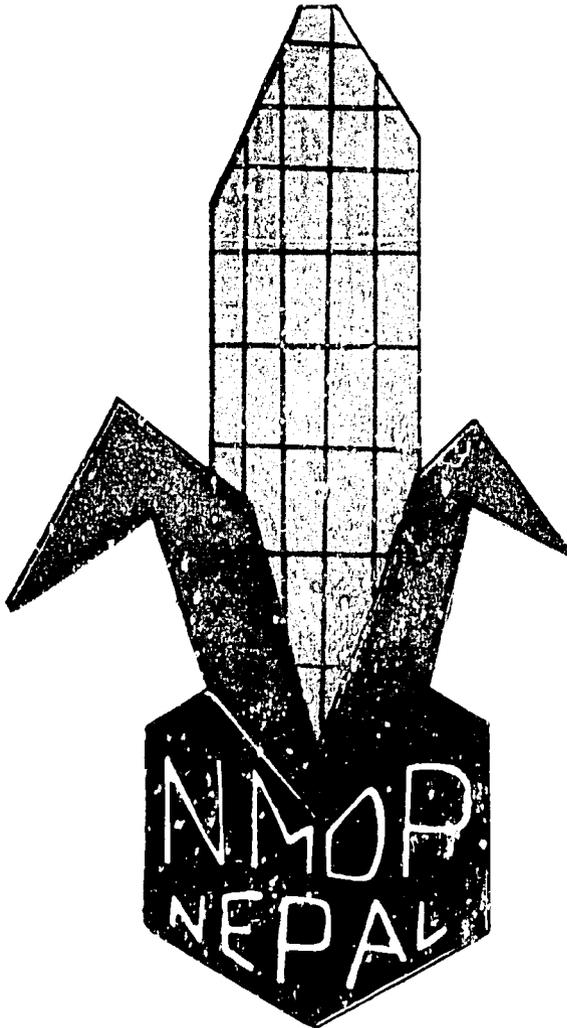


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HIS MAJESTY'S GOVERNMENT
DEPARTMENT OF AGRICULTURE



ANNUAL PROGRAM

**1984-85
(2041/042)**

**National Maize Development Program
Rampur Agriculture Station
Rampur, Chitwan
NEPAL**

HIS MAJESTY'S GOVERNMENT
DEPARTMENT OF AGRICULTURE

ANNUAL PROGRAM

1984 / 1985

(2041 / 2042)

NATIONAL MAIZE DEVELOPMENT PROGRAM

RAMPUR AGRICULTURE STATION

RAMPUR, CHITWAN

NEPAL

TABLE OF CONTENTS

	<u>Page</u>
List of Personnels	iv
<u>VARIETAL EVALUATION AND BREEDING</u>	
01. Germplasm collection and Introduction	1
02. Observation Nursery	2
03. Seed increase, maintenance and utilization of potential germplasms	4
04. Selection, unit testing as well as progeny testing and recombinations	6
05. Varietal trials	10
06. Spectal Project	14
<u>AGRONOMICAL TRIALS</u>	
01. Effect of planting method, fertilizer level and weeding method on maize yield	17
02. Study of different tillage systems on maize	19
<u>ENTOMOLOGICAL TRIALS</u>	
01. Economic Threshold of maize borer	21
02. Studies on relative susceptibility of some elite germplasms to the corn borer	24
03. Field biology of army worm by survey and surveillance	27
04. Seed bed beetle control trial in Chitwen	28
<u>PLANT PATHOLOGICAL TRIALS</u>	
01. Studies on the control of stalk rot by cultural and management practices	30
02. Studies on the effect of aging maize seeds on the incidence of diseases and pests in tropical conditions	32

	<u>Page</u>
03. Seed treatment trial against smuts of maize	34
04. Loss assessment studies on cob rot diseases of maize	36
05. Improvement of population on diseases of high altitude maize	37
06. Screening of common rust disease in the improvement of maize population	38
07. Loss assessment due to <u>Helminthosporium turcicum</u>	39
08. Finger-millet disease screening nursery	40
 <u>SOIL FERTILITY TRIALS</u>	
01. Variety cum fertilizer trial	42
02. Identification of yield limiting nutrient elements in maize growing soils of Chitwan Valley	45
03. Micronutrient trial on maize	47
04. Effect of organic manure & bacterial fertilizer on maize	49
 <u>POST HARVEST TECHNOLOGY</u>	
01. Study on the effect of polylined gunny sack of different gauge, seed moisture content and storage condition on the germinability of maize seed	51
 <u>OUTREACH PROGRAM AND SEED MULTIPLICATION PROGRAM</u>	
01. Farmers' field varietal trial on maize	53
02. Verification trial on maize	56
03. Training and extension services	59
04. Minikit demonstration program	61
05. Maize and millet seed multiplication in different farms and stations	70
06. Maize seed multiplication in farmers' field	72

	<u>Page</u>
<u>MILLET PROGRAM</u>	
01. Initial evaluation trial on finger millet	73
02. Advanced varietal trials on finger millet	74
03. Fertilizer Trial on finger millet	75
04. Different dates of transplanting on finger millet	76
05. Sorghum varietal trial	77
06. Sorghum introduction line	78
07. Pearl millet introduction line	79
08. Observation nursery on finger millet	80
<u>PRODUCTION PROGRAM</u>	81

AGRICULTURE FARMS/STATIONS AND PERSONNELS INVOLVED IN MAIZE
DEVELOPMENT PROGRAM 1984/1985

NATIONAL MAIZE DEVELOPMENT PROGRAM (NMDP)

AGRI. STATION, RAMPUR, CHITWAN, NEPAL

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

* On study leave.

PERSONNEL FROM:

- A. Soil Science & Agricultural Chemistry Division
- B. Agriculture Botany Division
- C. Agronomy Division
- D. Plant Pathology Division
- E. Entomology Division
- F. Pakhribas Agriculture Centre
- G. Tarahara Agriculture Station
- H. Kavre Agriculture Farm
- I. Kakani Agriculture Farm
- J. Nepalgunj Agriculture Station
- K. Jumla Agriculture Station
- L. Doti Agriculture Farm
- M. Lumle Agriculture Centre
- N. Regional Agriculture Training and Services Centre
- O. Bheirahawa Agriculture Farm
- P. Hardinath Agriculture Farm
- Q. Oil Seed Development Program, Nawalpur
- R. Surkhet Agriculture Station
- S. Kankai Irrigation Project
- T. Parwanipur Agriculture Station
- U. International Cooperators:
 - 1. International Maize & Wheat Improvement Centre (CIMMYT) - Mexico.
 - 2. Philippines Maize Development Program - Philippines.
 - 3. Asian Regional Maize Program - CIMMYT, Thailand.
 - 4. All India Coordinated Maize Improvement Program - IARI, New Delhi.
 - 5. ICRISAT - Hyderabad, India.

VARIETAL EVALUATION AND BREEDING

Project No. : 2041/2042 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 adoption 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 expended by other breeding programs. Many unwanted traits have been selected which might not be useful for Nepal.

B. Objectives:

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 : Continuous

Location : (a) Summer-Rampur and Khumal
(b) Winter-Rampur

Cooperation : Different Agriculture Development Offices, Farms and Stations etc.

Project Leader : NMDP

Other Research Staff : Concerned staff of NMDP

Expenditures : 1000 plastic bags - Rs. 500.00

Project No. : 2041/2042 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 agroclimatic 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:

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 in observation nursery no. 1

C D Pool, 238 entries (H. S. bulk)

Entries in observation nursery no. 2

01. Dhara Tani
02. Thulo Paheli
03. Paheli Makai
04. Sathiya Makai (1)
05. Agaute Thulo Paheli
06. Chepti Makai
07. Sathiya Makai (2)
08. Paheli Daralinge
09. Temase Makai
10. Seti Makai

Locations:

Ob. no. 1 : Rampur (summer & winter)

Ob. no. 2 : Khumal

Estimated duration : Continuous

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

Project Leader : NMDP

Other Research Staff : Concerned staff

Expenditure (approximate) :

a) Fertilizer	Rs. 500.00
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. 150.00
f) Miscellaneous	Rs. 150.00

Land Required : 600 sq. meter

Project No. : 2041/2042 NMDP - 3
Division : Maize
Section or Program : Coordinated National Maize Development Program
Line Project Title : Seed increase, maintenance and utilization in
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:

<u>Entry</u>	<u>Genotypes</u>
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

Project No. : 2041/2042 NMDP - 3
Division : Maize
Section or Program : Coordinated National Maize Development Program
Line Project Title : Seed increase, maintenance and utilization in
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:

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C. Plan of Work:

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

<u>Entry</u>	<u>Genotypes</u>
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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

Project No. : 2041/2042 NMDP -- 4
Division : Maize
Section or Program : Coordinated National Maize Development Program
Line Project Title : Selection unit as well as progeny 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) S₁ 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 : Continuous

Project Leader : HMDP

Other Research Staff : Concerned staff

- a) Entries in Canesh - 2:424 families
 Location: Rampur - winter
 Kakani and Jumle - Summer
- b) Entries in Manakamana - 2:334 families
 Location: Rampur - winter
 Kakani and Khumal - Summer
- c) Entries in Rampur - 2:554 families
 Location: Rampur - summer and winter
 Farm suwan - summer
- d) Entries (in Rampur - 1):
 Rampur-1 = Amarillo dal Bajio X 10 lines PD (MS) 6 X Phil.
 DMR = Mana*, (Suwan-1 Mana) Mana
 (Mana x Maracay-7530) Mana, (Mana x Pool-19) Mana
 (Eto Blace x Pozarica-7425) Mana) Mana
 white) Mana Mana x Ujala white Pool-23 x Mana

x turpeno drought selection.

	<u>Rampur</u> (Summer + Winter)	<u>Suwan Farm</u> (Summer)
Total families:	617 families	617 families
Male rows require (2:1)		
Total nos. of plots:	310	617
	<hr/> 927	

* Mana = manakamana

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, (TC-1 early x Arun-2) A-2 (D74 x Suwan-2) A-2, (D741 x A-2) A-2, (D741 x Suwan-2) A-2, SS₄ x D771) Suwan-2) Suwan-2 E) A-2, (Source=10 x A-2), (A-2 x Source 4) A-2, (TC-1 early x meddok Pool-3) A-2) A-2, (D741 x B73) Pool-17 (A-2, Pool 29 x A-2, (J663 x Suwan-2) A-2, Dhading yellow x A-2, D744 x A-2, Population 35 x A-2.

	<u>Rampur</u> (Winter)	<u>Khumal</u> (Summer)
1. Total families		799
2. Total rows required		401
Total no. of plots		<hr/> 1200

f) Entries in Arun - 1: (1

Location -- Rampur (winter and summer)

Arun-1 = Sathi Makai, Arun, Arun x Suwan-2

Arun x Pool-15, Arun x Barbote, Arun x Suwan-2,

Pool-15, 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 number of families	495 fam.
2. Male rows required (2:1)	249
Total number of plots	<hr/> 744

g) Entries (in Manakamana - 1)

Location: Rampur - Winter

Pakhribas - Summer

* A-2 = Arun - 2.

Manakamana-1 = Amarillo del Bajio x 10 lines PD (MS) 6 Phil.
DMR (Mana*), Suwan-1 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 Jjula white, Mana x Turpeno drought selection,
Pool - 23 x Mana, Rampur - 8075, Suwan - 8075.

Entries:

1. Total entries 142 units (including checks) and 2 replica-
tions and 2 rows/plot.

Project No. : 2041/2042 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,
c) CIMMYT varietal trial, and
d) Asian cropping system 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.

Observations:

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, cob 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. NMDF varietal trails:

01. Ganesh - 2
02. Manakamana - 2
03. Manakamana - 1
04. Rampur - 2
05. Rampur - 1
06. Arun - 4
07. Arun - 1
08. Pioneer 6181
09. Khumal Yellow (Check)
10. Rampur Composite (Check)
11. Arun - 2
12. Farmers' variety (Check)

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 (EVT 16A):

01. Seto lagoas 8033
02. La Molina (1) 8033

03. Across 8033
04. Guaira 8045
05. Capinapolis 8146
06. LaMolina 8146
07. Tlaltizapan 8146
08. Pirrabk 8146
09. Coimbatore 8146
10. Across 16146
11. Across 7845 RE
12. Across 7748 RE
13. Local Checks
14. Local Check
15. Local Check

D. CIMMYT Varietal Trial (EVT. 16B):

Entries:

01. San Jeronimo 8134
02. San Jeronimo (1) 8134
03. Tlaltizapan 8134
04. Sakha (1) 8134
05. Nazareth 8134
06. Celaya 8074
07. Across 7734 RE
08. Across 7844 RE
09. Local check (Rampur - 1)
10. Local check (Mana - 1)

E. Asian Cropping System Trial:

01. Jhai comp. 1 early DMR
02. Early DMR comp. no. 1
03. Early DMR comp. no. 2
04. Arun - 2
05. XC no. 1

06. Ranjuna
07. TFE 139
08. Pozarica 7931
09. Tocumen 7931
10. Pirsabak 7930
11. Local check 1 (Arun - 1)
12. Local check - 2 (Arun - 4)

Estimated Duration : Continuous

Location :

- a) NMDP varietal trial - Rampur, Kabhre, Surkhet, Jumla, Doti, Kakani, Kankai Nepalgunj, Dadapakhar, Khumaltar, Lumle, Parwanipur, Hardinath, Tarahara, Pakhribas, IRDP and CARE
- b) Varietal trial on hybrid maize Rampur and Khumal
- c) CIMMYT varietal trial
 - (i) EVT 16A - Khumal
 - (ii) EVT 16B - Rampur
- d) Asian cropping system trial - Rampur (Summer and Winter)

Cooperation : All concerned farms and stations

Project Leader : NMDP

Other Research Staff : All concerned staff of all farms and stations.

<u>Expenditure</u> :	a) Fertilizer	Rs. 500.00
	b) Pesticides	Rs. 100.00
	c) Labour for management	Rs. 400.00
	d) Labour for preparing the trial materials	Rs. 150.00
	e) Miscellaneous	Rs. 125.00

This expenditure is for one trial/location.

Project No. : 2041/2042 NMDP - 6
Division : Maize
Section or Program : Coordinated National Maize Development Program
Line Project Title : Special Project
a) Hybrid Maize Development Program
b) Selection for cob rot resistant of Maize
a) Description of Work :

Origin and Brief History:

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. In spite of this, NMDP is going to start the initial phase of the hybrid maize development by keeping the following objectives in the full perspective.

1. 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:

Arun - 1

S₁ families - 253

S₂ families - 58

Khumal yellow

S₁ families - 86

S₂ families - 13

S₃ families - 31

Rampur composite

S₁ families - 165

Hetauda comp.

S₁ families - 25

S₀ families -1000

b) Selection for cob rot resistant of maize

Objective: To find out cob rot resistant materials of maize

Location: Khumaltar and Kakani

Materials and Methods: 15 crossed materials are to be evaluated in non-replicated trial. Plot size is 8 rows of 3 meter long with 12 hills per row or 5 rows of 5 meter long for Khumal. About one kilogram composite of these 15 materials also is provided. It is supposed to plant this composite around these 15 materials.

Fertilization: 60:40 N: P₂O₅ : K₂O kg/ha respectively. Apply them as usual.

Selection: Follow these selection before teseling and detassed the unwanted plants (tall, short diseased if possible, late less vigor etc.). Select the best looking plant at harvest and after harvest again select the diseased (cob rot) resistant and best looking cob

and save the seed for the next year selection. This practice should be followed for the 15 materials and the composite separately.

Entries:

01. Kakani local x Khumal yellow 12
02. Kakani local x Khumal yellow 22
03. Kakani local x Khumal yellow 32
04. Kakani local x Khumal yellow 42
05. Kakani local x Khumal yellow 102
06. Kakani local x Khumal yellow 152
07. Kakani local x Khumal yellow 182
08. Kakani local x Khumal yellow 222
09. Kakani local x Khumal yellow 312
10. Kakani local x Khumal yellow 14
11. Kakani local x Khumal yellow 64
12. Kakani local x Thai composite
13. Kakani local x Hetauda composite
14. Kakani local x Khumal yellow 12
15. Khumal yellow 5Lb

Project Leader : Agri. Botany Section Khumaltar

Cooperators : NMDP, Plant Pathology Division and Kakani Farm

AGRONOMICAL TRIALS

Project No. : 2041/2042 NMDP - 7
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 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 5m² (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

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 sq. metres

- Project No. : 2041/2042 NMDP - 8
- Project Title : Study of different tillage systems on Maize
- Problems : In spite of several relentless efforts being made by various concerned agencies to increase production. Maize productivity is observed retarding considerably every year - Possibly due to depletion of nutrients from the soils brought about by severe soil erosion (nearly 240 million cubic metres of top soils are reported to have eroded annually). On the other hand, uncertainty of rains during the crop period, most often subjects maize crop to intolerable moisture - Stress resulting to nil to very low production. Under such conditions, traditional cultivation of soils as much as to make a fine powdery mass in order to grow maize (or even other crops), especially in the slopy hills (mid-hill and high
- Objective : To compare different tillage systems for better yield and moisture use efficiency.
- Review : Zero/minimum tillage systems reduce erosion, increase water use efficiency and give yields as much as or even more than in traditional tillage system.
- Location : Rampur
- Duration : At least 2 seasons
- Materials and Methods: The experiment will be conducted in the Randomised Complete Block Design with 3 Replications. Plot Size will be 6 m x 4.5 m (6 rows of 6 metre length) and the net harvest area will be 5 m x 3 m (central 4 rows discarding 2 end plants each in both sides). Planting (variety - Rampur Composite) at the recommended spacings of

75 cm x 25 cm will be done after broadcasting 60:30:30 kg NPK/ha basally. Sevin or Furadan granules will be applied in the whorl as and when necessary.

Treatments:

1. Conventional tillage (Recommended practices):
All sowing operations are done according to the recommended practices to maintain a population of about 53,000 plants/ha. Manual weedings (hoeings) are done as and when necessary.
2. Conventional tillage with mulch incorporated:
All the operations are same as trt. no. 1, except that mulch (maize or wheat straw depending upon the season) is incorporated in the soil before planting (at land preparation).
3. Minimum tillage with mulch on the surface:
Only the furrows/lines where seeds are dropped, are plowed and rest of the area is left uncultivated. Suitable herbicide (depending upon the availability) is used to kill the weeds as per need.
4. Minimum tillage without mulch:
All the operations are same as trt. no. 3, except that there is no mulch in this treatment.
5. No-tillage with mulch on the surface:
No plowing of any kind is done. Planting is done by dibbling the seeds in holes made by suitable equipment. Herbicide is used to kill the weeds as per the need.
6. No-tillage without mulch:
All the operations are same as trt. no. 5, except that there is no mulch in this treatment.

Personnel involved: NMDP

Expenditures: Rs. 10,000/- (Approximately)

ENTOMOLOGICAL TRIALS

Project No. : 2041/2042 NMDP - 9
Division : NMDP
Project Title : Economic threshold 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 bionomics of this insect shows 3-5 generation depending upon the climatic condition. However, the population peak, number of generation, other behavioral aspect of this insect, and type and time of chemical application for its control is already been determined, other behavioral 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 threshold is yet to be determined. In pest management system economic threshold 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 viceversa. 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 threshold of stripped borer in maize
Location : Rampur and Khumaltar (Summer)
Review : There is no such study in Nepal
Duration : 3 years
Plan of Work :
Design : CRD
Replication : 12
Treatments : 21
Plot Size : Wirehouse study

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

Treatments:

1.4	1st stage plant	infested with 2 first instar larvae					
2.4	2nd	" " " " 2 " " "					
3.4	1st	" " " " 4 " " "					
4.4	2nd	" " " " 4 " " "					
5.4	1st	" " " " 6 " " "					
6.4	2nd	" " " " 6 " " "					
7.4	1st	" " " " 8 " " "					
8.4	2nd	" " " " 8 " " "					
9.4	1st	" " " " 1 second instar larvae					
10.4	2nd	" " " " 1 " " "					
11.4	1st	" " " " 2 " " "					
12.4	2nd	" " " " 2 " " "					
13.4	1st	" " " " 3 " " "					
14.4	2nd	" " " " 3 " " "					
15.4	1st	" " " " 1 Egg mass					
16.4	2nd	" " " " 1 " "					
17.4	1st	" " " " 2 " "					
18.4	2nd	" " " " 2 " "					
19.4	1st	" " " " 3 " "					
20.4	2nd	" " " " 3 " "					
21.16	plant 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 stage 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.

Note: 1st stage plant = 4 complete leaves in the plant.
 2nd stage plant = 8 complete leaves in the plant.

Yield Record

1. Normal field yield (4 rows of 5 meter) controlled by furadon.
2. Equal number of normal Plants yield (50-100 plants/sample) as 4 units of 12-25 plants/in each unit.
3. Categorized infested plants yield (50-100) plants in each category.

Date 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 : Rs. 100/-
Non-recurring : Nil
Land required : 60 sq. meter

Project No. : 2041/2042 NMDP - 10
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 root 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 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 vandom every year, with this reason this trail is proposed to be screen some important genotype artificially.

Objective: To screen susceptible and resistant genotypes of maize against borer.

Location : Rampur and Khumaltar
Plan of Work :
Design : RBD
Replication : 4
Plot Size : 4 meters length
Spacing : 75 x 25 cm
No. of Entries : 12

- NPK : 90:45:0 kg/ha of $\frac{1}{2}$ N and all P_2O_5 at planting and $\frac{1}{2}$ N as top dressing.
- Soil treatment : BHC or Aldrin dust at the rate of 20 kg/ha.
- Other Research Staff : Assistant Entomologist and junior technicians.

Entries

1. Mana - 2
2. Rampur - 1
3. Pioneer - 6181
4. Arun - 2
5. Arun - 1
6. Farmers local
7. Rampur - 2
8. Ganesh - 2
9. Arun - 4
10. Rampur composite
11. Mana - 1
12. Khumal yellow

Infestation Methods:

8 plants of each rows in each genotype will be infested by artificially reared larvae 25 and 40 days after germination. The remaining 8 plants in each row of each treatment will be controlled by the application of granular insecticide. 10 first instar larvae per plant will be applied by the help of small brush.

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

Data to be taken:

1. General rating of individual treatments against the control plants in 1-9 basis.

2. 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 funnels.
3. Repeat the same desection for the remaining 4 plants from each plot at the time of harvest.
4. Also observe the recovery of plants or dead-hearts.
5. Grain will be harvested from the resistant plant if it is saved.
6. Height of the infested and controlled plants.
7. Take weight of the larvae of the source age during first dissection (Tasseling stage).

Project Leader : NMDP

Other Research Staff : Entomologist Division

Expenditure : Recurring Rs. 200/-

Project No. : 2041/2042 NMDP - 11
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 or larvae and larval count per 100 plants and to other possible behavior will be taken into consideration.

D. Estimated duration of years : 3 years

Locations : a) Summer : Khumal, Kakani
b) Winter : Rampur

Cooperation : Division of Entomology

Project Leader : NMDP

Other Research Staff : Entomologist Division and Farm Staff

Expenditure : Sampling - 18 @ Rs. 6.00 = Rs. 108.00

Project No. : 2041/2042 NMDP - 12
Division : NMDP
Section/Program : Maize
Line Project Title : Seed bed beetle control trial in Chitwan's farmers' field

Description of Work :

A. Problem:

The problem of seed bed beetle (Heteronychus lioderes) is observed particularly in spring maize in khet land of Chitwan. Some time infestation was observed upto 100%. Farmers had to reseed the field 2-3 times. Due to this reason the trial is proposed in the farmers' field.

B. Objectives:

To determine the seedling damage by this insect.

C. Plan of Work:

This field will be done in heavily infested area in the spring maize after paddy. Planting will be done in the first week of Falgun 2040 as usually the planting is done by the farmers. The rate of fertilizer will be as 90:20:0 NPK kg/ha of which $\frac{1}{2}$ of the N will be applied as basal and the remaining half will be top dressed at knee high slige of the plot. Two plant per hill will be planted keeping plant to plant, distance 25 cm and row to row 15 cm respectively.

Plot size : 8 rows of 10 meter length

Design : RED

Location : Saradanagar, Gunjanagar, Divyanagar

Replication : One farmers field is one replication

Variety : Khumal Yellow

Treatments:

1. Furadan 3% granules @ of .5 kg ai/ha at row during planting.

2. Sevin 4% granules @ of .5 kg ai/ha at row during planting.
3. Aldrin dust 5% @ of 2. kg dust/ha incorporate in whole plot before planting.
4. BHC dust 10% @ of 30 kg dust/ha incorporate in whole plot before planting.

D. Estimated duration of year : Three years

Cooperation : Farmers

Project Leader : NMDP

Research Staff : Entomologist and Plant Protection Divisions

Observation to be taken :

1. # of seeding damaged by seed bed beetles.
2. # of seeding damaged by other insects.
3. Stage of the plant (leaf stage) infected by the beetle. In this case observation must be continued till the beetle damages the plant.
4. Plant height and ear height before harvest.
5. Harvest 4 central rows from each plot.
6. Field cot and moisture percent at harvest.
7. Observation will be taken also from near by field (10 sq. m area will be taken and continued the infected plants and number of beetles found in the plot).
8. Other insect damage if any.

Expenditure:

Recurring	:	
Seed	:	Rs. 100/-
Insecticide	:	Rs. 100/-
Fertilizer	:	Rs. 180/-
Labour	:	Rs. 180/-
Miscellaneous	:	Rs. 40/-
Total	:	Rs. 600/-

PLANT PATHOLOGICAL TRIALS

Project No. : 2041/2042 NMDP - 13
Division : Maize
Section/Program : NMDP
Line Project Title : Studies on the control of stalk rot by cultural and management practices.

Description of Work :

A. Origin and Brief History:

Stalk rot is caused by bacteria and fungi. Bacterial stalk rot is mostly confined to hot and humid tropical zone of the country whereas fungal stalk rot is distributed in hot and humid tropics and cold and dry temperate areas. Infection is highly correlated with borer infestation, high plant density, high weed infestation and high level of nitrogen. Yield reduction upto 100% is noted in severe epiphytotic conditions. Literature says that plants become more vulnerable to stalk rot if these conditions (density, weed, borer etc.) prevail in the season. To find out the enureminate solution, for the control a bleaching powder trial was designed in 1979 and 1980, but the bleaching powder had no effect on bacterial stalk rot.

B. Objectives:

To evaluate some cultural methods for the control of stalk rot of maize.

C. Plan of Work:

The trial will be laid out in 24 factorial experiments with 4 replications. Plot size will be 5 m x 4.5 m. Treatments will be as follows:

Factors:

1. Fertilizer : (a) 120:60:40 kg NPK/ha
(b) 120: 0: 0 kg NPK/ha
2. Insect Control : (a) Chlordance 20 kg/ha soil application + furadan 10 kg/ha whorl applications + folial spray

- (b) No insecticide
3. Weed Control : (a) Atrazene 2 kg/ha + 2.4 D 2 kg/ha
(b) Weed control by traditional method
4. Plant Density : (a) 53000 plants/ha
(b) 100000 plant/ha

Disease observations and all the necessary data will be taken right from the time of planting to the maturity of crop.

- D. Estimated duration : 3 years
- Location : (a) Summer - Rampur
(b) Winter - X
- Cooperation : Division of Plant Pathology
- Project Leader : NMDP
- Other Research Staff : Entomologist, Agronomist and Soil Science Divisions
- Expenditures
- | | | |
|---|-----|---------|
| a) Labour | Rs. | 600/- |
| b) Fertilizer | Rs. | 200/- |
| c) Pesticide | Rs. | 30/- |
| d) Seed | Rs. | 20/- |
| e) Miscellaneous (e.g., rope, tag, bag, etc.) | Rs. | 400/- |
| Total | Rs. | 1,250/- |
- f) Land required: 100 sq. m.

Project No. : 2041/2042 NMDP - 14
Division : Maize
Program : NMDP
Line Project Title : Studies on the effect of aging maize seeds on the incidence of diseases and pests in tropical conditions.

Description of Work :

A. Origin and Brief History:

Maize seeds stored in ordinary conditions can retain viability upon 85% within the storage period of 2½ years. Reduction in yield due to aged seeds was insignificant as compared to the fresh seeds planted remaining the plant population is constant. But the reduction in plant vigor which may be due to either diseases or pests was not known in the studies carried out in 1983.

B. Objectives:

- (a) To find out the incidence of diseases and pests in the aged maize seeds and seedlings.
- (b) To find out the causes of reducing plant vigor and yield reduction in aged maize seeds.

C. Plan of Work:

The trial will be laid out in the randomized block design with 4 replications. Plot size will be 5 m x 4.5 m and fertilizer rates will be 60:60:40 kg NPK/ha as basal and 60 kg N/ha will be side dressed at knee height stage.

Treatments:

1. Seed lot of 1979
2. Seed lot of 1980
3. Seed lot of 1981
4. Seed lot of 1982

5. Seed lot of 1983
6. Seed lot of 1984 as a check

Observations to be taken:

1. Germination percentage
2. Days to germination
3. Rate of growth
4. Days to flower
5. Incidence of insects pests
6. Incidence of disease and rating
7. Plant stand at harvest
8. Yield ton/ha

- D. Estimated duration : a) Summer - Rampur and Khumaltar
b) Winter - Rampur

Project Leader : NMDP

Cooperators : Division of Plant Pathology and Agri. Bot.
Division

<u>Expenditure</u>	:	a) Labour	Rs. 500/-
		b) Fertilizer	Rs. 150/-
		c) Pesticides	Rs. 10/-
		d) Seed	Rs. 10/-
		e) Miscellaneous	Rs. 400/-
		Total	<u>Rs. 1,070/-</u>

f) Land required: 600 m²

Project No. : 2041/2042 NMDP - 15
Division : Maize
Program : NMDP
Line Project Title : Seed treatment trial against smut of maize
Description of Work :

A. Origin and Brief History:

Three types of maize smuts have been reported in Nepal. But only two types: head smut (Sphace lotheca reliana) and common smut (Ustilago maydis) are of our primary importance. These diseases are very destructive in cold and humid hilly districts like Dhankuta, Terhathum, Ilam, Gulmi, Dolakha etc. Palpa, Sankhuwasabha, Dolakha etc. Up till now no scientific data for its control are available here.

B. Plant of Work:

The trial will be laid out in randomized block design with 4 replications. Plot size will be 5 m x 3 m and fertilizer rate will be 120:60:40 kg NPK/ha. All P_2O_5 and K_2O and $\frac{1}{2}$ N will be applied as basal dose and there waening $\frac{1}{2}$ N will be side dressed at knee height stage.

Treatment:

1. Vitavax - 200 @ 2 gm/kg seed
2. Bentate @ 2 gm/kg seed
3. Bavistin @ 2 gm/kg seed
4. Captan @ 3 gm/kg seed
5. Topican @ 3 gm/kg seed
6. Brassicol @ 3 gm/kg seed
7. Untreated check

The seeds will be inoculated by the fungal spore mass before they are treated with the above mentioned chemicals.

Test Variety:

1. Most susceptible variety of the locality
2. Khumal Yellow

Estimated duration : 3 years

Location : Kabhre Agri. Farm

Cooperators : Kabhre Agri. Farm and Plant Pathology Division

Project Leader : NMDP

Expenditure : Rs. 1,000/= approx.

Project No. : 2041/2042 NMDP - 16
Division : Maize
Program : NMDP
Line Project Title : Loss assessment studies on cob rot disease of maize
Description of Work :

A. Origin and Brief History:

Cob rot diseases have been reported since 1966/67 but the work on this disease has been indicated only since 1974. The disease is prevalent in all types of agro-climatic belts of our country. Among the various pathogens reported Fusarium. Ear rot was found to be the most destructive. But the losses due to this disease is not yet estimated practically.

B. Objectives:

To find out the losses due to Fusarium Ear rot.

C. Plant of Work:

The trial will be laid out in the randomized block design with 4 replications. Fertilizer rate will be 60:60:40 kg NPK/ha as basal and 60:0:0 kg NPK/ha as side dressing at knee height stage.

Treatments:

1. Dithane M 45 spray.
2. Ear inoculation with inoculum of Fusarium sp.
3. Control without any inoculation of Fusarium sp. and fungicidal spray Dithane M 45 will be sprayed after tasseling and fusarium inoculation will be done 10 days after silking.
Disease - observations will be taken at harvest.

D. Estimated duration : 3 years

Location : Kakani Agri. Farm

Cooperators : Kakani Agri. Farm and NMDP

Project Leader : Plant Pathology Division

Expenditures : Rs. 1,200/= approx.

Project No. : 2041/2042 NMDP - 17
Division : Maize
Program : NMDP
Line Project Title : Improvement of population on diseases of higher
altitude maize

Description of Work :

A. Origin and Brief History:

The recommended and prominent varieties of maize appeared to be highly susceptible to cob rot in comparison with the local germplasm. Improvement in the maize population appeared to be highly essential. Therefore facilities in the population like Ganesh-2, Manakamana-1, Manakamana-2 will be screened for cob-rot diseases at different locations.

B. Objectives:

To find out the resistant material for the utilization in the varietal development work.

C. Plant of Work:

Innoculation of the fusarium sp. will be prepared in the laboratory at Khumal and this inoculum will be transported to the areas of experimentation. Innoculation will be done about 10 days after silking using syringe method. Disease observation will be taken at harvest, and the resistant families will be selected.

D. Estimated duration : Continuous process

Location : Pakharibas Agri. Centre, Lumle Agri. Centre,
Kabhre Agri. Farm, Kakani Agri. Farm

Project Leader : NMDP and Plant Pathology Division

Cooperators : Pakharibas and Lumle Agri. Centre, Kabhre
and Kakani Agri. Farm

Expenditures : Rs. 1,500/= approx.

Project No. : 2041/2042 NMDP - 18
Title : Screening of common rust, disease in the improvement
of maize population

Introduction:

Common rust of maize has been reported since 1964-65. The disease is distributed throughout the country, however it is more common in the mountains and valleys in the spring and monsoon maize than in the summer crop of Terai and inner Terai region. The incidence of rust is quite common in winter or spring maize at low altitude in some areas. It is the most important and if the infection starts early stage of the crop, the losses due to the disease is quite high.

Objective: To select the rust resistant families in the population.

Location: Khumaltar and Kakani.

Procedure: The observations will be taken in the following populations: Arun-4, Ganesh-2, and NMDP trial at their appropriate stages. The disease will be recorded on 0-5 scale.

Personnel: Division of Plant Pathology and NMDP.

Project No. : 2041/2042 NMDP - 19
Title : Loss assessment due to Helminthosporium turcicum

Introduction:

The northern leaf blight is caused by Helminthosporium turcicum and it is distributed throughout the country. The disease is most common in the hills in the summer crop but it is also prevalent in the winter maize in the Terai and inner Terai regions. The epidemic of the disease has not been reported so far. The estimation of losses due to the disease appeared to be essential.

Objectives:

To find out the losses due to the Northern leaf blight disease.

Location: Khairenitar.

Procedure:

The trial will be conducted with RCB design with 4 replications and 4 varieties, Khumal yellow, Rampur composite, Arun-2, Manakamana-1. The treatment will be (1) Dithane M-45 spray, (2) Helminthosporium turcicum inoculated and (3) without spray and without inoculation. The losses will be due to the disease determined after harvest. The disease screening will be taken 3 times on 0-5 scale at the appropriate stages of the plants. The inoculations of the causal organism will be done at knee high stage. The fertilizer doses will be 120:40:40 NPK per hectare.

Personnel: Khairenitar Training Center.

Project Leader: Division of Plant Pathology and NMDP.

Project No. : 2041/2042 NMDP - 20
Division : Millets
Program : NMDP
Line Project Title : Finger Millet disease screening nursery
Description of Work :

A. Origin and Brief History:

Several diseases have been reported as destructive one in hills and terai belts of millets in Nepal. Disease like blast is the most important one which could reduce yield up to 100% in several cases. This disease attacks all stages of crop right from nursery bed till to grain filling stage. Rhizoctonia and sclerotium are also equally importance in hot humid terai area. Since we have so many incidences of disease epiphytotic under natural conditions but no systematic studies have been undertaken in the varietal development work. Few recommended varieties are also susceptible to disease like blast.

B. Objectives:

To evaluate the resistant material which can be used as a source of resistance for major diseases.

C. Plan of Work:

Possibly all the finger millet genotypes available in Nepal will be screened under natural condition at Rampur, Khumal and Kakani. Seeds will be directly planted on two rows of 5 meter long plots. Row to Row distance will be 20 cms and plant to plant distance will be maintained 10 cms. Thinning will be done within 20-30 days of germination. Fertilizer, will be applied at the rate 20-40-20 kg NPK per hectare at planting and 20 kg N/ha will be side dressed after thinning.

Observations to be taken:

1. Days to germination
2. Days to flowering

3. Days to maturity
4. Tillering habit
5. Sycromication in maturity
6. Lodging tendency
7. Grain yield
8. Incidence of insect pest
9. Incidence of diseases mainly
 - a) Blast
 - b) Helminthosporicum leaf spot
 - c) Leaf and sheath blight
 - d) Root rots
 - e) Grain mould
 - f) Others

Genotypes: About 90 genotypes, local as well as exotic will be included.

D. Estimated duration : Continuous process

Location : Rampur Khumal and Kakani

Cooperators : Kakani and Khumal Agri. Farm

Project Leader : NMDP

Expenditures :

1. Labour	Rs.	600/=
2. Fertilizer	Rs.	150/=
3. Insecticide, fungicides	Rs.	50/=
4. Seeds		-
5. Miscellaneous	Rs.	400/=
Total		<u>Rs. 1,200/=</u>

SOIL FERTILITY TRIALS

Project No. : 2041/2042 NMDP - 21
Division : Maize
Section or Program : NMDP
Project Title : Variety Cum Fertilizer Trial
(a) Hill Set
(b) Terai Set
(c) Early Set

Description of Work :

A. Problem:

The optimum requirement at the maximum genetic potentiality of the new promising cultivars of maize in term of Nitrogen utilization are not known.

B. Objectives:

1. To know the optimum level of N- Fertilizer for different cultivars of maize.
2. To know the level of N- Fertilizer for exploiting the maximum genetic potentiality of different cultivars of maize in terms of dry matter yield.

C. Plant of Work:

3 sets of varieties, that is, Hill set, Terai set and Early set will be tested for Nitrogen utilization at different locations. The design will be split-plot for all the locations.

A basal dose of 40 kg P_2O_5 and 30 kg K_2O will be added to all the plots at all the locations. Plot size for hill set will be 4 m x 3 m and that for Terai and early sets will be 6 m x 4.5 m. There will be 4 replications at all the locations. Spacing will be 75 cm x 25 cm $\frac{1}{2}N$ and full P_2O_5 and K_2O will be added as basal in bends and the remaining $\frac{1}{2}N$ will be side dressed at knee high stage of the crop. A composite soil sample of the experimental plot will be taken before

sowing. After harvest of the crop a separate soil sample from each plot will be taken for laboratory analysis. The net harvest area will be the two central rows.

<u>Season:</u>	<u>Summer</u>	<u>Winter</u>
<u>Locations:</u>		
(A) Hill Set	i) Pakhribas ii) Kavre	x
(B) Terai Set	i) Rampur ii) Shiva Nagar	i) Rampur ii) Parwanipur
(C) Early Set	i) Rampur ii) Khairenitar iii) Shiva Nagar	i) Rampur

Treatments:

(A) Hill Set

Main Plot Varieties

V1 - Manakamana - 1

V2 - Manakamana - 2

V3 - Khumal Yellow (check)

V4 - Kakani Yellow will be added in Kavre only.

Sub-Plot Nitrogen Levels

N0 - 0

N1 - 50 kg N/ha.

N2 - 100 kg N/ha.

N3 - 150 kg N/ha.

(B) Terai Set

Main Plot Varieties

V1 - Rampur - 1

V2 - Rampur - 2

V3 - Rampur Composite (check)

Sub-Plot Nitrogen Levels

Same as in Hill set.

(C) Early Set

Main Plot Varieties

V1 - Arun - 1

V2 - Arun - 4

V3 - Arun - 2

Sub-Plot Nitrogen Levels

Same as in Hill set.

D. Estimated Duration : 3 years

Project Leader : NMDP

Cooperators : All the concerned farms and stations

Data to be collected :

- i) Dates of 50% Silking.
- ii) Plant height (Av. of 2 central rows).
- iii) Total Number of ears in the Net harvest/plot.
- iv) Plant stand in the Net harvest/plot.
- v) Grain yield data (kg/net harvest area)

Expenditures : Recurring Expenditures/Site/Season

a) Labor	Rs. 3,000/-
b) Fertilizer	Rs. 300/-
c) Seed	Rs. 40/-
d) Pesticides	Rs. 80/-
e) Miscellaneous	Rs. 150/-

Project No. : 2041/2042 NMDP - 22
Division : Maize
Section or Program : NMDP
Project Title : Identification of Yield limiting nutrient elements
in maize growing soils of Chitwan Valley.

Description of Work :

A. Origin and Brief History:

The maize plants, in Chitwan Valley have been observed showing hunger signs every year during summer season. The soil and plant analysis informations reveal very low to low contents of a number of secondary as well as micronutrient 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 experiment is needed for diagnosing the growth limiting nutrient elements in these soils.

B. Objectives:

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

C. Plant of Work:

7 treatments, a combination of Secondary and micronutrient elements will be tested in RBD with 3 replications. Individual Plot size will be 4.5 m x 5.0 m (6 rows of 5.0 m length).

Rampur composite or Rampur Yellow will be used as a test variety. Standard spacing and cultural practices will be followed.

A composite soil sample from each plot will be taken after sowing and after harvest of the crop for laboratory purposes. Net harvest area will be the two central rows.

Treatment Combinations (kg/ha):

Treatment No.	N	P	K	Mg	S	Zn	B	Mo
1.	100	20	40	30	30	10	2	0.5
2.	100	20	40	30	30	10	2	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

Location : Rampur

Estimated Duration : 3 years

Project Leader : NMDP

Cooperator : Soil Science Division

Data to be collected :

- i) Dates of 50% Silking.
- ii) Plant height (cm) (Av. of the two central rows).
- iii) Plant stand in Net harvest area/plot.
- iv) Total Number of ears in the net harvest area/plot.
- v) Grain Yield data (kg/Net harvest area).
- vi) Stover yield (kg/Net harvest area).

Expenditures : Recurring expenditure/Site/Season

- a) Labour Rs. 150/-
- b) Fertilizers Rs. 600/-
- c) Seed Rs. 30/-
- d) Miscellaneous Rs. 150/-

Project No. : 2041/2042 NMDP - 23
Division : Maize
Section or Program : NMDP
Project Title : Micronutrient trial on Maize
Description of Work :

A. Origin and Brief History:

Fertilizer containing all the secondary and micronutrient elements is not available. Micro-Chemicals, India, has started manufacturing micronutrient mixtures which contain almost all the secondary and micronutrient elements. Therefore, it is important to compare these mixtures with the micronutrient fertilizers.

B. Objectives:

- i) To observe the effects of nutrients mixtures with/or without nutrient fertilizer.

C. Plan of Work:

Nutrient Fertilizers will be applied as basal and 3 types of micronutrient mixtures will be used as spray after 30 days of sowing. The individual plot size will be 6 m x 4.5 m (6 rows of 6 m length). Design will be split-plot with 4 replications. Standard spacing and cultural practices will be followed. A full season maize variety will be used as a test variety.

Treatments:

Main Plot Treatments

- F0 - No Chemical (All zero)
- F1 - 60:30:30 NPK kg/ha.
- F2 - Macro + micronutrients
N, P, K, Mg, S, Zn, B, Mo,
60:30:30:30:30: 10: 2 0.5 kg/ha.

Sub-Plot Treatments

- MO - No mixture
- M1 - Micron Plain
- M2 - Micron 'B'
- M3 - Micron 'Z'

Location : Rampur

Estimated duration : 2 years

Project Leader : NMDP

Data to be collected :

- i) Dates of 50% silking.
- ii) Plant height (cm) Average of 5 plants.
- iii) Plant stand in the net harvest area/plot.
- iv) Total number of ears/harvest area/plot.
- v) Grain Yield data (t/g/Net harvest area).

Expenditures : Recurring expenditure/Site/Season

- a) Labour Rs. 200/-
- b) Fertilizers Rs. 700/-
- c) Seed Rs. 30/-
- d) Miscellaneous Rs. 180/-

Project No. : 2041/2042 NMDP - 24
Division : Maize
Section or Program : NMDP
Project Title : Effect of organic Manure and Bacterial Fertilizer
on Maize

Description of Work:

A. Origin and Brief History:

The effects of long and continuous use of chemical fertilizers on the same piece of land are not known. Farmers have the impression that long term use of chemical fertilizers has a deteriorating effect on the physical properties of soil. So, it is necessary to study the effects of long term use of chemical fertilizers, organic manure and Bacterial Fertilizer on maize.

B. Objectives:

- i) To study the effects of organic, inorganic as well as bacterial fertilizers on maize yield and soil properties.
- ii) To study the effects of chemical fertilizer with or without organic manures in the long run.

C. Plan. of Work:

The long run effects of 9 treatments will be tested in RBD with 3 replications. Individual Plot size will be 6 m x 4.5 m (6 rows of 6 m length). The trial will be conducted on the same piece of land. A composite soil sample will be taken from each plot before sowing and after harvest of the crop. Net harvest area will be the two central rows.

Treatments:

1. Control.
2. Compost 20 tons/ha.
3. Azotobacter.

POST HARVEST TECHNOLOGY

4. 100: 40: 30: NPK kg/ha.
5. 50% chemical fertilizer, i.e., 50:20:15: NPK kg/ha + 50% compost, i.e., 10 tons/ha.
6. 25% chemical fertilizer, i.e., 25:10:7.5: NPK kg/ha + 75% compost, i.e., 10 tons/ha.
7. Kissan Mal at the rate of 100 kg N/ha.
8. 50% Kissan Mal + Urea (50 kg N/ha).
9. Farmer's Practice.

Locations:

- 1) Rampur (Maize-Maize rotation)
- 2) Khumaltar (Maize-Wheat rotation)

Estimated Duration : 5 years or more

Project Leader : NMDP

Cooperators : Soil Science Division, Khumaltar

Data to be collected :

- i) Days to 50% silking.
- ii) Plant height (av. of Net harvest area/plot).
- iii) Plant stand in the Net harvest area/plot.
- iv) Cob length (Average of the Net harvest area).
- v) Total number of cobs in the net harvest area.
- vi) Grain yield (kg/Net harvest area).

Expenditures : Recurring expenditure/Site/Season

a) Labour	Rs. 400/-
b) Manures and Fertilizers	Rs. 400/-
c) Pesticides	Rs. 100/-
d) Seed	Rs. 75/-
e) Miscellaneous	Rs. 200/-

Project No. : 2041/2042 NMDP - 25
Division : Maize
Section or Program : NMDP
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 along. Use of thicker gauge of polyethylene lined gunny sack with relation to different seed moisture content was initiated in 2037/2038 Bickram Sambat at Rampur, which will be continued.

Objectives:

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.

Plant of Work:

Fresh needs from winter harvest will be sun-dried and brought at 10, 11, 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 : 3 years

Location : Rampur

Cooperator : Entomology Division, Plant Pathology Division and Division of Botany

Project Leader : Agriculture Division and 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. @ 20 Paisa/bag	Rs. 80.00
h) Miscellaneous	Rs. 100.00
i) Land required: Store Room (10' x 12')	

OUTREACH PROGRAM AND SEED MULTIPLICATION PROGRAM

Project No. : 2041/2042 NMDP - 26
Division : NMDP
Project Title : Farmer's Field Varietal Trial on Maize
Objectives:

- (a) To obtain comparative yield data and other information concerning the performance of improved maize genotypes in Kharif and Winter season.
- (b) To enable farmers to express their varietal preferences.

Plan of Work:

Design - Randomized Block Design (RBD)
Replication - Three (3) Please plant one replication without chemical fertilizer
Fertilizer application rate - 90:45:45 NPK kg/hac.
Basal Dose = 45:45:45: NPK kg/ha.
Side dressing = 45:0:0: NPK kg/ha.
Plot size - For Hill = 4.5 m x 3 m (6 rows of 3 m long)
For Terai = 5 m x 3 m (4 rows of 5 m long)

Entries:	S.No.	Hill Set		Terai Set
		Early	Full Season	
	1.	Arun - 1	Manakamana - 1	Rampur-1
	2.	Arun - 2	Manakamana - 2	Rampur-2
	3.	Arun - 4	Khumal Yellow	Rampur Composite
	4.	Farmers' Local	Farmers' local	Farmers' Local

Observations to be taken:

01. Cooperator's Name _____
02. Address, Panchayat _____ Ward No. _____ District _____
03. Date of Planting _____

04. Date of side dressing _____
05. Days to 50% silking _____
06. Plant stand at harvest _____
07. Lodging (a) Root _____ (b) Stalk _____
08. No. of harvested ears _____
09. No. of rotten ears _____
10. Field weights (kg) _____
11. Moisture % _____
12. Net harvested area _____ sq. m. (No. of rows _____ & row length
in meter)
13. Date of harvesting _____
14. Farmer's choice/preferences = 1st _____ 2nd _____

Expenditures:

Recurring - Rs. 200.00/location

Non-Recurring - -

Personnel involved: NMDP, ADO's Projects, Farm and Station

Locations:

- Pakharibas Agriculture Center
- Lumle Agriculture Center
- Kakani Agriculture Farm
- Kavre Agriculture Farm
- Agri. Botany Division Khumaltar
- IHDP Dandapakhar
- ADO Nuwakot
- Rapti Project Dang
- HFPP Syangja
- HFPP Tanahu

- HFPP Lamjung
- HFPP Gorkha
- CARE/NEPAL
- Tanahu Project Palpa
- Chitwan (Command Area)
- Makawanpur (Command Area)
- Nawalparashi (Command Area)
- Gorkha (Command Area)

Project No. : 2041/2042 NMDP - 27
Division : NMDP
Project Title : Verification Trial on Maize for:
i) Inner Tarai and Foot Hills
ii) Hills

1) Inner Tarai and Foot Hills

Objectives:

- (a) To compare the two planting methods.
- (b) To find out the economical response of N & NP application.
- (c) To enable the farmers to observe and choose two suitable planting methods.

Plan of Work: Treatment Combination (Summer)

01. Rampur Composite (IV) + 30 kg N/ha ., all side dressing + behind the plough planting.
02. Rampur Composite (IV) + 60:30 NP kg/ha ., apply $\frac{1}{2}$ N & all P_2O_5 as a basal dose and remaining $\frac{1}{2}$ N side dressing + behind plough planting.
03. Rampur Composite + 60:30 NP kg/ha ., apply $\frac{1}{2}$ N and all P_2O_5 as a basal dose and remaining $\frac{1}{2}$ N side dressing + line planting (75 cm x 25 cm) with 53,000 plant population.
04. Rampur Composite (IV) + 60:30 NP kg/ha ., apply $\frac{1}{2}$ N & all P_2O_5 as a basal dose and remaining $\frac{1}{2}$ N side dressing + line planting + insecticide application i.e. sevin application immediately after the pin holes appears in the leaves @ 4-7 granules/plant (8-10 kg/ha.).

Plot Size : 100 m² for each treatment i.e. 400 m²
Replication : Location as a replication
Duration : 2 years at least
Variety : Rampur Composite
Amount of Seed : 1 kg for 1 trial

Observation to be taken:

1. Cooperator's Name _____
2. Address _____ Panchayat _____
District _____
Ward No. _____
3. Date of Planting _____
4. Plot size for each treatment _____
5. Date of side dressing _____
6. Plant stand at harvest _____
7. No. of harvested ears _____
8. Field weight (kg) _____
9. Moisture % _____
10. Net harvested area (m²) _____
11. Farmer's reaction: _____

Expenditures:

Recurring - Rs. 250:00
Non-Recurring - Rs. -

Personnel Involved: NMDP, ADO's, Farms, Stations, Projects

Locations: Chitwan (Command Area)
Makawanpur (Command Area)
Nawalparasi (Command Area)

ii) Hills

Objectives:

- (a) To observe the effects of different technological inputs.
- (b) To find out the economical response of N application.

Plan of Work: Treatment Combination

01. Farmer's Variety + Farmer's Level of FYM + Farmer's method of Planting.
02. Farmer's Variety + 30 kg N/ha. side dressing + planting behind the plough.
03. Improved Variety (Khumal) rest same as treatment no. 01.
04. Same as treatment no. 3 but 30 kg N/ha. side dressing
05. Same as treatment no. 4 but planting behind the plough alternating 2 passage (1st plough passage seed, 2nd and 3rd empty and 4th again seed and so on).

Replication : Locations as a replication
Plot Size : 500 m² (100 m² for each treatment)
Duration : 2 years at least
Amount of Seed Requirement : 1.0 kg (NMDP will make available free of cost)
Variety : Khumal Panhelo

Observation to be taken:

1. Cooperator's Name _____
2. Address _____ Panchayat _____
District _____
Ward No. _____
3. Date of planting _____
4. Plot size (m²) for each treatment _____
5. Date of side dressing _____
6. Plant stand at harvest _____
7. No. of harvested ears _____
8. Field weight (kg) _____

9. Net harvested area (m²) _____
10. Moisture % _____
11. Farmer's Reaction: _____

Expenditures:

Recurring - Rs. 200:00

Non-Recurring - -

Personnel Involved: NMDP, ADO's, Project, Farms and Stations

Locations:

- Pakharibas Agri. Center
- Lumle Agri. Center
- Kavre Agri. Farm
- Kakani Agri. Farm
- Agri. Botany Section, Khumaltar
- IHDP Dandapakhar
- HFPP Syangja
- HFPP Tanahu
- HFPP Lamjung
- HFPP Gorkha
- CARE/NEPAL
- Tinau Project Palpa
- Chitwan (Command Area)
- Makawanpur (Command Area)
- Nawalparashi (Command Area)
- Gorkha (Command Area)

Training and Extension Services:

1. Training:

The Farmers' training will be conducted sub-centre level in each four command District consisting of 25 farmers. This will be of in each district.

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. Participation at ADO Staff Meeting:

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

4. Minikit Distribution:

Minikit will be distributed to all districts.

5. 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.

Project No. : 2041/2042 NMDP - 28
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 varies 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 parts 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 in accordingly.

1. Monsoon Minikit:

Area: 500 m² for each set of minikit.

Seed Rate: 1 kg for each set of minikit.

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

Urea 5 kg for each set of minikit (side dressing)

Insecticides: Sevin granule 300 g. for each set of minikit, whorl application only for borer control.

Booklet: A guidebook of planting maize.

Feedback Form: Collection of farmers reaction to NMDP.

2. Winter Minikit:

Area: 1000 m² each.

Seed Rate: 2 kg for each set of minikit.

Booklet: 1 copy.

Feedback Form: 1 copy.

3. Spring Minikit:

Area: 500 m² for each set of minikit.

Seed Rate: 1 kg for each set of minikit.

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

Booklet: 1 copy.

Feedback 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 granules 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 insecticides 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 insecticides 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 or Regional headquarter 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: 46 districts,
2. Winter: 27 districts, and
3. Spring: 28 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 m²

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

Materials Requirement:

Urea 5 kg	Rs. 17.75
Seed 1 kg	Rs. 8.00
Insecticide (Sevin Gr.) 300 Gr.	Rs. 4.00
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
Feedback Form	Rs. 0.50
	<hr/>
Total	Rs. 66.75

2. Winter Minikits:

Area: 100 m²

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

Materials Requirement:

Seed 2 kgs	Rs. 16.00
Plastic bags 5 pieces	Rs. 2.50
Labour charge	Rs. 2.50
Transportation	Rs. 3.00
Booklet 1 copy	Rs. 1.50
Feedback Form	Rs. 0.50
	<hr/>
Total	Rs. 26.00

3. Spring Minikits:

Area: 500 m²

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

Materials Requirement:

Complex 7.5 kgs	Rs. 24.75
Urea 3.5 kg	Rs. 12.50
Seed 1 kg	Rs. 8.00
Insecticide 300 gr.	Rs. 5.00
Plastic bag 4 pieces	Rs. 2.00
Labour charge	Rs. 6.50
Booklet 1 copy	Rs. 1.50
Feedback Form 1 copy	Rs. 0.50
Transportation	Rs. 5.00
	<hr/>
Total	Rs. 65.75

Millet Minikit:

Materials Requirement:

Seed ½ kg	Rs. 3.00
Plastic 2 pieces	Rs. 1.00
Transportation	Rs. 1.00
Labour	Rs. 1.00
	<hr/>
Total	Rs. 6.00

Minikit Distribution Chart

Eastern Region

Seasonal Demonstration of Minikits					
<u>S.No.</u>	<u>Districts</u>	<u>Monsoon</u>	<u>Winter</u>	<u>Spring</u>	<u>Finger Millet</u>
1.	Illam	100	-	-	50
2.	Terathum	100	-	-	30
3.	Panchthar	100	-	-	30
4.	Lhankuta	100	-	-	60
5.	Ehojpur	100	-	25	30
6.	Udaipur	100	-	25	30
7.	Diktel	100	-	-	30
8.	Okhaldhunga	100	-	-	30
9.	Sankhuwasabha	100	-	-	30
10.	Taplejung	75	-	-	30
11.	Jhapa	100	75	50	50
12.	Morang	-	125	25	-
13.	Sunsari	-	100	25	-
14.	Siraha	-	125	75	100
15.	Saptari	-	125	75	-
Total		1075	550	300	500

Minikit Distribution Chart

Central Region

<u>Seasonal Demonstration of Minikits</u>					
<u>S.No.</u>	<u>Districts</u>	<u>Monsoon</u>	<u>Winter</u>	<u>Spring</u>	<u>Finger Millet</u>
1.	Sindhuli	100	25	50	50
2.	Ramechhap	100	-	25	-
3.	Kavre	100	25	25	75
4.	Dhading	100	50	25	50
5.	Nuwakot	100	75	25	75
6.	Rasuwa	100	-	-	-
7.	Dolakha	50	-	-	75
8.	Sindhupalchowk	50	-	-	75
9.	Sarlahi	50	125	50	-
10.	Makawanpur	300	150	25	100
11.	Rautahat	50	125	25	-
12.	Dhanusha	-	125	75	-
13.	Mahottari	-	125	25	-
14.	Chitawan	300	150	50	125
Total		1400	975	400	680

Minikit Distribution Chart

Western Region

<u>Seasonal Demonstration of Minikits</u>					
<u>S.No.</u>	<u>Districts</u>	<u>Monsoon</u>	<u>Winter</u>	<u>Spring</u>	<u>Finger Millet</u>
1.	Tanahun	100	50	25	50
2.	Gorkha	300	75	50	125
3.	Lamjung	100	50	25	50
4.	Kaski	75	75	25	50
5.	Syangja	100	75	25	50
6.	Parbat	50	-	-	30
7.	Baglung	50	-	-	30
8.	Gulmi	100	-	-	30
9.	Palpa	100	50	50	50
10.	Nawalparasi	300	50	25	-
11.	Rupandehi	-	50	25	-
Total		1275	475	225	465

Minikit Distribution Chart

<u>Seasonal Demonstration of Minikits</u>					
<u>S.No.</u>	<u>Districts</u>	<u>Monsoon</u>	<u>Winter</u>	<u>Spring</u>	<u>Finger Millet</u>
<u>Mid-Western Region</u>					
1.	Sallyan	100	-	-	50
2.	Pyuthan	100	-	-	50
3.	Surkhet	100	-	25	30
4.	Dang	100	-	25	50
5.	Rukum	50	-	-	-
6.	Dailekh	50	-	-	30
7.	Banke	50	50	-	-
8.	Bardia	50	50	-	-
Total		600	100	50	210
<u>Far-Western Region</u>					
1.	Kailali	50	50	-	-
2.	Kanchanpur	50	50	-	-
3.	Doti	50	-	-	75
4.	Dandeldhura	50	-	-	70
5.	Achham	50	-	-	-
Total		250	100	-	145
Eastern Region		1075	550	300	500
Central Region		1400	975	400	680
Western Region		1275	475	250	465
Mid-Western Region		600	100	50	210
Far Western Region		250	100	-	145
Grand Total		4600	2200	1000	2000

Maize and Millet Seed Multiplication Program at Different Farms/Stations

2041/42 (1984/85)

<u>Farms/Stations</u>	<u>Foundation Seed MT</u>	<u>Improved Seed MT</u>	<u>Seed Source</u>
1. <u>Kenkai</u>			
Rampur Yellow	-	10.00	Tarahara
Dalle - 1	-	0.10	Rampur
2. <u>Tarahara</u>			
Rampur Yellow	2.0	8.00	Tarahara
3. <u>Hardinath</u>			
Sarlahi Seto	1.0	10.00	Hardinath
4. <u>Oil Seed Program</u>			
Rampur Composite	1.0	5.0	Rampur
5. <u>Kavre</u>			
Kakani Yellow	0.5	6.00	Kavre
6. <u>Agri. Bot. Division</u>			
Khumal Yellow	0.5	-	Khumaltar
7. <u>Agronomy Division</u>			
Dalle - 1	-	0.2	Rampur
8. <u>Kakani</u>			
Kakani Yellow	0.5	4.50	Kakani
Okhale - 1	-	0.10	Rampur
9. <u>Rampur</u>			
Rampur Composite	4.0	10.00	Rampur
Khumal Yellow	4.0	10.00	Rampur

<u>Farms/Stations</u>	<u>Foundation Seed MT</u>	<u>Improved Seed MT</u>	<u>Seed Source</u>
Arun - 2	3.0	5.00	Rampur
Dalle - 1	-	1.00	Rampur
10. <u>Surkhet</u>			
Sarlahi Seto	-	5.00	Surkhet
Arun - 2	-	1.00	Surkhet
11. <u>Doti</u>			
Khumal Yellow	-	1.00	Rampur
Dalle - 1	-	0.075	Rampur
12. <u>Jumla</u>			
Khumal Yellow	-	0.60	Rampur
13. <u>Lumle</u>			
Dalle - 1	-	0.10	Rampur
Okhale - 1	-	0.10	Rampur
14. <u>Nepalgunj</u>			
Rampur Composite	-	5.00	Rampur
15. <u>Pakhribas</u>			
Dalle - 1	-	0.15	Rampur
Okhale - 1	-	0.10	Rampur
16. <u>Sindhuli Agri. Farm</u>			
Khumal Yellow	-	1.00	Rampur
Arun - 2	-	1.00	Rampur
17. <u>Khairanitar</u>			
Arun - 2	2.0	10.00	Rampur
Khumal Yellow	2.0	10.00	Khairanitar
Dalle - 1	-	0.2	Rampur

Proposed Maize Seed Multiplication Program in Farmer's Field

2041/42 (1984/85)

Area: Hectare

S.No.	Districts	Season	Khumal Yellow	Rampur Composite	Arun-2	Rampur Yellow	Kakani Yellow	Sarlahi Seto	Foundations Seed Source
01	Morang	Winter	-	100	-	-	-	-	
02	Chitawan	Winter and Spring	100	-	100	-	-	-	
03	Bara	Winter	100	100	-	-	-	-	
04	Parsa	Winter	50	-	-	-	-	-	National Maize Development
05	Dhanusha	Winter	-	-	-	50	-	-	Program
06	Mahottari	Winter	-	-	-	-	-	30	
Total			250	200	100	50	-	30	

MILLET PROGRAM

Line Project

Project No. : 2041/2042 NMDP - 29
Division : Finger Millet
Section or Program : Millet Development Program
Line Project Title : Initial evaluation trial
Description of Work :

A. Origin and Brief History:

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

B. Objectives:

To evaluate the promising lines for longer plot trials.

C. Plan of Work:

Design: RBD Rep-4 plot size - $2m^2$ (2 x 1) (5 rows 2 m long. plant spacing 20 x 10 cm).

D. Estimated duration : Continuous
Location : Khumaltar, Rampur, PAC, LAC
Cooperation : Rampur, Khumal, PAC, LAC
Other Leader : NMDP
Other Research Staff : Concerning assistant agronomist of different farms/stations

<u>Items of Expenditure</u>	1. Seed	Rs. 20/-
	2. Fertilizer	Rs. 100/-
	3. Insecticides and pesticides	Rs. 15/-
	4. Labour	Rs. 250/-
	5. Miscellaneous	Rs. 50/-
	Total	Rs. 435/-

Project No. : 2041/2042 NMDP - 30
Division : Finger Millet
Section/Program : NMDP
Line Project Title : Advanced varietal trial
Description of Work :

A. Origin and Brief History:

In the beginning finger millet program was started under of these were done. In the meantime selection work of these lines were carried out and tested in different hilly as well as the inner Terai regions. And consequently, in 1978/79 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. Objectives:

The central theme behind this is to observe the behavior of the quantitative and qualitative agronomic characteristics for each variety.

C. Plan of Work:

Design: RBD; Rep 4; Plot size (4x2) m² (Row spacing 20 cm and plant spacing 10 cm). Fertilizer: 40:40:20 NPK kg/ha; Treatment - 10.

D. Estimated duration : Continuous

Location : Rempur

Project Leader : NMDP

E. Expenditures:

1. Seed	: Rs. 40/-
2. Fertilizer	: Rs. 150/-
3. Insecticides and pesticides	: Rs. 50/-
4. Labour	: Rs. 500/-
5. Miscellaneous	: Rs. 100/-
Total	<u>Rs. 840/-</u>

Project No. : 2041/2042 NMDP - 31
Division : Finger Millet
Section or Program : NMDP
Line Project Title : Fertilizer Trial on Finger Millet
Description of Work :

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 1978/79 at Khumaltar farm. The recommended dose of the chemical fertilizer for the general cultivation of the finger millet crop was 40:40:20 kg NPK/ha.

B. Objective:

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

C. Plan of Work:

Design: Split plot; Replication 4; Plot size 15 m² (3m x 5m)

Fertilizer: 40:40:20 NPK kg/ha. Treatments main treatment variety - 2 subtreatment fertilizer - 4.

D. Estimated Duration: Three years.

E. Location: Rampur and Khumal

Cooperation: Agronomy and Soil Science Divisions

Project Leader: NMDP

Other Research Staff: Concerned staff of different Farms/Stations.

<u>Items of Expenditure:</u>	1. Seed	Rs. 40/-
	2. Fertilizer	Rs. 150/-
	3. Insecticides & pesticides	Rs. 20/-
	4. Labour	Rs. 500/-
	Total	Rs. 710/-

Project No. : 2041/2042 NMDP - 32
Division : Finger Millet
Section or Program : NMDP
Line Project Title : Different dates of Transplanting
Description of Work :

A. Origin and Brief History:

The released varieties of finger millet were tested in collaboration with division of Agronomy and NMDP.

B. Objectives:

To find out the optimum date of finger millet by transplanting at Chitawan 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) = 20 m²

D. Estimated Duration : 3 years

Location : Rampur

Project Leader : NMDP

Other Research Staff : Concerning Agronomists and Technical Assistants

E. Expenditures:

1. Seed	:	Rs. 5.00
2. Fertilizer	:	Rs. 40.00
3. Insecticides and pesticides	:	Rs. 25.00
4. Labour	:	Rs. 450.00
Total		<hr/> Rs. 520.00

Project No. : 2041/2042 NMDP - 33
Division : Sorghum
Section or Program : NMDP
Line Project Title : Sorghum varietal trial
Description of Work :

A. Origin and Brief History:

Since last two years, Sorghum Development Program has been undertaken under the direct supervision of NMDP 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 the above told experiment.

B. Objectives:

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

C. Plan of Work:

Design RBD; Rep 4; Plot Size 6 m² plant to plant spacing 25 cm, Row to row 50 cms.

D. Estimated duration : Continuous

Location : Rampur

Project Leader : NMDP

Items of Expenditures :

1. Seed	: Rs. 5.00
2. Fertilizers	: Rs. 100.00
3. Insecticides and pesticides	: Rs. 50.00
4. Labour	: Rs. 1100.00
Total	<u>Rs. 1255.00</u>

Project No. : 2041/2042 NMDP - 34
Division : Sorghum
Section or Program : NMDP
Line Project Title : Introduction Line
Description of Work :

A. Origin and Brief History:

The sorghum Development Program for the first time initiated at Rampur by the NMDP, by introducing some indigenous and exotic lines. All these indigenous lines 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 abroad in order to carry on their further study.

B. Objectives:

To identify the new superior and promising lines for their various kinds of desired traits.

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C. Plan of Work:

To multiply their seeds (2m length and 2m width will be individual plot size, spacing 50 x 25 cms).

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

D. Estimated duration : Continuous
Location : Rampur
Cooperations : Rampur Agri. Station & Division of Pl. Path.
Project Leader : NMDP

E. Items of Expenditure :

1. Seed	:	Rs.	10.00
2. Fertilizers	:	Rs.	350.00
3. Insecticides and pesticides	:	Rs.	60.00
4. Labour	:	Rs.	800.00
Total		Rs.	1220.00

Project No. : 2041/2042 NMDP - 35

Division : Pearl Millet

Section or Program : NMDP

Line Project Title : Introduction Line

Description of Work :

A. Origin and Brief History:

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

B. Objectives:

To identify the new superior and promising lines for their desired traits.

C. Plan of Work:

To multiply their seeds (1.5 m width and 2 m length will be individual plot, spacing 50 x 15 cm²).

Fertilizer: 60:40:20 kg NPK/ha.

D. Estimated duration : Continuous

Cooperations : Rampur Agri. Station and Division of Pl. Path.

Project Leader : NMDP

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

Project No. : 2041/2042 NMDP - 36
Division : Finger Millet
Section or Program : NMDP
Line Project Title : Observation Nursery
Description of Work :

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 indigenous 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 indigenous lines with a view to gather more information for their further study.

B. Objectives:

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 (3 meter long 2 rows in each plot). Spacing row to row 20 cm and plant to plant 10 cm and the distance between two varieties will be about 30 cms.

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

D. Estimated duration : Continuous
Location : Rampur
Cooperation : Rampur Agri. Station and Division of Plant Pathology
Project Leader : NMDP

E. Expenditure:

1. Seed	:	Rs. 5.00
2. Fertilizer	:	Rs. 30.00
3. Insecticides and Pesticides	:	Rs. 20.00
4. Labour	:	Rs. 300.00
Total		<u>Rs. 355.00</u>

PRODUCTION PROGRAM

PRODUCTION PROGRAM OF MAIZE

NMDP has been entrusted with the responsibility of increasing maize production of Nepal. To achieve this goal, several outreach activities are going and will continue during 1984/85 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 1984/1985. It is estimated that 50% 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:

	<u>N</u>	<u>P</u>	<u>K</u> (kg)	<u>Credit</u>
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 through adoption of the improved technology, yield would be maintained at 2.3 T/ha during 1984/1985. 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 1.9 t/ha. during 1984/1985.

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 the following table.

District-wise Production Program, 1984/85 (2041/42)

(Area in ha.)

Region	District	Special	Pocket	General
Eastern Development Region	01. Taplejung	50.0	60.0	1380.0
	02. Jhapa	2000.0	900.0	2600.0
	03. Sankhuwasabha	10.0	200.0	1500.0
	04. Terahthum	70.0	190.0	1670.0
	05. Panchthar	15.0	30.0	1800.0
	06. Udaypur	500.0	100.0	1500.0
	07. Okhaldhunga	35.0	250.0	1450.0
	08. Solukhumbu	50.0	20.0	1110.0
	09. Sunsari	25.0	500.0	3500.0
	10. Ilam	300.0	125.0	2200.0
	11. Siraha	1000.0	200.0	3650.0
	12. Morang	2000.0	1000.0	5500.0
	13. Saptari	300.0	185.0	3510.0
	14. Bhojpur	50.0	100.0	1730.0

Region	District	Special	Pocket	General
	15. Khotang	50.0	20.0	1600.0
	16. Dhankuta	320.0	1120.0	3300.0
	Total	7000.0	5000.0	38000.0
Central Development Region	01. Chitwan	2600.0	1700.0	1400.0
	02. Bara	3500.0	400.0	660.0
	03. Parsa	2460.0	60.0	4750.0
	04. Makawanpur	770.0	1340.0	9105.0
	05. Nuwakot	100.0	800.0	4555.0
	06. Rautahat	200.0	225.0	1200.0
	07. Dhading	1110.0	62.0	5500.0
	08. Dhanusha	221.0	535.0	2235.0
	09. Mahottari	500.0	200.0	1500.0
	10. Sarlahi	315.0	278.0	2460.0
	11. Sindhuli	175.0	125.0	3200.0
	12. Lalitpur	1005.0	350.0	1490.0
	13. Bhaktapur	500.0	100.0	1400.0
	14. Kathmandu	10.0	305.0	2555.0
	15. Kavrepalanchok	150.0	50.0	6000.0
	16. Sindhupalchok	500.0	215.0	4046.0
	17. Rasuwa	5.0	120.0	690.0
	18. Ramechhap	15.0	200.0	1125.0
	19. Dolkha	30.0	65.0	1020.0
	Total	14266.0	7130.0	54891.0
Western Development Region	01. Gulmi	340.0	300.0	1500.0
	02. Manang	-	10.0	20.0
	03. Parbat	200.0	100.0	1700.0
	04. Gorkha	330.0	200.0	2000.0
	05. Myagdi	300.0	100.0	1200.0

Region	District	Special	Pocket	General	
	06. Kapilbastu	450.0	200.0	100.0	
	07. Kaski	450.0	200.0	1900.0	
	08. Nawalparasi	1700.0	400.0	5000.0	
	09. Arghakhanchi	200.0	100.0	500.0	
	10. Baglung	300.0	300.0	1600.0	
	11. Rupandehi	500.0	50.0	3000.0	
	12. Syangja	370.0	200.0	3000.0	
	13. Palpa	400.0	500.0	6300.0	
	14. Tanahu	330.0	50.0	2000.0	
	15. Lamjung	230.0	300.0	2200.0	
	16. Mustang	-	-	-	
	Total	6100.0	3010.0	32020.0	
	Mid-Western Development Region	01. Bā e	1000.0	500.0	4000.0
		02. Barā e	1000.0	300.0	4000.0
		03. Dang	1000.0	1055.0	6000.0
		04. Salyan	400.0	50.0	600.0
		05. Pyuthan	1000.0	200.0	3000.0
06. Rukum		100.0	100.0	1000.0	
07. Rolpa		150.0	40.0	900.0	
08. Jajarkot		50.0	100.0	400.0	
09. Kalikot		50.0	10.0	200.0	
10. Surkhet		125.0	100.0	1600.0	
11. Dailekh		50.0	100.0	800.0	
12. Humla		-	-	-	
13. Jumla		-	50.0	200.0	
14. Mugu		50.0	10.0	100.0	
15. Dolpa		50.0	20.0	200.0	
Total		5025.0	2635.0	23000.0	

Region	District	Special	Pocket	General
Far Western Development Region	01. Kailali	250.0	250.0	3000.0
	02. Bajhang	10.0	10.0	100.0
	03. Kanchanpur	300.0	300.0	3100.0
	04. Baitadi	200.0	200.0	2000.0
	05. Doti	20.0	20.0	100.0
	06. Darchula	100.0	-	350.0
	07. Dandeldhura	75.0	500.0	180.0
	08. Bajura	10.0	10.0	100.0
	09. Achham	10.0	10.0	100.0
	Total	1000.0	1300.0	9030.0
National Total		33391.0	19075.0	156,941.0