

annual report



**ANNUAL
REPORT
1989-90**

**NATIONAL RESEARCH CENTRE FOR WEED SCIENCE
ADHARTAL, JABALPUR-482 004. (M.P.) INDIA.**

ANNUAL REPORT 1989-90

वार्षिक प्रतिवेदन १९८९ - ९०



(Date of Establishment : 22nd April, 1989)

DIRECTOR : DR. V. M. BHAN

NATIONAL RESEARCH CENTRE FOR WEED SCIENCE
ADHARTAL, JABALPUR - 482 004, M. P.

राष्ट्रीय खरपतवार विज्ञान अनुसंधान केन्द्र
अधरताल, जबलपुर - ४८२ ००४, म. प्र.

INTRODUCTION

The struggle of men with weeds probably started with the very beginning of agriculture which coincided the process of civilisation. It began with the era of uprooting and burning and later followed by preparatory cultivation and cultural methods. This was followed by use of chemical methods of weed control which are getting prevalent in developed countries. The problem of weeds in different fields of environment, crop production, forest development, aquatic and non-crop situations is well-known. Losses caused by weeds in decreasing the productivity of crops from an area have been worked nearly Rs. 5000 crores. The problem has accentuated with the increase in use of inputs like high yielding varieties seeds, fertilizer application, irrigation and plant protection measures, etc. These inputs also help in better growth of weeds, thereby causing severe competition and reduced crop yields, if not properly brought under control. Presence of weeds is constraint and the effect is further accentuated by their improper management practices. Identification of the extent and degree of these constraints and developing appropriate, corrective and preventive measures is very important for developing the sustainable production in crop situation and reducing losses in other situations. Weed research,

however has now extended its dimensions of a separate agricultural science involving Agronomy, Taxonomy, Ecology, Physiology, Bio-chemistry as well as soil and Agricultural Engineering. Therefore, it has become imperative that programme is developed to keep these unwanted plants under well managed conditions so as to avoid losses caused by their presence.

As early as in 1952, ICAR launched a weed control scheme on wheat, rice and sugarcane in 11 States to monitor the weed flora and to find out feasibility of weed control. A number of State Research Organisations, Crop Research Institutes of ICAR and State Agricultural University have tried to develop weed control research during last 25 Years. Until 1978, screening and evaluation of herbicides for control of weeds in different crops have been the major concern of research in these Institutions. In 1978, All India Coordinated Research Programme on Weed Control was initiated initially with 6 locations in different Agro-climatic zones of the country and it was subsequently increased at various locations and in 1989, the Programme was at 22 locations.

National Research Centre for Weed Science :

The National Research Centre for Weed Science was approved during the middle phase of the 7th Five Year Plan with a total outlay of Rs 64.00 lakhs. The approval of the Government of India for establishing the NRCWS was conveyed vide DARE letter No. 3-13/85/AFC dated November 14, 1986. The Centre actually came into existence on April 22, 1989 with the joining of its Director at Jabalpur, Madhya Pradesh.

The temporary Office of NRCWS with one room was initiated in the Department of Agronomy at Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur. The funds were provided in September 1989 and the first office of NRCWS started functioning in December, 1989. The farm for the research work was acquired on January 1, 1990.

Mandate :

"To act as a nodal Institution in Weed Science for providing (a) leadership through basic and applied multi-disciplinary research, (b) training and (c) national facility for research and information".

Thrust Areas :

1. Initial identification and evaluation of new herbicides.
2. To generate data on residue estimation and management of herbicides in soil, water and plants, cropped and non-cropped situations.
3. Study of the long term effect of herbicides in important (wet, irrigated and

rained cropping system). Develop weed management technology for rainfed rice cropping system.

4. To conduct research for weed developing methodology for biological and non-chemical technology for control of weeds.
5. Study on the biology and Agro-ecology of weeds. Monitor and analysis of weed shift under different ecological environments and to develop strategies for effective management programme.
6. Study on the physiology of weeds and bio-chemistry of herbicides. Development and utilisation of allelopathy methods for developing herbicides sources from plant kingdom and also evaluating the effect of weeds and crops residue on each other.
7. Study on the aquatic and problem weeds and their control.
8. Identification and development of bio-herbicides for problem weeds.
9. Development and testing of weed control equipments.
10. Conduct training programme in weed science.
11. To generate information on socio-economic aspects of weed control in different cropping systems.
12. Develop computer laboratory to assist in various types of statistical analysis.

13. To conduct 'on farm testing' and operational research project regarding use of recommended and newly developed weed management technology at farmers field.

Participating Institutions & Linkages :

The National Research Centre for weed Science will be the nodal point for basic approaches to sub-programmes and will also provide National Facility for

research on biology, eco-physiology, residue management and development of tools and implements.

AIU RP-Weed Control with its Head Quarters at NRC-Weed Science and its 22 Centres/any other Institution located at various SAUs will work for applied research and on problems of their region to provide instant answers to the socio-economic needs concerning weed management of those areas.

INFRASTRUCTURAL FACILITIES

Research Farm :

The National Research centre for weed science acquired research farm from JNKVV on January 1, 1990. The farm is located 9 km from the main Jabalpur Railway Station on National Highway No. 7. The area of farm is 59.5 hectares. The farm has two tube-wells and an underground irrigation pipeline in some fields.

Climate :

The climate of Jabalpur region is typically semi-humid and subtropical, where winters are cool and summers are hot and dry. Jabalpur is situated between 22.49° and 24.8° North latitude and 78.21° and 80.58° East longitude at an altitude of 411.78 metres above the mean sea level.

The Tropic of Cancer passes through the middle of district. Jabalpur comes under the agro-climatic region of Kymore Plateau and Satpura Hills and lies in the Rice-wheat crop zone of the State. The average annual rainfall is nearly 1300-1400mm which is mostly received between June and September. Very little rainfall (75-175mm) is received during October to May.

The mean maximum temperature during the hottest months of May and June varies from 45.5°C to 46.4°C. January is the coldest month of the year with an average maximum temperature of 24.4°C and lowest temperature being 7.1°C. The mean relative humidity of the tract is 74 per cent.

Soil :

The soil of the farm belong to Kheri series. The Kheri series is a member of the very fine, montmorillonitic, hyperthermic family of Typic Chromusterts. Kheri soils have dark greyish brown to very dark greyish brown neutral clayey A horizons and very dark greyish brown moderately alkaline AC horizons. They have developed in basaltic alluvium on level to very gently sloping piedmont plains in Jabalpur and Narsinghpur districts of Madhya Pradesh at an elevation of 375 to 400 m above MSL. The climate is subhumid tropical with mean annual rainfall of 1440mm and mean annual air temperature of 25.2°C. Principal associated soil is Adhartal series, a Vertic Ustochrept.

Typifying pedon : Kheri clay - cultivated

- Ap 0-15cm — Very dark greyish brown to dark greyish brown (2.5Y 3.5/2 D&M) clay; weak medium prismatic structure breaking to moderate medium subangular blocks; firm, sticky and plastic; few fine to medium basalt fragments and fine lime nodules; many fine and medium roots inside peds; fine tubular pores; pH 7.1; gradual smooth boundary.
- A12 15-37cm — Very dark greyish brown (10YR 3/2 M); moderate coarse prismatic structure breaking to moderate medium angular blocks; very firm, very sticky and plastic;

few fine to medium basalt fragments and lime nodules; common fine roots; very fine irregular pores; pH 7.3; diffuse smooth boundary.

- A13 37-60cm — Very dark greyish brown (10YR 3/2 M) clay; intersecting slickensides forming strong coarse angular blocky structure with shiny pressure faces; very firm, very sticky and plastic; few fine to medium basalt fragments and lime nodules; few fine roots; pH 7.4; diffuse smooth boundary.
- A14 60-84cm — Very dark greyish brown and dark greyish brown (10YR 3/2, 4/2 M) clay; intersecting slickensides forming strong coarse angular blocky structure with shiny pressure faces; very firm, very sticky and plastic; few fine to medium basalt fragments and lime nodules; slightly effervescent; few fine roots; pH 7.3; diffuse smooth boundary.
- A15 84-129 cm — Very dark greyish brown and dark greyish brown (10Y 3/2, 4/2. M) clay; intersecting slickensides forming strong coarse parallelepiped with long axes tilted 40 to 45° from the horizontal that break into strong coarse angular blocks with shiny pressure faces; very firm; very sticky and plastic; few fine to medium basalt fragments and few fine lime nodules; strongly effervescent; few fine roots; pH 8.0; clear wavy boundary

AC 129-150 cm + ——— Very dark greyish brown and dark greyish brown (10YR 3/2, 4/2 M) clay; intersecting slickensides forming strong coarse parallelepipeds with long axes tilted 30 to 35° from the horizontal that break into strong coarse angular blocks with shiny pressure faces; very firm and very sticky; few fine to medium basalt fragments and lime nodules; strongly effervescent; few fine roots; pH 8.1.

Range in characteristics : The thickness of the solum is more than 125 cm. The estimated MAST is 26.2°C, MSST is 29.3°C and MWST is 21.2°C. Moisture regime is ustic and moisture control section is dry for more than 90 cumulative days. The A horizon is more than 125 cm thick. Its colour is in hue 2.5Y and 10YR, value 3 to 4 and chroma 2. The texture is clayey with more than 60% clay. In the lower layers of the A horizon, intersecting slickensides forming strong coarse parallelepipeds are observed.

Drainage and permeability : Moderately well to imperfectly drained with slow permeability.

Use and vegetation : Cultivated to rice, wheat, gram, linseed, pea and lentil; natural vegetation - *Acacia* spp., *Butea* spp., *Annona* spp., and grasses - *Cynodon* spp., *Saccharum* spp., etc.

Distribution and extent : Extensive in the upper catchment of Narmada covering Jabalpur and Narsinghpur districts, Madhya Pradesh.

Type location : Village kheri, Tehsil and District Jabalpur, Madhya Pradesh, Kheri Research Farm, JNKVV. 23° 10'N 79°57'E.

Series proposed : Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur.

Interpretation : Kheri series are moderately productive and crops respond to management. In some soils poor drainage may give rise to problems.

Interpretative grouping :

- | | | |
|-------|---------------------------|--------|
| i) | Land capability sub class | IIIs |
| ii) | Irrigability sub-class | 3d |
| iii) | Productivity potential | Medium |

DETAILS OF SCIENTIFIC, TECHNICAL & ADMINISTRATIVE POSTS :

O. Director's Unit :

- | | | |
|----|-------------------------|---|
| 1) | Director | 1 |
| 2) | T-5 (Technical Officer) | 1 |
| 3) | Senior Stenographer | 1 |
| 4) | Messenger | 2 |
| 5) | Driver (Vehicle) | 1 |

I. Weed management in cropping system

- | | | |
|----|---------------------------------|---|
| 1) | Principal Scientist (Agronomy) | 1 |
| 2) | Senior Scientist (Agronomy) | 3 |
| 3) | Senior Scientist (Soil Science) | 1 |
| 4) | Scientist (Soil Science) | 1 |
| 5) | T-1 (Field Assistant) | 3 |

II. Biology & agro-ecology of weeds :		6) T-II-3 (Artist)	1
		7) T-II-3 (Tech. Asstt., Statistics)	1
1) Senior Scientist (Botany)	1	8) T-1 (Tech. Asstt., Economics)	1
2) Senior Scientist (Ecology)	1		
3) Senior Scientist (Taxonomy)	1	VI. Engineering Unit :	
4) T-1 (Field Assistant)	1	1) Sr. Scientist (Agril. Engg.)	1
5) Lab. Attendent	1	2) T-II-3 (Draftsman)	1
		3) T-2 (Mechanic)	1
		4) T-1 (Carpenter)	1
		5) T-1 (Field Assistant)	1
III. Vegetation management in non-crop areas & aquatic environment :			
		Farm Unit :	
1) Sr. Scientist (Agronomy, Aquatic Weeds)	1	1) T-5 (Farm Manager)	1
2) Sr. Scientist (Microbiology)	1	2) T-1 (Field Assistant)	2
3) Scientist (Plant Pathology)	1	3) T-1 (Meterological Asstt.)	1
4) Scientist (Entomology)	1	4) Storekeeper (UDC)	1
5) T-1 (Field Assistants)	3	5) L.D.C./Typist	1
6) Lab Attendent	1	6) Farm Mazdoors	9
		7) Chowkidars	5
		8) Tractor Driver	1
IV. Residue Chemistry & Weed Physiology :			
		Library Unit :	
1) Sr. Scientist (Plant Physiology)	1	1) T-4 (Librarian)	1
2) Sr. Scientist (Analytical Chemistry)	1	2) Library Attendent	1
3) Sr. Scientist (Residue Chemistry)	1		
4) Sr. Scientist (Plant Biochemistry)	1	Administrative Section :	
5) Scientist (Plant Physiology)	1		
6) T-1 (Field Assistants)	3	1) Asstt. Adm. Officer	1
7) Lab Attendent	1	2) Superintendent	1
		3) Asstt./Cashier	2
V. Social Science & Transfer of Technology :		4) L.D.C./Typist	2
		5) Despatcher/ L.D.C.	
1) Sr. Scientist (Agril. Economics)	1	6) Stenographer	
2) Sr. Scientist (Statistics)	1	7) SSG-I (Messenger)	
3) Sr. Scientist (Agronomy, Training coordinator)	1		
4) Scientist (Agril. Extn.)	1	Accounts Section :	
5) T-4 (Photographer)	1	1) Asstt Finance & Accounts Officer	1
		2) L.D.C.	1
		3) SSG-I (Messenger)	1

Functional relationship and area of work of various sections and units :

Weed Management in Cropping System : Initial identification and evaluation of herbicides.

Weed management in cropping system with emphasis on low land rainfed rice system.

Study of the long term effect of herbicides in important cropping systems.

Designing and testing of weed control equipments (in association with Engineering Unit).

Biology & Agroecology of weeds : Study of biology and ecology of important weed species. Study of weed shift in crop and non-crop systems.

Survey and mapping of important weeds (in association with AICRP-WC).

Vegetation management in non-crop areas and aquatic environment : Biological and non-chemical control of weeds.

Biology and control of aquatic, parasitic, perennial and problem weeds.

Weed management in non-cropped System.

Residue chemistry & weed Physiology : Behaviour of weeds. Chemistry and mode of action by herbicides.

Herbicide residue estimation and their management in soil-water-plant in crop and non-crop situation.

Identification and development of bio-herbicides.

Social science and transfer of technology :

To generate information on socio-economic aspects of weed management in different cropping systems.

To develop computer laboratory to assist scientist in various forms of analysis.

To develop data base information system.

Develop courses and conduct training programmes in weed science.

To conduct 'On Farm Testing' and Operational Research Projects to generate information on weed management technology at farmers' field.

Engineering Unit : Designing and testing of weed control equipments (in association with CIAE, IIT, Kharagpur and any other AICRP-WC Centre having facility of designing and development of field equipments). The work is to be done in association with Agronomists in management cropping system.

Farm Unit : Providing infrastructure facilities of research at farm.

Prepare plan and execute land development programme.

Develop cropping plan and its executive for non experimental area.

STAFF IN POSITION (AS ON 31.3.1990) :

Sl. No.	Designation	Name	Date of Joining
SCIENTIFIC :			
01.	Director	Dr. V. M. Bhan	22.04.89
02.	Project Coordinator	Dr. V. N. Saraswat	18.08.89
ADMINISTRATIVE :			
03.	Asstt. Adm. Officer	Shri Balwant Rai	21.08.89
04.	Office Assistant	Shri S. C. Sharma	19.03.90
05.	Junior Stenographers	Ku. Shirley Jacob	01.12.89
		Ku. Nidhi Kaushik	28.11.89
06.	Junior Clerks	Shri S. K. Sharma	02.12.89
		Shri Veerendra Singh	02.12.89
TECHNICAL :			
07.	Field Assistants (T-1)	Shri Sudhir Parey	15.03.90
		Shri R. S. Upadhyay	17.03.90
		Shri J. N. Sen	13.03.90
SUPPORTING :			
08.	Messenger	Shri Francis Xavier	17.02.90
		Shri Veer Singh	02.03.90
09.	Farm Mazdoor	Shri Raju Prasad	19.03.90
		Shri Jagoli Prasad	21.03.90
		Shri J. S. Thakur	23.03.90
		Shri C. L. Yadav	30.03.90
10.	Security Guard	Shri Sunil Kumar	17.02.90
AUXILLIARY :			
11.	Driver	Shri Prem Lal	23.03.90
		Shri Dilip Sahu	23.03.90

**LIST OF TOOLS, PLANTS AND OTHER OFFICE EQUIPMENTS
PURCHASED BY THE CENTRE DURING 1989-90 (NUMBERS)**

Sl. No.	Name of the item	NRCWS	AICRPWC	Total
01.	Tractors MF-1035 alongwith implements	2	-	2
02.	Staff car	1	1	2
*03.	Jeep	1	-	1
*04.	A. C.	2	-	2
05.	P. C. A. T.	-	1	1
06.	Electronic Typewriters	2	-	2
07.	Duplicating Machine	1	1	2
08.	Refrigerators	2	-	2
*09.	Water Cooler	1	-	1
10.	Tractor Trolley	1	-	1
11.	Water Tanker (Tractor Driven)	1	-	1
12	Photocopier	1	-	1
		<u>15</u>	<u>3</u>	<u>18</u>

*Indent has already been placed alongwith money with the DGS & D.

FINANCIAL STATEMENT :

The details of budget allocated and expenditure incurred during 1989-90 is Presented in Table enclosed.

VISITORS :

Dr. G. B. Singh, Assistant Director General (Agronomy), ICAR, New Delhi visited this Centre on 22nd December, 1989.

ACKNOWLEDGEMENTS :

The Director acknowledge with thanks the Vice Chancellor, JNKVV and Head of the Deptt. (Agronomy) for providing temporary sitting accomodation at their campus to initiate the Organisation (NRCWS). The considered technical and administrative assistance of Dr. I. P. Abrol, DDG(S), Dr. G. B. Singh, ADG (Agronomy) is gratefully acknowledged. He also acknowledges the help rendered by the Secretary ICAR, Director (Finance), Director (Personnel) and Deputy Secretary, of the IA-II. The help rendered bythe scientist, officer and staff of NRCWS is also gratefully acknowledged.

STATEMENT OF BUDGET AND EXPENDITURE

Sl. No.	Head of Account	Budget Estimate (Rs. in lakhs) 1989-90	Expenditure (Rs. in Lakhs) 1989-90		Remarks
			NRCWS	AICRPWC	
			—	—	
01.	Establishment Charges including LSP & PF	1.50	1.36	1.07	Apart from this, the funds to the tune of Rs. 7.20 lakhs were also allocated under AICRP in the month of October, 1989. In spite of late allocation of funds and the release of first remittance to the Centre during end of Sept., '89, the Centre was in a position to utilize the entire budget allocations of Rs. 27.20 lakhs but ICAR remitted only Rs. 19.40 Lakhs upto 31-3-90. This expenditure includes the GPF & other receipts of the Centre.
02.	Travelling Expenses	0.70	0.66	0.12	
03.	Other Charges (including equipments)	14.80	12.68	1.98	
04.	Works	1.00	—	—	
05.	Other items	2.00	2.01	—	
		<u>20.00</u>	<u>16.71</u>	<u>3.17</u>	

NOTE : The Centre started functioning w. e. f. 22-4-1989 and the national budget of Rs. 2.00 lakhs was provided for the year 1989-90. Against the demand of Rs. 30.00 lakhs of the Centre for the year, the budget of only Rs. 10.00 lakhs was allocated and subsequently revised allocations of Rs. 20.00 lakhs was conveyed in the month of March, 1990.

NATIONAL RESEARCH CENTRE FOR WEED SCIENCE

The office of the National Research Centre for Weed Science is located in 135, Ravindra Nagar, Adhartal, Jabalpur. The farm is located 9 km from the main Jabalpur Railway Station on National Highway No. 7. (Jabalpur - Katni Road) The area of the farm is 59.5 hectares.

TELEGRAM : WEED SCIENCE, JABALPUR

TELEPHONE : 23939

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