

**RESEARCH PROJECT
MANAGEMENT INFORMATION SYSTEM
(RPMIS)**

RP 08569

ICRISAT CENTER - GROUNDNUT

October 1991

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**ICRISAT
Research Project Proforma**

1. Project Number: **LG -601(90)IC/IC**
2. Predecessor Project:
3. Linked Projects:
4. Title: **Breeding for resistance to rust and late leaf spot
of groundnut**

5. Discipline(s):

Genetic Resources	Pathology
Physiology	Entomology
Cell Biology	

6. Crop(s)/Resource(s):

groundnut

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Reddy, L.J.	0.40	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Nigam, S.N.	0.01
Subrahmanyam, P.	0.10
Ramraj, V.M.	0.05
Moss, J.P.	0.03
Singh, A.K.	0.01

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
ICAR/AICORPO, NARS Scien.		

8. Dates:

- a. Approval Date: **19900101**

b. Starting Date: 01/1990

c. Review Dates: 1992

d. Completion Date: 1992

9. Background:

During the last 12 years at ICRISAT Center several rust and late leaf spot resistant sources available within the cultivated species have been utilized in the breeding program and high yielding varieties with high levels of rust resistance and moderate levels of late leaf spot resistance/tolerance have been developed. Two such elite resistant varieties, ICG(FDRS) 4 and ICG(FDRS) 10 are being considered for release, in peninsular India where rust and late leafspot are prevalent. There is further scope for the improvement in kernel yields by increasing shelling percentage of the advanced breeding lines and interspecific derivatives.

10. Objectives:

1. To develop high yielding rust and late leaf spot resistant varieties adapted to different agroecological conditions 2. To evaluate and characterise the new sources of resistance 3. To improve shelling percentage and other pod and seed characteristics of high yielding resistant varieties 4. To reduce the maturity duration and increase to shelling percentage of high yielding resistant interspecific derivatives 5. To study the inheritance of components of rust and late leaf spot resistance.

11. Techniques:

1. Standard breeding procedures including limited backcrossing would be followed to develop high yielding resistant varieties with acceptable pod and seed characters. 2. Using Mahalonobis D2 analysis and Canonical analysis the new resistant sources will be characterized. 3. The resistant lines from the preliminary trials will be screened under extended day length. 4. The early generation segregating material from crosses involving resistant x photoperiod insensitive parents will be screened.

12. Classification:

a. Keywords:

Rust resistance or	Late leafspot resistance
Photoperiod sensitivity	Interspecific derivatives

b. CGIAR Activities

Gerplasm - Enhancement	10.0%
Gerplasm - Plant breeding/improvement	80.0%
Gerplasm - International trials	10.0%

c. Type of Research (percent distribution):

Basic: 5.0 Strategic: 5.0 Applied: 85.0 Adaptive: 5.0

d. Geographical Scope: G

e. Target Regions:

South Asia	40.0%
Southeast Asia	40.0%
Western Africa	10.0%
Southern Africa	10.0%

13. Training Component:

a. In-Service 1 d. Research Fellows 0

b. Research Scholars 1 e. Apprentices 1

c. Post Docs 1

**ICRISAT
Research Project Proforma**

- 1. **Project Number:** LG -602(90)IC/IC
- 2. **Predecessor Project:**
- 3. **Linked Projects:**
- 4. **Title:** Breeding for resistance to aflatoxin contamination in groundnut

5. **Discipline(s):**

Breeding Pathology

6. **Crop(s)/Resource(s):**

groundnut

7. **Staffing:**

a. **Lead Scientists**

Name	Sci Years	Institute	Inst Type
Nigam, S.M.	0.10	ICRISAT	IARC
Reddy, L.J.	0.05	ICRISAT	IARC

b. **ICRISAT Scientists**

Name	Sci Years
Mohan, V.K.	0.10

c. **Non-ICRISAT Scientists**

Name	Institute	Inst Type
ICAR/AICORPO & NARS scientists		

8. **Dates:**

- a. **Approval Date:** 19900101
- b. **Starting Date:** 01/1990
- c. **Review Dates:** 1992
- d. **Completion Date:** 1992

9. Background:

Pre- and post-harvest infection of groundnut seeds by *A. flavus* occurs in most countries where the crop is grown, but is more serious where the temperatures are high and the crop encounters end-of-season drought. Seven germplasm lines (J 11, Ah 7223, Var. 27, UF 71513, Paizpur 1-5, PI 337394P, PI 337409) showing IVSCAF-resistance, were crossed to higher yielding adapted lines. Advanced generation breeding lines were screened for IVSCAF-resistance in trials at ICRISAT Center and other locations in India.

10. Objectives:

1. To develop high yielding varieties with resistance to aflatoxin contamination and pod rots.

11. Techniques:

Evaluation of the advanced breeding lines for yield potential, resistance to aflatoxin contamination and resistance to pod rots. Assist in developing an integrated aflatoxin containment package with aflatoxin contamination resistant lines as the base on which management approaches are superimposed.

12. Classification:

a. Keywords:

Dry seed coat resistance resistance breeding,
resistance to aflatoxin production, IVSCAF-resistance

b. CGIAR Activities

Germplasm - Enhancement	30.0%
Germplasm - Plant breeding/improvement	65.0%
Germplasm - International trials	5.0%

c. Type of Research (percent distribution):

Basic: 5.0 Strategic: 5.0 Applied: 85.0 Adaptive: 5.0

d. Geographical Scope: G

e. Target Regions:

South Asia	30.0%
Southeast Asia	50.0%
Western Africa	10.0%
Southern Africa	10.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	0
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

ICRISAT
Research Project Proforma

1. Project Number: LG -603(90)IC/IC
2. Predecessor Project:
3. Linked Projects:
4. Title: Breeding for resistance to groundnut viruses
5. Discipline(s):

Breeding Pathology
Entomology

6. Crop(s)/Resource(s):

groundnut

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Dwivedi, S.L.	0.10	ICRISAT	IARC
Reddy, L.J.	0.05	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Moss, J.P.	0.03
Singh, A.K.	0.01

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
NARS, ICAR/ICRISAT Scientists		

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1992

9. Background:

Bud Necrosis Disease (BND), caused by Tomato Spotted Wilt Virus (TSWV), is an important virus disease causing substantial yield losses in India, and becoming important in other countries as well. Several germplasm lines have shown resistance to vector (thrips). Resistance to TSWV have not been reported so far in cultivated groundnut. However, some varieties, particularly ICGV 86029 and ICGV 86031 with field resistance to BND, had shown tolerance to TSWV under repeated mechanical inoculation tests indicating that resistance to vector combined with tolerance to TSWV may be achieved t

10. Objectives:

1. To locate resistance/tolerance to TSWV in wild species and interspecific derivatives 2. To combine vector resistance with tolerance to TSWV 3. To study the mechanism of tolerance/resistance to TSWV 4. Genetic studies of resistance/tolerance to TSWV and PMV tolerance 5. To develop high yielding groundnut varieties with....

11. Techniques:

i) To screen germplasm/breeding lines, and wild species and their derivatives for possible resistance/tolerance to TSWV. ii) Single/multiple crosses involving sources with vector resistance and/or tolerance to TSWV to generate segregating populations. iii) Widely spaced late planting of segregating populations under natural insect pest infestation for field screening against BND. iv) Generation advance/selection following bulk/pedigree method. v) Laboratory scree

12. Classification:

a. Keywords:

Resistance breeding	Bud necrosis disease
Tomato spotted Wilt virus	Vector resistance
Peanut mottle resistance	Non-seed transmission

b. CGIAR Activities

Germplasm - Enhancement	30.0%
Germplasm - Plant breeding/improvement	65.0%
Germplasm - International trials	5.0%

c. Type of Research (percent distribution):

Basic: 5.0 Strategic: 5.0 Applied: 85.0 Adaptive: 5.0

d. Geographical Scope: G

e. Target Regions:

India	50.0%
South Asia	25.0%
Southeast Asia	25.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

ICRISAT
Research Project Proforma

1. Project Number: LG -604(90)IC/IC
2. Predecessor Project:
3. Linked Projects:
4. Title: Breeding for resistance to groundnut insect pests.
5. Discipline(s):

Genetic Resources	Pathology
Physiology	Entomology
Cell Biology	

6. Crop(s)/Resource(s):
groundnut
7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Dwivedi, S.L.	0.25	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Nigam, S.N.	0.01
Moss, J.P.	0.03
Reddy, D.V.R.	0.01
Ranga Rao, G.V.	0.01
Singh, A.K.	0.01
Jambunathan, R.	0.01
Nageswara Rao, R.C.	0.01
Ramraj, V.M.	0.01

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
NARS, Agricultural Universities, ICAR/ ICRISAT Collaborative project		

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1992

9. Background:

Several germplasm lines resistant to thrips and jassids has been identified. Resistance to Spodoptera have been located in ICGV 86031, ICGV 86535, and ICG 5240. ICG 5240 has also shown resistance to aphids. No stable resistant sources to leafminer identified so far though some lines had shown promise under field conditions which need further confirmation. Several thrips and jassid resistant/tolerant populations have been developed. Some of these had also shown field resistance to bud necrosis disease.

10. Objectives:

1. Develop varieties/populations with multiple resistance/tolerance to spodoptera, leafminer and aphids with particular emphasis on spanish types 2. Develop varieties/populations with combined vector (thrips) resistance and TSWV tolerance with particular emphasis on spanish types. 3. Inheritance studies on host-plant resistance to spodoptera and aphids 4. Locate stable resistant sources to leaf miner.

11. Techniques:

i) Single/multiple crosses and selected backcrosses are made to generate segregating populations. ii) Segregating populations, grown under natural insect-pest infestation, are advanced following bulk/pedigree methods. iii) Fairly uniform varieties/populations are yield tested under natural insect pest infestation, following three tier evaluation system for 3 consecutive years, to select varieties with stable resistance and wide adaptation.

12. Classification:

a. Keywords:

Sucking pests	Defoliators
Host-plant resistance	Germplasm enhancement
Resistance Breeding	

b. CGIAR Activities

Geroplasm - Enhancement	25.0%
Geroplasm - Plant breeding/improvement	65.0%
Geroplasm - International trials	10.0%

c. Type of Research (percent distribution):

Basic: 5.0 Strategic: 5.0 Applied: 85.0 Adaptive: 5.0

d. Geographical Scope: G

e. Target Regions:

Southeast Asia	40.0%
South Asia	30.0%
Southern Africa	20.0%
Eastern Africa	10.0%

13. Training Component:

a. In-Service 1 d. Research Fellows 1

b. Research Scholars 1 e. Apprentices 1

c. Post Docs 1

ICRISAT
Research Project Proforma

1. Project Number: LG -605(90)IC/IC
2. Predecessor Project:
3. Linked Projects:
4. Title: Breeding for drought tolerance in groundnut.
5. Discipline(s):

Genetic Resources	Breeding
Physiology	Cell Biology

6. Crop(s)/Resource(s):
- groundnut

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Reddy, L.J.	0.20	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Nageswara Rao, R.C.	0.10
Nigam, S.N.	0.01
Johansen, C.	0.01
Vacant	0.01

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
AICORPO, NARS scientists		

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1992

9. Background:

Screening technique using line-source sprinkler is standardized and genotypes possessing tolerance to mid-season and end-of-season droughts and varieties with better recovery ability have been identified. Genotypes with better water use have also been identified. Crosses between high yielding cultivars and drought tolerant sources have been made and are being advanced at ICRISAT Center and Anantapur under rainfed conditions both by bulk method and by single pod descent method.

10. Objectives:

- 1. To identify and develop drought resistant/tolerant groundnut varieties of early, medium, and late duration
- 2. To study the inheritance of components of drought tolerance/resistance.

11. Techniques:

(1) Intermating of mid-season and end-of-season stress tolerant genotypes. (2) Generation advance during postrainy season under drought treatment by standard breeding procedures. (3) Generation advance under rainfed conditions at Anantapur and ICRISAT Center during rainy season by mass pedigree and single pod descent methods. (4) Testing of fixed lines by using line-source technique. (5) Multilocation testing of promising varieties under rainfed conditions.

12. Classification:

a. Keywords:

Drought tolerance	Recovery ability
Genetics of efficient root	systems

b. CGIAR Activities

Germpasm - Enhancement	25.0%
Germpasm - Plant breeding/improvement	65.0%
Germpasm - International trials	10.0%

c. Type of Research (percent distribution):

Basic: 5.0 Strategic: 5.0 Applied: 85.0 Adaptive: 5.0

d. Geographical Scope: G

e. Target Regions:

South Asia	50.0%
Western Africa	40.0%
Southern Africa	10.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

ICRISAT
Research Project Proforma

- 1. Project Number:** LG -606(90)IC/IC
- 2. Predecessor Project:**
- 3. Linked Projects:**
- 4. Title:** Breeding for short-duration groundnut varieties.
- 5. Discipline(s):**
Breeding Physiology
- 6. Crop(s)/Resource(s):**
groundnut
- 7. Staffing:**

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Nigam, S.N.	0.10	ICRISAT	IARC
Reddy, L.J.	0.10	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Nageswara Rao, R.C.	0.01
Ramraj, V.M.	0.01
Singh, A.K.	0.01

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
NARS, Agricultural Universities, AICORPO/ ICAR scientists		

8. Dates:

- a. Approval Date:** 19900101

b. Starting Date: 01/1990

c. Review Dates: 1992

d. Completion Date: 1992

9. Background:

Early maturing groundnut varieties are required in areas where (i) end of season droughts are frequent, (ii) crop is grown in receding moisture conditions, and (iii) intensive cropping systems and intercropping situation require short-duration variation. These areas are widespread in the groundnut growing regions of Africa and South and Southeast Asia. Limited germplasm search and irradiation of early source lines to diversify the sources have been attempted.

10. Objectives:

1. To improve the yield levels of the 90-day varieties 2. To incorporate limited seed dormancy into the early varieties 3. To incorporate resistances to diseases, insect pests and abiotic stresses relevant to regions.

11. Techniques:

(1) Improve further the methodology to screen for earliness by including other environmental factors in the model to predict harvest data. (2) Continue to improve yield levels of early lines by using standard breeding procedures. (3) Creation of gene pools for the combinations of stress resistances relevant to early lines for different regions in the SAT (bacterial wilt and peanut-stripe do not occur at ICRISAT Center).

12. Classification:

a. Keywords:

Early maturity	Limited seed dormancy
Cumulative thermal time	Biotic and abiotic

b. CGIAR Activities

Germplasm - Enhancement	20.0%
Germplasm - Plant breeding/improvement	70.0%
Germplasm - International trials	10.0%

c. Type of Research (percent distribution):

Basic: 5.0 Strategic: 5.0 Applied: 85.0 Adaptive: 5.0

d. Geographical Scope: 0

e. Target Regions:

Southeast Asia	60.0%
South Asia	20.0%
Southern Africa	10.0%
Western Africa	10.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

ICRISAT
Research Project Proforma

1. Project Number: LG -607(90)IC/IC
2. Predecessor Project:
3. Linked Projects:
4. Title: Breeding medium maturing groundnut varieties with resistanceto multiple stress factors.

5. Discipline(s):

Crop Quality Unit	Breeding
Pathology	Physiology .
Entomology	

6. Crop(s)/Resource(s):

groundnut

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Nigam, S.N.	0.30	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Dwivedi, S.L.	0.01
Reddy, L.J.	0.01
Singh, A.K.	0.01
Nageswara Rao, R.C.	0.01
Ramraj, V.M.	0.05
Jambunathan, R.	0.01

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
NARS, ICAR/ICRISAT Collaborative project		

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1992

9. Background:

Success in developing groundnut varieties in the medium- and late-maturing group has been most spectacular. ICGS 11 (ICGV 87123) and ICGS 44 (ICGV 87128) have been released for irrigated post-rainy season cultivation in India. ICGS 37 (ICGV 87187) has been identified for pre-release seed multiplication for summer groundnut zone II consisting of Gujarat, North Maharashtra and Madhya Pradesh. Another variety, ICGS 76 (ICGV 87141), has been recently released for rainfed cultivation in southern Maharashtra, Andhra Pradesh (except North coastal districts), Tamil Nadu, and Karnataka.

10. Objectives:

1. Development of high yielding base populations adapted to rainy as well as post-rainy irrigated situations responsive to high/low input systems 2. Incorporate multiple resistance to major biotic (insect-pests-leafminer, spodoptera; foliar diseases--rust, late leafspot and early leafspot) and abiotic (drought) stresses. 3. To select photoperiod insensitive varieties/populations for wide adaptation 4. Inheritance studies of photoperiod response.

11. Techniques:

i) Single and multiple crosses involving source with multiple resistance/tolerance to biotic and abiotic stresses, are made with high yielding widely adapted varieties to generate broad based populations. ii) Segregating populations are grown under natural insect-pest and foliar diseases situation to select for resistance to pests and diseases coupled with desirable agronomic traits. iii) Generation advance and selections following bulk/pedigree method.

12. Classification:

a. Keywords:

High yielding varieties	Adaptation breeding
Biotic stress	Abiotic stresses
Oil types	

b. CGIAR Activities

Germplasm - Enhancement	10.0%
Germplasm - Plant breeding/improvement	80.0%
Germplasm - International trials	10.0%

c. Type of Research (percent distribution):

Basic: 5.0 Strategic: 5.0 Applied: 85.0 Adaptive: 5.0

d. Geographical Scope: G

e. Target Regions:

South Asia	50.0%
Southeast Asia	30.0%
Western Africa	10.0%
Southern Africa	10.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

ICRISAT
Research Project Proforma

1. **Project Number:** LG -609(90)IC/IC
2. **Predecessor Project:**
3. **Linked Projects:**
4. **Title:** Breeding groundnuts for confectionery requirements
5. **Discipline(s):**

Genetic Resources	Breeding
Pathology	Physiology
Cell Biology	

6. **Crop(s)/Resource(s):**
groundnut

7. **Staffing:**

a. **Lead Scientists**

Name	Sci Years	Institute	Inst Type
Dwivedi, S.L.	0.40	ICRISAT	IARC

b. **ICRISAT Scientists**

Name	Sci Years
Nigam, S.N.	0.01
Reddy, L.J.	0.01
Jambunathan, R.	0.10
Mehan, V.K.	0.05
Moss, J.P.	0.03
Singh, A.K.	0.01
Ramraj, V.M.	0.05
Nageswara Rao, R.C.	0.01

c. **Non-ICRISAT Scientists**

Name	Institute	Inst Type
NARS; NCSU, USA; ICAR/ ICRISAT Collaborative project scientists		

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1992

9. Background:

Several high yielding groundnut varieties with a large pod/seed size developed, and promising varieties were channeled into the national programs. A number of varieties, in the preliminary international trials conducted in several countries outyielded local control. For instance, ICGV 86979 and ICGV 86733 in Sudan, China, Korea and Zambia; ICGV 86028 in Burundi, Cyprus and Korea; ICGV 86553 in China, Korea and Zambia outyielded their respective local controls. ICGV 86573 on an average recorded 9.6% higher seed yield against local control over five years of testing in Cyprus, and may possibly be released.

10. Objectives:

- 1. Development of varieties/populations with uniform seed size and shape, and consistency in seed mass.
- 2. Incorporate moderate levels of resistance to rust, late leaf spot and early leafspot.
- 3. Development of varieties/populations with reduced duration
- 4. Development of varieties/populations with improved oleic/linoleic acid ratio (≤ 1.6).

11. Techniques:

i) Single/multiple crosses and selected backcrosses are made to generate segregating populations. Continue to involve new germplasm/breeding lines with desirable traits in breeding program. ii) Generation advance and selection following bulk/pedigree and backcross methods. iii) Fairly uniform varieties/populations are yield tested, following 3 tier evaluation system for 3 consecutive years, to select varieties with wide adaptation.

12. Classification:

a. Keywords:

Edible nuts	Roasted salted nuts
In-shell roasted/boiled nuts	Nutritional and food quality
Boiling types	

b. CGIAR Activities

Germpiasm - Enhancement	10.0%
Germpiasm - Plant breeding/improvement	80.0%
Germpiasm - International trials	10.0%

c. Type of Research (percent distribution):

Basic: 5.0 Strategic: 5.0 Applied: 85.0 Adaptive: 5.0

d. Geographical Scope: G

e. Target Regions:

South Asia	40.0%
Southeast Asia	30.0%
Western Africa	10.0%
Southern Africa	20.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

ICRISAT
Research Project Proforma

1. Project Number: LG -610(90)IC/IC
2. Predecessor Project:
3. Linked Projects:
4. Title: International groundnut trials and nurseries
5. Discipline(s):

Breeding	Pathology
Physiology	Entomology
Climatology	

6. Crop(s)/Resource(s):

groundnut

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Nigam, S.N.	0.20	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Reddy, L.J.	0.05
Dwivedi, S.L.	0.05
Subrahmanyam, P.	0.00
Mehan, V.K.	0.00
Moss, J.P.	0.03
Singh, A.K.	0.01
Virmani, S.M.	0.00
Wightman, J.A.	0.00
Ramraj, V.M.	0.01

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
NARS, ICAR, ACIAR, CGPRT, Peanut CRSP scientists		

8. Dates:

- a. Approval Date:
- b. Starting Date: 01/1990
- c. Review Dates:
- d. Completion Date: 1992

9. Background:

To strengthen national agricultural research system (NARS), the unit organizes a series of international trials and nurseries, specialized training in breeding techniques, consultancies, conferences, seminars and contract breeding. It also participates actively in the in-service training organized by the Training Program of ICRISAT. In India, the groundnut group very actively participates in the All India Coordinated Research Project on Oilseeds (AICORPO) activities.

10. Objectives:

1. To organize and coordinate international evaluation of breeding material and nurseries 2. To participate in regional and national evaluation networks 3. To initiate and develop proposals for strengthening national programs 4. To interact regularly with breeders in ICRISAT regional programs 5. To provide consultancy services on request.

11. Techniques:

(a) International adaptation trials. (b) Supply of specific genotypes to national evaluation network. (c) Contract hybridization and supply of segregating populations to regional/national programs. (d) Training of national scientists. (e) Participation in the national, regional, and international workshop/meetings. (f) Organization of scientists' meet/international workshops.

12. Classification:

a. Keywords:

G x E interaction	Workshops
Breeders' Meet	Consultancy
Training	

b. CGIAR Activities

Germplasm - International trials	80.0%
Seed Production	10.0%
Conferences and Seminars	10.0%

c. Type of Research (percent distribution):

Basic: 5.0 Strategic: 0 Applied: 0 Adaptive: 95.0

d. Geographical Scope: G

e. Target Regions:

South Asia	40.0%
Southeast Asia	30.0%
Western Africa	10.0%
Southern Africa	10.0%
South America	10.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

ICRISAT
Research Project Proforma

1. **Project Number:** LG -651(90)IC/IC
2. **Predecessor Project:**
3. **Linked Projects:** LG -652(90)IC
LG -653(90)IC
4. **Title:** Transfer of desirable traits from wild species of groundnut by sexual means

5. **Discipline(s):**

Breeding	Pathology
Entomology	Cell Biology

6. **Crop(s)/Resource(s):**

groundnut

7. **Staffing:**

a. **Lead Scientists**

Name	Sci Years	Institute	Inst Type
Nalini, M.	0.10	ICRISAT	IARC

b. **ICRISAT Scientists**

Name	Sci Years
Moss, J.P.	0.05
Vacant (AKS)	0.02

c. **Non-ICRISAT Scientists**

Name	Institute	Inst Type
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--Nil--

8. **Dates:**

- a. **Approval Date:** 19900101
- b. **Starting Date:** 01/1990
- c. **Review Dates:** 1992

d. Completion Date: 1992

9. Background:

ICRISAT has the record of effective means of exploitation of desirable traits from wild species of groundnut for crop improvement and will extend the activities to other agronomically desired traits such as early leafspot and rosette virus resistances.

10. Objectives:

1. To transfer resistances - to rust and leaf spot pathogens, tomato spotted wilt virus, groundnut rosette, peanut stripe, peanut mottle viruses and insect pests.

11. Techniques:

Sexual hybridization supported by hormone applications and embryo rescue and cytogenetic manipulations.

12. Classification:

a. Keywords:

Groundnut improvement	wild species
gene transfer	embryo rescue
tissue culture	

b. CGIAR Activities

Germplasm - Enhancement	90.0%
Research on Approaches, Concepts, Methods, & Procedures	10.0%

c. Type of Research (percent distribution):

Basic: 10.0 Strategic: 0 Applied: 80.0 Adaptive: 10.0

d. Geographical Scope:

e. Target Regions:

Eastern Africa	40.0%
India	40.0%
South America	20.0%

3. Training Component:

a. In-Service	1	d. Research Fellows	2
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

ICRISAT
Research Project Proforma

1. **Project Number:** LG -652(90)IC/IC
2. **Predecessor Project:**
3. **Linked Projects:**
4. **Title:** DNA transfer to groundnut by asexual means
5. **Discipline(s):**
Cell Biology
6. **Crop(s)/Resource(s):**
groundnut
7. **Staffing:**

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Sharma, K.K.	0.30	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Moss, J.P.	0.05
Nalini, H.	0.05
Prasad, M.S. (PDF)	0.60

c. Non-ICRISAT Scientists

Name	Institut	Inst Type
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--Nil--

8. **Dates:**
 - a. **Approval Date:** 19900101
 - b. **Starting Date:** 01/1990
 - c. **Review Dates:** 1992

d. Completion Date: 1992

9. Background:

For crop improvement, methods are now becoming available for direct transfer of desirable genes into plants. These are Agrobacterium-mediated or through physical methods. Attempts are therefore being initiated to explore these proven methods of transformation in groundnut.

10. Objectives:

1. To transfer DNA by vector (Agrobacterium) or direct means into groundnut.

11. Techniques:

Microbiological and tissue culture, DNA cloning, and sequencing, western/southern blocks, protein analysis.

12. Classification:

a. Keywords:

Groundnut improvement	Genetic Transformation
DNA	Agrobacterium
Tissue culture	GV
PMV	

b. CGIAR Activities

Germplasm - Plant breeding/improvement	10.0%
Research on Approaches, Concepts, Methods, & Procedures	80.0%
Exploratory Research	10.0%

c. Type of Research (percent distribution):

Basic: 10.0 Strategic: 0 Applied: 70.0 Adaptive: 20.0

d. Geographical Scope: G

e. Target Regions:

South America	35.0%
South Asia	35.0%
Southeast Asia	30.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

ICRISAT
Research Project Proforma

1. Project Number: LG -653(90)IG/IC
2. Predecessor Project:
3. Linked Projects:
4. Title: Tissue Culture and regeneration of groundnut
5. Discipline(s):
Cell Biology
6. Crop(s)/Resource(s):
groundnut
7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Nalini, M.	0.10	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Sharma, K.K.	0.10
Moss, J.P.	0.05
Vacant (AKS)	0.05
Prasad, M.S. (PDF)	0.40

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
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--Nil--

B. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992

d. Completion Date: 1992

9. Background:

Initial information on tissue culture and regeneration was generated at IC. More work needs to be done to improve regeneration frequency and consistency. This would be of great importance to all work on genetic transformation of groundnut by asexual means.

10. Objectives:

1. To develop techniques for high frequency regeneration and somatic embryogenesis in groundnut tissue and cell cultures.

11. Techniques:

Regeneration has been achieved for some genotypes of *A. hypogaea*, and from some wild species. Although regeneration in those genotypes is sufficient for some crop improvement techniques, we need to improve on this for other uses, and extend the range of genotypes that can be regenerated. Experiments will use novel combinations and concentrations of hormones and assess the effect of condition of the explant, and of external factors on regeneration.

12. Classification:

a. Keywords:

Regeneration, groundnut, transformation, tissue culture

b. CGIAR Activities

Germplasm - Plant breeding/improvement	10.0
Research on Approaches, Concepts, Methods, & Procedures	80.0
Exploratory Research	10.0

c. Type of Research (percent distribution):

Basic: 20.0 Strategic: 0 Applied: 60.0 Adaptive: 20.0

d. Geographical Scope: G

e. Target Regions:

South America	30.0%
South Asia	35.0%
Southeast Asia	35.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

ICRISAT
Research Project Proforma

1. Project Number: LG -654(90)IC/IC
2. Predecessor Project:
3. Linked Projects: Breeding proj
4. Title: Haploid production in groundnut, pigeonpea, and chickpea

5. Discipline(s):

Breeding Cell Biology

6. Crop(s)/Resource(s):

chickpea groundnut
pigeonpea

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Nalini, M.	0.05	icrisat	IARC

b. ICRISAT Scientists

Name	Sci Years
Moss, J.P.	0.05

c. Non-ICRISAT Scientists

Institute	Inst Type
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--Nil--

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992

d. Completion Date: 1992

9. Background:

Haploids have proved important in improvement of a few crops. In legumes a few attempts have been made.

10. Objectives:

1. To achieve homozygosity in reduced time, and to assist in genetic analysis, especially in groundnut.

11. Techniques:

Pretreatment (temperature, light, and physical forces) and culture of anthers and microspores on liquid and agar media, cytology, chromosome doubling.

12. Classification:

a. Keywords:

Haploids	Anther (Pollen)
Culture	Chickpea
Groundnut	Pigeonpea

b. CGIAR Activities

Germplasm - Plant breeding/Improvement	50.0%
Research on Approaches, Concepts, Methods, & Procedures	50.0%

c. Type of Research (percent distribution):

Basic: 10.0 Strategic: 0 Applied: 70.0 Adaptive: 20.0

d. Geographical Scope: G

e. Target Regions:

South America	30.0%
South Asia	35.0%
Southeast Asia	35.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

ICRISAT
Research Project Proforma

1. Project Number: LG -655(90)IC/IC
2. Predecessor Project:
3. Linked Projects: LG -651(90)IC
 LG -652(90)IC

4. Title: RFLP mapping and linkage in groundnut.

5. Discipline(s):

Breeding	Pathology
Entomology	Cell Biology

6. Crop(s)/Resource(s):

groundnut

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Moss, J.P.	0.10	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Nalini, M.	0.05

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
Powell, W.	SCRI	MENT

8. Dates:

- a. Approval Date: 1990101
b. Starting Date: 01/1990

c. Review Dates: 1992

d. Completion Date: 1993

9. Background:

Restriction fragment length polymorphism has emerged as a very powerful and certain tool in a few crops for study of species relationships and for identifying molecular markers for desirable genes.

10. Objectives:

1. Identification of desirable genes and/or related DNA sequences, with possibilities of developing markers and linkage maps and transferring the genes.

11. Techniques:

Molecular biology, ultracentrifugation, DNA/RNA extraction, cloning of DNA fragments, cDNA, restriction enzymes, electrophoresis, radioisotope, labeling of DNA.

12. Classification:

a. Keywords:

Groundnut improvement	Resistance
Wild species	RFLP markers
Interspecific derivatives	Diagnosis
Diagnosis	

b. CGIAR Activities

Germplasm - Plant breeding/improvement	60.0%
Research on Approaches, Concepts, Methods, & Procedures	20.0%
Technical Assistance	20.0%

c. Type of Research (percent distribution):

Basic: 10.0 Strategic: 0 Applied: 50.0 Adaptive: 40.0

d. Geographical Scope: G

e. Target Regions:

South America	35.0%
South Asia	35.0%
Southeast Asia	30.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	0	e. Apprentices	1
c. Post Docs	1		

ICRISAT
Research Project Proforma

1. **Project Number:** LG -701(90)IC/IC
2. **Predecessor Project:**
3. **Linked Projects:** LG-605(90)IC/
LG-805(90)IC/
GRG-002(90)IC
4. **Title:** Identification, evaluation and characterization of groundnut genotypes tolerant to drought.

5. **Discipline(s):**

Genetic Resources	Breeding
Pathology	Physiology

6. **Crop(s)/Resource(s):**

climate	groundnut
germplasm	pigeonpea
water	seed
rainfall	

7. **Staffing:**

a. **Lead Scientists**

Name	Sci Years	Institute	Inst Type
Nageswara Rao, R.C.	0.60	ICRISAT	IARC

b. **ICRISAT Scientists**

Name	Sci Years
Johansen, C.	0.01
Reddy, L.J.	0.05
Mehan, V.K.	0.05
Singh, A.K.	0.05
Nigam, S.N.	0.01

c. **Non-ICRISAT Scientists**

Name	Institute	Inst Type
Udayakumar, M.K.	UAS	UNIV
Joshi, Y.C.	WRCC	NARS
Reddy, P.V.	ARS	UNIV
Physiologists	AICORPO	NARS

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1992

9. Background:

Good progress was made in identifying genotypes with tolerance to mid-, and end-of-season droughts and recovery from mid-season droughts. Physiological basis of drought tolerance and recovery were examined. Genotypic differences in water use, moisture extraction pattern, water-use efficiency and partitioning of dry matter to pods were observed. In collaboration with the Australian National University, we found that the water-use efficiency of genotypes measured in the field was negatively correlated with the C13:C12 discrimination ratio in leaves. But this relationship was not as strong as it was found in pot experiments. However, there is a need to understand better the benefits and penalties associated with different mechanisms imparting tolerance to genotypes. In national and international drought trials in drought-prone locations, drought tolerant selections did well.

10. Objectives:

1. To identify genotypes with superior performance under inadequate water supply conditions. 2. To identify genotypes with rapid recovery responses. 3. To evaluate performance of selected genotypes under rain-fed conditions in drought-prone locations through National and International Drought Nurseries.

11. Techniques:

a) Drought stress will be imposed using the line-source sprinklers and genotypes grouped according to maturity and origin will be screened. b) Selected genotypes will be subjected to multilocal trials in drought prone environments under rain-fed conditions in co-operation with NARS. c) Drought mechanisms will be studied in pot and field experiments in post-rainy season and under rain-out shelter during rainy season. d) Techniques of screening for root systems and water-use efficiency need to be developed in collaboration with national and international institutes. e) Influence of drought and genotypic differences in partitioning will be compiled from various experiments as a first step. f) Role of growth regulators in recovery from drought will be examined.

12. Classification:

a. Keywords:

Drought	Physiology
Screening	Methodology
Mechanisms	Drought tolerance
Drought resistance	

b. CGIAR Activities

Geroplasm - Plant breeding/improvement	50.0%
Documentation and Dissemination	25.0%
Research on Approaches, Concepts, Methods, & Procedures	25.0%

c. Type of Research (percent distribution):

Basic: 25.0 Strategic: 50.0 Applied: 25.0 Adaptive: 0

d. Geographical Scope: G

e. Target Regions:

India	40.0%
Southeast Asia	30.0%
Western Africa	30.0%

13. Training Component:

a. In-Service	0	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	0
c. Post Docs	1		

ICRISAT
Research Project Proforma

1. Project Number: LG -702(90)IC/IC
2. Predecessor Project:
3. Linked Projects: LG-701(90)IC/
4. Title: Assessment of genetic variation in water-use efficiency in groundnut cultivars under water limited conditions in the field.

5. Discipline(s):

Physiology

6. Crop(s)/Resource(s):

groundnut	germplasm
machinery	structures
water	facilities
seed	equipment

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Nageswara Rao, R.C.	0.10	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Johansen, C.	0.01

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
Bell, M.J.	QDPI	MENT
Shorter, R.	QDPI	MENT
Hubick, K.T.	ANU	UNIV
Farquhar, G.D.	ANU	UNIV

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 11/1990
- c. Review Dates: 1992
- d. Completion Date: 1991

9. Background:

Genotypic variation in water-use efficiency has been shown in pots (Hubick et al. 1986, 1988) and in recent field studies by Mathews et al. 1988, while being potentially useful, water-use efficiency is not able to easily be exploited because of difficulties in measurement of total (root + shoot) biomass and water use. Farquhar et al. (1982) at ANU, suggested on the basis of theory that water-use efficiency and isotopic discrimination against ^{13}C during CO_2 assimilation, were negatively correlated, thereby supporting the possibility of using isotopic discrimination technique to identify genotypes with higher water-use efficiency. However, information is lacking on peanut cultivar differences for water-use efficiency, and whether the relationship between water-use efficiency and carbon discrimination in leaf still holds under drought condition in the field remains to be examined.

10. Objectives:

1. To study whether genotypic differences exist in water-use efficiency under drought condition in the field. 2. To determine whether field-measured water-use efficiency and $\text{C}^{13}:\text{C}^{12}$ isotope composition in the leaf tissue discrimination are correlated, as predicted by theory. 3. To investigate whether the genotypic ranking for water-use efficiency and carbon isotope discrimination measured under irrigated conditions is similar to that observed under drought conditions.

11. Techniques:

The work will be done at the J.B. Peterson Res. Station, Kingaroy, Australia. Minilysimeters at the QDPI, Kingaroy will be used to monitor the water-use efficiency of some selected groundnut genotypes. The carbon isotope composition in the leaf tissues will be analysed at the Australian National University, Canberra.

12. Classification:

a. Keywords:

Drought	Genotypes
Water-use efficiency	Carbon isotope discrimination

b. CGIAR Activities

Research on Approaches, Concepts, Methods, & Procedures	75.0%
Documentation and Dissemination	25.0%

c. Type of Research (percent distribution):

Basic: 50.0 Strategic: 50.0 Applied: 0 Adaptive: 0

d. Geographical Scope: G

e. Target Regions:

India	40.0%
Southeast Asia	30.0%
Western Africa	30.0%

13. Training Component:

a. In-Service	0	d. Research Fellows	0
b. Research Scholars	0	e. Apprentices	0
c. Post Docs	0		

ICRISAT
Research Project Proforma

1. Project Number: LG -703(90)IC/IC
2. Predecessor Project:
3. Linked Projects: LG-601(90)IC/
LG-609(90)IC/
LG-803(90)IC/
4. Title: Role of photoperiod and temperature in the adaptation of groundnut to different environments.

5. Discipline(s):

Breeding	Pathology
Physiology	

6. Crop(s)/Resource(s):

groundnut	germplasm
seed	

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Ramraj, V.M.	0.60	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Johansen, C.	0.01
Nigam, S.N.	0.01
Reddy, L.J.	0.01
Dwivedi, S.L.	0.03
Jambunathan, R.	0.01
Singh, A.K.	0.01

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
Summerfield, R.J.	Reading Univers	UNIV
Bell, M.	QDPI, Australia	MENT

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1993

9. Background:

Research done at ICRISAT Center has shown that in groundnut while photoperiod does not influence phenology, it does influence partitioning of dry matter to pod development. In several genotypes, long days per se promoted vegetative growth, but pod yields and seed size were drastically reduced. Many of the desirable traits like tolerances to diseases, pests and drought were found to be in the photoperiod sensitive genotypes. Screening results have shown that to date, ICRISAT's successful varieties have photoperiod insensitivity as a common attribute. However, it is important to understand and quantify groundnut responses not only to photoperiod, but also other interacting environmental factors, especially temperature, in order to help breeding efforts to fit genotypes to specific environments and requirements.

10. Objectives:

1. To understand the mechanism of groundnut responses to variations in daylength and temperature associated with seasons and latitudes and establish their role in adaptation 2. To devise simple screening procedures, based on few environments, which will predict behaviour over a much wider range of environmental conditions. 3. To screen germplasm and breeders material to identify photoperiod insensitive genotypes.

11. Techniques:

a) Growth and biochemical analyses of diverse genotypes grown under varied environmental conditions obtained using controlled environment facilities and techniques of time-of-planting and artificial daylength extension under field conditions. b) Manipulation of photoperiod responses using plant growth regulators; collaboration with legumes virology/biochemistry for immunological and biochemical methods of analysis of plant growth regulators.

12. Classification:

a. Keywords:

Groundnut	Photoperiod
Temperature	Adaptation

b. CGIAR Activities

Genoplasm - Plant breeding/improvement	80.0%
Research on Approaches, Concepts, Methods, & Procedures	20.0%

c. Type of Research (percent distribution):

Basic: 25.0 Strategic: 50.0 Applied: 25.0 Adaptive: 0

d. Geographical Scope: C

e. Target Regions:

India	45.0%
Western Africa	35.0%
Southern Africa	20.0%

13. Training Component:

a. In-Service	0	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	0
c. Post Docs	1		

ICRISAT
Research Project Proforma

1. Project Number: LG -751(90)IC/IC
2. Predecessor Project:
3. Linked Projects:
4. Title: Biological studies of groundnut foliar pests carried out to provide background information for IPM programs.

5. Discipline(s):

Economics	Entomology
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6. Crop(s)/Resource(s):

groundnut pesticides	insecticides
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7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Wightman, J.A.	0.50	ICRISAT	IARC
Ranga Rao, G.V.	0.50	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
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--Nil--

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
Armes, N.J.	ODNRI, UK	MENT
Shanower, T.G.	California Univ	UNIV
Manochai	Khon Kaen Univ.	UNIV
Sathorn	Min. of Agric.	IARC
Campbell, W.V.	NCSU	UNIV
Asian NARS	Natl. Agri. Res. S	NARS

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 02/1990
- c. Review Dates: 1992
- d. Completion Date: 1993

9. Background:

The foliage of groundnut plants growing in parts of Asia, but more rarely in Africa, is subjected to attack by many species of insects. This attack is sometimes associated with lower pod yields than those anticipated by the farmers. We have selected two species of defoliator, one a leaf chewer and the other a leaf miner, to study all aspects of their applied ecology to generate relevant information needed by NARS to develop IPM procedures on these key pests but also to set up a model research system that can absorb and act as a training ground for scientists from client and developed countries. This project has been divided into 8 sub-projects that are independent but inter-linked.

10. Objectives:

1. Provision of data applicable to processing via GIS system indicating the distribution and importance of major groundnut pests. 2. Determination of the relationships between insect density and crop loss and subsequent economic analysis. 3. Testing and installation of a network of pheromone traps for key groundnut pests to facilitate forecasting pest damage across the SAT. 4. To quantify the effects of soil characteristics and climate on the physiology of groundnut pests. 5. To ensure that any recommendations made about IPM in groundnut crops have a sound economic basis. 6. To determine the role, importance and interaction between the components of the life systems of key pests. 7. The collation of data, simulation that will predict the effect of a range of pest scenarios. 8. Dissemination of information about IPM collected at IC and by the NARS.

11. Techniques:

The techniques involved are standard entomological procedures, such as pheromone trapping and evaluations of the trophic relationships of the insects involved.

12. Classification:

a. Keywords:

IPM, defoliators, surveys, forecasting, damage pheromones, models,

b. CGIAR Activities

Human Resource Enhancement	20.0%
Plant Protection Research	80.0%

c. Type of Research (percent distribution):

Basic: 0 Strategic: 50.0 Applied: 50.0 Adaptive: 0

d. Geographical Scope: R

e. Target Regions:

South Asia	65.0%
Southeast Asia	35.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

ICRISA
Research Project Proforma

1. Project Number: LC -752(90)IC/IC
2. Predecessor Project:
3. Linked Projects:
4. Title: Research on host plant resistance to insects in the genus *Arachis* in the context of IPM of all pest classes.

5. Discipline(s):

Chickpea	Breeding
Entomology	

6. Crop(s)/Resource(s):

groundnut

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Ranga Rao, G.V.	0.60	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Dwivedi, S.L.	0.15
Moss, J.P.	0.05
Reddy, D.V.R.	0.05
Singh, A.K.	0.05
Wightman, J.A.	0.05

c. Non-ICRISAT Scientists

	Institute	Inst Type
Padgham, D.F.	ODNRI	MENT
Kimmins, F.W.	ODNRI	MENT
Stevenson, P.	ODNRI	MENT
Campbell, W.V.	PCRSP, NCSU	MENT
Scientists from Asia	NARS	NARS

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1992

9. Background:

The genus *Arachis* has a relatively low reproduction rate when compared with many other legumes. This is perhaps linked with the subterranean position of the seeds. Their relatively large size and high oil (energy) content. As a result of this, the genus has evolved several methods of protecting its investment of photosynthate, including the development of structures (trichomes) and the synthesis of chemicals that imbue resistance to insects.

10. Objectives:

- 1. To screen and exploit host plant resistance to insects in the genus *Arachis*

11. Techniques:

The techniques have shifted from the broadacre screening of germplasm at IC to developing methods of identifying resistance sources in nethouse and laboratory conditions. The cooperative project with ODNRI on the mechanisms of host plant resistance to insects will also indicate individual traits that can be sought in laboratory tests. The procedures developed in the cell biology unit will be applied to transfer the relevant genes from *Arachis* spp. to suitable *A. hypogaea* identities. It is intended to help NARS to screen germplasm lines for resistance to insects in environments that are relevant to the needs of their farmers. This may require follow-up action in the form of assistance with crossing. Special techniques will be developed to help NARS screen for resistance to white grubs.

12. Classification:

a. Keywords:

IPM, host plant resistance, screening,
secondary plant substances, trichomes

b. CGIAR Activities

Human Resource Enhancement	10.0%
Plant Protection Research	90.0%

c. Type of Research (percent distribution):

Basic: 10.0 Strategic: 40.0 Applied: 50.0 Adaptive: 0

d. Geographical Scope: G

e. Target Regions:

India	40.0%
Southeast Asia	60.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

ICRISAT
Research Project Proforma

1. Project Number: LG -753(90)IC/IC
2. Predecessor Project:
3. Linked Projects:
4. Title: Cultural control of groundnut pests including the influence of crop management on the efficiency of natural control processes

5. Discipline(s):

Entomology	Agronomy
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6. Crop(s)/Resource(s):

cropping systems insecticides	groundnut
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7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Ranga Rao, G.V.	0.05	ICRISAT	IARC
Wightman, J.A.	0.10	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Pimbert, M.P.	0.05
Anders, M.M.	0.05

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
Gold, C.S.	IITA	IARC
Shanower, T.G.	Calif. Univ., U	UNIV

8. Dates:

a. Approval Date: 19900101

b. Starting Date: 02/1990

c. Review Dates: 1992

d. Completion Date: 1993

9. Background:

Insects usually become pests of agricultural crops when the normal balance between a defoliator and its natural enemies is upset. Factors that cause such imbalances, including the injudicious application of insecticides and cropping systems based on mono-cultures. The cropping system can also influence the distribution of and damage caused by insects. Contemporary sectors of this research are in manuscript.

10. Objectives:

1. To study the effect of a cultural control practices on the population dynamics of groundnut pests and their natural enemies.

11. Techniques:

Standard entomological and field techniques.

12. Classification:

a. Keywords:

IPM, defoliators, parasites, predators, pathogens,
intercropping

b. CGIAR Activities

Human Resource Enhancement	10.0%
Plant Protection Research	90.0%

c. Type of Research (percent distribution):

Basic: 10.0 Strategic: 40.0 Applied: 50.0 Adaptive: 0

d. Geographical Scope: R

e. Target Regions:

Southeast Asia	90.0%
Southern Africa	10.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

**ICRISA
Research Project Proforma**

1. **Project Number:** LG -754(90)IC/IC
2. **Predecessor Project:**
3. **Linked Projects:**
4. **Title:** The IPM of soil insects in Groundnut fields.
5. **Discipline(s):**

Breeding	Entomology
Agronomy	Cell Biology

6. **Crop(s)/Resource(s):**

cropping systems	groundnut
insecticides	

7. **Staffing:**

a. **Lead Scientists**

Name	Sci Years	Institute	Inst Type
Wightman, J.A.	0.05	ICRISAT	IARC

b. **ICRISAT Scientists**

Name	Sci Years
Anders, M.M.	0.05
Moss, J.P.	0.05
Dwivedi, S.L.	0.05
Pimbert, M.P.	0.05
Ranga Rao, G.V.	0.10

c. **Non-ICRISAT Scientists**

Name	Institute	Inst Type
Gold, C.S. Taxonomists	IITA USDA, BMNH	IARC MENT

8. **Dates:**

a. **Approval Date:** 19900101

b. Starting Date: 02/1990

c. Review Dates: 1992

d. Completion Date: 1993

9. Background:

One of the most important research findings of the Legumes Entomology Unit is that insects feeding on groundnut foliage have less impact on crop yield than previously suspected. However, an equally important discovery is that the economic significance of insects living under the ground has been greatly underrated. In fact, our knowledge of the relevant soil insects is such that, on a global scale, we are virtually at the beginning of our journey. Research at IC has dealt with alternatives to the environmentally unacceptable organochlorine insecticides and is now concentrating on the evaluation of various management practices for the management of termites. The role of termites and other insects in dissipating organic soil inputs has been known to entomologists for a long time.

10. Objectives:

1. To develop methods of reducing yield losses caused by soil insects to groundnut crops.

11. Techniques:

Standard entomological and field techniques.

12. Classification:

a. Keywords:

IPM, termites, whitegrubs, groundnut, soil pests

b. CGIAR Activities

Human Resource Enhancement	10.0%
Plant Protection Research	90.0%

c. Type of Research (percent distribution):

Basic: 20.0 Strategic: 50.0 Applied: 30.0 Adaptive: 0

d. Geographical Scope: 0

e. Target Regions:

Southeast Asia	70.0%
India	20.0%
Southern Africa	10.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

d. Completion Date: 1993

9. Background:

Farmers can suffer considerable reduction in the amount of good quality groundnut (in and out of the pod) they own as a result of the activities of insects in the stored product. We know that there is a range of susceptibility to storage pests in the germplasm but we do not screen specifically for this factor because there are more effective methods of dealing with the problems. However, we do ensure that there are no highly resistant lines among the advanced breeders' material. As a major constraint to groundnut production is the cost of seed we should like to encourage farmers to keep their own material for resowing. We are, therefore, evaluating cheap and effective ways of protecting seed from storage pests.

10. Objectives:

1. To monitor levels of resistance to insects that damage stored groundnut in advanced breeders material.

11. Techniques:

Standard entomological techniques. Most of the research on the product protection aspects of this research has been repeated many times. We have no intention of repeating it again. We believe that we can contribute to increasing groundnut production by ensuring that farmers have relevant information about seed storage.

12. Classification:

a. Keywords:

Groundnut, stored product, resistance

b. CGIAR Activities

Human Resource Enhancement	20.0%
Plant Protection Research	80.0%

c. Type of Research (percent distribution):

Basic: 0 Strategic: 50.0 Applied: 40.0 Adaptive: 10.0

d. Geographical Scope: G

e. Target Regions:

India	100.0%
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13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

ICRISAT
Research Project Proforma

1. Project Number: LG -756(90)IC/IC
2. Predecessor Project:
3. Linked Projects:
4. Title: Epidemiology and control of groundnut virus vectors in the context of integrated pest and disease management.

5. Discipline(s):

Breeding	Pathology
Entomology	Cell Biology

6. Crop(s)/Resource(s):

groundnut	virus
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7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Wightman, J.A.	0.05	ICRISAT	IARC
Reddy, D.V.R.	0.04	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Moss, J.P.	0.03
Nigam, S.N.	0.01

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
Padgham, D.F.	ODNRI	MENT
Kimmins, F.M.	ODNRI	MENT
Stevenson, P.	ODNRI	MENT
Palmer, J.	BMNH, UK	MENT
Scientists	NARS in SE	NARS
Reddy, D.D.R.	NARS, APAU	NARS

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 02/1990
- c. Review Dates: 1992
- d. Completion Date: 1993

9. Background:

Aphids are the commonest vectors of the virus diseases of groundnut and other grainlegumes. Thrips are the specialized vectors of tomato spotted wilt virus (TSWV). As high levels of resistance to virus diseases are not common within the germplasm it is necessary to pursue other lines of disease management. This includes vector management by methods common to many conventional IPM programmes.

10. Objectives:

1. In association with the LVU to identify, characterize and describe the ecology of the vectors of Groundnut virus diseases.

11. Techniques:

Aphid resistance is screened by adding wingless adult aphids to potted plants that are specially grown at IC in screenhouses. The number of aphids per plant after one week is taken as an index of antibiosis. All available genotypes are screened in the field by assessment of population density when aphids appear. ODMRI personnel apply a wide range of techniques as described for project #. Cell biologists will use the appropriate methods for whichever wild species need to be exploited. The study of the inheritance of aphid resistance in *A. hypogaea* will depend on bioassay with aphids to determine which progeny are resistant, unless we develop the ability to detect the chemicals that make the plants resistant before the crosses reach the F2 generation. Research on thrips will follow a parallel direction with the existing, well established techniques.

12. Classification:

a. Keywords:

Aphids resistance,
disease management

mechanisms virus vector

b. CGIAR Activities

Plant Protection Research	70.0%
Human Resource Enhancement	20.0%
Research on Approaches, Concepts, Methods, & Procedures	10.0%

c. Type of Research (percent distribution):

Basic: 20.0 Strategic: 60.0 Applied: 20.0 Adaptive: 0

d. Geographical Scope: G

e. Target Regions:

India 100.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

ICRISAT
Research Project Proforma

1. Project Number: LG -757(90)IC/IC
2. Predecessor Project:
3. Linked Projects:
4. Title: The rationalisation of insecticide application for the control of Groundnut pests within the context of IPN.

5. Discipline(s):

Entomology Cropping Systems

6. Crop(s)/Resource(s):

groundnut insecticides
pulse crops

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Wightman, J.A.	0.05	ICRISAT	IARC
Ranga Rao, G.V.	0.05	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
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--Nil--

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
King, A.B.S.	ODNRI, UK	MENT
Armes, N.J.	ODNRI, UK	MENT
Private Sector		

8. Dates:

- a. Approval Date: 19900101

- b. Starting Date: 02/1990
- c. Review Dates: 1992
- d. Completion Date: 1993

9. Background:

Our scientific data and feed back from the NARS and the farming sector indicate that many of the pest problems faced by legume growers in Asia are induced by the misuse (Usually the overuse) of insecticides. The situation is such that we know insecticides have to be used but at the same time we know that their application is worsening pest problems, due to the disruption of natural control processes and the increase of insecticide resistance. Our network activities show quite clearly that this situation is common to all grain legumes in Asia, largely because they are attacked by the same cohort of insects. Unless the abuse of insecticides in Asia is checked it will be virtually impossible to harvest legume crops in 20 years. This is at a stage in the history of the Region when legume production has stagnated in the face of a population density that is still increasing at an exponential rate.

10. Objectives:

1. To develop insecticide regimes that are compatible with IPM schemes and that do not promote insecticide resistance.
2. To stimulate research by other organisations.

11. Techniques:

This section can be completed as the project develops.

12. Classification:

a. Keywords:

Insecticides
 Legumes Pulses
 Predators

Insecticide resistance
 Parasites

b. CGIAR Activities

Counselling and Advising NARS	50.0%
Plant Protection Research	50.0%

c. Type of Research (percent distribution):

Basic: 0 Strategic: 50.0 Applied: 50.0 Adaptive: 0

d. Geographical Scope: G

e. Target Regions:

India	60.0%
Southeast Asia	40.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

**ILMISA:
Research Project Proforma**

1. **Project Number:** LG -801(90)IC/IC
2. **Predecessor Project:** G-101(85)IC
3. **Linked Projects:** LG-802(90)IC/
LG-601(90)IC/
GG-002(90)IC/
4. **Title:** Screening for resistance to rust and late leaf spot of groundnut

5. **Discipline(s):**

Genetic Resources	Breeding
Pathology	Cell Biology

6. **Crop(s)/Resource(s):**

fungicides	groundnut
germplasm	seed

7. **Staffing:**

a. **Lead Scientists**

Name	Sci Years	Institute	Inst Type
Mehan, V.K.	0.15	ICRISAT	IARC

b. **ICRISAT Scientists**

Name	Sci Years
Smith, D.H.	0.05
Reddy, L.J.	0.05
Nigam, S.N.	0.05
Singh, A.K.	0.05
Moss, J.P.	0.05

c. **Non-ICRISAT Scientists**

Name	Institute	Inst Type
Beute, M.K.	NC State Univer	UNIV

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1995

9. Background:

Rust and late leaf spot are the most serious fungal diseases of groundnut on a worldwide scale. Yield losses are generally substantial when the crop is attacked by both late leaf spot and rust. At ICRISAT Center, Hyderabad, simple and effective field and laboratory screening methods have been developed. A world collection of over 12,000 germplasm lines including several wild *Arachis* species was systematically evaluated for resistance to rust and late leaf spot during 1977 to 1989.

10. Objectives:

1. To improve/modify the existing field and laboratory screening methods for resistance to rust and late leaf spot. 2. To screen new germplasm, breeding lines and interspecific hybrid derivatives for resistance to rust and late leaf spot. 3. To determine the response of rust and/or late leaf spot resistant lines to differential control of these diseases using selective fungicides.

11. Techniques:

a) Use of infector row and field inoculation techniques. b) Use of potted plants and detached leaves in the laboratory. c) Use of improved scale systems for evaluation of disease resistance. d) Screening of available germplasm including wild *Arachis* species, breeding lines and interspecific hybrid derivatives for resistance to rust and late leaf spot. e) Use of selective fungicides for determining the yield.

12. Classification:

a. Keywords:

Rust	Leaf spots
Resistance	Pathotypes
Stability of resistance	

b. CGIAR Activities

Germplasm	40.0%
Plant Protection Research	40.0%
Documentation and Dissemination	20.0%

c. Type of Research (percent distribution):

Basic: 10.0 Strategic: 70.0 Applied: 20.0 Adaptive: 0

d. Geographical Scope: G

e. Target Regions:

Eastern Africa	25.0%
South America	25.0%
South Asia	25.0%
Southeast Asia	25.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	0		

**ICRISAT
Research Project Proforma**

1. Project Number: LG -802(90)IC/IC
2. Predecessor Project: G-101(85)IC
3. Linked Projects: LG-801(90)IC/IC
 LG-601(90)IC/IC
 GG-002(90)IC/IC
4. Title: Stability of resistance to rust, early and late leaf spots of groundnut.

5. Discipline(s):

Genetic Resources	Breeding
Pathology	Climatology

6. Crop(s)/Resource(s):

climate	groundnut
germplasm	seed
rainfall	

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Smith, D.H.	0.15	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Waliyar, F.	0.05
Hildebrand, G.L.	0.05
Paris, D.G.	0.05

c. Non-ICRISAT Scientists

Scientists	Institute	Inst Type
	NARS	NARS

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1992

9. Background:

Rust, early and late leaf spots are the most serious diseases of groundnut on a worldwide scale. At ICRISAT Center, a world collection of over 12,000 germplasm lines was systematically evaluated for resistance to rust and late leaf spot during 1977 to 1989 and several sources of resistance to these diseases have been identified. The stability of resistance to rust and late leaf spot identified at ICRISAT Center is being tested in different locations in the world. The results obtained so far indicate that rust and late leaf spot resistances of most genotypes are stable.

10. Objectives:

- 1. To test the stability of resistance to rust, early and late leaf spot pathogens of groundnut.

11. Techniques:

- a) Multilocational field trials in selected countries in the semi-arid tropics to permit the study of host-pathogen-environment interaction.
- b) Use of standard field inoculation techniques.
- c) Disease assessment using standard scale systems.
- d) Collection of weather data from each location.

12. Classification:

a. Keywords:

Rust	Leaf Spots
Resistance	Pathotypes
Stability of resistance	

b. CGIAR Activities

Germplasm	40.0%
Plant Protection Research	40.0%
Documentation and Dissemination	20.0%

c. Type of Research (percent distribution):

Basic: 0 Strategic: 80.0 Applied: 20.0 Adaptive: 0

d. Geographical Scope: G

e. Target Regions:

Eastern Africa	30.0%
South America	30.0%
South Asia	40.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	0
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

**ICRISA:
Research Project Proforma**

1. Project Number: LG -803(90)IC/IC
2. Predecessor Project: G-101(87)IC
3. Linked Projects: R-250(90)IC/IC
LG-702(90)IC/IC
RM-110(90)IC/IC
4. Title: Epidemiology of rust, early and late leaf spots of groundnut.

5. Discipline(s):

Pathology	Physiology
Agronomy	Climatology

6. Crop(s)/Resource(s):

climate	cropping systems
fungicides	groundnut
rainfall	

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Smith, D.H.	0.20	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Ramraj, V.M.	0.05
Butler, D.R.	0.05
Waliyar, F.	0.05
Hildebrand, G.L.	0.05

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
Maillaih, K.V. Scientists	Nagarjuna Univ. CABIMI	UNIV
Scientists	MARS	MARS

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1995

9. Background:

Although there is abundant literature on rust and leaf spots of groundnut, there is still not a clear picture of the distribution and relative importance of individual diseases. There is also not much information available on the perpetuation and carry-over of rust and leaf spot pathogens. The effects of various environmental factors such as temperature, relative humidity, rainfall, dew and photoperiod on epiphytotic of rust and leaf spots need to be understood. Information on the role of various cultural practices.

10. Objectives:

- 1. To determine the distribution and relative importance of rust, early and late leaf spot pathogens in various agroclimatic zones
- 2. To investigate the survival and carry-over of rust, early and late leaf spot pathogens
- 3. To study the effects of environmental factors such as temperature, relative humidity, rainfall, dew and photoperiod on disease epiphytotic
- 4. To study the effects of agronomic practices on foliar diseases development.

11. Techniques:

a) Determine the worldwide distribution and relative importance of rust and leaf spot pathogens through literature search, distribution of questionnaires and disease surveys, and prepare the disease distribution maps in relation to agroclimatic zonations. b) Search for the occurrence of collateral hosts of rust and leaf spot pathogens, and other stages in life cycle, if exist. c) Determine the effects of environmental factors on the survival of rust and leaf spot.

12. Classification:

a. Keywords:

Rust
Foliar diseases
Epidemiology
Agronomic practices

Leaf spots
Biology
Climate

b. CGIAR Activities

Agroclimatology Research	50.0%
Plant Protection Research	25.0%
Documentation and Dissemination	25.0%

c. Type of Research (percent distribution):

Basic: 40.0 Strategic: 60.0 Applied: 0 Adaptive: 0

d. Geographical Scope: G

e. Target Regions:

Eastern Africa	30.0%
South America	30.0%
South Asia	40.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

**ICRISAT
Research Project Proforma**

1. Project Number: LG -804(90)IC/IC
2. Predecessor Project: G-101(95)IC
3. Linked Projects: LG-801(90)IC/IC
LG-802(90)IC/IC
LG-601(90)IC/IC
4. Title: Farm management of rust and leaf spots of groundnut.

5. Discipline(s):

Economics	Breeding
Pathology	On-Farm Research

6. Crop(s)/Resource(s):

fungicides	groundnut
farm as business	

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Meri L. Whitaker	0.15	ICRISAT	IARC
Smith, D.H.	0.15	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Reddy, L.J.	0.03

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
Scientists	MARS	MARS

8. Dates:

a. Approval Date: 19900101

b. Starting Date: 01/1990

c. Review Dates: 1992

d. Completion Date: 1995

9. Background:

Rust and leaf spots are the most serious fungal diseases of groundnut on a worldwide scale. Losses caused by them were assessed at ICRISAT Center, Patancheru - combined attack causing 70% loss in pod yield while each disease alone caused around 50% loss. At ICRISAT Center, several high-yielding breeding lines with resistance to rust and late leaf spots have been developed. Preliminary trials conducted in farmers fields in Andhra Pradesh have shown superior performance of some of these high-yielding foliar diseases-resistant breeding lines over the varieties grown by the farmers.

10. Objectives:

1. To evaluate yield trade-offs among farmers's cultivars, released high yielding but susceptible cultivars and released high yielding and resistant cultivars. 2. To assess the market acceptance of the released high yielding foliar disease-resistant cultivars 3. To quantify the economic impact or returns to research from genetic resistance to rust and late leaf spot.

11. Techniques:

a) Synthesis and analysis of existing experimental literature. b) Researcher managed on-farm trials with and without fungicide including 3 varietal types (farmers' varieties, high-yielding but susceptible released varieties and high-yielding and disease-resistant released varieties). c) Use of locally available fungicides for controlling rust and leaf spot diseases .d) Comparison of pod and haulm yields with and without foliar diseases control. e) Economic assessment of foliar diseases control.

12. Classification:

a. Keywords:

Rust
Fungicides
Yield losses
Onfarm research

Leaf spots
Genetic resistance
Economics

b. CGIAR Activities

Plant Protection Research	50.0%
Documentation and Dissemination	25.0%
Counselling and Advising MARS	25.0%

c. Type of Research (percent distribution):

Basic: 0 Strategic: 80.0 Applied: 20.0 Adaptive: 0

d. Geographical Scope: C

e. Target Regions:

India 100.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

**ICRISAT
Research Project Proforma**

1. Project Number: LG -805(90)IC/IC
2. Predecessor Project:
3. Linked Projects: LG-602(90)IC/
LG-701(90)IC/
4. Title: Identification of resistance in groundnut and related wild species to *Aspergillus flavus* infection and aflatoxin production.

5. Discipline(s):

Genetic Resources	Crop Quality Unit
Breeding	Pathology
Physiology	

6. Crop(s)/Resource(s):

climate	groundnut
germplasm	soil
seed	rainfall

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Mehan, V.K.	0.20	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Nageswara Rao, R.C.	0.10
Moss, J.P.	0.05
Singh, A.K.	0.05
Jambunathan, R.	0.05
Reddy, L.J.	0.05

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
Scientists		NARS

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1993

9. Background:

Recommendations have been evolved in various countries for methods of growing, harvesting, drying, and storage of groundnuts to minimize aflatoxin contamination. But these recommendations have yet to be adopted by the majority of small groundnut farmers. Research has therefore been concentrated on finding and utilizing genetic resistance. Resistance has been found in some germplasm lines to in vitro seed invasion/colonization by *A. flavus* (IVSCAP) and to natural seed infection. Resistance screening methods have been developed and a breeding program started.

10. Objectives:

1. To screen germplasm/breeding lines for resistance to seed infection by *A. flavus*. 2. To screen mild *Arachis* species/interspecific hybrid derivatives/germplasm for resistance to aflatoxin production. 3. To test the stability of resistance to seed infection by *A. flavus* and aflatoxin contamination of multilocal trials in both drought-prone and wet/humid areas.

11. Techniques:

a) Field screening: for natural seed infection by use of *A. flavus* - hot spots and imposed drought stress. Inoculation tests in the laboratory using the IVSCAP test. b) Inoculation of seeds with toxigenic strains of *A. flavus*/*A. parasiticus*. Standard analytical procedures to determine aflatoxin levels. c) Selected lines grown in different environments will be tested for fungal infection and aflatoxin contamination.

12. Classification:

a. Keywords:

Arachis spp	Groundnut
A flavus	A parasiticus
Aflatoxins	Mycotoxins
Resistance mechanisms	

b. CGIAR Activities

Plant Protection Research	70.0%
Germplasm - Plant breeding/improvement	30.0%

c. Type of Research (percent distribution):

Basic:15.0 Strategic:25.0 Applied:50.0 Adaptive:10.0

d. Geographical Scope: G

e. Target Regions:

South Asia	30.0%
Southeast Asia	30.0%
Western Africa	25.0%
Southern Africa	15.0%

13. Training Component:

a. In-Service	0	d. Research Fellows	1
b. Research Scholars	0	e. Apprentices	0
c. Post Docs	1		

ICRISAT
Research Project Proforma

1. Project Number: LG -806(90)IC/IC
2. Predecessor Project: G-102(85)IC
3. Linked Projects: LG-805(90)IC/IC
4. Title: Integrated management systems for control of aflatoxin contamination in groundnut.

5. Discipline(s):

Farming Systems	Pathology
Climatology	On-Farm Research

6. Crop(s)/Resource(s):

climate	cropping systems
groundnut	soil
rainfall	

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Mehan, V.K.	0.20	ICRISAT	IARC
Smith, D.H.	0.10	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Virmani, S.M.	0.05
Singh, P.	0.05
Ramakrishna, A.	0.05
Paris, D.G.	0.05
Gowda, C.L.L.	0.05

c. Non-ICRISAT Scientists

Institute	Inst Type
Scientists	NARS

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1993

9. Background:

Research in a number of countries has provided an excellent understanding of the effects of cultural practices, produce handling, and storage conditions on aflatoxin contamination in groundnuts. Effects of soil water and temperature levels in the geocarposphere on pod and seed invasion by *A. flavus* and on aflatoxin contamination have been examined. Limited studies have been done on effects of soil types on aflatoxin contamination. Components of integrated management systems should be determined for representative environments and integrated management systems incorporating use of *A. flavus* - resistant cultivars should be developed and evaluated.

10. Objectives:

1. Evaluation of representative groundnut production systems in selected agroclimatic zones of SAT and humid tropics for risk of aflatoxin contamination. 2. To develop and test aflatoxin management systems appropriate to the specific environments.

11. Techniques:

a) Characterization of agroclimatic zones, using data from RMP and AGLN reports/meetings (surveys and questionnaire). Soil type descriptions. b) Test locations to be selected on the basis of zones (soil types, climate, cropping systems, varieties and farm practices). To be done in close cooperation with MARS. c) Testing of production and produce handling systems for influence on aflatoxin contamination. ELISA may be used for rapid aflatoxin analyses and backed up by standard physico-chemical methods.

12. Classification:

a. Keywords:

Groundnut
Soil types
Climate

Aflatoxin
Cropping systems

b. CGIAR Activities

Plant Protection Research	40.0%
Counselling and Advising NARS	30.0%
Research on Approaches, Concepts, Methods, & Procedures	30.0%

c. Type of Research (percent distribution):

Basic: 0 Strategic: 40.0 Applied: 30.0 Adaptive: 30.0

d. Geographical Scope: 0

e. Target Regions:

South Asia	20.0%
Southeast Asia	50.0%
Western Africa	30.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	0	e. Apprentices	0
c. Post Docs	1		

**ICRISAT
Research Project Proforma**

1. Project Number: LG -807(90)IC/IC
2. Predecessor Project:
3. Linked Projects: LG-805(90)IC/
4. Title: Immunochemical methods for detection and quantification of *Aspergillus flavus/A. parasiticus* and aflatoxin in groundnut.
5. Discipline(s):
Pathology
6. Crop(s)/Resource(s):
groundnut
7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Mehan, V.K.	0.15	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Reddy, D.V.R.	0.05

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
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--Nil--

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990

c. Review Dates: 1992

d. Completion Date: 1993

9. Background:

In recent years, simple, sensitive and quick enzyme-linked immunoassays (ELISA) of aflatoxins have been developed. Several Commercial ELISA Kits have been developed but these are expensive and accurate over limited ranges only. However, for research purposes, emphasis is centered on the development of a competitive direct ELISA for routine analysis of aflatoxin in groundnuts. Specific polyclonal/monoclonal antibodies against the aflatoxin-producing fungi need to be produced for developing an ELISA to quantitate the fungal growth in seeds.

10. Objectives:

1. Production of polyclonal/monoclonal antibodies against aflatoxin, and against *A. flavus* and *A. parasiticus* 2. To select or develop rapid ELISA Technique(s) for analysis of aflatoxin in groundnut seeds. 3. To develop ELISA technique(s) for detection and quantification of *A. flavus*/*A. parasiticus* mycelial growth in seeds.

11. Techniques:

a) Antisera to be produced in rabbits by intramuscular injections of aflatoxin - oxime - BSA and of *A. flavus*/*A. parasiticus* spores and/or mycelium. Toxicogenic and nontoxicogenic strains to be used for production of antisera against *A. flavus* and *A. parasiticus*. b) Aqueous methanol to be used for extraction of aflatoxin. Toxin-enzyme conjugate to be used in the detection system. Quantitative ELISA to be developed. c) Direct ELISA to be used to quantitate fungal growth and to detect toxicogenic and nontoxicogenic strains.

12. Classification:

a. Keywords:

Aflatoxins
Strains
Groundnuts

Seed infection
Aspergillus spp
ELISA

b. CGIAR Activities

Research on Approaches, Concepts, Methods, & Procedures	80.0%
Counselling and Advising MARS	20.0%

c. Type of Research (percent distribution):

Basic: 10.0 Strategic: 0 Applied: 90.0 Adaptive: 0

d. Geographical Scope: G

e. Target Regions:

South Asia	30.0%
Southeast Asia	30.0%
Western Africa	25.0%
Southern Africa	15.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	0	e. Apprentices	0
c. Post Docs	1		

ICRISA
Research Project Proforma

1. Project Number: LG -808(90)IC/IC
2. Predecessor Project:
3. Linked Projects:
4. Title: Database on aflatoxin - producing fungi and aflatoxin in groundnuts - Review and Annotated Bibliography.

5. Discipline(s):

Pathology

6. Crop(s)/Resource(s):

groundnut germplasm
seed

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Mehan, V.K.	0.20	ICRISAT	IARC
McDonald, D.	0.10	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Haravu, L.J.	0.05

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
Scientists		NARS

8. Dates:

- a. Approval Date: 19900101

b. Starting Date: 01/1990

c. Review Dates: 1992

d. Completion Date: 1992

9. Background:

The CAB International has developed a limited database on aflatoxin in agricultural commodities. In response to a request at the 1987 Aflatoxin Workshop, we have started a comprehensive database on the groundnut aflatoxin problem using a text-oriented database management software package on a micro-computer. In addition to presenting abstracts of individual papers we will be including brief critical reviews of the major subject areas. Considering that ICRISAT has a comparative advantage in terms of resources, skills.

10. Objectives:

1. To create a microcomputer based database on aflatoxin in groundnut. 2. To provide the database in hard copy and on floppy diskettes to interested NARS/Institutions/Scientists worldwide. 3. To prepare an annotated bibliography and mini reviews on all aspects of the groundnut aflatoxin problem.

11. Techniques:

a) Detailed abstracts to be entered manually using a text-oriented database management software package on micro-computer. Literature from 1960 onwards. b) Database to be offered to interested NARS/Institutions/Scientists on floppy diskettes together with an appropriate manual. Public domain software to be used. It may be offered on specific aspects. c) Detailed abstracts of papers to be prepared. Critical mini reviews of major subject areas to be produced.

12. Classification:

a. Keywords:

Aspergillus flavus
Aflatoxins
Groundnuts

A parasiticus
Groundnut products
Mycotoxins

b. CGIAR Activities

Documentation and Dissemination

100.0%

c. Type of Research (percent distribution):

Basic: 0 Strategic: 0 Applied: 100.0 Adaptive: 0

d. Geographical Scope: G

Target Regions:

South Asia	35.0%
Southeast Asia	30.0%
Western Africa	35.0%

13. Training Component:

a. In-Service	0	d. Research Fellows	1
b. Research Scholars	0	e. Apprentices	0
c. Post Docs	1		

ICRISA
Research Project Proforma

1. Project Number: LO -841(90)IC/IC
2. Predecessor Project: Cp 128(87)IC
3. Linked Projects:
4. Title: Investigations on nematode problems of groundnut.

5. Discipline(s):

Genetic Resources	Pathology
Cropping Systems	

6. Crop(s)/Resource(s):

groundnut

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Sharma, S.B.	0.35	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Smith, D.H.	0.05
Wightman, J.A.	0.01
Mehan, V.K.	0.05
Subrahmanyam, P.	0.05
Singh, A.K.	0.01
Waliyar, F.	0.05

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
Siddiqi, M.R.	CABI, UK.	MENT
Starr, J.L.	Texas A&M, USA.	UNIV
Scientists	ASIA	NARS

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1993

9. Background:

Very little information is available on nematode problems of groundnut in the SAT. Limited surveys have indicated that parasitic nematodes (root-knot and lesion) may be very important problems in many regions. Very limited information is available on the interactions between nematodes and other soilborne pathogens. Screening work in collaboration with IMP, North Carolina has indicated that resistance is available to the root-knot disease.

10. Objectives:

- 1. Surveys for identification of nematode-caused problems
- 2. Identify sources of resistance to the root-knot nematodes and other important nematode problems
- 3. Understand interactions between pathogenic nematodes and important soilborne diseases.

11. Techniques:

Attempts will be made to assess the major nematode problems in parts of South Asia and South East Asia. Soil, roots, pods, and seeds will be examined for plant nematodes. Germplasm lines will be evaluated for resistance to the root-knot nematodes in pots and possibly at hot-spot locations. Interactions with soilborne microorganism will be studied in the glasshouse and in hot spot locations.

12. Classification:

a. Keywords:

Nematode Surveys	Resistance
Interactions	

b. CGIAR Activities

Plant Protection Research	30.0%
Exploratory Research	40.0%
Germplasm - Plant breeding/improvement	30.0%

c. Type of Research (percent distribution):

Basic: 30.0 Strategic: 60.0 Applied: 10.0 Adaptive: 0

d. Geographical Scope: G

e. Target Regions:

South Asia	45.0%
Southeast Asia	45.0%
Central America	10.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	0		

ICRISAT
Research Project Proforma

1. Project Number: LG -851(90)IC/IC
2. Predecessor Project: G 104
3. Linked Projects: Co-G-15,
Co-G
4. Title: Characterization of isolates of tomato spotted wilt virus (TSWV), epidemiology and management of bud necrosis disease.

5. Discipline(s):

Genetic Resources	Breeding
Entomology	Cell Biology
Virology	

6. Crop(s)/Resource(s):

groundnut

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Reddy, D.V.R.	0.15	ICRISAT	IARC
Poul, F.X.	0.60	ICRISAT	IARC
Buiel, A.A.M	0.60	Wageningen	

b. ICRISAT Scientists

Name	Sci Years
Moss, J.P.	0.03
Singh, A.K.	0.01
Dwivedi, S.L.	0.05

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
Demski, J.W.	Univ. of Georgi	UNIV
Goldbach, R.	Agri.Univ.Wagen	UNIV
Parlevliet	Agri.Univ.Wagen	UNIV
Singh, A.B.	Mainpuri, U.P.	NARS
Reddy, D.D.R.	APAU	NARS
Vijay Kumar	UAS, Raichur	NARS

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1993

9. Background:

Bud necrosis disease, caused by tomato spotted wilt virus (TSWV), is economically important on groundnuts in the Indian sub-continent. It is widely distributed currently known to be present in all the major groundnut growing countries. Since TSWV causes wide variation of symptoms in groundnut and the virus is extremely unstable it is essential to develop reliable methods for its detection. Polyclonal antisera produced for TSWV often react with healthy plant components. Thus it is essential to produce specific monoclonal antibodies or cDNA probes. TSWV has extremely wide host range. It is transmitted by thrips. Actual thrips vectors of TSWV that causes bud necrosis in groundnut, in the Indian subcontinent need investigation.

10. Objectives:

1. Identification and development of detection methods for peanut vein chlorosis virus, peanut yellow spot virus, witches broom disease etc. 2. Development of detection methods and determination of interrelationships with similar viruses or agents. 3. To characterize various isolates of TSWV occurring in India by using serological physico-chemical properties including complementary DNA probes. 4. Identification of principal thrips vectors of TSWV isolates and develop methods for virus detection in thrips. 5. Identification of sources of resistance to TSWV and the principal thrips vectors both in *A. hypogaea*, wild arachis and interspecific derivatives.

11. Techniques:

a) Purification of isolates of TSWV, production of polyclonal and monodonal antisera; Electro immunoblot assay of polypeptides with various TSWV antisera, nucleic acid analysis and development of cDNA probes. b) Transmission utilizing various thrips known to transmit TSWV and detection of TSWV in the principal thrips vectors utilizing various detection methods. c) Screening for resistance under field conditions to identify field-resistant genotypes. d) Screening of selected genotypes

12. Classification:

a. Keywords:

Tomato spotted wilt virus	Bud necrosis disease
Host plant resistance	Purification
Electro blot immunology	ELISA

b. CGIAR Activities

Plant Protection Research	100.0%
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c. Type of Research (percent distribution):

Basic: 15 Strategic: 30 Applied: 40 Adaptive: 15

d. Geographical Scope: G

e. Target Regions:

India	60.0%
South Asia	20.0%
Southeast Asia	20.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

**ICRISAT
Research Project Proforma**

1. Project Number: LG -852(90)IC/IC
2. Predecessor Project: G-104
3. Linked Projects: Co-G-15
4. Title: Development of detection methods and management of peanut clump virus disease.

5. Discipline(s):

Genetic Resources	Breeding
Cell Biology	Virology

6. Crop(s)/Resource(s):

groundnut	millet
finger millet	sorghum

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Reddy, D.V.R.	0.10	ICRISAT	IARC
Poul, F.X.	0.10	ICRISAT	IARC
Broglia, P.	0.20	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Moss, J.P.	0.03
Waliyar, F.	0.00
Singh, A.K.	0.01

c. Non-ICRISAT Scientists

	Institute	Inst Type
Rao, A.S.	Nagarjuna Unive	UNI\
Dollet, M.	CIRAD	MENT
Parnaik, Veena	CCMB	MENT
Mayo, M.	SCRI	MENT

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1993

9. Background:

PCV is widely distributed in India and west Africa and is economically important. The virus infects several monocotyledonous and dicotyledonous plants. The virus occurs as serologically distinct variants. The virus is seed transmitted in groundnuts and in some of cereal hosts. Since resistance to the virus has so far not been located in *A. hypogaea*, it is essential to explore nonconventional methods for developing resistant cultivars.

10. Objectives:

1. To develop DNA probes and polyclonal and monoclonal antisera which can detect several peanut clump virus (PCV) isolates. 2. Transmission of PCV by *Polymyxa graminis*. 3. Limited screening of germplasm, under natural conditions, for resistance to PCV. 4. Development of resistance to PCV utilizing nonconventional methods for introducing resistance.

11. Techniques:

a) Purification, cloning,; development of non-radioactive C-DNA probes; production of monoclonal antibodies; production of polyclonal antibodies for core region of PCV polypeptide. b) Screening of germplasm, especially wild *Arachis* spp. and interspecific hybrids, in infested soils. c) Effect of soil solarization; biological control utilizing pathogens.

12. Classification:

a. Keywords:

Peanut clump virus	Polymerase chain reaction
Nonradioactive DNA Probes	Solarization
Cloning	Coat protein gene resistance
Ribozymes	

b. CGIAR Activities

Seed Production	10.0%
Plant Protection Research	90.0%

c. Type of Research (percent distribution):

Basic: 20 Strategic: 25 Applied: 40 Adaptive: 15

d. Geographical Scope: R

e. Target Regions:

India	50.0%
Western Africa	50.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	0
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

**ICRISA.
Research Project Proforma**

1. Project Number: LG -853(90)IC/IC
2. Predecessor Project: G-104
3. Linked Projects: Co-G-15
Co-G
4. Title: Development of detection methods and identification of genotypes with resistance to peanut mottle and peanut viruses.

5. Discipline(s):

Genetic Resources	Breeding
Cell Biology	Virology

6. Crop(s)/Resource(s):

groundnut

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Reddy, D.V.R.	0.10	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
Reddy, L.J.	0.03
Moss, J.P.	0.03
Singh, A.K.	0.01

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
Demski, J.W.	Univ. of Georgia	UNIV
Kuhn, C.W.	Univ. of Georgia	UNIV
Wongkaew, S.	Khonkaen Univer	UNIV
Zeyong, X.	China	NARS
Saleh, M.	Indonesia	NARS
Middleton, K.	Auskalia	UNIV
Ditatzgen, R.	Auskalia	UNIV

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1993

9. Background:

Peanut mottle virus (PMV) and peanut stripe virus (PSV) occurs in some groundnut growing countries. It is a seed-transmitted potyvirus. It has potential to cause losses upto 40% to yields of groundnut. Since alternate methods, other than growing resistant cultivars, are currently not available for controlling, it is essential to identify germplasm sources which can resist virus multiplication and genotype in which viruses are not seed transmitted.

10. Objectives:

1. To produce polyclonal and monoclonal antisera and develop simple and more sensitive detection methods. 2. To identify sources of resistance or tolerance to peanut mottle virus and genotypes with negligible or no seed transmission. 3. Multilocation testing of selected genotypes.

11. Techniques:

a) Purification of the virus and production of polyclonal antisera in rabbits utilizing methods already developed. b) Introduce suitable modifications to ELISA, especially to process large number of plant samples. Develop highly specific antibodies for virus detection. c) Mechanical sap inoculation of various genotypes using an air brush under field and laboratory conditions. d) Evaluation for yield losses under field conditions. e) Seed testing for virus presence by non destructive sampling using enzyme-linked immunosorbent assay (ELISA) to identify non-seed transmitting genotypes.

12. Classification:

a. Keywords:

Peanut mottle virus
Tolerance
Peanut stripe virus

Resistance
Nonseed transmission

b. CGIAR Activities

Seed Production	10.0%
Germplasm - Enhancement	40.0%
Plant Protection Research	50.0%

c. Type of Research (percent distribution):

Basic: 10 Strategic: 25 Applied: 50 Adaptive: 15

d. Geographical Scope: 0

e. Target Regions:

Southeast Asia	50.0%
Eastern Africa	25.0%
Southern Africa	25.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	0
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	0		

ICRISA:
Research Project Proforma

1. Project Number: LG -854(90)IC/IC
2. Predecessor Project:
3. Linked Projects: CO-g-17(86)

4. Title: Sequencing of peanut chlorotic leaf streak virus
DNA and characterization of 35S promoter.
5. Discipline(s):
 Cell Biology Virology
6. Crop(s)/Resource(s):
 groundnut
7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Reddy, D.V.R.	0.02	ICRISAT	IARC
Shepherd, R.J.	0.10	Kentucky	Mont

b. ICRISAT Scientists

Name	Sci Years
Moss, J.P.	0.03

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
Scientists		NARS

8. Dates:

c. Review Dates: 1992

d. Completion Date: 1992

9. Background:

Peanut chlorotic leaf streak virus is the first caulimovirus identified in groundnut and was shown to prefer high temperatures (30-35 C) for its multiplication. It is essential to find out if the virus has a promoter (35S) which prefers high temperatures. Such a promoter could be used for gene transfers in to plant cells which prefer high temperatures. Since facilities for sequencing viral nucleic acids and for checking the 35S promoter activity are not available at the ICRISAT Center a collaborative project was initiated with Dr. R.J. Shepherd of the University of Kentucky.

10. Objectives:

1. Purification, cloning and sequencing of peanut chlorotic leaf streak virus 2. Characterization of 35S promoter.

11. Techniques:

a) Conventional techniques used in DNA sequencing. b) Sequencing of 35S promoter and its functioning especially at high temperatures.

12. Classification:

a. Keywords:

Caulimo viruses Peanut chlorotic leaf streak
35 S promoter

b. CGIAR Activities

Plant Protection Research 50.0%
Research on Approaches, Concepts,
Methods, & Procedures 50.0%

c. Type of Research (percent distribution):

Basic: 70 Strategic: 20 Applied: 10 Adaptive: 0

d. Geographical Scope: 0

e. Target Regions:

India 100.0%

13. Training Component:

a. In-Service	0	d. Research Fellows	0
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

**ICRISA:
Research Project Proforma**

1. Project Number: LG -855(90)IC/IC
2. Predecessor Project:
3. Linked Projects:
4. Title: Identification of minor diseases of groundnut
 caused by viruses, prokaryotes and viroids.
5. Discipline(s):
 Virology
6. Crop(s)/Resource(s):
 groundnut
7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Reddy, D.V.R.	0.05	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
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--Nil--

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
Sreenivasulu, P.	S.V. University	UNIV
Mali, V.R.	M.A. University	UNIV
Varma, A.	IARI	NARS
Prasada Rao, R.D.V.J. Scientists	NBPGR	NARS NARS

8. Dates:

- a. Approval Date: 19900101

b. Starting Date: 01/1990

c. Review Dates: 1992

d. Completion Date: 1992

9. Background:

Several viruses such as cowpea mild mottle Peanut veinal chlorosis, yellow spot virus, and chlorotic streak viruses are known to occur. They are widely distributed and have the potential to become economically important, especially when changes in cropping pattern and new cultivars are introduced.

10. Objectives:

1. Identification and development of detection methods for peanut veinal chlorosis virus, peanut yellow spot virus, witches' broom disease 2. Development of detection methods and determination of interrelationships with similar virus or agents.

11. Techniques:

a) Determination of host range, purification of viruses, transmission characteristics and production of polyclonal antisera. b) Utilize various serological techniques and cDNA probes for determining interrelationships; for potyviruses antibodies for N termini will be utilized.

12. Classification:

a. Keywords:

Peanut veinal chlorosis virus Cowpea mild mottle virus
Peanut yellow spot virus Peanut chlorotic leaf spot virus

b. CGIAR Activities

Plant Protection Research 100.0%

c. Type of Research (percent distribution):

Basic: 30 Strategic: 20 Applied: 30 Adaptive: 20

d. Geographical Scope: G

e. Target Regions:

India 100.0%

13. Training Component:

a. In-Service	0	d. Research Fellows	0
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	1		

**ICRISAT
Research Project Proforma**

1. Project Number: LG -856(90)IC/IC
2. Predecessor Project: Co-G-15
3. Linked Projects:
4. Title: Characterization, detection and management of economically important groundnut viruses in Asia and Africa.

5. Discipline(s):

Genetic Resources	Breeding	
Entomology	Cell Biology	Virology

6. Crop(s)/Resource(s):

groundnut

7. Staffing:

a. Lead Scientists

Name	Sci Years	Institute	Inst Type
Reddy, D.V.R.	0.05	ICRISAT	IARC
Waliyar, F.	0.01	ICRISAT	IARC
Subrahmanyam, P.	0.01	ICRISAT	IARC

b. ICRISAT Scientists

Name	Sci Years
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--Nil--

c. Non-ICRISAT Scientists

Name	Institute	Inst Type
Harrison, B.D.	SCRI	MENT
Demski, J.W.	Univ. of Georgi	UNIV
Dollet, M.	CIRAD	MENT
Saleh, N.	MARIF	NARS
Middleton, K.J.	QDP	UNIV
Gibbs, A.J.	ANU	MENT
Wongkaew, S.	Khonkaen Univ.	NARS
Bos, L.	IPO	MENT
Zeyong, S.	China	NARS

8. Dates:

- a. Approval Date: 19900101
- b. Starting Date: 01/1990
- c. Review Dates: 1992
- d. Completion Date: 1993

9. Background:

Groundnut rosette and peanut clump virus diseases are considered to be economically important on groundnut in Africa and peanut stripe virus in south and southeast Asia. It is essential to develop highly specific detection methods for them and assist scientists in NARS to identify sources of resistance and to study epidemiology of virus diseases. Since facilities for virus characterization and for developing detection methods are not available in some of the countries, it is important to conduct this research in mentor institutes in western Europe where it is possible to import live viruses. Additionally it is essential to coordinate research efforts of various groups, by holding regular meetings and by interchange of data and staff.

10. Objectives:

- 1. To characterize groundnut rosettes, peanut clump, peanut mottle, peanut stripe, tomato spotted wilt and other economically important groundnut virus diseases.
- 2. Development of detection methods.
- 3. Vector ecology and epidemiology of the disease.
- 4. To organize meetings to coordinate research and provide training.
- 5. Purification, cloning and sequencing of peanut chlorotic leaf streak virus.
- 6. Characterization of 35S promoter.

11. Techniques:

- a) Determination of host range purification of viruses, transmission characteristics and production of polyclonal antisera.
- b) Utilize various serological techniques and CDNA probes for determining interrelationships; for potyviruses antibodies for N termini will be utilized.

12. Classification:

a. Keywords:

Groundnut rosette	Peanut clump
Peanut stripe	Peanut mottle
Epidemiology	Host plant resistance

b. CGIAR Activities

Plant Protection Research 100.0%

c. Type of Research (percent distribution):

Basic: 10.0 Strategic: 20.0 Applied: 40.0 Adaptive: 30

d. Geographical Scope: C

e. Target Regions:

Western Africa	35.0%
Southeast Asia	35.0%
Southern Africa	30.0%

13. Training Component:

a. In-Service	1	d. Research Fellows	1
b. Research Scholars	1	e. Apprentices	1
c. Post Docs	0		