To screen susceptible and resistant genotypes of maize against borer.

Locations : Rampur and Khumaltar

Plan of Work :

Design : R B D

Replications : 3 (Three)

Plot Size : 2 row of 2 metres length

Spacing : 75 X 25 cm.

No. of Entries : 14 (Fourteen)

NPK: 90:45:0 kg/ha of ½ N and all P_2O_5 at planting and ½ N as top-dressing

Soil Treatment: BHC or Aldrin dust at the rate of 20 kg/ha.

Project Leader : NMDP

Other Research Staff : Assistant Entomologist and Junior Technicians.

Entries :

01. Rampur - 1
02. Rampur - 2
03. Arun - 1
04. Arun - 2
05. Arun - 4
06. Manakamana - 1
07. Manakamana - 2
08. Pop - 27 + 503 A
09. Pop - 47
10. Pool - 19
11. Pool - 21
12. Rampur Composite
13. Khumal Yellow
14. Ganesh - 2
15. Pop - 27 # 503.

Infestation Method :

Four plants of each rows in each genotype will be infested by artificially rared larvae 25 and 40 days after germination. The remaining 4 plants in each row of each treatment will be controlled by the application of grannular insecticide. 10 first instar larvae per plant will be applied by the help of small brush. Infestation will be repeated 3 days after the first application. Thus, approximately 20 larvae per plant will be in total.

The larvae will be rared in the laboratory by collecting gravid moths or the egg masses from the infested field.

Data to be Taken :

01. General rating of individual treatments against the control plants in 1-9 basis.
02. Disect 4 plants from each treatment replication-wise neat to tassel initial stage and count surviving larvae, pupae or pupal cases and the length of tunnels.
03. Repeat the same disection for the remaining 4 plants from each plot at the time of harvest.

04. Also observe the recovery of plants or dead-hearts.
05. Grain will be harvested from the resistant plant if it is saved.
06. Height of the infested and controlled plants.
07. Take weight of the larvae of the same age during first disection (Tasseling stage).

Project No. : 2040/2041 NMDP - 12

Division : NMDP

Section or Program : Maize

Line Project Title : Field Biology of Army Worm by survey and surveillances.

Description of Work :

A. Origin and Brief History:

The army worm has become the number one enemy to the maize grower in Nepal. Once its incidence is noticed it is very difficult to control the pest by means of conventional methods. The loss caused by this pest in maize crop varies from negligible to total failure of the crop. Therefore, it is very important to answer the farmers as to how, when and where the pest occurs.

B. Objectives:

1. To understand the basic point regarding the field biology of the pest
2. To understand the time of incidence and intensity of damage.

C. Plan of Work:

Four sites each of half hectares within five kilometer from the farm or station will be selected in four directions and one site will be within to farm or station. Recording of infested plants, recording of different stages of larvae and larval count per 100 plants and other possible behaviour will be taken into consideration.

D. Estimated Duration of Years: 3 years.

Locations: a) Summer: Khumal; Kakani
b) Winter: Rampur.

Cooperation: N M D P

Project Leader: Entomologist - Assistant Entomologist of the above locations.

Other Research Staff:

Expenditure:

Labours - Sampling - 18 @ Rs.6.00 = Rs. 108.00

Project No. : 2040/2041 NMDP - 13

Division : Maize

Section or Program : NMDP

Line Project Title : Study on the grain yield stability of aged maize seed.

Description of Work :

A. Origin and Brief History:

Since spring 1980, corn seeds at different moisture level (10, 11, 12 and 13%) are being packed in different gauge of polyethylene bags and stored at ordinary storage at Rampur conditions. Seeds sample were taken from each of these bags for moisture and germination tests at an internal of 60 days. The results of this experiment revealed that corn at 13% moisture if packed in 300 gauge of polyethylene gunny bags, can be stored in ordinary storage condition for a period of 600 days without loosing the viability of seeds. But this is not understood clearly that whether the aging of seeds have any correlation on the grain yield stability of maize. So, this trial was designed to find out the effect of aging on the grain yield of maize at Rampur conditions.

B. Objectives:

To find out the effect of aged seeds on the yield potentiality of maize.

C. Plan of Work:

The trial will be laid out in (RBD with three replications. Plot size will be 4 rows of 5m long (5m x 3m) with 75 cm x 25 cm spacing). Fertilizer will be given at the rate of 120:60:40 kg NPK/ha. Test variety will be Rampur Composite.

Treatments Detailed:

01. 20 days old seeds
02. 60 days old seeds
03. 150 days old seeds
04. 415 days old seeds
05. 505 days old seeds
06. 760 days old seeds
07. 850 days old seeds.

Observation to be Taken :

- Seed moisture content at sowing time
- Germination % " " } Lab. Test
- Days to germination - field test
- Early plant vigour and plant stand
- Lodging %
- Diseases and insects attack
- Plant stand at harvest
- Yield in kg/plot (Harvest 2 central rows only)

D. Estimated Duration: 3 years.

Location: a) Summer/Spring - Rampur, Khumaltar
b) Winter - Rampur

Cooperation: Agri. Botany Division, Khumaltar

Other Research Staff: JT and JTA's - NMDP.

Expenditure:

a) Labour	Rs. 500.00
b) Fertilizer	Rs. 100.00
c) Pesticides	Rs. 10.00
d) Seeds	Rs. 10.00
e) Miscellaneous	Rs. 400.00
Total :	Rs. 1020.00
f) Land Required	- 500 square metres.

Project No. : 2040/2041 NMDP - 14
Division : Maize
Section or Program : NMDP
Line Project Title : "Seed Treatment Trial against Downy Mildew of maize".
Description of Work :

A. Origin and Brief History:

Downy Mildew has been reported since 1966/1967. A number of studies had been carried out during 1970-1974. The chemical control has no meaning but seed treatment with different seed dressing have shown to minimize infection. Therefore, a seed treatment trial using different chemicals will be worth test for minimizing the incidence of the disease.

B. Objective:

To determine the appropriate chemical (fungicide) to control the incidence of Downy Mildew in the field condition.

C. Plan of Work:

The trial will be laid out the RBD with 3 replications. Plot size 5m X 3m and spacing 75 X 24 cm. The fertilizer doses will be 120:60:40 NPK kg/ha. One recommended and one local varieties will be used. The seed dressers will be as follows:

01. Vitavax: 4 gm/kg of seed
02. Benlate @ 3gm/kg seed
03. Apron 35 SD: 3gm/kg seed
04. Furavax @ 2gm/kg seed
05. Erex @ 2gm/kg seed
06. Panoram @ 2gm/kg seed
07. Komgurd @ 2gm/kg seed and
08. Untreated - Control.

The fungicides will be treated before sowing and evaluated under artificially inoculated conditions. Ths incidence of Downy Mildew will be recorded on three and six weeks old plants.

D. Estimated Duration: 3 years

Location: a) Summer - Rampur

b) Winter - Rampur

Cooperation: Division of Plant Pathology

Project Leader: Assistant Plant Pathologist, NMDP

Other Research Staff: All NMDP staff

Expenditure:

a) Labour	Rs.	300.00
b) Fertilizer	Rs.	100.00
c) Pesticide	Rs.	15.00
d) Seed	Rs.	10.00
e) Miscellaneous	Rs.	371.00
f) Land Required	-	500 square metres.

Project No. : 2040/2041 NMDP - 15
Division : Maize
Section or Program : NMDP
Line Project Title : International Downy Mildew and Stalk Rot Nursery.

Description of Work :

A. Origin and Brief History:

Downy Mildew resistant materials what so ever are received from different international organizations will be tested at NMDP Rampur during summer 1982.

B. Objective:

To find out the resistant materials against Downy Mildew and stalk rot diseases of maize.

C. Plan of Work:

The exotic materials will be planted as per recommendation/ instruction of the concerned international organization.

D. Estimated Duration: Uncertain

Location: a) Summer - Rampur
b) Winter -

Cooperation: Plant Pathology Division

Project Leader: NMDP, Assistant Plant Pathologist

Other Research Staff: All concerned NMDP staff

E. Expenditure:

Depends on the size of entry approximately Rs. 1,000.00

Seed:

Seed will be supplied by international agency.

Land Required:

Depends on the entry.

Project No. : 2040/2041 NMDP - 16

Division : Maize

Section or Program : NMDP

Line Project Title : Study on the control of stalk rot by cultural and management practices.

Description of Work :

A. Origin and Brief History (Introduction):

Stalk rot of corn has been noticed since long in Nepal in hills and Terai and yield reduction due to this disease is assessed up to 80% several chemicals were tested for the control of this disease. But none of them was proved effective for the successful disease control. So, cultural measure, which could be easily accepted by the farmers, are to be tested and judged against the stalk rot of maize.

B. Objective:

To find out the suitable cultural means/methods of stalk rot control.

C. Plan of Work:

Trial will be laid out in Randomized Block Design (RBD) with 4 replications. Plot will be 25cm X 25cm plant to plant spacing fertilizer will be given as described below in treatment combinations.

Treatments:

01. 120:60:40 NPK kg/ha along with 40 kg BHC, 10 kg Sevin 4 G and 1.5 kg Atrazine/ha.
02. All the crop residue of the plots will be burnt in the respective plot.
03. 120:0:0 NPK kg/ha
04. 120:60:40 NPK kg/ha
05. 120:0:0 NPK kg/ha. all the crop residue will be applied at planting time and Sevin at 15-20 days old seedlings Atrazine as pre-emergence herbicide immediately after planting. Disease observation will be taken after tasseling.

D. Estimated Duration: 3 years

Location:

a) Summer - Rampur

b) Winter -

Cooperation:

Division of Plant Pathology

Project Leader:

Plant Pathologist, NMDP

Other Research Staff:

All concerned NMDP staff

Expenditure:

a) Labours	Rs. 220.00
b) Fertilizer	Rs. 99.00
c) Pesticides	Rs. 20.00
d) Seed	Rs. 5.00
e) Miscellaneous	Rs. 168.00
f) Land Required	- 350 square metres.

Project No. : 2040/2041 NMDP - 17
Division : Plant Pathology
Project Title : Cob Rot disease or maize.
Introduction :

The cob rot disease has been reported since 1966/1967 but the work on this disease has been initiated only since 1974. The disease is prevalent in the mountains and hills where the low temperature and high humidity prevails. Among the various pathogens reported on cob rots, Fusarium was found to be the most important one and most destructive too. The damage due to this disease is pretty high. Keeping this view in mind a number of specialized studies were made during the period and a number of methods have been found for the control of the disease. However, the actual loss due to this disease has not been estimated so far. The most important factor at present is to improve the maize population at high altitude area by using artificial incoculation method for cob rot disease.

1. Loss assessment due to ear rot of maize.
2. Improvement of population of high altitude maize.

1. Loss Assessment due to Ear Rot of Maize:

Ear rot is most important in the high elevation. The improved varieties are more susceptible than some of the local ones. Therefore, the losses due to the disease is very high and it is essential to estimate the approximate losses due to the disease.

Objective:

To find out the approximate losses due to Fusarium ear rot of maize.

Location :

Kakani.

Procedure:

The trial will be conducted with randomized block design with four replications fertilizer doses will be applied 60:40:40 NPK kg/ha and ½ the dose of N apply as top-dressing. The varieties used will be Arun-2, Kakani Yellow, Manakamana and Rampur Composite. The treatment will be (1) Dithane M-45 spray, (2) Without fungicidal spray and without inoculation, (3) With inoculation of cob rot organism. The Dithane M-45 will start to spray after tasseling at an interval of 10-15 days. The inoculation will be done 10 days after silking. The observation 'weight, moisture and disease) will be taken at harvest time.

Personnel:

1. Dr. Keshari L. Manandhar } Division of Plant Pathology.
2. Mrs. Gyanu Gurung. } Division of Plant Pathology.
3. Mr. Bimal Baaniya (Kakani Farm)

Project No. : 2040/2041 NMDP - 18

Division : Division of Plant Pathology

Project Title : Improvement of Population of high altitude maize.

Introduction:

Most of the improved varieties of maize are more susceptible to ear rot disease. Therefore, the improvement of maize population at high altitude areas should be screened in the artificially inoculated conditions. The different populations of Ganesh-2, Manakamana-1, Manakamana-2, Arun-4 at various locations will be inoculated with ear rot organism. Plant selection and ear selection will be done at the time of harvest.

Objective:

To determine the ear rot resistant families and plants, and to improve the population in general.

Location:

Kakani, Khumaltar, Lumle, Pakhribas and Kabhre.

Procedure:

The fusarium moniliforme is the casual organism for the important ear rot disease. The organism will be multiplied in sorghum, grain media. The inoculation will be done after silking (within 10 days) using syringe or other methods. The inoculum will be supplied by the Division of Plant Pathology at the above mentioned stations and if possible one pathologist will inoculate the organism. Of course, during plant and the ear selection, disease should be considered as an important factor.

Personnel:

Lumle - Mr. S.K. Sen

Pakhribas - Mr. Shrestha

Kakani - Mr. Bimal Baaniya

Kabhre - Mr. R.P. Upreti

Khumal - Dr. Keshari L. Manandhar and
Mrs. Gyanu Gurung.

Project No. : 2040/2041 NMDP - 19
Division : Plant Pathology
Project Title : Common Rust of maize

Introduction:

Common rust of maize has been reported since 1964-1965. The disease is spread throughout the country, however, it is more common in the mountains and valleys in the Kharib maize then is the summer crop of Terai and inner-Terai region. The incidence of rust is quite common in winter or spring maize at low altitude areas. The local variety of maize is very susceptible to common rust and the rust scoring usually appeared to be 3-4 scale (in 0-5 scale). Therefore, among the foliat disease common rust is the most important and if the infection starts early stage of the crop, the loss and the damage of the crop is quite high. Therefore, the information about the time of incidence of rust in the natural condition will be quite helpful.

1. Different dates of sowing maize trial
2. Selection and breeding for rust resistant

1. Different Date of Sowing Maize Trial:

Introduction:

The incidence of common rust varieties from low to high depending upon the weather conditions of the season. It has experienced that some year the disease incidence was very low and at other time it was very high. Therefore, it is essential to study the time of disease incidence and its spread and damage at natural condition. The temperature, relative humidity and rainfall should be related.

Objective:

To find out the time of high incidence of the disease by sowing maize at different dates.

Location: Khumaltar

Procedure:

The trial will be conducted with complete randomized block design. The varieties used in this trial will be Ganesh-2, Arun-2, Rampur Composite and Khumal Yellow. Four rows of each variety will be planted with four replications at six different dates starting from 1st Chaitra to the end of Jestha at an interval of 15 days the rust scoring will be done from time to time. The fertilizer will be applied 60:40:40 NPK kg/ha and ½ the dose of N will be used as top-dressing.

Personnel:

1. Dr. Keshari L. Manandhar
2. Mrs. Gyanu Gurung

2. Selection and Breeding for Rust Resistant:

Introduction:

The selection Khumal Yellow lines have been initiated since 1976 and the line 51b found to be completely free from rust. Similarly, there are few other lines which are free from rust but with dwarf and good agronomical characters. These lines will be further studied. Some of the crossed materials after silking found to be free from rust and should be put inot half sib families to improve further.

Objective:

To find out the rust resistant material of maize.

Location: Khumaltar

Procedure:

One row of double population density will be planted as male rows and three female rows will be planted in between male rows. All the female plants and the unwanted male plants will be detasselled. The plants will be selected at right time and the cob selection will be done during harvest.

Personnel:

1. Dr. Keshari L. Manandhar
2. Ms. Gyanu Gurung.

Project No. : 2040/2041 NMDP - 20
Division : Plant Pathology
Project Title : Northern Leaf Blight of Maize

1. Varietal Screening + Loss Assessment against Northern Leaf Blight of Maize during Winter Season.

Introduction:

Northern leaf blight of maize is caused by Trichometa sphaeria turcica lutt. (Helminthosporium turcicum pass). The disease is spread throughout the country, however, it is more common in the summer crop in the mountains and hills and in the winter crop of Terai and inner Terai regions. The incidence of this disease has been reported since 1964/1965 but the intensity of the disease has not been observed high in the Kharif as well as Rabi maize. Only sometime some of the maize varieties appeared to be susceptible to this disease. Hence the experiments on this aspect has not been conducted so far. At Khairenitar, the winter maize of 1982 was heavily infected with this leaf blight. Therefore a loss assessment and a varietal trial appeared to be essential to be conducted at Khairenitar.

Objective:

1. To find out the varietal susceptibility of this leaf blight.
2. To determine the losses caused by this disease.

Location: Khairenitar

Procedure:

Both the trials will be conducted with randomized block design with four replications. The fertilizer doses will be 60:40:40 NPK kg/ha and ½ the nitrogen doses will be used as top-dressing.

In the first experiment, about 12 varieties of maize will be used for the screening. The inoculation of the casual organism will be done at knee-high stage. The disease observation will be taken three times during the crop period.

In the second experiment, only four varieties of maize will be used and the treatments will be the (1) Dithane M-45 spray, (2) Helminthosporium turcicum inoculated, and (3) Control without spray and without inoculation. The losses will be due to the disease determined after harvest.

Experiment I

1. Rampur Composite
2. Manakamana - 1
3. Arun - 2
4. Janaki
5. Khumal Yellow
6. Rampur - 1
7. Kakani Yellow
8. Sarlahi Seto
9. Manakamana - 2
10. Ganesh - 2
11. Suwan - 1
12. Rampur - 2

Experiment II

1. Khumal Yellow
2. Rampur Composite
3. Arun - 2
4. Manakamana - 1

Personnel:

1. Dr. Keshari L. Manandhar
2. Ms. Gyanu Gurung
3. Mr. Karmacharya, Khairenitar Pl. Prot. Officer.

Project No. : 2040/2041 NMDP - 21

Project Title : Field Management Study on FYM/Compost.
I. Methods of Application.

Problem:

FYM is the main source of plant nutrients for maize crop, especially, in the hill lands of Nepal. But, due to the faulty management practices conventionally followed in its preparation, storage and application, the efficiency of so labourously prepared plant food source in increasing crop yield becomes highly deteriorated. This necessitates to assess the loss of plant nutrients from FYM in conventional management practices and measure its efficiency for recommending the nutrients preserving and efficiency increasing management technology to the farmers.

Objective:

1. To assess the efficiency of FYM/Compost under different method of application and climatic conditions.
2. To assess the nutrient losses from the FYM/compost under different management and climatic conditions.
3. To compare the effects of conventionally and scientifically prepared FYM/compost under varying climatic and field conditions.
4. To study the plant available nutrients from FYM/compost under different set of management practices.

Review of Past Works, If Any:

The use of organic manures mainly, cow-dung and FYM is prevalent among the farmers of Nepal since the time immemorial. But, the informations about the effect of management practices on the efficiency and quality of FYM/compost in increasing crop yield under varying agro-climatic condition of Nepal is not available. However, Salter and Schollenberger (1939), in Denmark, reported the relative effectiveness of manure in increasing crop yield when plowed under immediately, left in piles on the field for 2 and 14 days before plowing it under to be as 100%, 80% and 55% respectively. They also observed that the effectiveness of organic manure decreased with time when spread and left on the field.

Project Description:

Introduction:

The use of chemical fertilizers for growing maize crop is still scanty in Nepal. The reasons are so many high cost, low purchasing capacity, timely unavailability, transportation difficulty, etc. The farmers prepare FYM by composting the mixture of animal dungs, forest leaves and all other farm wastes. The quantity depending upon the number of cattle-heads and availability of animal breeding materials. The FYM thus prepared are applied to the field at or about a few days before sowing the conventional methods of FYM preparation, storage and application result in a heavy loss of nutrients from FYM and it becomes less efficient in increasing crop production. Since the increasing denudation of forest resources has adversely affected the availability of composting materials, any attempt to increase the efficiency of available FYM/compost will be of great significant.

Location:

It should be conducted in 3 representative climatic zones of Nepal.

1. Rampur Agriculture Station: Terai
2. Khumaltar: Mid hill
3. Lumle/Kabhre: High hill.

Duration: 2 years

Crops:

Maize + Finger millet

Variety:

Improved or local varieties popular to the locality. If possible only improved variety.

Materials and Methods:

Design: Split Plot

a) Quality of FYM/compost as main plot
b) Methods of application as sub-plots.

Replications: 3 (Three)

Plot Size: 5m X 3m (can be adjusted according to availability and nature of land)

Harvest 2 central rows of land (32 plants) by leaving 2 plants from both ends of each row)

Spacing:

Maize - 75cm X 25cm, row - row and plant-plant

Wheat - 25cm X 25cm, apart rows, continuous seeding

Tori - Uniform broadcasting

Finger-millet - Transplant 2 rows of finger millet in between the 2 rows of maize, 25 cm apart.

Seed Rate:

Maize - 20 kg/ha

Wheat -100 kg/ha

Tori - 12 kg/ha

Finger-millet - 5-7 kg/ha, transplant 1 seedling/hill.

Rate of FYM/ Compost : 20 tons/ha.

Treatment Combination

Main Treatments

A. FYM/compost prepared by improved technology

B. FYM/compost prepared by conventional practices

Sub-Treatments:

1. Manure spread and mixed with soil immediately
2. Manure kept in pile for 1 day before spreading and plowing
3. Manure kept in pile for 7 days before spreading and plowing
4. Manure kept in pile for 15 days before spreading and plowing
5. Manure spread and plowed under after one day
6. Manure spread and plowed under after 7 days
7. Manure spread and plowed under after 15 days
8. Manure spread as mulch after sowing.

Project Leader:

Division : NMDP

Cooperation:

Division of Soil Science

Kabhre Agriculture Farm

Research Staff:

Rampur: 1. Mr. S.P. Pandey, Assistant Soil Scientist

2. Mr. B.P. Sharma, Acting Chief Officer

Kabhre: 1. Mr. R.P. Upreti.

Layout Plan

Rep. I								Rep. II								Rep. III							
3	2	1	5	8	7	6	4	6	7	5	2	8	1	4	3	5	1	3	7	2	8	4	6
A								B								A							
2	7	6	1	3	5	4	8	8	5	1	3	7	6	2	4	8	6	3	1	2	4	5	7
B								A								B							

A = FYM/compost by improved method.

B = FYM/compost by local method

Sampling:

A. Soil Sample:

Take composite soil samples from each plot (48 plots = 48 samples) before and after conducting experiment. Label it properly and send about 1 kg of each sample to S.P. Pandey, Rampur Agriculture Station, Chitwan.

B. FYM/Compost Sample:

1. Take the decomposed FYM/compost sample from the mid depth of pit for improved as well as local source, before taking to the field. Seal them and label properly.

2. Take the compost/FYM sample from each sub-treatments just before mixing into the soil. Seal it an label properly.

C. Plant Sample:

Cut above ground whole plants from each plot after harvesting the grain chaff or cut into pieces (500 g.), dry and keep in paper or polyethene bags, with proper label.

D. Grain Sample:

Sample about 250 g. grain from each plot after recording the final weight. Dry well and store in paper or polyethene bag with proper label.

Managemenet of the Trial:

It is preferable that this trial will be grown under rainfed conditions. However, if irrigation is available, it may be given to save the trial from total loss. It is desired to follow all the cultural practices equally in all the treatments.

Suggested Field Data:

Plant Stand after Thinning:

Soon after thinning, record the number of plants in net harvest area.

Days to 50% Silking:

Record the number of days from germination to 50% of the plants in net harvest area are at anthesis.

Plant Height:

Record plant height (in cm) base of plant to the upper most mode.

Weight of the Grain:

In case of maize harvest the net area (4 X 155m^2), dehusk and weight the cobs (in kg.). Record moisture % at the time of weighing. If moisture tester is not available, dry the cobs uniformly in sun and record the cob weight.

In case of other crops, after harvesting thresh the grain, clean, dry and weight. Determine the moisture percent of grain if facility is available.

Location:

Initial content of different nutrient elements in FYM/compost.

Nutrients	FYM / Compost	
	Scientifically Prepared	Conventionally Prepared
N (%)		
P (%)		
K (%)		
Ca(%)		
Mg(%)		
S (%)		
Zn(ppm)		
Cu(ppm)		
Mn(ppm)		
Fe(ppm)		
B (ppm)		
Mp(ppm)		

Location:

Laboratory Analysis Work:

Initial content of different nutrient elements in the soil of experimental plot.

Initial

pH = Organic carbon (%)

CEC = m.e. / 100 g. soil

Available N (kg/ha) =

Available P (kg/ha) =

Exchangeable K (kg/ha) =

Exchangeable Ca (kg/ha) =

Exchangeable Mg (kg/ha) =

Sulphate S (kg/ha) =

DTPA-Extrac Zn (kg/ha) =

" " Cu (kg/ha) =

" " Fe (kg/ha) =

" " B (kg/ha) =

Hot water soluble B (kg/ha) =

Acid Extrac. Ho (kg/ha) =

Content of major nutrient elemnts in soil after harvest of main crop (Maize)

Nutrients	Treatments															
	A*								B							
	1	2	3	4	5	6	7	8	1	2	3	4	5	6	7	8
OC (%)																
Available N (kg/ha)																
Available P (kg/ha)																
Available K (kg/ha)																

Content of major nutrient elements in soil after harvest of second crop (Tori, Wheat or Finger millet).

OC (%)																
Available N (kg/ha)																
Available P (kg/ha)																
Available K (kg/ha)																
CEC (m.s./100 g.)																

* A = Scientifically prepared FYM source

B = Conventionally prepared FYM source.

<u>Loss of nutrients from FYM/Compost under different management practices</u>

Treatments	FYM/Compost					
	Scientifically Prepared			Conventionally Prepared		
	N	P	K	N	P	K
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						

Content of nutrient elements in tested plants (%)

Location:

Treatments	FYM/Compost (Scientifically Prepared)							
	Main Crop (Maize)				Second Crop ( )			
	N	P	K	Zn	N	P	K	Zn
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								
	FYM/Compost (Conventionally Prepared)							
1.								
2.								
3.								
4.								
5.								
6.								
7.								
8.								

General information:

1. Name of the person: _____
   Conducting trial & _____
   Designation _____

2. Location _____

3. Latitude _____; Longitude _____; Altitude _____

4. Monthly total rainfall (mm)

	Year
January	
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

Please begin recording monthly total rainfall and temperature from the month, the FYM/compost preparation started through the month harvest was done.

5. Monthly mean temperature (in centigrade)

Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.

6. Dates of cultural operation:

Planting : _____
Thinning : _____
Weeding : _____
Harvesting : _____

Field observation sheet:

Rep. --- --- --- --- --- ---

Plot No.	Treat-ment	Days to 50% Silking	Plant ht. cm.	Ear ht. cm.	Plant Stand	Total no. of ears	Field wt. kg.	Moisture %	Adjusted grain yield kg.

Project No. : 2040/2041 NMDP - 22

Identification of yield limiting nutrient elements in maize growing soils of Chitwan Valley.

Problem:

The maize plants, in Chitwan Valley, have been observed showing hunger signs, every year during summer season. The soil and plant analysis information reveals very low contents of a number of secondary as well as micro-nutrient elements, more acutely Zn and B. Whereas, the field experimental results, on the application of Zn as well as B were not found much encouraging. Therefore, a carefully planned field experiments are needed for diagnosis the growth limiting nutrient elements under the farmers' field conditions.

Objectives:

1. To identify the yield limiting nutrient elements in maize growing of Chitwan Valley, and
2. To compare the yield reduction due to non-application of one of the soil deficient nutrient element when all other limiting nutrients are adequately supplied.

Review of Past Works:

A wide occurrence of primary, secondary and micro-nutrient deficiency problems was recognized in the soils of Chitwan Valley (Khatri-Chhetri, 1982). Out of the samples taken for study, he observed that 36, 64, 100 and 83 percent soils were found very low to low in available P, K, B and Zn, respectively. The status available Ca and Mg were found to be medium in more than 70% soils. However, the field experimental results on the application of B as well as Zn were not found much encouraging (Khatri-Chhetri, 1982, Schmidt and Karna, 1977). Although an increase of 10-24 percent grain yield was obtained with 10-20 kg Zn SO4/ha (Prasad, 1978).

It is observed that most of the previous field experiments were conducted without considering the supply of other soil deficient nutrient elements which might be limiting the growth of plants in those soils.

Project description:

Introduction:

Cases of micro-nutrients dificiencies have been reported time and again in Chitwan soils. However, their applications to the ma. : crop has not been found much encouraging. The very low to low contents of secondary nutrients might be limiting the response to micro-nutrients application in Chitwan Valley soils.

Location:

NMDP

Test crop:

Maize

Variety:

Rampur Composite

Materials and Methods:

Design:

Randomized Complete Block Design

Replications:

3 in Rampur Agri. Station, non-replicated in farmers' field.

Plot Size:

8 rows of 5 metre length

Seed Rate:

20 kg/ha.

Fertilizer Application:

Apply ½ N and all other nutrient elements at basal by broadcasting and ½ N be dressed at knee-high stage of the crop.

Treatment Combinations (KG/HA):

Treatment No.	N	P	K	Mg	S	Zn	B	M
1.	100	20	40	30	30	10	2	0.5
2.	100	20	40	30	30	10	2	0.0
3.	100	20	40	30	30	10	0	0.5
4.	100	20	40	30	30	0	2	0.5
5.	100	20	40	30	0	10	2	0.5
6.	100	20	40	0	30	10	2	0.5
7.	100	20	40	0	0	0	0	0
8.	0	0	0	0	0	0	0	0

Lay-out

1--- 6m ---

5m	1	4	6	8	5	3	7	2
2m	5	6	8	4	2	3	7	1
	8	4	5	2	3	6	1	7

Space between the reps. 2 metre

Total land required = 50 X 20 m^2

= 1000 Square metres.

Project Leader:

National Maize Development Program

Cooperator:

Division of Soil Science and Agro-chemistry.

Research Personnels:

1. Mr. S.P. Pandey, Assistant Soil Botanist
2. Mr. D.D. Neupane, J.T.

Sampling:

A) Soil Sample: Each plot should be sampled separately before and after conductions of the experiment.

B) Plant Sample: Sample the above ground plant from each plot for the analysis.

Project No. : 2040/2041 NMDP - 23

Project Title : NPK Fertilizer Trial in Maize

Problem:

The response of improved maize to 45-90 kg/ha level of N application has been proved beneficial under normal weather conditions in most of the soils of Nepal. However, the response to P and K has been found site and soil specific, and whether or not, the application of P and K fertilizers would be economical, is still inconclusive.

Objectives:

1. To compare the yield response of maize due to NP, N, P, NK and NPK fertilizers.
2. To identify the interactions between NP, NK and NPK.
3. To identify yield limiting major nutrient elements for further study under farmers field condition.

Review of Past Works:

Deo and Chaudhary (1978) reviewed and reported the average return of maize grain per kg on N, P_2O_5 and K_2O to tange from 4.7-31.1, 2.6-16.1 and 1.3-7.0 kg with an overall average of 15.9, 6.2 and 3.4 kg respectively. They did not find any significant difference in N-utilization efficiency when N was applied alone, with P and PK under Rampur Khumaltar and Kakani soil conditions. Schmidt and Karna (1977) also noted no significant response to P and K application in Chitwan soils. They attributed it to high to medium content of P and K in their experimental sites.

However, fair to strong response to P in association with N was observed in Lele (lalitpur district), Khandbari (Sankhuwasabha district), and Ratna Nagar (Chitwan district) cropping systems sites (Cropping systems staff report, 1978 - 1983).

The above mentioned findings suggest us to be soil and site specific in recommending the P and K fertilizers for maize production in Nepal.

Project Description:

Introduction:

Fertilizer has become the costliest input for crop production. But, maize production in Nepal is mainly limited because of inadequate supply and use of fertilizers. The soils of Nepal are universally found to be deficient in N content whereas, P and K supply seems to be crop, soil and site specific. On the other hand, the maize production in Nepal is mostly dependent on rain water where the crop may suffer due to excess or stuss of soil moisture. Under these situations, the risk minimization is very important and the concept of balanced fertilizer use should not be over emphasized just to overcome the possible deficiency in the long run. Thus, the recommendation of P and K fertilizers should be made only to the area where the crop response would be beneficial.

Location:

Kabhre Agriculture Farm

Duration:

2 - 3 years,

Test Crop:

Maize

Variety:

Kakani Pahenlo (Yellow)

Materials and Methods:

Replications:

3 (Three)

Plot Size:

5m X 3m, 4 rows of 5 metre length (harvest only central 2 rows of 4m length)

Spacing:

75cm X 25cm (plant 3 kernels/hill and thin to one plant after 3 weeks).

Source of Fertilizer: N from urea and complesal

P from complesal (20 - 20 - 0)

K from M/P

Treatment Combination:

Treatment No.	N	P_2O_5	K_2O
01	0	0	0
02	50	0	0
03	50	0	40
04	50	50	0
05	50	50	40
06	100	0	0
07	100	0	40
08	100	50	0
09	100	50	40
10	50	0	0 + 5 ton FYM/ha

1——3m

5m

2m

6 (1)	4 (2)	1 (3)	2 (4)	10 (5)	8 (6)	9 (7)	7 (8)	3 (9)	5 (10)	I
5 (20)	9 (19)	7 (18)	4 (17)	8 (16)	10 (15)	3 (14)	6 (13)	2 (12)	1 (11)	II
9	3	2	5	7	10	4	8	1	6	III

Space between the reps. 2 metre

Experimental area = 30m X 20m

=600 square metres.

Project Leader:

National Maize Development Program

Cooperator:

Division of Soil Science and Agro-Chemistry.

Research Personnels:

1. Mr. S.P. Pandey, Assistant Soil Scientist, NMDP
2. Mr. H.M. Kalim, Assistant Agronomist, Kabhre Farm

Sample Collection:

a) Soil Sample:

Collect soil sample from each plot separately before and after conduction of the experiment. Label correctly, dry properly in shade and store in a proper place.

b) Plant Sample:

Sample the whole above ground plant, 3 from each plot remove only the kernels, dry, cut into pieces each part separately (Stalk + leaves cob and husk) label correctly and store in a safe place.

c) Grain Sample:

Sample about 250 g grain from each plot after, recording the final weight.

d) FYM Sample:

Sample about 200 g FYM from the bulk to be used for the experiment and send analysis in relied container.

Note: Please send all the samples to S.P. Pandey, Asstt. Soil Scientist, Rampur Agriculture Station, Rampur, Chitwan for the laboratory analysis.

Management of the Experiment:

It is preferable that the trial be conducted under rainfed condition. However, if irrigation is available, it may be given to save the trial from total loss. It is desired to follow all the cultural practices equally in all the treatments. Please keep the plots weed free throughout the season.

Manure and Fertilizer Application:

Apply all NP and K in treatment no. 2, 3, 4 and 5 and ½ N and all P and K in treatment no. 6, 7, 8 and 9 in bond as basal. Side-dress with ½ N in treatment no. 6, 7, 8 and 9 at knee-high stage. Apply FYM @5 tons/ha as basal in treatment no. 10 and side-dress with 50 kg/ha at knee-high stage of the crop.

Suggested Procedure for Taking Field Data:

Plant Stand:

Soon after thinning and at harvest area

Days to 50% Silking:

Record the number of days from germination to 50% the plants in net harvested area are at an thesis.

Plant Height:

Record the plant height (in cm) from the base of the plant to the upper most node.

Ear Height:

Record the height (in cm) from the base of the plant to the base of the first ear.

Weight of the Store:

Cut the above ground whole plants of the net harvest area and dry fro 3-4 days and weight along with the ears. Deduct the grain weight from the total weight and record the stores weight.

Grain Weight:

After recording the store + grain weight, take out the ears dehusk and shell the kernels. Record the weight of grain and adjust to 13% moisture content.

When the moisture meter is not available dry the grain in 4-5 sun and record the weight.

General Information:

1. Name of the person: _____
   Conducting trial and _____
   Designation _____

2. Location : _____

3. Latitude: _____; Longitude: _____; Altitude: _____

4. Monthly total rainfall (mm) during the trial period

   Year: _____

Month	Monthly mean	Temperature (°C)	Monthly rainfall(mm)

6. Date of planting: _____

7. Date of thinning: _____

8. Date of Weeding : _____

9. Date of Side-dressing: _____

10. Date of Harvesting: _____

Field Observation Sheet

Net Harvest Area Rep.

Plot No. Treatment Number	Days to 50% Silking	Plant ht. (cm) Ave. of 5 Plants	Ear ht. (cm) Ave. 5	Plant Stand	Total No. of ears.	Grain wt. at 23% Moist. (kg)	Store wt. dried (kg)

Estimated Expenditure (Recurring):

1. Fertilizers

   a. Urea = 3.179 kg

   b. Triple Superphosphate = 2.586 kg

   c. Muriate of Potash = 1.620 kg

2. Seeds = 6 kg

3. Ropes, pegs, tags, bags, etc.

4. Stationeries

5. Land preparation

6. Labours

7. Plant protection

8. Supervisions

9. Chemical and glass apparatus for soil and plant analysis

10. Miscellaneous.

Project No. : 2040/2041 NMDP - 24

Project Title : I - Field Management Study on FYM/Compost

II - Combinations of Organic Manure and Mineral Fertilizer.

Problem:

Among the plant nutrients, nitrogen has been observed limiting in our soils for increasing crop production. The hill farmers are using FYM/ compost in the range of 5 to 15 tons/ha per annum. These manures are of bulky nature and may supply about 5 kg N/ton when mineralized. This indicated that a huge quantity is required to replenish the crop removal. On the other hand, mineral fertilizers have become costly and is not produced in the country. This suggests to establish a proper combinations of organic manures and chemical fertilizers so that a maximum crop yield and fertilizer efficiency can be achieved.

Objectives:

1. To establish the proper rates and combinations of organic manure and chemical fertilizer for increasing crop yield.
2. To evaluate the efficiency of organic manure and chemical fertilizers when alone or in combination.

Review of Past Works, If Any:

Although some farmers are practising the combined use of organic manures and mineral fertilizers for growing maize crops, the information for prescribing the proper combination is scare. However, there is evidence that higher crop yields are obtained when organic manures are applied in combination with chemical fertilizers than when either one is applied alone.

Project Description:

Introduction:

At present the crop production in Nepal is mainly based upon 3 sources of plant nutrient supply viz: the inherent soil fertility, farm yard manure (FYM) and the imported chemical fertilizers.

The inherent soil fertility has been seriously depleted because of continuous crop removal through age old cultivation and heavy soil erosion. It is experienced that the quantity of organic manure addition is also decreasing partly because of decline of forest and pasture land for supporting the cattle and partly increasing dependency on chemical fertilizers. Although, the chemical fertilizer is increasingly finding its place in Nepalese Agriculture, it has become very costly. All these factors have lead to low productivity. Therefore, it has become very necessary to raise the productivity by using the available resources more efficiently.

Location:

Rampur Agriculture Station

Duration:

2-3 years in the same plot.

Test Crop:

Maize - Tori

Maize

Variety:

Improved variety popular to the location.

Materials and Methods:

Design:

Randomized Block Design.

Replication:

Plot Size:

5m X 3m (can be adjusted according to the availability and nature of land)

Planting Spacing:

As described in code no. experiment (method of application).

Seed Rate:

1. Maize: 20 kg/ha; 2. Tori: 12 kg/ha; 3. Wheat: 100 kg/ha;
4. Finger millet: 5-7 kg/ha.

Manure and Fertilizer Application:

Apply the FYM or compost one month prior to seeding, side-dressing should be made when the crop grows to knee-high stage. If no moisture in the soil, wait until it rains and soil comes to proper moisture condition. Hoeing should be done after side-dressing. The second crop should be grown without fertilization.

Treatment Combinations:

T_1 = Control (Natural fertility)
T_2 = FYM @ 5 tons/ha
T_3 = @ 5 tons/ha + 30 kg N/ha side-dressing
T_4 = FYM @ 5 tons/ha + 60 kg N/ha
T_5 = FYM @ 10 tons/ha
T_6 = FYM @ 10 tons/ha + 30 kg N/ha side-dressing
T_7 = FYM @ 15 tons/ha
T_8 = N:P:K: @ 60:30:20 kg/ha, respectively

Cooperator:

Division of Soil Science and Agriculture Chemistry, Khumaltar

Project Leader:

Rampur Agriculture Station

Research Personnels:

Mr. S.P. Pandey, Assistant Soil Scientist

Mr. D.D. Neupane, J.T.

Layout

I	(1) 1	(2) 4	(3) 6	(4) 8	(5) 5	(6) 3	(7) 7	(8) 2
II	(16) 5	(15) 6	(14) 3	(13) 4	(12) 1	(11) 2	(10) 7	(9) 8
III	(17) 3	(18) 4	(19) 6	(20) 2	(21) 5	(22) 1	(23) 7	(24) 8

18m

31m

Space between the plots - 1m, space between the replication - 1.50m

Plot size: 5m X 3m

Total land required: 31m X 18m = 558 square metres.

Sampling:

a) Soil Sample:

Each plot should be sampled separately before and after conducting the experiment. Store the sample in clean cloth or polyethene bags marked with correct labelling.

b) Plant Sample:

Sample the whole above ground plant remove only the grain from each plot separately and claff or cut into pieces dry and store in paper or polyethene bags with proper label.

c) Grain Sample:

Sample about 250 g grain from each plot after taking final weight. Keep it in paper bag with label.

d) FYM/Compost Sample:

Get the FYM or compost analyzed before adding into the soil if possible. If not, keep sample inside the polyethene bag.

Note: Please send all the samples to S.P. Pandey, Assistant Soil Scientist, Rampur Agriculture Station, Rampur, Chitwan.

Management of the Trial:

It is preferable that this trial be grown under rainfed conditions. However, if irrigation is available, it may be given to save the trial from total loss. It is desired to follow all the cultural practices equally in all the treatments.

General Information:

1. Name of the person : _____
   Conducting trial and _____
   Designation _____

2. Location : _____

3. Latitude: _____; Longitude: _____; Altitude: _____

4. Monthly total rainfall (mm) during the trial period.

Year	Monthly rain (mm)
Months	
_____	
_____	
_____	
_____	
_____	
_____	
_____	

5. Monthly mean temperature (°C)

_____

_____

_____

_____

_____

6. Date of planting _____

Date of thinning _____

Date of weeding _____

Date of side-dressing _____

Date of harvesting _____

Project No. : 2040/2041 NMDP - 25

Division : Maize

Section or Program : NMDP, Division of Botany.

Line Project Title : Study on the effect of polylined gunny sack of different gauge seed moisture content and storage condition on the germinability of maize seed.

Introduction:

Studies conducted at Rampur in 1977 - 1979 proved the superiority of polylined gunny sack over gunny sack alone. Use of thicker gauge of polyethylene lined gunny sack with realtion to different seed moisture content was initiated in 2037/2038 Bickram Sambat at Rampur, which will be continued.

Objective:

To determine the suitable polyethylene gunny sack and permissible moisture content of maize seed for a longer period of storage under ordinary storage condition at Rampur.

Plan of Work:

Fresh seeds from winter harvest will be sun-dried and brought at 10, 12, 12 and 13% moisture. Seeds of different moisture content will be packed in 200, 250, 300 and 350 polylined gunny sack. Each sack will contain 10 kg seed treated by bag sealer samples will be taken every month and moisture and germination will be recorded.

Estimated Duration:

1 - 2 years

Location:

Rampur Agriculture Station.

Cooperator:

Entomology Division, Plant Pathology Division and Division of Botany.

Project Leader:

Assistant Plant Pathologist, National Maize Development Program, Rampur.

Other Research Staff:

JT / JTAs, NMDP

Expenditure:

a) Labour	Rs. 300.00
b) Maize seed 400 kgs @ Rs.3/kg	Rs. 1200.00
c) Pesticide (Malathion thiside) Rs.36/-	Rs. 36.00
d) Polyethylene bags @ Rs.40/kg (13 kg)	Rs. 520.00
e) Gunny sack 40 pcs. @ Rs.10/pc	Rs. 700.00
f) Tin 16 pcs. @ Rs.20/tin	Rs. 320.00
g) Paper bag 400 pcs. @ 20Paisa/bag	Rs. 80.00
h) Miscellaneous	Rs. 100.00

i) Land required: Store Room (10' X 12').

Project No. : 2040/2041 NMDP - 26

Division : NMDP

Project Title : Farmers' Field Varietal Trial on Maize

Objectives:

1. To obtain comparative yield data and other informations concerning the performance of Kharif and winter season.
2. To enable farmers to become familiar with different varieties and to provide farmers with an opportunity to express their variety preference.

Plan of Work:

Design:

Randomized Block Design (RBD)

Replications:

Two (2)

Fertilization:

90:45:45 NPK kg/ha.

Plot Size:

5m X $3m^2$ (4 rows of 5m length) but harvest only control two rows).

Entries:

S. No.	Varieties
01.	Rampur Composite
02.	Manakamana - 1 / Rampur - 1
03.	Manakamana - 2 / Rampur - 2
04.	Ganesh - 2 / Poineer 6181
05.	Arun - 2 / Arun - 1
06.	Farmers' variety - 1
07.	Arun - 4

Observation:

01. Plant stand
02. Lodging
03. No. of ears at harvest
04. No. of diseased ears

05. Field weight
06. Moisture % age
07. Date of planting
08. Date of harvesting
09. Varietal choice by the farmers.

First ---------- Second

Estimated duration:

Continuous.

Locations*

Chitwan, Gorkha, Makwanpur, and Nawalparasi (4 trials in each location both in winter and summer)

Project Leader:

National Maize Development Program.

Cooperations:

All concerned ADO's and Projects

Expenditure:

a) Labour	Rs.	2000.00
b) Fertilizers	Rs.	400.00
c) Pesticides	Rs.	100.00
d) Seeds	Rs.	100.00

---

* Other locations included are in table no. 1.

Table No. 1:

	Summer		Winter	
	Varietal Trial No.	Management Trial No.	Varietal Trial No.	Management Trial No.
A. COMMAND AREAS				
01. Chitwan district	4	4	4	2
02. Makwanpur district	4	4	4	2
03. Gorkha district	4	4	4	2
04. Nawalparasi district	4	4	4	2
B. STATION, FARMS AND PROJECTS (NATION-WIDE PROGRAM)				
01. Pakhribas Agriculture Centre	1	2	-	-
02. Tarahara Agri. Station	1	-	2	-
03. Kabhre Agriculture Farm	1	2	-	-
04. IHDP, Dandapakhar	1	-	-	-
05. Khumal Agriculture Farm	2	-	-	-
06. Kakani Agriculture Farm	1	-	-	-
07. Parwanipur Agriculture Stn.	-	-	2	-
08. Bhairahwa Agri. Farm	-	-	2	-
09. Nepalgunj Agri. Station	1	-	2	-
10. Surkhet Agri. Farm	1	-	-	-
11. Doti Agri. Farm	1	-	-	-
12. Jumla Agri. Station	1	-	-	-
13. Agriculture Training Centre, Khairenitar	1	-	-	-
14. Lumle Agriculture Centre	1	-	-	-
15. Tinau Water-Shed Project	2	2	2	-
16. Hill Food Production Project	2	-	-	-
17. Hardinath Agri. Farm	-	-	1	-
Total:	33	22	27	8

Project No. : 2040/2041 NMDP - 27

Division : NMDP

Project Title : A) Management Trial on Maize,
B) Training and Extension Services,
C) Mini-seed multiplication program in hills.

Objectives:

1. To compare the different planting methods,
2. To find out the economical response of N application
3. To enable the farmers to observe and choose the suitable planting methods.

Treatments:

1. Farmer's method of planting + 45 kg N/ha side-dressing
2. Same as treatment 1 but no N
3. Behind the plough planting leaving every two alternate plough passage + 45 kg N/ha side-dressing
4. Same as treatment 3 but no N
5. Line showing (75 X 25 cms, spacing) + 45 kg N/ha side-dressing
6. Same as treatment 5 but no N.

Plan of Work:

Time of Side-dressing:

30 - 35 days from planting.

Method of Side-dressing:

Localized application

Variety:

Rampur Composite for all treatments
(Try to maintain equal amount of seed for each treatment)

Plot Size:

50 m^2 for each treatment
(This may vary from place to place.)

Observation:

1. Plot size for each treatment
2. Date of showing
3. Cooperator _____; Address _____
4. Plant stand at harvest
5. Lodging:
   a) Root
   b) Stalk
6. No. of ear harvested
7. No. of diseased ears
8. Field weight (kg)
9. Moisture %
10. Estimation of FYM/compost used by the farmers in this trial plot
11. Date of harvest
12. Remarks by the farmers
    1.
    2.
    3.

Locations:

		Summer	Winter
1. Chitwan	-	4	2
2. Makwanpur	-	4	2
3. Gorkha	-	4	2
4. Nawalparasi	-	4	2

Estimated Duration:

Continuous.

Expenditure:

a) Labour	Rs.	1000.00
b) Fertilizer	Rs.	400.00
c) Pesticides	Rs.	100.00
d) Seeds	Rs.	150.00
e) Miscellaneous	Rs.	100.00

b) Training and Extension Services:

1. Training:

The farmers' training will be conducted at districts or sub-centre level.

2. Participation at Exhibition/Fare:

NMDP will participate in districts level exhibition/fare but ADO has to be pre-informed about the location and date of the fare.

3. Diamond Demonstration:

Five sets of demonstration in each district will be provided JT/JTA should conduct the above demonstrations.

Treatments:

1. Farmers' variety + Farmers' practice
2. Farmers variety + Improved practice
3. Improved variety + Farmers' practice
4. Improved variety + Improved practice

Note: Improved practice = 45 kg N/ha, side-dressing at knee-high stage.
Improved variety = Rampur Composite
Planting method is as farmers' practice.

4. Participation at ADO Staff Meeting:

NMDP staff will participate in the meeting to discuss program to gather information and to provide technical service.

5. Minikit Distribution:

Minikit will be distributed to all districts.

6. Minikit Supervision:

Minikits that are distributed in the districts will be supervised by production agronomists. This will be at least 60% for the command areas.

7. Mini-seed Multiplication Program:

This program will be conducted in coordination with ADO in the hilly districts. NMDP will provide the foundation seed and ADO will provide fertilizers, insecticides and metal bins to store the produced seed.

The seed produced will be diffused among farmers, the fertilizer rate for seed multiplication program will be 60:30:0 NPK kg/ha.

c) Mini-Seed Multiplication (Maize) Program in Hills:

Though seed multiplication in the farmers' field and its collection and distribution is done by AIC, sometimes it becomes difficult on the part of AIC to take the seed to the hills for timely distribution. It is anticipated that mini-seed multiplication will ease seed situation in hills and help the farmers get the seeds in time. This may reduce the burden on the transportation subsidy also.

Mini-seed multiplication program will be conducted in Dhading, Lamjung, Syangja, Gorkha and Baglung districts in 5 ha. each during 1983/1984. This program will be conducted in collaboration with the ADO.

The ADO will (on payment) the required amount of foundation seed to ADO. The ADO will provide seed, fertilizer and insecticide. The seed, thus, produced and collected will be deffused among the farmers either, by sale or barter. The fertilizer dose recommended for such multiplication is 60:30:0 kg NPK/ha.

To make this program successful, the ADO must select the farmers from a proper location and make an agreement with the farmers concerned that they would store the seed produced in their fields and distribute at least 70% seed under the guidance of the ADO on cash payment or barter system. The ADO must see that the farmers get required seed, fertilizer and insecticide free and metal bins through credit.

If such program is agreed upon, NMDP will provide the required amounts of foundation seed to the ADO, provide all the technical help and supervise the seed multiplication fields.

Project No. : 2040/2041 NMDP - 28
Division : Maize
Project Title : Production Program of Maize

NMDP has been entrusted with the responsibility of increasing maize and finger millet production of Nepal. To achieve this goal, several out-reach activities are going and will continue during 1983/1984 also. In collaboration with the ADO, AIC and ADB, production programs for different districts have been formulated.

Special Programs:

Maize presently plays a less significant role in agriculture of the Terai, but it is showing considerable potential in winter and spring season under irrigation. Spring cultivation in mid hills is also becoming popular. Such area under maize has been designated as special program area and it is anticipated that 3 T/ha will be obtained from such area during 1983/1984. It is estimated that only 75% of the total requirement of the inputs and the credit will be required for such area. The input and credit requirement/ha will be as follows:

	N	P	K (kg)	Credit
Hill	60	30	30	75% of the cost
Terai	90	45	45	- ditto -

Seed requirement will be 20 kg/ha.

Pocket Program:

Pocket program will be launched in areas that are easily accessible and have some potential for higher production. It is expected that though adoption of the improved technology, yield would be maintained at 2 T/ha during 1983/1984. It is expected that Pocket Program will need 43:20 kg N and P, 20 kg seed/ha and 50% of the cost of inputs as production loan respectively.

General Program:

The other area having some potential has been designated as general program area. It is planned that 10% of such area only will be supplied with inputs (23 kg N and 20 kg seed/ha.). In such area, through rapid spread of improved varieties from farmer to farmer and a limited spread of a modest level of

improved cultural practices and some fertilizer, the yield is expected to be 1.8 t/ha during 1983/1984.

Rest of the area under maize is expected to maintain a yield level of 1.6 t/ha.

District-wise distribution of special, pocket and general program area is presented in Table 2.

Table No. 2: District-wise Production Program, 1983/84 (2040/41)

(Area in ha.)

Region	District	Special	Pocket	General
Eastern Development Region	01. Taplejung	-	8	396
	02. Jhapa	333	1165	703
	03. Sankhuwasabha	-	16	321
	04. Terahthum	-	24	1888
	05. Panchthar	-	24	1795
	06. Udaypur	1086	15	332
	07. Okhaldhunga	-	12	1813
	08. Solukhumboo	-	-	108
	09. Sunsari	176	335	2315
	10. Ilam	-	80	1097
	11. Siraha	160	201	1007
	12. Morang	531	60	4243
	13. Saptari	-	129	340
	14. Bhojpur	-	12	761
	15. Khotang	-	-	561
	16. Dhanluta	91	1079	2340
	Total :	2377	3145	20020

Contd.../...

	01.	Chitwan	2392	1562	-
	02.	Bara	3364	-	760
	03.	Parsa	2263	-	550
	04.	Makwanpur	721	608	9180
	05.	Nuwakot	28	30	5087
	06.	Rautahat	1274	-	305
	07.	Dhading	52	45	4623
Central Deve-	08.	Dhanusha	213	341	2400
	09.	Mahottari	598	268	5528
lopment Region	10.	Sarlahi	616	515	-
	11.	Sindhuli	-	39	6775
	12.	Lalitpur	-	21	1680
	13.	Bhaktapur	-	6	1500
	14.	Kathmandu	-	22	2619
	15.	Kavrepalnchowk	-	24	5367
	16.	Sindhupalchowk	-	22	3804
	17.	Rasuwa	-	18	797
	18.	Ramechhap	-	30	1170
	19.	Dolkha	-	91	447
		T o t a l :	11521	3642	52592
	01.	Gulmi	76	22	1451
	02.	Manang	-	2	24
	03.	Parbat	-	18	1930
	04.	Gorkha	14	38	2354
Western Deve-	05.	Myagdi	-	11	1296
	06.	Kapilvastu	118	275	83
lopment Region	07.	Kaski	138	6	2030
	08.	Nawalparasi	1470	258	4731
	09.	Arghakhanchi	-	7	543
	10.	Baglung	-	5	2281
	11.	Rupandehi	102	379	2425
	12.	Syangja	54	29	3095

Contd.../...

	13. Palpa	-	220	6373
	14. Tanahu	57	31	2574
	15. Lamjung	25	38	2148
	16. Mustang	-	-	-
	Total :	2054	1331	33338
Mid-Western Development Region	01. Bankey	30	484	3996
	02. Bardiya	67	644	3230
	03. Dang	137	197	5154
	04. Salyan	-	9	293
	05. Pyuthan	-	57	1639
	06. Rukum	-	28	460
	07. Rolpa	-	14	806
	08. Jajarkot	-	13	330
	09. Kalikot	-	-	105
	10. Surkhet	27	72	1236
	11. Dailekh	-	27	774
	12. Humla	-	-	64
	13 Jumla	-	-	229
	14. Mugu	-	4	65
	15. Dolpa	-	7	118
	Total :	261	1556	18505
Far-Western Development Region	01. Kailali	-	158	6248
	02. Bajhang	-	25	364
	03. Kanchanpur	104	197	3913
	04. Baitadi	-	22	847
	05. Doti	-	38	1054
	06. Darchula	-	-	370
	07. Dadeldhura	-	15	476
	08. Bajura	-	6	105
	09. Achham	-	13	236
	Total :	104	474	13613
National Total :		16317	10148	138068

Project No. : 2040/2041 NMDP - 29

Division : Maize

Section or Program : NMDP

Line Project Title : Minikit Demonstration

Description of Work :

A. Origin and Brief History:

The minikit program from NMDP was started in 2035 and a large number of minikits were distributed to various districts of the country. Since, Nepal has different type of climate and environment, so the maize growing season also various accordingly. With this view minikit covers summer, winter and spring season minikits.

B. Objectives:

To help the farmers to be acquainted with improved practices and varieties.

To cover large number of Panchayats and farmers mainly of remote pasrts of the different districts and to disseminate the seeds in shortest possible time.

C. Plan of Work:

Since maize is grown in three different seasons the plan of work to distribute minikits to various districts is accordingly.

1. Monsoon Minikit:

Area: 500 m^2 each set of minikit

Seed Rate: 1 kg each set of minikit

Fertilizer Dose: 45:0:0 kg NPK/ha.

Urea 5 kg each set of minikit side

Insecticide: Sevin grannule 300 g. each set of minikit, whorl application only for proper control.

Booklet: A guide book of planting maize

Feed-Back Form: Collection of farmers interest to NMDP

2. Winter Minikit:

Area: 100 m^2 each

Seed Rate: 2 kg each set of minikit.

Fertilizer Dose: 90:40:45 NPK kg/ha.
50% N all P_2O_5 and K_2O applied at planting basal.
Rest of N at knee-high stage as top-dressing.

Booklet: 1 copy

Feed-Back Form: 1 copy.

3. Spring Minikit:

Area: 500 m^2 each set of minikit

Seed Rate: 1 kg each set of minikit

Fertilizer Dose: 60:30:0 NPK kg/ha application same as winter.

Booklet: 1 copy

Feed-Back Form : 1 copy

Working Procedure:

Seed is treated with fungicide and insecticide to protect against diseases and insects, in a seed drum. Different quantity of seed, fertilizer and Sevin grannules are packed in a different size of plastic bags.

Seed packets and booklets are again packed in other plastic bag. Sometime fertilizer packets have also double plastic bags.

All the above materials are packed in one cloth bag that is called one set of minikit.

Monsoon minikit sets supplied mostly in hilly districts almost in the month of January and February, where the fertilizer and insecticide are difficult to get.

In winter and spring minikits only seed is applied mostly to Terai districts where the other inputs are easily available. District ADO offices provide fertilizers and insecticide to farmers. After receiving the bill of the inputs money is paid back to the District office of involved agencies from NMDP (Minikit Program).

Transportation:

Monsoon and spring minikits are sent to the district headquarter of regional head-quarter hiring truck by NMDP

Winter Minikit:

These are mostly distributed in Terai districts are transported by official vehicle or transportation by bus, depending upon availability of the transportation means.

D. Estimated Duration of Year:

Continuous.

Location:

1. Summer: 36 districts; 2. Winter: 17 districts, and
3. Spring: 16 districts.

Cooperation:

Free distribution of minikits among the farmers through the cooperation of Agriculture District Officers (ADO), JT and JTAs.

Project Leader:

National Maize Development Program, Rampur.

Other Research Staff:

Assistant Agronomist and Assistant Production Agronomist, NMDP

E. Expenditure:

Each set of minikit requires following materials and expenditure: It varies according to the season.

1. Monsoon Minikits:

Area: 500 m^2

Fertilizer Dose: 45:0:0 NPK kg/ha.

Materials Requirement:

Urea 5 kg	Rs. 15.75
Seed 1 kg	Rs. 4.50
Insecticide (Sevin Gr.) 300 Gr.	Rs. 3.60
Cloth and printing	Rs. 9.00
Plastic bags 10 pieces	Rs. 6.00
Labour charges	Rs. 10.00
Transportation	Rs. 10.00
Booklet	Rs. 1.50
Feed-Back form	Rs. 0.50
Total :	Rs. 62.85.

2. Winter Minikits:

Area: 100 m^2

Fertilizer Dose: 90:45:45 NPK kg/ha.

Materials Requirement:

Compound fertilizer	Rs. 82.20
Urea kg.	Rs. 31.50
Seed 2 kgs	Rs. 9.00
Plastic bags 5 pieces	Rs. 2.50
Insecticide 1 kg.	Rs. 12.00
Labour charge	Rs. 6.50
Transportation	Rs. 4.00
Booklet 1 copy	Rs. 1.50
Feed-back form	Rs. 0.50
	Rs. 149.70

Spring Minikits:

Area: 50 m^2

Fertilizer Dose: 60:30:0 NPK/kg/ha.

Materials Requirement:

Complex 7.5 kgs	Rs. 22.05
Urea 3.5 kg	Rs. 12.00
Seed 1 kg	Rs. 4.05
Insecticide 300 gr.	Rs. 5.00
Plastic bag 4 pieces	Rs. 1.05
Labour charge	Rs. 6.05
Booklet 1 copy	Rs. 1.05
Feed-back form 1 copy	Rs. 0.05
Transportation	Rs. 5.00
Total:	Rs. 59.00

Note: Distribution of Minikits is given in Table 3.

Table No. 3: Distribution of Minikits

Districts	No. of Maize Minikits				No. of F. millet minikits	Remarks
	Monsoon		Winter	Spring		
	Training	Monsoon				
EASTERN REGION						
01. Dhankuta		150	-	-	60	
02. Ilam		150	-	-	50	
03. Bhojpur		150	-	-	-	
04. Udaypur		150	-	-	-	
05. Okhaldhunga		150	-	-	-	
06. Jhapa		100	-	-	-	
07. Morang		-	100	-	-	
08. Sunsari		-	100	25	-	
09. Siraha		-	100	25	100	
Total:		850	300	50	260	
CENTRAL REGION						
01. Sindhuli		150	-	25	50	
02. Ramechhap		150	-	25	-	
03. Kabhre		150	-	25	50	
04. Dhading		150	100	25	50	
05. Nuwakot		100	-	20	50	
06. Dolkha		100	-	-	50	
07. Sindhupalchowk		150	-	-	50	
08. Sarlahi		100	120	-	-	
09. Makwanpur	100	200	205	25	100	
10. Rautahat		100	-	-	-	
11. Dhanusha		-	120	25	-	
12. Mahottari		-	120	-	-	
13. Chitwan	100	250	205	50	100	
14. Rasuwa		-	-	-	30	
Total:	200	1600	870	220	530	

Contd.../...

Contd... Table No. 3....

WESTERN REGION					
01. Tanahu		200	150	20	50
02. Gorkha	100	250	150	15	100
03. Lamjung		150	75	-	50
04. Kaski		100	100	15	50
05. Syangja		200	100	-	50
06. Baglung		150	-	-	30
07. Gulmi		100	-	-	30
08. Arghakhanchi		100	-	-	30
09. Palpa		150	-	-	50
10. Parbat		50	-	-	30
11. Nawalparasi	100	200	205	20	-
12. Rupandehi		200	50	15	-
13. Kapilvastu		100	-	-	-
Total:	200	1800	820	85	470
MID & FAR-WESTERN REGIONS					
01. Salyan		150	-	-	50
02. Pyuthan		150	-	-	50
03. Surkhet		150	-		-
04. Dang		150	-	25	50
05. Bankey		150	-	-	-
06. Bardiya		150	-	-	-
07. Kailali		100	-	-	-
08. Kanchanpur		100	-	20	-
09. Dadeldhura		100	-	-	50
10. Doti		100	-	-	50
Total :		1300	-	45	250
A. EASTERN REGION:		850	300	50	260
B. CENTRAL REGION:	200	1600	870	220	530
C. WESTERN REGION:	200	1800	830	105	470
GRAND TOTAL:	400	5550	2000	400	1500

Maize and Millet Seed Multiplication Program At Different Farms and Stations 2040/41 (1983/84)

Sl. No.	Farms/Stations	Foundation Seed (MT)	Improved Seed (MT)	Seed Source
01.	Kankai			
	Rampur Yellow	-	10.00	Tarahara
	Dalle-1 (Millet)	-	0.10	Rampur
02.	Tarahara			
	Rampur Yellow	2.0	8.00	Tarahara
03.	Hardinath			
	Sarlahi Seto	2.0	10.00	Hardinath
04.	Oilseed Program			
	Rampur Composite	1.0	5.00	Rampur
05.	Kabhre			
	Kakani Yellow	0.5	6.00	Kabhre
06.	Agriculture Botany Division			
	Khumal Yellow	0.5	-	Khumaltar
07.	Agronomy Division			
	Dalle-1	-	0.20	Rampur
08.	Kakani			
	Kakani Yellow	0.5	3.50	Kakani
	Okhale-1 (Millet)	-	0.10	Rampur
09.	Rampur			
	Rampur Composite	4.0	10.00	Rampur
	Khumal Yellow	4.0	10.00	Rampur
	Arun-2	3.0	10.00	Rampur
	Dalle-1	-	1.00	Rampur

Contd.../...

10.	Khairenitar			
	Khumal Yellow	2.0	10.00	Khairenitar
	Dalle-1	-	0.20	Rampur
11.	Surkhet			
	Sarlahi Seto	-	5.00	Surkhet
	Arun	-	1.00	Surkhet
12.	Doti			
	Khumal Yellow	-	1.00	Rampur
	Dalle-1	-	0.075	Rampur
13.	Jumla			
	Khumal Yellow	-	0.60	Rampur
14.	Lumle			
	Dalle-1	-	0.10	Rampur
	Okhale-1	-	0.10	Rampur
15.	Bhairahwa			
	Rampur Composite	-	2.00	Rampur
16.	Nepalguni			
	Rampur Composite	-	2.00	Rampur
17.	Pakhribas			
	Dalle-1	-	0.15	Rampur
	Okhale-1	-	0.15	Rampur

Note:

1. Approximately 2550 kg of millet seed will be produced in different farms/stations which will cover about 255 ha of land.
2. About 400-500 ha is estimated to be covered by improved seed by diffusion from farmers to farmers.

Maize Seed Multiplication Program in Farmer's Field, 2040/41 (1983/1984)

Sl. No.	Districts	Season	Khumal Yellow	Rampur Comp.	Arun	Rampur Yellow	Kakani Yellow	Sarlahi Seto	Foundation Seed Source
01.	Morang	Winter	-	75	-	-	-	-	National Maize Development Program
02.	Chitwan	Winter+ Spring	100	-	75	-	-	-	
03.	Bara	Winter	100	100	-	-	-	-	
04.	Parsa	Winter	50	-	-	-	-	-	
05.	Dhanusha	Winter	-	-	-	50	-	-	
06.	Mahottari	Winter	-	-	-	-	-	30	
07.	Nawalparasi	Winter	-	25	-	-	-	-	
	Total :		250	200	75	50	-	30	

Project No. : 2040/2041 NMDP - 30

Division : Finger Millet

Section of Program : National Maize Development Program

Line Project Title : Initial Evaluation Trial

Description of Works:

A. Origin and Brief History:

The new germplasm accession are not necessarily good. For this reason, they need to be evaluated constantly and properly for agronomic trials, disease resistant, early maturing and their adaptability in the various agro-climatic conditions. Of them, only a few superior materials will be preserved for further investigation.

B. Objective:

To evaluate the promising lines for larger plot trials.

C. Plan of Work: Design: RBD; Replications: 4; Plot Size 1.5 m^2 (5 rows, 15 metre long; Row spacing: 20cm and Plant spacing 10cm.)

Fertilizers : 40:40:20 NPK kg/ha (Treatments - 19).

D. Estimated Duration: Continuous.

Location:

Rampur, Jumla, Sindhuli Farm and Agronomy Division.

Cooperation:

Rampur, Jumla and Sindhuli Farm and Agronomy Division.

Other Leader:

National Maize Development Program, Rampur.

Other Research Staff:

Concerning Assistant Agronomists of the different Farms/Stations.

Items of Expenditure:

1. Seed	Rs. 1.25
2. Fertilizers	Rs. 13.10
3. Insecticides and Pesticides	Rs. 11.00
4. Labour	Rs. 200.00
Total:	Rs. 225.35

Project No. : 2040/2041 NMDP - 31

Division : Finger Millet

Section and Program : NMDP

Line Project Title : Advanced Varietal Trials

Description of Work:

A. Origin and Brief History:

In the beginning, finger millet development program was started under Agronomy Division in 1973/1974. Collection of local germplasm selection work of these were done. In the mean time, selection work of these lines were carried out and tested in different hilly as well as the inner Terai regions. And consequently, in 1978/1979 some finger millet varieties such as Okhale-1 and Dalle-1 had been released for general cultivation to hilly, inner Terai and Terai regions.

B. Objective:

The central theme behind this is to identify and select early maturing, disease resistant, high yielding varieties adaptable to different agro-climatic conditions.

C. Plan of Work:

Design: RBD; Rep. 4; Plot size: $50m^2$ (Variable 8 rows, 4.5m long, Row spacing 20cm and Plant spacing 10cm)

Fertilizer: 40:40:20 NPK kg/ha; Treatment - 9

D. Estimated Duration: Continuous.

Location: Rampur, Lumle, Pakhribas and Khumaltar

Cooperations: Rampur, Lumle, Pakhribas and Khumal Farm/Stations, and Division of Plant Pathology.

Project Leader: National Maize Development Program

Other Research Staff:

Concerning Assistant Agronomists of the different Farms/Stations.

E. Items of Expenditure:

1. Seed	Rs. 2.00
2. Fertilizer	Rs. 30.00
3. Insecticide and Pesticides	Rs. 15.00
4. Labour	Rs. 250.00
Total:	Rs. 297.00

Project No. : 2040/2041 NMDP - 32

Division : Finger Millet

Section or Program : NMDP

Line Project Title : Fertilizer Trial on Finger Millet.

Description of Works:

A. Origin and Brief History:

Fertilizer trial in the finger millet crop was initiated for the first time under the direct supervision of the Soil Science Division and Agronomy Division in 1978/1979 at Khumaltar Farm. The recommended dose of the chemical fertilizer for the general cultivation of the finger millet crop was 40:40:20 NPK kg/ha.

B. Objective:

To find out the optimum level of NPK for the various agro-climatic conditions for the recommended varieties in order to maximize the yield.

C. Plan of Work:

Design: Split; Reps.: 4; Plot size: 15 m^2 (3 X 5cm)

Fertilizer: 40:40:20 NPK kg/ha; Treatments, Main treatment variety 2 and Sub-treatment fertilizer - 4.

D. Estimated Duration:

Three years.

E. Location: Rampur and Khumal

Cooperation: Rampur, Khumal Farm and Division of Soil Science.

Project Leader: National Maize Development Program.

Other Research Staff: Concerning Assistant Agronomists of different Farms/Stations.

Items of Expenditure:

1. Seed	Rs. 2.25
2. Fertilizer	Rs. 40.00
3. Insecticides and Pesticides	Rs. 20.00
4. Labour	Rs. 350.00
Total :	Rs. 412.25

Project No. : 2040/2041 NMDP - 33

Division: : Finger Millet

Section or Program : NMDP

Line Project Title : Different Dates of Transplanting.

Description of Works:

A. Origin and Brief History:

The released varieties of finger millet were tested in collaboration with Division of Agronomy and NMDP in 1979/1980.

B. Objective:

To find out the optimum date of finger millet by transplanting at Chitwan condition having transplanted 25 days old seedlings at the interval of 15 days.

C. Plan of Work:

RBD; Rep.: 4; Treatments 6 and dates of transplanting at the interval of 15 days.

Plot size: (5m X 4m) = $20m^2$.

D. Estimated Duration:

Three years.

Location: Rampur

Cooperation: Rampur Agriculture Station

Project Leader: National Maize Development Program

Other Research Staff:

Concerning Agronomists and Technical Assistants.

E. Expenditures:

1. Seed	Rs. 3.00
2. Fertilizer	Rs. 37.00
3. Insecticides and Pesticides	Rs. 22.00
4. Labour	Rs. 400.00
Total :	Rs. 462.00

Project No. : 2040/2041 NMDP - 34

Division : Finger Millet

Section or Program : NMDP

Line Project Title : Introduction Line

Description of Works:

A. Origin and Brief History:

The Millet Development Program work for the first time, was initiated at Khumal farm by the Agronomy Division by introducing some indigeneous lines. Furthermore, all these lines were collected from the various parts of the kingdom. An effort is also being made from the constantly to collect other new more exotic as well as the indigeneous lines with a view to gather more informations for their further study.

B. Objective:

To identify the new promising lines for their different kinds of large scale trials for further investigation purposes.

C. Plan of Work:

To multiply their seeds (1 metre length and 60cm width with the individual plot size, row to row spacing 20 cm, plant to plant spacing 10 cm, the distance between the 2 varieties will be about 30cm. Total area required: 315 square metres.

D. Fertilizer: 40:40:20 NPK kg/ha.

E. Estimated Duration: Continuous.

Location: Rampur

Cooperation: Rampur Agri. Station and Division of Plant Pathology.

Project Leader: National Maize Development Program

Other Research Staff: Concerning Agronomists and Asstt. Agronomists of the Stations.

F. Expenditures:

1. Seed	Rs. 2.00
2. Fertilizer	Rs. 26.00
3. Insecticides and Pesticides	Rs. 16.00
4. Labour	Rs. 250.00
Total:	Rs. 294.00

Project No. : 2040/2041 NMDP - 35

Division : Finger Millet

Section or Program : NMDP

Line Project Title : Finger Millet Seed Multiplication, Sorghum and Pearl Millet Germplasm and Minikits.

A. Seed Multiplication Program:

About 1 ha of land will be covered by the seed multiplication program of finger millet for the fiscal year 2041/41.

B. With respect to new finger millet germplasms, efforts will be continued to collect new land races from the different parts of the kingdom and foreign countries. And finally these new lines will be introduced at the Agriculture Station, Rampur to take into account of their further investigation purposes.

C. Out-reach Program of Finger Millets:

This program seems to be quite effective and encouraging too with a view to diffuse the ides of an improved variety of seeds among the common farmers. In order to gain some momentum in relation to this program about 200 finger millet minikit packets will be distributed in the various districts of the kingdom.

D. As regards to the sorghum germplasms collection of new lines will be continues as much as possible from the internal and external sources without failure. And furthermore, these new lines will be tested at this Station for their further study purposes.

E. Items of Expenditure:

1. Seed	Rs. 16.00
2. Fertilizers	Rs. 1084.00
3. Insecticides and Pesticides	Rs. 200.00
4. Labour	Rs. 1100.00
Total:	Rs. 2400.00

Project No. : 2040/2041 NMDP - 36

Division : Sorghum

Section or Program : NMDP

Line Project Title : Sorghum Varietal Trial.

Description of Works:

A. Origin and Brief History:

Since last two years, sorghum development program has been undertaken under the direct supervision of National Maize Development Program, Rampur. Collection of local germplasm from the various parts of the kingdom was initially needed. It is for this, some indigeneous as well as the exotic materials as regards to sorghum crop were collected in order to study their different characteristics. Out of many 12-15 superior and promising lines have been selected for this above told experiment.

B. Objective:

The main theme is to identify and select early maturing, disease resistant, and high yielding varieties easily adaptable to various agro-climatic conditions.

C. Plan of Work:

Design: RBD; Reps.: 4; Plot size: $12m^2$; Plant to plant spacing 25 cm; Total area required: 893 sq. m.

D. Estimated Duration:

Continuous.

Locations: Rampur, Nepalgunj, Nawalpur Oil Seed Program and Division of Plant Pathology.

Project Leader: National Maize Development Program.

Other Research Staff: Concerning Asstt. Agronomists of the different Farms/Stations.

E. Items of Expenditure:

1. Seed	Rs. 5.00
2. Fertilizers	Rs. 141.00
3. Insecticides and Pesticides	Rs. 20.00
4. Labour	Rs. 1100.00
Total:	Rs. 1266.00

Project No. : 2040/2041 NMDP - 37

Division : Sorghum

Section or Program : NMDP

Line Project Title : Introduction Line.

Description of Works:

A. Origin and Brief History:

The Sorghum Development Program for the first time initiated at Rampur, by the National Maize Development Program by introducing some indigenous and exotic lines. All these indigenous line were collected from the different districts, with personal contact. An effort is being made constantly with exotic lines from the different parts of the kingdom and foreign abroad in order to carry on their further study.

B. Objective:

To identify the new superior and promising lines for their various kinds of large scale trials keeping in view of their further investigation purposes.

C. Plan of Work:

To multiply their seeds (3 metre length and 2 metre width will be individual plot size, row to row spacing 50 cm plant to plant spacing 25 cm). Total area required: 2235 square metres.

Fertilizer: 100:60:40 NPK kg/ha.

Estimated Duration:

Continuous.

Location: Rampur

Cooperations: Rampur Agri. Station & Division of Plant Pathology.

Project Leader: National Maize Development Program.

Other Research Staff: Concerning Agronomists & JT of the Station.

E. Items of Expenditure:

1. Seed	Rs. 7.00
2. Fertilizers	Rs. 343.00
3. Insecticides and Pesticides	Rs. 60.00
4. Labour	Rs. 800.00
Total:	Rs. 1210.00

Project No. : 2040/2041 NMDP - 38
Division : Pearl Millet
Section or Program : NMDP
Line Project Title : Introduction Line

Description of Works:

A. Origin and Brief History:

This pearl millet crop is a minor millet crop in Nepal. Since last two years this crop has been included in the millet development program with a view to make their feasibility study for its general cultivation and the increasing the yield. Some initial work has already been started by introducing indigenous and exotic lines at Rampur. These lines have been collected from the various parts of the kingdom and foreign countries also. To make this program fruitful, an effort has been made to collect as much lines as possible for their further study.

B. Objective:

To identify the new superior and promising lines for their large scale trials and further study purposes.

C. Plan of Work:

To multiply their seeds (1.5m width and 2m length will be individual plot size), row to row spacing 50cm, plant to plant spacing 15cm)
Total area required: 147 square metres.
Fertilizer: 60:40:20 kg NPK/ha.

D. Estimated Duration: Continuous.
Cooperations: Rampur Agri. Station and Division of Plant Pathology.
Project Leader: National Maize Development Program.
Other Research Staff: Concerning Agronomists and JTs of the Stations/Farms.

E. Items of Expenditure:

1. Seed	Rs. 3.00
2. Fertilizers	Rs. 110.00
3. Insecticides and Pesticides	Rs. 25.00
4. Labour	Rs. 270.00
Total:	Rs. 409.00

IADS/ICP: ds
May 6, 1983.