Best Practice 1

Empowering budding Agripreneurs Elevating University Brand through Entrepreneurial and Employable Graduates

RAJMATA VIJAYARAJE SCINDIA KRISHI VISHWA VIDYALAYA, GWALIOR (M.P.)

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Strategic Insights and Highlights

Title: Empowering budding Agripreneurs: Elevating University Brand through Entrepreneurial and Employable Graduates"

1. Objectives:

Ambitious initiative with following objectives is aimed at enriching the esteemed brand of RVSKVV, Gwalior by nurturing graduates who excel not only in agriculture but also possess robust entrepreneurial acumen and are poised for professional pursuits.

- To create a dynamic first stop learner centre for addressing the skill needs by designing entrepreneurship oriented professionals with an international outlook that are scholarly acclaimed, life enhancing, socially sensitive and environmentally responsible.
- To develop globally competent human resources to lead educational institutions, developmental organizations and agri - based industries for knowledge sharing and value addition for achieving acclaimed output.

2. Context:

Agricultural education is being increasingly challenged to engage in a new global social contract to serve the needs of the society which necessitates the inclusion of innovation, and entrepreneurship promotion to render skill sense to agricultural education. This underlines the reorientation of the entire education system to cater to the learning needs of the students and quality human resource needs of the agri based enterprises.

Hence, it is crucial to devise a framework for transforming agricultural education geared to reinforce the brand image of the institute, promotion of the entrepreneurial opportunities for graduates with capacity building and career guidance, academic-industry integration, increased collaboration and looking beyond India rendering an opportunity for international exposure to modernize outreach activities and stay abreast of cutting-edge advancements in agricultural sciences and related sectors to evolve in time and space portraying agricultural education responsive to high green growth with high quality human resources.

3. The Practice of Empowering budding Agripreneurs achieved through:

a. Cultivating Global Perspectives:

- Established robust exchange programs with international and national institutions to enable faculty and students to gain valuable insights and build international networks crucial for their future careers in agriculture.
- Rendered opportunity to > 100 UG students to visit 09 global Centres of Excellence. While five UG students awarded Dual Degree from RVSKVV and Dalhousie university, Canada.

b. Enhancement of Capability and Expertise:

- Offered specialized certificate/pilot courses/ short trainings in frontier areas in collaboration with industry experts for enhancing employability and skill sets aligned with market demands.
- Over 10 students have engaged in entrepreneurial ventures. Additionally, over 650 students benefited from trainings, fostering multidisciplinary projects facilitated by the Innovation cum Incubation Centre.
- The **"Raj Vijay Lecture Series"** organized over 200 sessions by eminent scholars and practitioners from academia, research organizations, and industry having focus on quality education, soft skills, personality development, communication and entrepreneurial skills, and job orientation, bridging theory with practical applications effectively.

c. Building for the Future:

- Enhancement of RVSKVV's infrastructure, including laboratories, student and faculty amenities, and technology-enabled classrooms, ensures access to state-of-the-art facilities for advanced research and experiential learning. The implementation of digital classrooms, 15 interactive smart boards, Virtual Reality and 3D Viewing Lab, CCTV surveillance, and Wi-Fi across campus, along with amenities like dishwashers, washing machines, deep freezers, sanitary vending machines, incinerators, and water filtration units in hostels has significantly transformed teaching and learning environment while enhancing student comfort. Ramp and Wheelchair accessibility across campus promotes inclusivity, complemented by a dedicated placement cell and language labs equipped with advanced multimedia resources and interactive software.

d. Forging Partnerships:

- Strengthened global collaboration and network by executing 45 MoUs for industry-academia partnerships, involving over 50 industry experts. They contributed through trainings, interactions, collaborations, internships, and mentoring, benefiting students in terms of employment generation initiatives.

e. Green Initiatives for Protection and Posterity:

- RVSKVV demonstrates its dedication to sustainable agriculture by integrating environmental sustainability into its curriculum and operations. Regular trainings on environmental and social issues are organized to embed these concerns within the university system. Initiatives such as "Waste Paper Recycling" and "Bio-Waste Recycling machines" have been implemented to tackle current environmental challenges. The university's transformation into a green campus through "Agri-Eco-Tourism" initiatives includes extensive landscaping and urban forest development. Solar energy is adopted across the campus as a sustainable energy source, enhancing environmental sustainability and safeguard measures.

4. Success:

- During Covid-19 pandemic, RVSKVV continued to nurture students' ambitions to study abroad. The mentor-mentee approach received steadfast support from university faculty. Their ongoing guidance proved pivotal as five students courageously pursued and excelled in a Dual Degree Programme at Dalhousie University, Halifax, Canada, earning prestigious Deans' Medals. They all pursued their career growth with unwavering determination, choosing to extend their stay rather than returning home.

- Mr. Kuldeep Anjana earned three esteemed accolades at the Student Advancement Leadership Awards: the Community Service, Student Ambassador, and Student Leadership Awards. These honours not only celebrated his outstanding achievements but also highlighted his dedication to nurturing positive change within the university and beyond, enhancing RVSKVV Gwalior and India's international reputation.

- Major success of our initiatives is providing students exposure to esteemed national and international institutes, cultivating future visionary leaders with global competence through carefully orchestrated knowledge sharing, value addition, and achieving recognized outcomes.

- Empowered faculty through robust international and National exposure, providing faculty with invaluable opportunities to gain insights, build National/ international networks, and remain abreast of cutting-edge advancements in agriculture.

- Through the Agri-Eco-Tourism initiative, the university campus has been revitalized into a green campus with extensive landscaping and urban forest development.

5. Problem Encountered and Resources Required

- The approach was innovative and implemented under World Bank guidelines, allowing for a liberal and open-handed approach compared to existing rules. Adapting this mindset and gaining acceptance for integration into ongoing system posed a significant challenge.
- Pandemic presented significant challenges to implementation. However, the project team successfully turned this adversity into an opportunity to excel in virtual modes of operation.
- Implementation of global collaborative programs and similar initiatives in agricultural universities nationwide is still undergoing systematization.

To sustain the empowerment of budding agripreneurs and enhance their capabilities and expertise, establishment of world-class infrastructure, forging partnerships to reinforce entrepreneurial acumen, and embracing global perspectives and green initiatives for future protection are crucial. This requires a continuous flow of funds, uninterrupted tech-enabled environments, updated and motivated faculties and mentors, proactive student support services, flawless administrative support and a robust monitoring system with incentives for team members.

From Adversity to Achievement

Against All Odds: A SUCCESS STORY

RAJMATA VIJAYARAJE SCINDIA KRISHI VISHWA VIDYALAYA, GWALIOR (M.P.)

RVSKVV Students Excel in Canada Despite Pandemic Hurdles!"

Institutional Development Plan-National Agriculture Higher Education Project has been implemented in Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior on January 9, 2020 with a Vision to create a dynamic first stop agricultural education learner centre to strengthen the undergraduate system for addressing the skill needs of agri- entrepreneurship by designing successful entrepreneurship oriented professionals with an international outlook that are scholarly acclaimed, life enhancing, socially sensitive and environmentally responsible with a mission to develop globally competent quality human resources with national and international outlook to lead the educational institutions, developmental organizations and agri - based industries through a network of all stakeholders for knowledge sharing and value addition for achieving acclaimed output.

The title of the project 'Reinforcement of The Brand Value of University for Designing Market Ready Graduates for Entrepreneurship and Employment Generation' is itself suggestive of the fact that the University has been very keen for the real strengthening of the human recourse being produced from RVSKVV Gwalior. The Dual Degree Programme is one such initiative undertaken by the University for which the University has started exploration of international institutions of repute and found Dalhousie University Halifax, Nova Scotia Canada a suitable destination for the students of RVSKVV. Dalhousie University (commonly known as *"Dal"*) is a large public research University in Nova Scotia, Canada, with three campuses in Halifax, a fourth in Bible Hill, and a second medical school campus in Saint John, New Brunswick. Dalhousie University offers over 200 degree programs in 13 undergraduate, graduate, and professional faculties. The University is a member of the U15, a group of research-intensive universities in Canada.

Everything was well planned and going on smoothly until the portentous Covid hit the world and shattered the dreams of millions in unprecedented way. When the threat was looming large and the world was living under the black shadow of lock down. When even stepping out of home was prohibited and faced by dire consequences imposed upon by the vigilant administration. When the transportations of all kind whether local, national or international, all alike, was shut down when even the thought about going abroad was treated with rough refutation, RVSKVV has kept on planning in the direction of fulfilling the dreams of the students here which was once dreamt through the mission and vision of NAHEP and it did not let the flicker of hope extinguish.

The University kept on working during those star-crossed days and developed communication with different foreign institutions and gets the necessary documents like MOUs signed with them for training and completion of the students' degree programme from abroad.

Fortunately the limping world came back to normalcy. The International travel and flight services were resumed by and by. Still the world was not fully out of the intimidation of Covid, as wave after wave of the infection has shook the very foundation of humanity and sometimes even the likelihood of the annihilation of the mankind by this endemic has encroached upon the general perception of human being and kept on haunting the common mass. In such formidable circumstances it was very difficult to convince the students of RVSKVV to get ready to undertake the International training and pack their bag and baggage to dream big.

The extended hands of support of the University faculty through mentor-mentee system which works on guardian-ward mode through Shake hands club come for the encouragement of the students daring to leave the native country to realize their dreams. The continuous counseling of the students by the teachers has paid off. Five students of the University undertook the daunting task of opting for Dual Degree Programme from Dalhousie University Halifax, Nova Scotia Canada and they have completed the same with flying colours while winning accolades and appreciation all along, even bagging prestigious Deans' medal too thereby spreading the name and fame of RVSKVV Gwalior and India to International horizon.

The names of the courageous students from RVSKVV, opting for Dual Degree Programme during the aftermath of pandemic are: Miss Shreya Chaturvedi, Miss Shaily Tandekar, Miss Chandrika Chaturvedi, Miss Vijaya Raje Singh and Mr. Kuldeep Anjana. The study of these students for one year including expenses on stay, tuition fee, airfare etc. was paid by RVSKVV, Gwalior through IDP-NAHEP.

वीजा होते ही कृषि विवि का पहला बैच दो साल के लिए कनाडा जाएगा, ऑनलाइन पढ़ाई शुरू की

डलहौजी यूनिवर्सिटी में दो साल तक प्लांट साइंस की पढ़ाई करेंगे, पांच छात्रों के बैच में चार छात्राएं हैं

- विवि ने बीएससी-एजी में 70 फीसदी से अधिक अंक प्राप्त करने वाले 35 छात्र शॉट लिस्ट किए थे

पीपुल्स संवाददाता • ग्वालियर

editor@peoplessamachar.co.in

राजमाता विजयाराजे सिंधिया कृषि विवि के पांच छात्र-छात्राएं (चंद्रिका चतुर्वेदी ग्वा., विजयाराजे सिह इंदौर, कुलदीप सिह, शैली टंडेकर, श्रेया चतुर्वेदी मंदसौर) जल्द ही कृषि शिक्षा में अंतराराष्ट्रीय स्तर की पढ़ाई करने के लिए डलहौजी यूनिवर्सिटी जाएंगे। यूनिवर्सिटी में छात्रों के एडमिशन तो हो गए हैं, लेकिन वीजा नहीं हो पाया है। छात्रों ने वीजा होने तक ऑनलाइन पढ़ाई शुरू कर दी है। विवि का यह पहला बैच होगा, जो कि तीन साल की बीएससी-एजी की पढ़ाई करने के बाद प्लांट साइंस का अध्ययन के लिए विदेश जाएगा। बता दें कि विवि ने यूनिवर्सिटी से डबल डिग्री प्रोग्राम के तहत एमओयू किया है।

कृषि विवि ग्वा. ने स्टूडेंट डवलपमेंट प्रोग्राम (आईडीपी) के अंतर्गत बीएससी-एजी में जिन छात्रों के 70 फीसदी से अधिक अंक थे, ऐसे 35 छात्र कनाडा भेजने के लिए शॉट लिस्ट किए थे। 22 छात्रों के अभिभावकों ने छात्रों को विदेश जाने की सहमति दे दी थी, लेकिन डलहौजी यूनिवर्सिटी नोवा स्कोटिया (कनाड़ा) में पांच छात्रों के एडमिशन हुए हैं। छात्र वीजा होने का इंतजार कर रहे हैं और वीजा होते ही वह कनाडा चले जाएंगे, जहां रहकर एग्री. प्लांट साइंस की पढ़ाई करेंगे। यूनिवर्सिटी द्वारा वर्ष 2023 में पांचों छात्रों को बीएससी एग्रीकल्चर प्लांट साइंस की डिग्री दी जाएगी।

एक साल का खर्चा को छात्रों को उठाना होगा, दूसरे साल का विवि उठाएगा

विवि के तकनीकी अधिकारी डॉ. अखिलेश सिंह ने बताया कि कनाडा यूनिवर्सिटी में दो साल की पढ़ाई करने छात्रों को एक साल की पढ़ाई, रहने, खाने व अन्य खर्च खुद उठाने होंगे, जो कि लगभग 12 से 15 लाख रुपए होगा। दूसरे साल का खर्च विवि नेशनल एग्रीकल्चर हायर एजुकेशन प्रोजेक्ट (नाहेप) के अंतर्गत वहन करेगा। नाहेप के अंतर्गत 50 फीसदी पैसा वर्ल्ड बैंक और 50 फीसदी शासन देगा।

चंद्रिका चतुर्वेदी कुलदीप सिंह शैली टंडेकर विजयाराजे सिंह श्रेया चतुर्वेदी

इनका कहना है

विवि के पांच छात्र-छात्राओं का एडमिशन डलहौजी यूनिवर्सिटी कनाडा में एडमिशन हो गया है। वीजा होते ही छात्र कनाडा चले जाएंगे, जहां दो साल तक प्लांट साइंस की पढ़ाई करेंगे। छात्रों के पास बीएससी-एजी के साथ ही एग्री. प्लांट साइंस की डिग्री भी होगी।

डॉ. दीपक रानाडे, डीएफए कृषि विवि

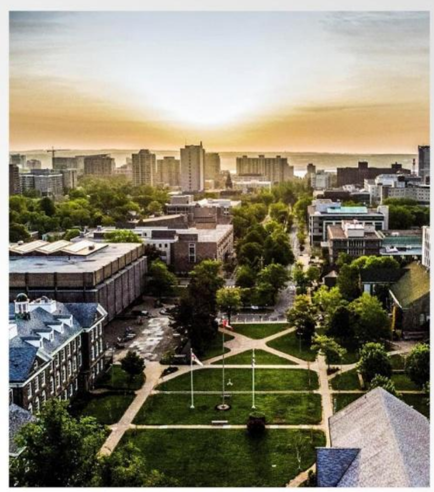
Dalhousie University

13 faculties	**1,100** faculty	**20%** of students are international	**80%** of all research funding in Nova Scotia	**54** Canada Research Chairs
$135M+ in research funding	**18,800** students	**130+** graduate programs	**200** years old in **2018**	

DALHOUSIE UNIVERSITY
FACULTY OF AGRICULTURE

Dalhousie University

- **U15 research intensive universities Canada**
- **Top 5** international university in Canada
- **Top 100** University for Social Impact
- **Top 150** International University
- **Top 150** globally in Agriculture, Earth and Marine Sciences (QS rankings)
- **Nobel prize** in physics
- **3** Gerhard **Herzberg Gold** Medals
- **91** Rhodes scholars



DALHOUSIE UNIVERSITY
FACULTY OF AGRICULTURE

3

Dr. Miriam Gordon, Assistant Dean, International Visited RVSKVV, Gwalior

Enriching Education and Life

RVSKVV Students' Dual Degree Programme Odyssey

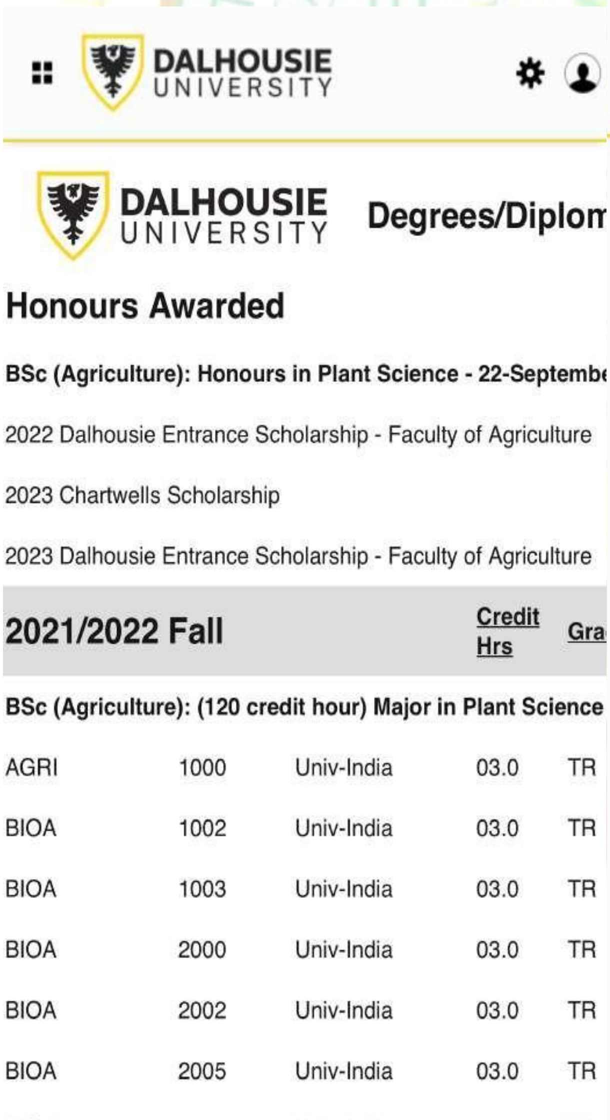
Kuldeep Singh Anjana
B.Sc. (Hons.) Agriculture,
Major in Plant Science
First Class Honors

Embarking on my academic journey at Dalhousie University's Dual Degree Program in Plant Science has been nothing short of transformative. From laying the groundwork in foundational courses to delving into cutting-edge research and engaging deeply in community initiatives, my experience has been a testament to dedication, growth, and passion for sustainable agriculture.


Shot on OnePlus

First Year Foundations:

During my first year, I delved into the core courses of Plant Science, covering topics from Research Methods in Agriculture to the complexities of Structural Botany and Geographic Information Systems. My dedication to academic excellence led to top grades and earned me a place on the Dean's List for consecutive semesters, along with receiving two prestigious scholarships: the Faculty of Agriculture Award and the Chartwells Scholarship.


DALHOUSIE UNIVERSITY

DALHOUSIE UNIVERSITY Degrees/Diplom

Honours Awarded

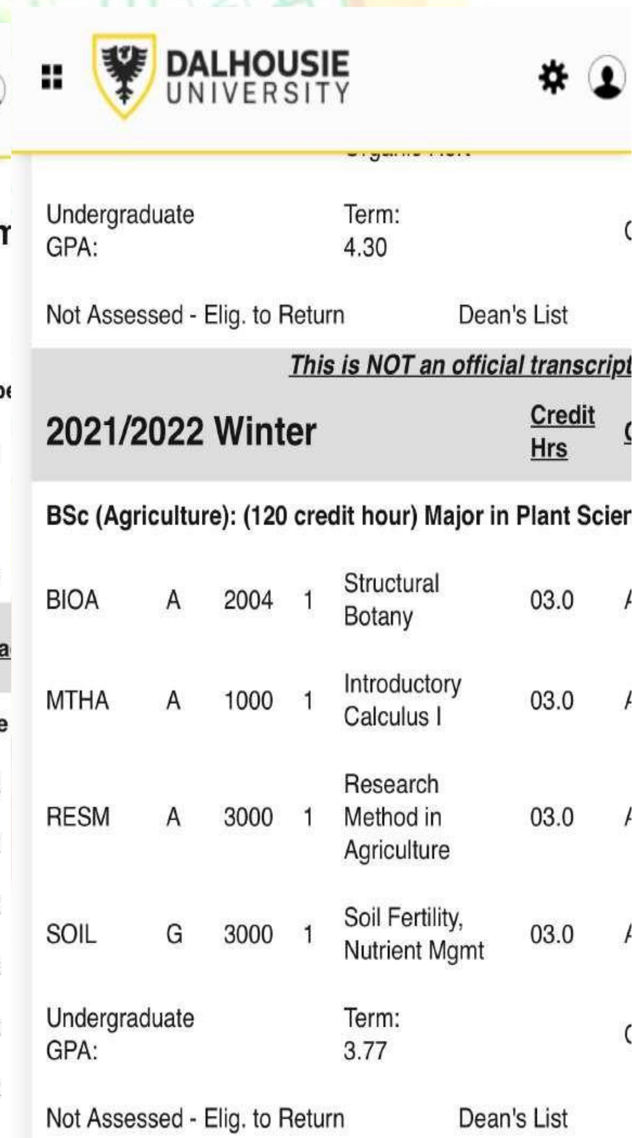
BSc (Agriculture): Honours in Plant Science - 22-Septembe

2022 Dalhousie Entrance Scholarship - Faculty of Agriculture

2023 Chartwells Scholarship

2023 Dalhousie Entrance Scholarship - Faculty of Agriculture

2021/2022 Fall			Credit Hrs	Gra
BSc (Agriculture): (120 credit hour) Major in Plant Science				
AGRI	1000	Univ-India	03.0	TR
BIOA	1002	Univ-India	03.0	TR
BIOA	1003	Univ-India	03.0	TR
BIOA	2000	Univ-India	03.0	TR
BIOA	2002	Univ-India	03.0	TR
BIOA	2005	Univ-India	03.0	TR


DALHOUSIE UNIVERSITY

Undergraduate GPA:				Term: 4.30		
Not Assessed - Elig. to Return				Dean's List		

This is NOT an official transcript

2021/2022 Winter					Credit Hrs	
BSc (Agriculture): (120 credit hour) Major in Plant Scier						
BIOA	A	2004	1	Structural Botany	03.0	
MTHA	A	1000	1	Introductory Calculus I	03.0	
RESM	A	3000	1	Research Method in Agriculture	03.0	
SOIL	G	3000	1	Soil Fertility, Nutrient Mgmt	03.0	
Undergraduate GPA:				Term: 3.77		
Not Assessed - Elig. to Return				Dean's List		


Phosphorus Fast or Slow: Lessons from Thirty-Five Years of Phosphorus Modelling
D. Keith Reid (retired)
Antoun El-Khoury
Canada

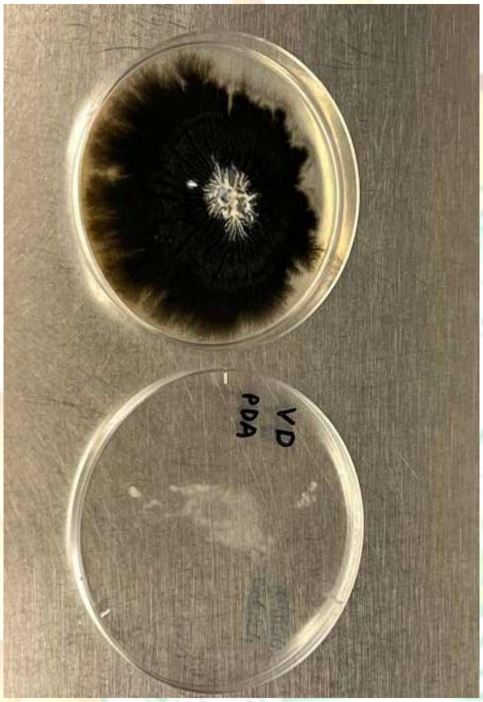

EXIT
pepsi

Summer Internship 1

During the summer break, I enthusiastically joined Dalhousie University's Weed Science and Vegetation Management Lab as a Research Assistant under the guidance of Dr. Scott White. This hands-on experience involved studying weed biology and toxicology in Atlantic Canada's blueberry fields, significantly refining my research abilities and enhancing my insight into real-world agricultural issues.

Second Year: Research and Innovation

Entering my second year, I eagerly embarked on my undergraduate honours research project under the mentorship of Dr. Tudor Borza at the Plant Genomics and Molecular Biology Lab. Titled "Detection, Diagnosis, and Management of Plant Diseases in Dalhousie University's Agricultural Campus Community and Demonstration Garden," this project seamlessly integrated theoretical plant genomics and pathology knowledge with practical applications. It enabled me to contribute meaningfully to agricultural sustainability efforts.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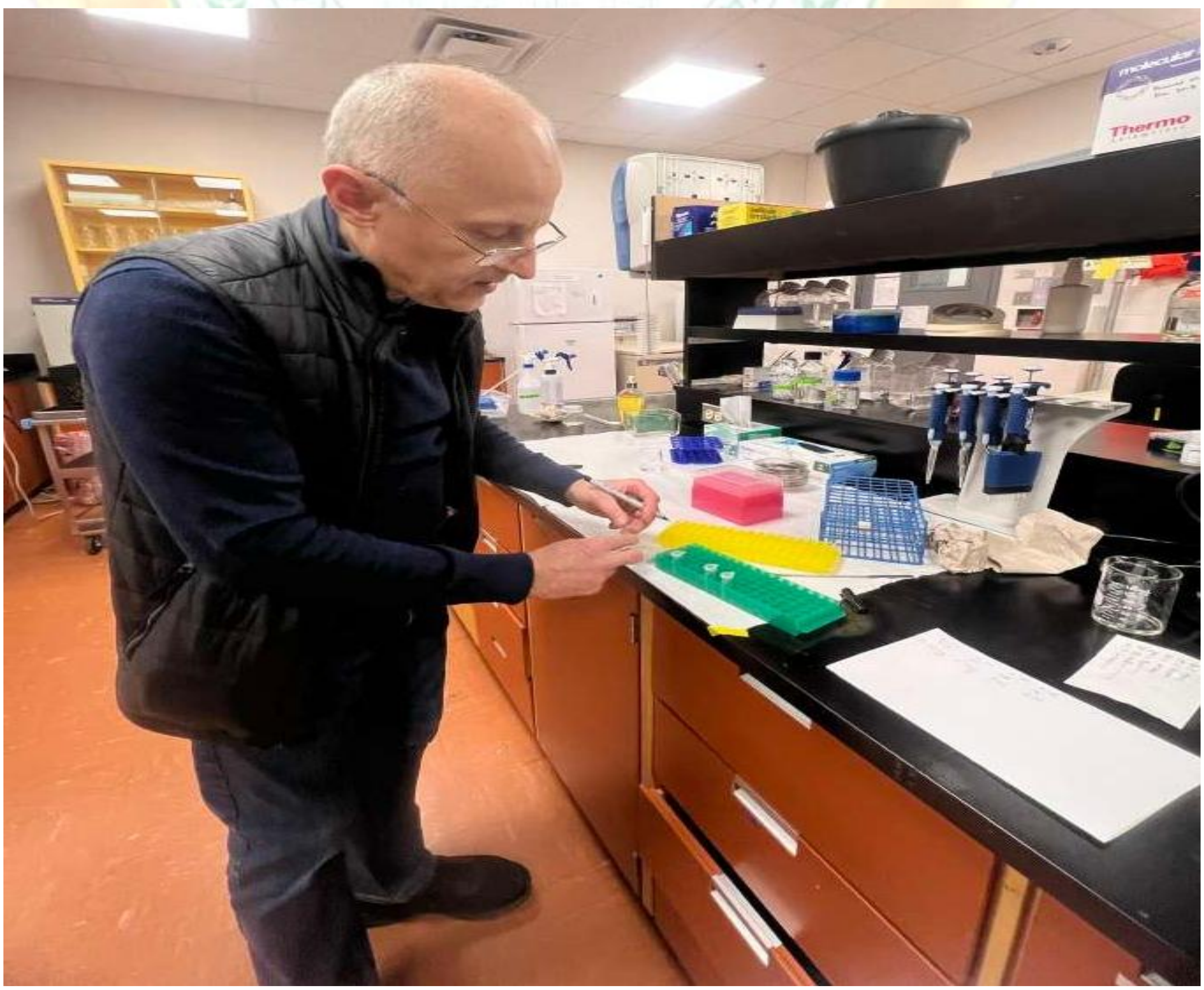
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Balancing Academics with Active Engagement

In addition to my academic pursuits, I immersed myself in diverse extracurricular activities. Serving in leadership roles within the Global Student Union Club, I contributed to vibrant celebrations such as Diwali and multicultural festivals. Volunteering at the local food bank further underscored my dedication to community service and social responsibility, enriching my university journey with a well-rounded experience.

National Recognition and Awards

In 2023, my commitment and contributions to the Dalhousie community were celebrated with three esteemed accolades at the Student Advancement Leadership Awards: the Community Service Award, Student Ambassador Award, and Student Leadership Award. These honors not only acknowledged my achievements but also affirmed my dedication to making a positive impact within and beyond the university. Additionally, I had the privilege of being chosen as one of only 25 Young Voice Participants nationwide for the 40th Hunger on the Hill event hosted by the Canadian Food Grain Bank. At this event, I engaged with Agricultural and Food Minister John Barlow, MPs Shaun Chen, and Dane Lloyd, collaborating on critical issues of hunger and climate change policy.


STUDENT
AMBASSADOR


SAIL 2023
Excellence

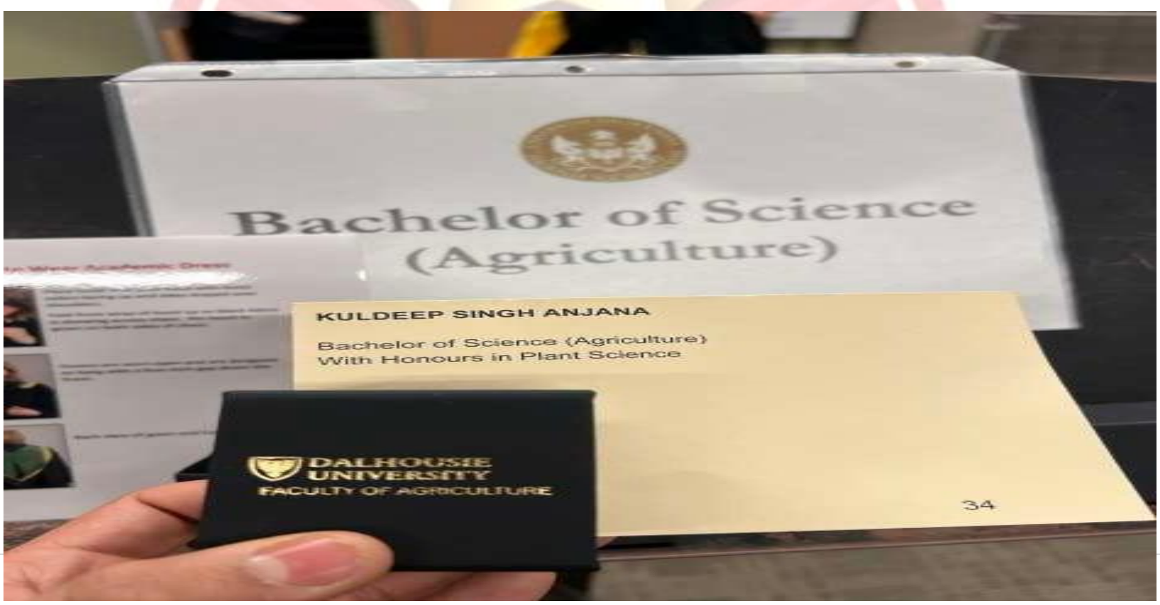
Summer Research Internship Refinement

In pursuit of fulfilling my degree requirements, I undertook a rigorous 5-month summer internship as a Research Assistant in the Agronomy and Crop Physiology Lab under the guidance of Dr. Yunfei Jiang. This immersive experience not only provided me with invaluable insights into advanced research methodologies but also deepened my passion for advancing agricultural sciences.


AGRICULTURE
Where farm meets future
DALHOUSIE UNIVERSITY

Career Achievement Update

After graduating, I attained a dynamic position as a Horticulture Research Technician at Truro Cannabis International, a leading pharmaceutical firm known for its dedication to sustainable agricultural practices. In this role, I leverage my academic background and research skills to drive innovation in horticulture and support global sustainability initiatives.



On behalf of the University Senate,
we hereby attest that

Dalhousie University

has awarded the degree of

Bachelor of Science (Agriculture)

With Honours
in Plant Science

to

Kuldeep Singh Anjana

who, having completed all of the requirements for this degree, as established by the Faculty and approved by Senate, is entitled to assume all the rights, privileges, and responsibilities appertaining thereto. In witness whereof, we have subscribed our signatures and affixed the Seal of the University to this document.

UNIVERSITAS DALHOUSIANA HALIFAXIAE N.S. MDCCCXVIII

Kim Brooks — *President*

D.R. Gray — *Dean*

[illegible] — *Chair of Senate*

Dated at Halifax, Nova Scotia
on the 22nd day of September 2023

"Exploring Boundless Horizons"
RVSKVV Students' Dual Degree Programme Journey

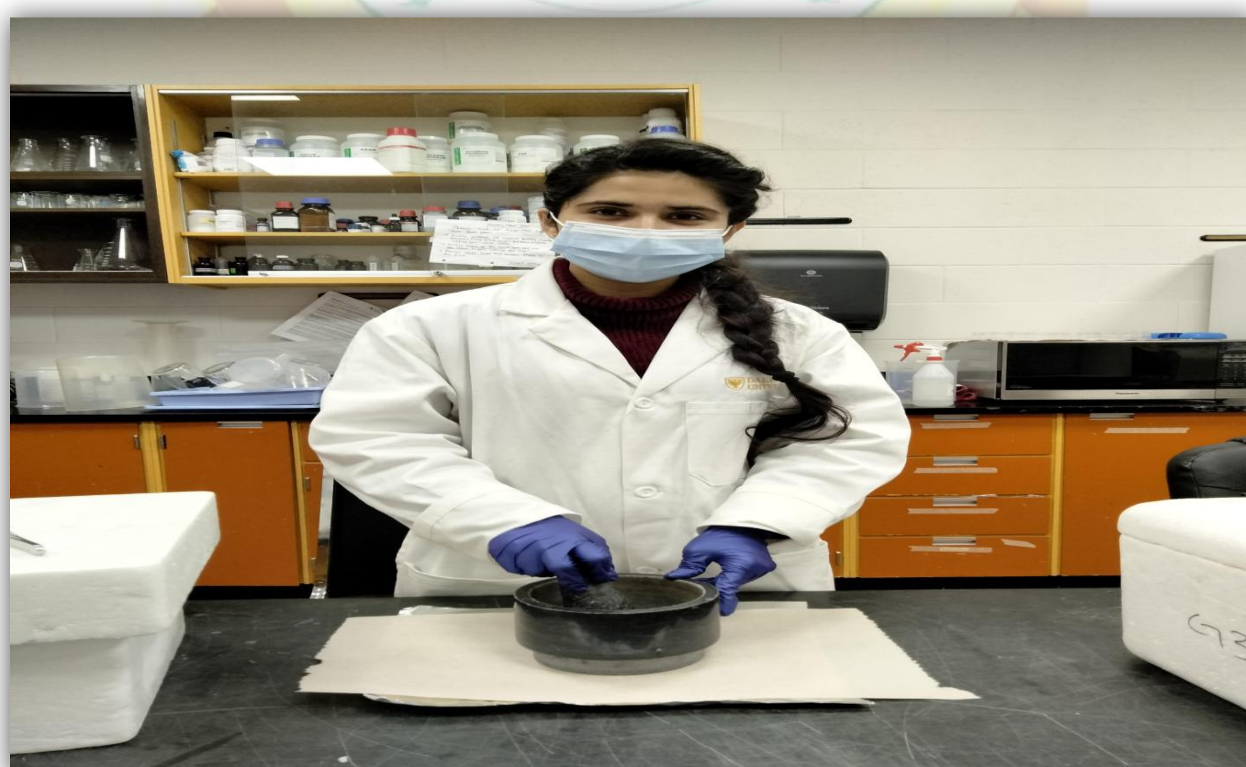
Ms Shreya Chaturvedi,
B.Sc. (Hons.) Agriculture,
Major in Plant Science
First Class Honors

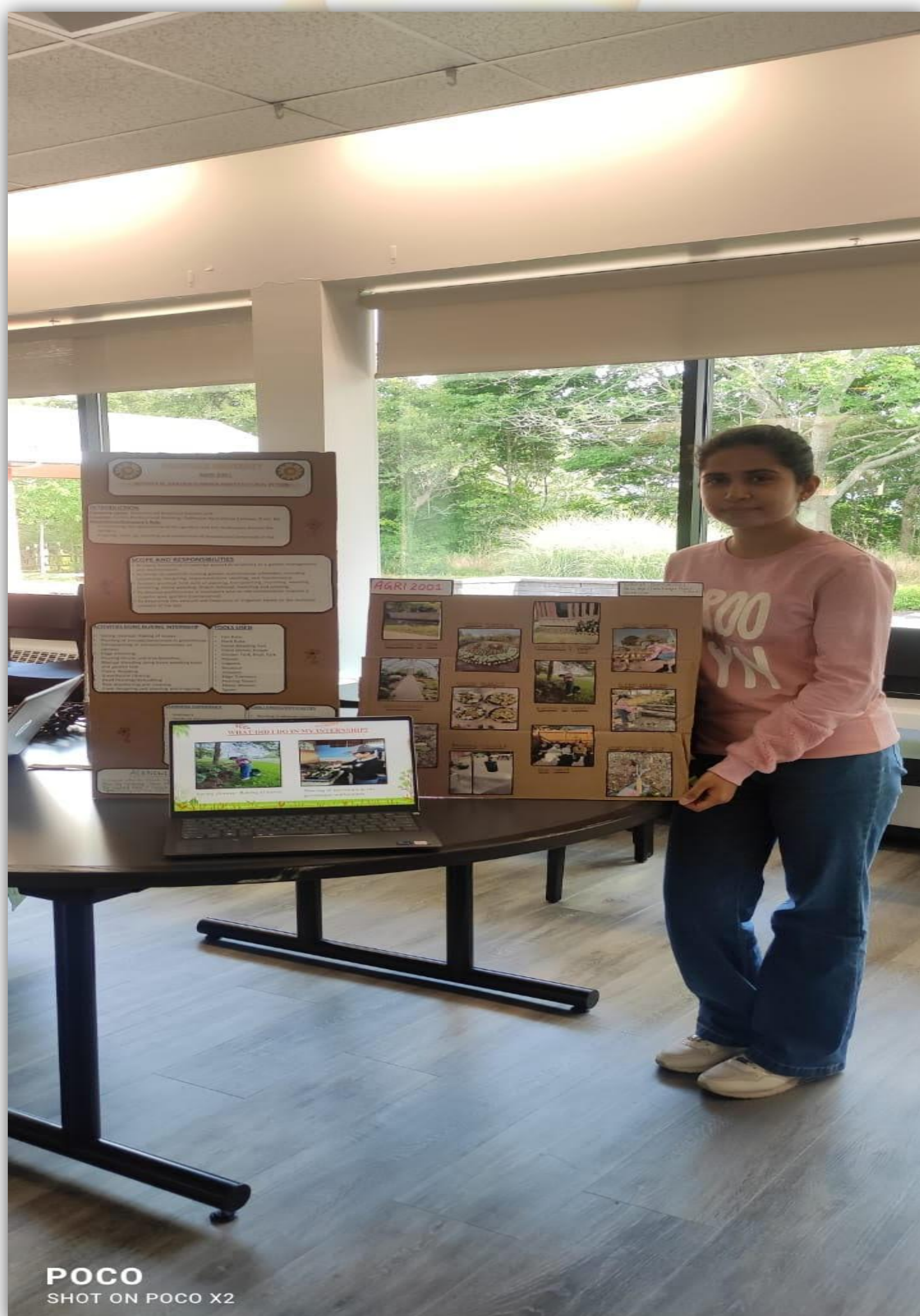
The quality of education has been exceptional, offering cutting-edge research opportunities and practical fieldwork that deepens my understanding of plant biology and agricultural practices. However, the journey has not been without its challenges. From the initial struggle of adapting to a new academic environment and overcoming language barriers to navigating cultural differences and adjusting to the Canadian way of life, every step has been a test of resilience and determination. The experience of culture shock was both daunting and enlightening, as it exposed me to new perspectives and broadened my understanding of global agriculture. Through perseverance and embracing opportunities for cultural exchange, I have not only thrived academically but also developed personally, gaining invaluable skills and forging lasting friendships in this vibrant multicultural community.

Currently, I am working as a Research Assistant in a USA based Agro-tech company Intag Systems, since my graduation in May 2023. Working at INTAG has been a transformative experience dedicated to addressing global food challenges through innovative biological solutions. My role involves collaborating with a passionate team committed to integrating microbial life and beneficial organisms into organic nutrient solutions aimed at enhancing agricultural productivity while minimizing environmental impacts. I engage in diverse projects, from researching microbial formulations to field-testing biological products that promote soil health and plant resilience. The emphasis on sustainability and cutting-edge technology not only expand my knowledge of biological sciences but also instill a profound sense of purpose in contributing to sustainable food production.

Working at INTAG has been an inspiring journey of applying science to practical solutions that benefit farmers and ecosystems alike, reinforcing my commitment to advancing sustainable agriculture practices.


Rotaract

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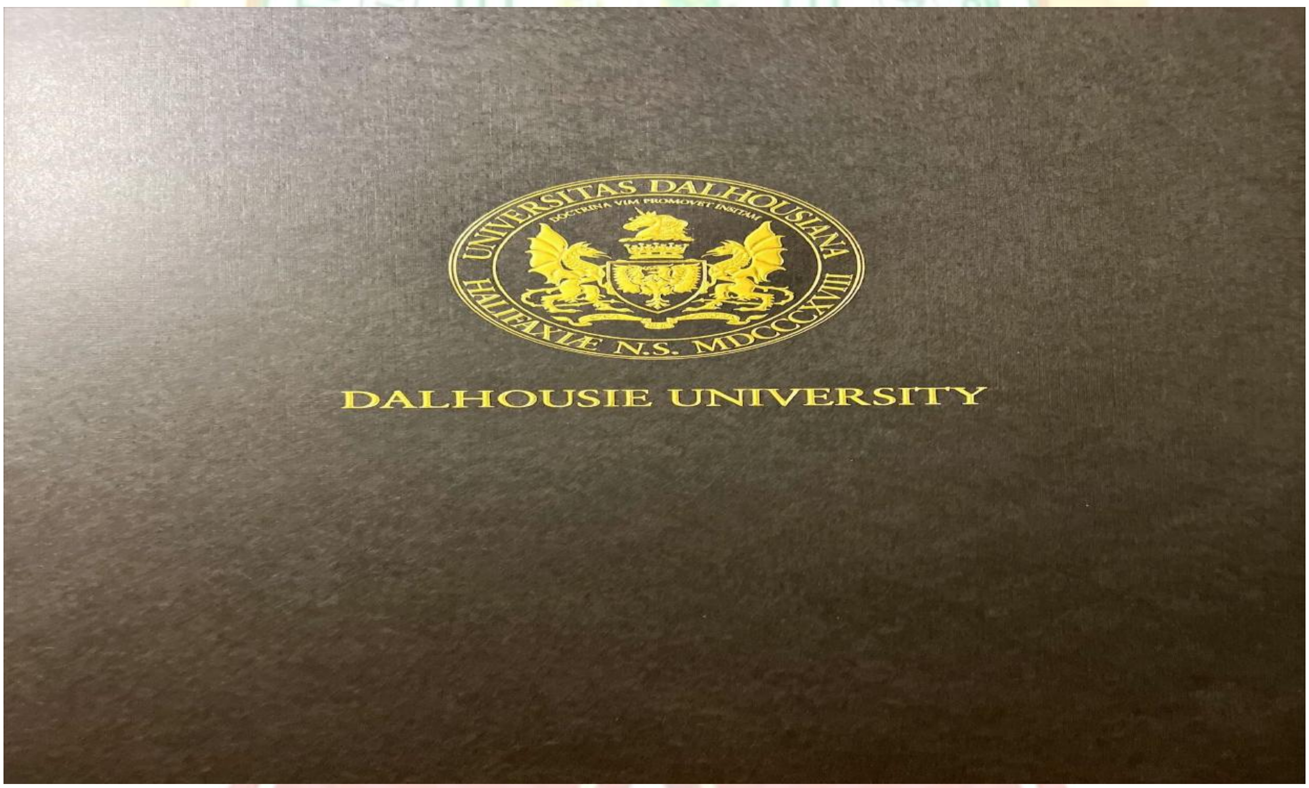

UNIVERSITAS DALHOUSIANA
HALIFAXIÆ N.S. MDCCCXVIII
DALHOUSIE UNIVERSITY

On behalf of the University Senate,
we hereby attest that

Dalhousie University

has awarded the degree of

Bachelor of Science (Agriculture)

With Honours

in Plant Science

to

Shreya Chaturvedi

who, having completed all of the requirements for this degree, as established by the Faculty and approved by Senate, is entitled to assume all the rights, privileges, and responsibilities appertaining thereto. In witness whereof, we have subscribed our signatures and affixed the Seal of the University to this document.

President (Acting)

D. R. Gray
Dean

Chair of Senate

Dated at Halifax, Nova Scotia
on the 16th day of May 2023

On behalf of the University Senate,
we hereby attest that

Dalhousie University

has awarded the degree of

Bachelor of Science (Agriculture)

With Honours

in Plant Science

to

Chandrika Chaturvedi

who, having completed all of the requirements for this degree, as established by the Faculty and approved by Senate, is entitled to assume all the rights, privileges, and responsibilities appertaining thereto. In witness whereof, we have subscribed our signatures and affixed the Seal of the University to this document.

President (Acting)

D. R. Gray — Dean

Chair of Senate

Dated at Halifax, Nova Scotia
on the 16th day of May 2023

On behalf of the University Senate,
we hereby attest that

Dalhousie University

has awarded the degree of

Bachelor of Science (Agriculture)

With Honours

in Plant Science

to

Vijaya Raje Singh

who, having completed all of the requirements for this degree, as established by the Faculty and approved by Senate, is entitled to assume all the rights, privileges, and responsibilities appertaining thereto. In witness whereof, we have subscribed our signatures and affixed the Seal of the University to this document.

Kim Brooks
President

D.R. Gray
Dean

Chair of Senate

Dated at Halifax, Nova Scotia
on the 22nd day of September 2023

DALHOUSIE UNIVERSITY

June 1, 2023

To whom it may concern:

This is to confirm Tandekar, Shaily (B00913095) was awarded a Bachelor of Science (Agriculture) Honours in Plant Science degree on May 16, 2023 by the Senate of Dalhousie University.

Sincerely,

Adam Robertson

Adam Robertson
Assistant Vice-Provost Student Affairs and University Registrar

OFFICE OF THE REGISTRAR | PO Box 15000 | Halifax NS B3H 4R2 Canada | **902.494.2450** | FAX: 902.494.1630 | registrar@dal.ca | dal.ca/registrar
AGRICULTURAL CAMPUS | PO Box 550 | Truro NS B2N 5E3 Canada | **902.893.6722** | FAX: 902.895.5529 | enrolment.services@dal.ca | dal.ca/registrar-dac
DAL.CA

Gratitude and Commitment

WE express sincere gratitude to NAHEP, ICAR, RVSKVV, and the esteemed professors at Dalhousie University and RVSKVV, Gwalior, NAHEP IDP Unit RVSKVV and ICAR New Delhi for their unwavering support and mentorship throughout my educational journey. As we advance in our career, we are dedicated to pioneering innovation in sustainable agriculture. We eagerly embrace every opportunity for lifelong learning and personal growth.

"Nurturing Global Leaders"

The Transformative Impact of National and International Exposure

RAJMATA VIJAYARAJE SCINDIA KRISHI VISHWA VIDYALAYA, GWALIOR (M.P.)

Exposing students to national and international institutions is essential in today's interconnected world. Such exposure not only broadens their horizons but also equips them with valuable skills and perspectives that are crucial for their personal and professional development. The need for this exposure arises from the growing demand for globally competent individuals who can navigate diverse cultural landscapes and contribute effectively to various sectors, including education, development organizations, and agricultural industries.

The relevance of national and international exposure lies in its ability to foster a deep understanding of global issues and trends, thereby preparing students to tackle complex challenges with innovative solutions. By interacting with renowned institutes, students gain access to cutting-edge research, best practices, and international networks, which are instrumental in shaping their academic and career trajectories. Moreover, exposure to different educational systems and cultural environments enhances their adaptability and cross-cultural communication skills, making them valuable assets in a globalized workforce.

The rationale behind promoting such exposure is rooted in the belief that experiential learning and firsthand exposure to diverse perspectives significantly enhance the quality of education and holistic development of students. It enables them to apply theoretical knowledge in real-world contexts, fostering critical thinking, creativity, and leadership qualities. Furthermore, exposure to international institutes facilitates knowledge exchange and collaboration, paving the way for interdisciplinary research and innovation in agriculture and allied fields.

National and international exposure enhances academic enrichment, fostering global competence crucial for national growth. It cultivates leaders adept at continuous learning, contributing to career success and national development. This initiative equips students to tackle global challenges and promote sustainable development through diverse perspectives and skills.

Flag of Ceremony of students AIT Bangkok

Flag of Ceremony- Summer Programme at the Hebrew University, Jerusalem (Israel)

Flag of Ceremony- Three month Training program at the Murdoch University, Western 1.0 (Australia)

Flag of Ceremony- Training program at the CIMMYT (Mexico)

Flag of Ceremony- Training program at the Murdoch University, Western 2.0 (Australia)

Flag of Ceremony- Training Program at IRRI, Manila, Philippines

Flag of Ceremony- Training Program at University Putra Malaysia, Malaysia

Students Training program Certificate

WESTERN SYDNEY
UNIVERSITY

CERTIFICATE OF RECOGNITION

This certificate is presented to

Akansha Kawreti

in recognition of your international training at

Western Sydney University, Australia

on

climate change and food security for addressing UN sustainable goals, entrepreneurship in sustainable agriculture, spatial data analysis, protected cultivation, food technology, vertical farming, hydroponics, automation in irrigation, precision agricultural water management, water harvesting and recycling

3rd November – 14 December 2023

Professor Ian Anderson
Institute Director
Hawkesbury Institute for the Environment
Western Sydney University

WESTERN SYDNEY
UNIVERSITY

CERTIFICATE OF RECOGNITION

This certificate is presented to

Shivraj Singh Poshwal

in recognition of your completion in the

Exposure Visit

Western Sydney University 2023

Professor Ian Anderson

Institute Director
Hawkesbury Institute for the Environment
Western Sydney University


Asian Institute of Technology
Department of Food, Agriculture and Bioresources

This is to certify that

Mr. Amit Patel

has successfully completed a two-month International Training Program on "Climate Change Adaptation in Crop Production using Smart Farming Techniques" during 24 August–23 October 2023 at the Asian Institute of Technology (AIT), Bangkok, Thailand

Dr. Sushil K. Himanshu
Assistant Professor
Department of Food, Agriculture and Bioresources

Avishek Datta
Dr. Avishek Datta
Professor and Head
Department of Food, Agriculture and Bioresources


Asian Institute of Technology
Department of Food, Agriculture and Bioresources

This is to certify that

Mr. Lokendra Singh

has successfully completed a one-month International Training Program on "Climate Change Adaptation in Crop Production using Smart Farming Techniques" during 25 November–24 December 2023 at the Asian Institute of Technology (AIT), Bangkok, Thailand

Dr. Sushil K. Himanshu
Assistant Professor
Department of Food, Agriculture and Bioresources

Avishek Datta
Dr. Avishek Datta
Professor and Head
Department of Food, Agriculture and Bioresources

UPM UNIVERSITI PUTRA MALAYSIA BERILMU BERBAKTI

SEKOLAH PERNIAGAAN DAN EKONOMI
SCHOOL OF BUSINESS AND ECONOMICS

AACSB ACCREDITED

EQUIS ACCREDITED

CERTIFICATE

Approved by the School of Business and Economics
Universiti Putra Malaysia

THIS IS TO CERTIFY THAT

Kharoon Nissa

has successfully completed the

EXECUTIVE CERTIFICATE IN AGRICULTURE ENTREPRENEURSHIP

on 17th October to 15th November 2023

PROF. DR. BANY ARIFFIN AMIN NOORDIN
Dean
School of Business and Economics
Universiti Putra Malaysia

No. SPE/IND/EDR 1018

IRRI CGIAR

The International Rice Research Institute

certifies that

Prajikta Katare

has satisfactorily completed the

Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya (RVSKVV)
Study Visit Program

held on October 1 to 25, 2023.

Issued on the 25th day of October 2023 at the International Rice Research Institute,
Los Baños, Laguna, Philippines.

Gopesh Tewari

GOPESH TEWARI
Head, IRRI Education

JOANNA KANE-POTAKA
Deputy Director General for
Strategy, Engagement & Impact

AJAY KOHLI
Interim Director General

IRRISC-Praji-IRR-443


भाकृअनुप-राष्ट्रीय कृषि अनुसंधान प्रबंध अकादमी
राजेन्द्रनगर, हैदराबाद-५०००३०, तेलंगाणा, भारत
ICAR-National Academy of Agricultural Research Management
(ISO 9001:2015 Certified)
Rajendranagar, Hyderabad-500030, Telangana, India
https://naarm.org.in

Certificate

This is to certify that
Anushka Shrivastava
has successfully completed the
National Training Programme on
"Entrepreneurial Skill Development"
[for B.Sc.(Agri./ Horti.) students of
RVSKVV, Gwalior]
organized by ICAR-NAARM, Hyderabad
during 04 - 23 December, 2023.

(Ramasubramanian V) (Umesh Hudedamani)
Programme Directors

(Ch. Srinivasa Rao)
Director

A total of 100 students were privileged to visit 8 prominent international institutes for training and exposure, as detailed in Appendix 1. Additionally, 70 students seized the opportunity to undergo training and exposure at 3 distinguished national institutes, outlined in Appendix 2.

APPENDIX 1

INTERNATIONAL TRAINING

1. University Putra Malaysia, Malaysia

S.No	Name of students	Category	College Name
1.	ItishreeRathore	OBC	CoA, Gwalior
2.	Kharoon Nisha	ST	CoA, Gwalior
3.	VidhiPurbiya	OBC	CoH, Indore
4.	Mehroz	OBC	CoA,Indore
5.	AkashatPatidar	OBC	CoH, Mandsaur
6.	Saloni Sharma	Gen	CoH, Mandsaur
7.	Rohan	OBC	CoA, Indore
8.	Arvind Sekwaria	OBC	CoH, Mandsaur
9.	Santosh Malviya	SC	CoA, Sehore
10.	Saniya rathore	OBC	CoA, Sehore

2. CIMMYT, Mexico

S.No	Name of students	Category	College Name
11.	Muhammad Ameen Sadath	OBC	CoA, Sehore
12.	PrincyDhakar	Gen	CoA, Gwalior
13.	Abhishek Jaiswal	Gen	CoA, Gwalior
14.	ParikshitGadge	SC	CoA,Gwalior
15.	PriyaPrajapati	OBC	CoH,Mandsaur
16.	Kanchan Tiwari	Gen	CoA, Indore
17.	Nikita Nagar	OBC	CoA, Indore
18.	Aditi Pradhan	ST	CoA, Sehore
19.	Nabia Khan	Gen	CoA, Indore

3. AIT, Bangkok

S.No.	Name of students	Category	College Name
1.	Samriddhi Udaywal	OBC	CoA, Indore
2.	Vaishali Namdeo	Gen	CoA, Gwalior
3.	Ankita Gangwar	Gen	CoA, Gwalior
4.	Nikita Choudhary	Sc	CoA Khandwa
5.	JitendraMalviya	Sc	CoA, Indore
6.	ShubhamCahudhary	OBC	CoA, Gwalior
7.	Satish Raikwar	OBC	CoA Khandwa
8.	Priyanshi Jain	Gen	CoA Sehore
9.	SaklenDahliya	OBC	CoA, Gwalior
10.	Priyanka Priyadarshini	SC	CoA, Gwalior
11.	Akash Deep	Gen	CoA, Gwalior
12.	Aditi Pandey	Gen	CoH, Mandsaur
13.	RitikaBhalavi	ST	CoH, Mandsaur
14.	Amit Patel	Gen	CoA, Gwalior
15.	Garvit Agrawal	Gen	CoA, Gwalior
16.	Saloni Panchal	OBC	CoH, Mandsaur
17.	Khushi Thakur	OBC	CoA, Indore
18.	ManoliSahu	OBC	CoA, Indore
19.	SukirtiBhargav	ST	CoA, Indore
20.	Tisha Gondey	SC	CoA, Indore
21.	Nancy Rathore	OBC	CoA, Sehore
22.	Raina Sharma	Gen	CoA, Sehore
23.	Priyanshi Singh Thakur	ST	CoA, Gwalior
24.	Lokendra Singh	OBC	CoA, Gwalior
25.	VarshaPrajapati	SC	CoA, Indore
26.	PrachiChouhan	OBC	CoA, Gwalior
27.	AnshulPatidar	OBC	CoA, Gwalior

4. Hebrew University of Jerusalem, Israel

S.No	Name of students	Category	College Name
1	Shivansh	Gen	CoA Gwalior
2	Martand Sharma	Gen	CoA Gwalior
3	Atul Singh Jadon	OBC	CoA Gwalior
4	Priyanshi	Gen	CoA Gwalior

5. IRRI, Manila, Philippines

S.No	Name of students	Category	College Name
1.	Shivani Thakur	OBC	CoA, Gwalior
2.	Nikita Patidar	OBC	CoA, Indore
3.	RamuBaghel	OBC	CoA, Gwalior
4.	Kinjal Trivedi	Gen	CoA, Gwalior
5.	IshitaMital	Gen	CoA, Gwalior
6.	DeshieChoubey	Gen	CoA, Indore
7.	Harsh Jain	Gen	CoA, Gwalior
8.	Nitin Turkane	Sc	CoA, Khandwa
9.	ShrutiTomar	Gen	CoA, Sehore
10.	Sneha Biswas	SC	CoA, Gwalior
11.	Anurag Sharma	Gen	CoA Khandwa
12.	Jayesh Pathak	Gen	CoA, Indore
13.	MuneeraKausar Ansari	OBC	CoA, Indore
14.	GargiTripathi	Gen	CoH, Mandsaur
15.	Sneha Sharma	Gen	CoA, Gwalior
16.	SuranjanaKumari	SC	CoA, Gwalior
17.	Mareena V.L.	Gen	CoA, Indore
18.	Prajiktakatare	Gen	CoA, Gwalior

6. International Center for Bio saline Agriculture, Dubai

S.No	Name of students	Category	College Name
1.	DhirajPomane	OBC	CoA, Sehore
2.	RajnandaniPatidar	OBC	CoA, Sehore
3.	PratikshaRajpoot	OBC	CoA, Gwalior
4.	VanshikaSugandhi	Gen	CoA, Indore
5.	Ranjana Singh	OBC	CoA, Gwalior
6.	Vijay Mishra	Gen	CoA, Indore
7.	AanchalGole	OBC	CoA, Indore
8.	MahimaBeldar	SC	CoA, Gwalior
9.	Anjali Yadav	OBC	CoA, Sehore

7. Hue University of Agriculture and Forestry, Vietnam

S.No	Name of students	Category	College Name
1.	MohitPatidar	OBC	CoA, Sehore
2.	RaginiRajak	OBC	CoA, Gwalior
3.	Abhishek Meena	OBC	CoA, Gwalior
4.	Sakshammehra	SC	CoH, Mandsaur
5.	Priyanshu Patel	OBC	CoH, Mandsaur

8. Western Sydney University, Australia

S.No	Name of students	Category	College Name
1.	AlokChaturvedi	Gen	CoA, Gwalior
2.	Surbhi Acharya	Gen	CoH, Mandsaur
3.	TanuSisodiya	Gen	CoA, Sehore
4.	Shivraj Singh Poshwal	OBC	CoA, Gwalior
5.	Kashish Yadav	Gen	CoA, Gwalior
6.	Nikhil khare	Gen	CoA, Gwalior
7.	Nikita Solanki	OBC	CoA, Indore
8.	AdeshKanel	ST	CoA, Indore
9.	Dileep Kumar Bairwa	SC	KNK CoH,Mandsaur
10.	Raj Joshi	Gen	CoA, Indore
11.	Pranshi Dubey	Gen	RAK CoA,Sehore
12.	AkanshaKawreti	ST	CoA,Gwalior
13.	LokeshMeena	ST	KNK CoH,Mandsaur
14.	PramilaKawreti	ST	KNK CoH,Mandsaur
15.	KundanMalviya	SC	CoA,Indore
16.	Niharika Adey	OBC	CoA,Indore
17.	Anuj Singh	Gen	CoA, Gwalior
18.	Shrasti Gupta	Gen	RAK CoA, Sehore

APPENDIX 2

NATIONAL TRAINING

1. EDII, Ahmedabad, Gujrat

S.No.	Name of students	College Name
1.	Shivam Sharma	CoA, Sehore
2.	Ku. Priyansi Singh	CoA, Sehore
3.	Ku. Drishta Kala	CoA, Sehore
4.	Pravin Kumar Dhal	CoA, Sehore
5.	SurajPatidar	CoA, Khandwa
6.	Hansa Solanki	CoA, Khandwa
7.	TulsiMalviya	CoA, Khandwa
8.	ShivaniMalakar	CoA, Khandwa
9.	RajkumarRathore	CoA, Khandwa
10.	AkeshBalke	CoA, Indore
11.	SwarnimaKaurav	CoA, Indore
12.	Adarsh Sharma	CoA, Indore
13.	Yogesh Chandravanshi	CoA, Indore
14.	Ankit Parmar	CoA, Indore
15.	Mohit Yadav	CoH, Mandsaur
16.	Nikhil Patel	CoH, Mandsaur
17.	Amit Birgodiya	CoH, Mandsaur
18.	Lilly Patta	CoA, Gwalior
19.	Gaurav	CoA, Gwalior
20.	Mukesh Solanki	CoH, Mandsaur

2. UAS Dharwad, Karnataka

S.No.	Name of students	College Name
1.	Bhakti Pandey	CoA, Gwalior
2.	Abhay Sharma	CoA, Gwalior
3.	Garima Sharma	CoA, Gwalior
4.	Rajpratap S Bhadoria	CoA, Gwalior
5.	SheetalPatil	CoA, Khandwa
6.	KritiVishwakarma	CoA, Khandwa
7.	PragyaRathore	CoA, Khandwa
8.	Anjali Sharma	CoA, Khandwa
9.	Ravi Garg	CoH, Mandsaur
10.	Shakshi Raman	CoH, Mandsaur
11.	Radha Pandey	CoH, Mandsaur
12.	TamannaKunwar	CoH, Mandsaur

13.	MuskanMalviya	CoA, Sehore
14.	PreetiParmar	CoA, Sehore
15.	Savita Dongre	CoA, Sehore
16.	PrincyGontia	CoA, Sehore
17.	Janhwi Singh	CoA, Indore
18.	Vinayak Sharma	CoA, Indore
19.	ShailjaBijoriya	CoA, Indore
20.	Abhinav Sharma	CoA, Indore

3. NAARM, Hyderabad

S.No.	Name of students	College Name
21.	Ku. KalpanaGour	CoA, Sehore
22.	Ankit Kanthiya	CoA, Sehore
23.	YashPatidar	CoA, Sehore
24.	Ayush Jain	CoA, Sehore
25.	Ku. Laxmi Nagar	CoA, Sehore
26.	Shumaila	CoA, Sehore
27.	RamitSoni	CoA, Sehore
28.	BrijeshDangi	CoA, Sehore
29.	Ku. ShristyPoddar	CoA, Sehore
30.	Anuska Srivastava	CoA, Gwalior
31.	Somil Singh	CoA, Gwalior
32.	StutiShrivastava	CoA, Gwalior
33.	Ku. Neeraj	CoA, Gwalior
34.	DeepanshuGurjar	CoA, Khandwa
35.	Kamlesh	CoA, Khandwa
36.	Navin Patel	CoA, Khandwa
37.	AmbikaPatidar	CoA, Khandwa
38.	Yuvrajpatidar	CoA, Khandwa
39.	Rajvardhan S Rathore	CoA, Khandwa
40.	Aditi Lodhi	CoH, Mandsaur
41.	Saroj Yadav	CoH, Mandsaur
42.	RiteshKumariya	CoH, Mandsaur
43.	Chetan Nagar	CoH, Mandsaur
44.	Virendra Yadav	CoH, Mandsaur
45.	TeesaMalviya	CoH, Mandsaur
46.	Hardik Shukla	CoA, Indore
47.	Kuldeep Yadav	CoA, Indore
48.	BrajeshPatidar	CoA, Indore
49.	Bhagyashree Rathore	CoA, Indore
50.	RachanaPatidar	CoA, Indore

Students Visited Israel

Students Visited Israel

Students Visited IRRI, Philippines

AIT, Bangkok, Thailand

विदेश जाने वाले छात्रों को राज्यपाल ने दिए टिप्स

भोपाल। राज्यपाल मंगुभाई पटेल ने रविवार को राजभवन से अंतर्राष्ट्रीय प्रशिक्षण कार्यक्रम में भाग लेने वाले राजमाता विजयाराजे सिंधिया कृषि विश्वविद्यालय, ग्वालियर के विद्यार्थियों की बस को हरी झंडी दिखाकर रवाना किया। विश्व बैंक और भारतीय कृषि अनुसंधान परिषद के वित्तीय सहयोग से संचालित राष्ट्रीय कृषि उच्च शिक्षा परियोजना के संस्थान विकास कार्यक्रम में 18 विद्यार्थी चयनित हुए हैं। इनमें से 8 ऑस्ट्रेलिया में और 10 फिलीपींस में प्रशिक्षण प्राप्त करेंगे। राज्यपाल पटेल ने विद्यार्थियों से संवाद कर प्रशिक्षण संबंधी टिप्स दिए।

पीपुल्स समाचार

फ्लैग सेनेमनी में संभागायुक्त ने कहा-तकनीक सीखकर नवाचार करें

कृषि विश्वविद्यालय के नौ विद्यार्थी प्रशिक्षण लेने के लिए दुबई जाएंगे

पत्रिका न्यूज नेटवर्क
patrika.com

ग्वालियर . राजमाता विजयाराजे सिंधिया कृषि विश्वविद्यालय के अंतर्गत संचालित नाहेप परियोजना के तहत दो माह का अंतरराष्ट्रीय प्रशिक्षण कार्यक्रम किया जा रहा है। इसमें विश्वविद्यालय अंतर्गत महाविद्यालयों से चुने गये नौ विद्यार्थी धीरज पोमाने, राजनंदनी पाटीदार, प्रतीक्षा राजपूत, वंशिका सुगंधी, रंजना सिंह, विजय मिश्रा, आंचल गोले, महिमा बेलदार, अंजली यादव को संयुक्त अरब अमीरात दुबई के जैव लवणीय कृषि के अंतरराष्ट्रीय केंद्र भेजा जा रहा है। प्रशिक्षण में जाने वाले विद्यार्थियों के लिए विश्वविद्यालय की ओर से फ्लैग ऑफ सेरेमनी का आयोजन किया गया।

अतिथि संभागीय आयुक्त दीपक सिंह उपस्थित हुए। उन्होंने विद्यार्थियों से कहा कि आप सभी में विदेश यात्रा के लिए जो उत्साह है, उसे बनाए रखें और वहां जाकर नवाचारों व तकनीक सीखकर विश्वविद्यालय के साथ देश का नाम ऊंचा करें।

विश्वविद्यालय की वैज्ञानिक सुषमा तिवारी द्वारा लघु बाजरा के पौष्टिक व औषधीय महत्व पर प्रेजेंटेशन भी दिया गया। कार्यक्रम के निदेशक विस्तार सेवायें तथा परियोजना समन्वयक डॉ. वाय पी सिंह, निदेशक अनुसंधान सेवायें डॉ. संजय शर्मा, कुलसचिव श्री अनिल सक्सेना, सह-परियोजना समन्वयक अखिलेश सिंह और विद्यार्थी मौजूद रहे।

नौकरी लेने वाले नहीं, देने वाले बनें

कृषि विश्वविद्यालय के कुलपति डॉ. अरविंद कुमार शुक्ला ने कहा कि आप नौकरी लेने वाले नहीं वरन देने वाले बनें। आज कृषि में हमें जल की समस्या का सामना करना पड़ रहा है। भूमिगत जल के अत्यधिक दोहन से जल स्तर कम होता जा रहा है, उन्होंने कहा कि हमें तकनीकों को सीखने के लिए विदेश जाना पड़ रहा है। आप सभी तकनीकों को ध्यानपूर्वक सीखें ताकि आने वाले भविष्य में इसके लिए हमें दूसरों पर निर्भर न रहना पड़े।

पीपुल्स समाचार 04 ग्वालियर, बुधवार, 6 दिसंबर 2023

एंटरप्रेन्योरशिप व बिजनेस इन एग्रीकल्चर की ट्रेनिंग के लिए 30 छात्र हैदराबाद गए

पीपुल्स संवाददाता ● ग्वालियर
मो.नं. 9644644430

नाहेप परियोजना के तहत 20 दिन के लिए गए हैं

राजमाता विजयाराजे सिंधिया कृषि विवि के ग्वालियर, सीहोर, मंदसौर, इंदौर, खंडवा कॉलेजों के 30 छात्र-छात्राएं नेशनल एग्रीकल्चर हायर एजुकेशन (नाहेप) के तहत एंटरप्रेन्योरशिप इन एग्रीकल्चर की ट्रेनिंग लेने के लिए 2 दिसंबर को भारतीय कृषि अनुसंधान अकादमी हैदराबाद रवाना हो गए थे और 4 दिसंबर से ट्रेनिंग शुरू हो गई है। छात्र 20 दिन हैदराबाद में रहेंगे, छात्रों के रहने और खाने का खर्चा विवि उठाएगा। भारतीय कृषि अनुसंधान अकादमी भारतीय कृषि अनुसंधान परिषद (आईसीएआर) का एक अधीनस्थ संस्थान है। यह भारत का एक प्रमुख कृषि अनुसंधान संस्थान माना जाता है। इसका मुख्य कार्य विभिन्न कृषि अनुसंधान, प्रशिक्षण, शोध और प्रबंधन क्षेत्रों में मान्यता प्राप्त कार्यक्रमों का संचालन करना है।

ये छात्र गए हैदराबाद

ग्वालियरः अनुष्का श्रीवास्तव, सोमिल सिंह, स्तुति श्रीवास्तव, नीरज, **सीहोरः** कल्पना गौर, अंकित कंथिया, यश पाटीदार, लक्ष्मी नागर, आयुष जैन, सुमैला, रमित सोनी, बृजेश दांगी, सृष्टि पोद्दार, **खंडवाः** दीपांशु गुर्जर, कमलेश, नवीन पटेल, अंबिका पाटीदार, युवराज पाटीदार, राजवर्धन सिंह राठौर, **मंदसौरः** अदिति लोधी, सरोज यादव, रीतेश कुमरिया, चेतन नागर, वीरेंद्र यादव, तिषा मालवीय, **इंदौरः** हार्दिक शुक्ला, कुलदीप यादव, बृजेश पाटीदार, भाग्यश्री राठौर, रचना पाटीदार।

किस कॉलेज के कितने छात्र

कॉलेज	छात्र
ग्वालियर	04
सीहोर	09
खंडवा	06
मंदसौर	06
इंदौर	05

विवि के पांचों कॉलेजों के 30 छात्र-छात्राएं एंटरप्रेन्योरशिप और एग्री बिजनेस इन एग्रीकल्चर की ट्रेनिंग लेने के लिए हैदराबाद गए हैं।

डॉ. वाईपी सिंह,
डीईएस कृषि विवि ग्वालियर

स्वदेश
ग्वालियर, रविवार 27 अगस्त 2023

कृषि विवि में आज राज्यपाल करेंगे दत्तोपंत ठेंगड़ी की प्रतिमा का अनावरण

नगर संवाददाता ■ ग्वालियर

विद्यार्थियों के साथ संवाद में होंगे शामिल

राजमाता विजयाराजे सिंधिया कृषि विश्वविद्यालय के दत्तोपंत ठेंगड़ी सभागार में रविवार को सुबह 9:30 बजे कृषि शिक्षा मेले का आयोजन किया जाएगा। जिसमें मुख्य अतिथि के रूप में राज्यपाल तथा विश्वविद्यालय के कुलाधिपति मंगुभाई पटेल शामिल होंगे। इस अवसर पर विश्वविद्यालय के दत्तोपंत ठेंगड़ी सभागार में स्व. दत्तोपंत जी की प्रतिमा का अनावरण भी राज्यपाल द्वारा किया जाएगा। विवि के कुलसचिव अनिल सक्सेना ने बताया कि कार्यक्रम भारतीय कृषि अनुसंधान परिषद, नई दिल्ली के उपमहानिदेशक (कृषि शिक्षा) डॉ. आर.सी. अग्रवाल के विशिष्ट आतिथ्य एवं कृषि विश्वविद्यालय के कुलपति डॉ. अरविन्द कुमार शुक्ला की उपस्थिति में सम्पन्न होगा। कार्यक्रम में प्रतिभावान विद्यार्थियों को राज्यपाल द्वारा पुरस्कृत भी किया जाएगा।

राज्यपाल श्री पटेल के मुख्यआतिथ्य में 27 अगस्त को दोपहर 3 बजे राजा मानसिंह तोमर संगीत एवं कला विश्वविद्यालय में कार्यक्रम आयोजित किया जाएगा। जिसमें राज्यपाल विद्यार्थियों से संवाद एवं सांगीतिक प्रस्तुतियों के कार्यक्रम में शामिल होंगे। इसके अलावा विवि परिसर में चित्रकला, मूर्तिकला प्रदर्शनी का अवलोकन भी करेंगे। साथ ही विश्वविद्यालय और जेल प्रशासन की आपसी सहमति से विभिन्न विषयों में सर्टिफिकेट कोर्स प्रारंभ करने की घोषणा करेंगे। कार्यक्रम के विशिष्ट अतिथि सांसद विवेक नारायण शेजवलकर होंगे।

नईदुनिया
ग्वालियर, रविवार 27 अगस्त, 2023

कृषि विश्वविद्यालय में कृषि शिक्षा मेला व ठेंगड़ी जी की प्रतिमा का अनावरण आज

राजमाता विजयाराजे सिंधिया कृषि विश्वविद्यालय के दत्तोपंत ठेंगड़ी सभागार में रविवार को कृषि शिक्षा मेला का आयोजन किया जा रहा है। इसका शुभारंभ सुबह साढ़े नौ बजे होगा और इस आयोजन के मुख्य अतिथि प्रदेश के राज्यपाल एवं विश्वविद्यालय के कुलाधिपति मंगुभाई पटेल मौजूद रहेंगे। इस अवसर पर वह दत्तोपंत ठेंगड़ी की प्रतिमा का अनावरण करेंगे। कार्यक्रम भारतीय कृषि अनुसंधान परिषद्, नई दिल्ली के उपमहानिदेशक डा.आरसी अग्रवाल के विशिष्ट आतिथ्य एवं कृषि विश्वविद्यालय के कुलपति डा. अरविन्द कुमार उपस्थिति रहेंगे।

नईदुनिया
ग्वालियर, सोमवार 28 अगस्त, 2023

कृषि में अच्छी शिक्षा प्राप्त करें और देश की प्रगति में अपना योगदान दें

कृषि एक व्यापक क्षेत्र है, जिसे समझें और ज्ञान बढ़ाएं तथा रोजगार स्थापित करें। कृषि को केवल खेती करना न माने बल्कि यह उद्योग बन चुकी है। आप फल, सब्जी, उनके लिए आर्गेनिक खाद, मिलेट्स से तैयार होने वाले भोजन आदि का व्यापार खड़ा कर सकते हैं, इसलिए ज्ञान अर्जित करो और रोजगार देने वाले बनो। यह बात रविवार को राजमाता विजयाराजे सिंधिया कृषि विश्वविद्यालय में कृषि मेला और दत्तोपंत ठेंगड़ी की प्रतिमा के अनावरण समारोह में प्रदेश के राज्यपाल एवं कुलाधिपति मंगुभाई पटेल ने कही। उन्होंने कहा कि हमारे देश के वैज्ञानिकों चंद्र तक पहुंचा और सफलता हासिल कर देश का मान बढ़ाया है। इसी प्रकार मानव स्वास्थ्य के हित में हमारे परंपरागत अनाज मिलेट्स की दुनिया में स्वीकार्यता बढ़ी है। ऐसे में हमारे बच्चे कृषि में अच्छी शिक्षा प्राप्त करें तथा देश की प्रगति में अपना योगदान दे तथा प्राकृतिक खेती की ओर बढ़ें। विशिष्ट अतिथि सांसद विवेक नारायण शेजवलकर का कहना था कि श्री ठेंगडी ने देश के हित में काम किया और भारतीय चिंतन दिया। उन्होंने विद्यार्थियों को कृषि शिक्षा को अपनाकर उसमें नई तकनीकों का विकास कर आगे बढ़ने को कहा।

कृषि में 80 विषय है, जिनमें पीजी की डिग्री होती है: भारतीय कृषि अनुसंधान परिषद्, नईदिल्ली के उपमहानिदेशक (कृषि शिक्षा) डा. आरसी अग्रवाल का कहना था कि कृषि एक व्यापक क्षेत्र है। इसमें 80 विषय है जिनमें पीजी की पढ़ाई की जाती है। कृषि शिक्षा के प्रति विद्यार्थियों की रुचि बढ़ी है। इस वर्ष कृषि शिक्षा में प्रवेश हेतु 5 लाख 80 हजार आवेदन प्राप्त हुए है। कृषि शिक्षा में छात्राओं का प्रतिशत 23 से बढ़कर 49 हो चुका है। अब आधुनिक कृषि को सस्टेनेबल लेवल से कमर्शियल स्तर पर ले जाने की आवश्यकता है।

दत्तोपंत ठेंगड़ी की प्रतिमा का अनावरण करते राज्यपाल मंगुभाई पटेल। • नईदुनिया

- कृषि शिक्षा मेला का हुआ आयोजन, दत्तोपंत ठेंगड़ी की प्रतिमा का हुआ अनावरण

यह लोग रहे उपस्थितः इस मौके पर कृषि शिक्षा मेला का आयोजन हुआ। जिसमें जिन लोगों ने स्टार्टअप लिया था उन्होंने अपने प्रोडक्ट लगाए थे। इस मौके पर कृषि के भविष्य एवं भविष्य में कृषि पर विचार मंथन भी हुआ। उपमहानिदेशक (कृषि शिक्षा) डा. आरसी अग्रवाल, आइजीएफआरआइ, झांसी के निदेशक डा. अमरेश चंद्र, डा. एसके चतुर्वेदी, अधिष्ठाता कृषि संकाय डा. दीपक हरि रानडे, कृषि वैज्ञानिक डा. सुषमा तिवारी, ग्वालियर ग्लोरी स्कूल की प्राचार्य राजेश्वरी सावंत तथा विश्वविद्यालय के संचालक अनुसंधान डा. एसके शर्मा ने संबोधित किया।

इनका हुआ सम्मानः सत्र के अंत में विश्वविद्यालय द्वारा विभिन्न विद्यालयों में कृषि शिक्षा को लोकप्रिय बनाने की दृष्टि से आयोजित प्रतियोगिताओं के विजेता बच्चों को कुलपति द्वारा पुरस्कृत किया गया, जिसमें ग्लोरी स्कूल की छात्रा कु शुची लाहा एवं एएमआई शिशु मंदिर की छात्रा कु गौरांशी श्रीवास्तव ने पंरपरागत तथा आधुनिक खेती पर एक रोचक संवाद प्रस्तुत किया। इन्हें तथा जल संरक्षण विषय पर आयोजित प्रतियोगिता में विजेता कु. प्राची मिश्रा को राज्यपाल जी द्वारा पुरस्कृत किया गया। कार्यक्रम के प्रांरभ में राज्यपाल महोदय द्वारा अन्न भराव तथा जलभराव पूजन किया गया। कु. शांभवी शुक्ला ने श्री अन्न द्वारा बनाया गया राज्यपाल जी का चित्र उन्हें भेंट किया।

लालच की खेती न करें

कृषि विश्वविद्यालय के कुलपति प्रो. अरविन्द कुमार शुक्ला का कहना था कि आधुनिक खेती के साथ साथ लालच की खेती हो रही है। जिससे तरह तरह की बीमारियां पैदा हो रही है। जबकि हमारी परंपरागत खेती का विश्व की प्राचीनतम ग्रंथ ऋग्वेद मे कृषि का गौरवपूर्ण इतिहास रहा है। देश में 75 सरकारी तथा 30 निजी कृषि विश्वविद्यालय, 500 कृषि कालेज आज कृषि शिक्षा प्रदान कर रहे हैं। इस क्षेत्र मे कृषि, उद्यानिकी, मछलीपालन, पशुपालन, कृषि प्रौद्योगिकी आदि में अपार संभावनाएं है। आज स्मार्ट एग्रीकल्चर तकनीक आधारित कृषि की जा रही है। 2200 स्टार्टअप देश में एग्री इंडस्ट्री आधारित चल रहे है। कृषि के अनुसंधान, विस्तार कार्य करने मे नवीन तकनीकों का समावेशन तभी संभव होगा जब हम कृषि मे उच्च शिक्षा देकर कार्यदक्ष मानव संसाधन तैयार करे।

राज एक्सप्रेस
सोमवार, 28 अगस्त, 2023

आप रोजगार लेने नहीं, देने वाले बनें

राज्यपाल ने कृषि विश्वविद्यालय में किया कृषि शिक्षा मेला का उद्घाटन

ग्वालियर, (आरएनएन)। कृषि क्षेत्र में प्राप्त ज्ञान का सर्वश्रेष्ठ उपयोग कर आप सब रोजगार लेने वाले के स्थान पर रोजगार देने वाले बनें। आप सब अपनी प्रतिभा और ज्ञान से ग्रामीण युवाओं, महिलाओं और कृषकों की आर्थिक मजबूती का नया इतिहास रच सकते हैं। उन्नत कृषि तकनीक और शोध सीमांत किसानों के खेतों तक पहुंचाएं।

यह बात राज्यपाल मंगूभाई पटेल ने राजमाता विजयाराजे सिंधिया कृषि विश्वविद्यालय में कृषि का भविष्य एवं भविष्य में कृषि विषय पर आयोजित हुए कृषि शिक्षा मेला के उद्घाटन सत्र को संबोधित करते हुए कही। राज्यपाल ने इस मौके पर स्व.दत्तोपंत ठेंगड़ी की प्रतिमा का अनावरण किया। उन्नत कृषि तकनीक को बढ़ावा देने के उद्देश्य से लगाई गई प्रदर्शनी का उद्घाटन भी किया। साथ ही कृषि शिक्षा मेला के आरंभ में राज्यपाल मंगूभाई पटेल ने अन्न भराव तथा जल भराव पूजन भी किया। कार्यक्रम में सांसद विवेक नारायण शेजवलकर ने भारतीयता के आधार पर कृषि शिक्षा व तकनीक अपनाकर उन्नत खेती को बढ़ावा देने पर बल दिया। उन्होंने कहा दत्तोपंत ठेंगड़ी ने भी कृषि में भारतीय दर्शन के आधार पर खेती के तौर तरीकों में बदलाव लाने की पहल की थी। दत्तोपंत ठेंगड़ी ने देश के हित में करेंगे काम, काम के बदले लेंगे दाम का नारा दिया था, जो सभी को सकारात्मकता का संदेश देता है। भारतीय कृषि अनुसंधान परिषद के उप महानिदेशक (कृषि शिक्षा) डॉ. आरसी अग्रवाल ने कहा कि देश में कृषि शिक्षा के प्रति विद्यार्थियों में रुचि बढ़ रही है। कृषि शिक्षा में प्रवेश के लिए इस साल 5 लाख से अधिक आवेदन प्राप्त हुए हैं, जो पिछले वर्षों में 84 हजार तक रहते थे। उन्होंने कहा कृषि शिक्षा में छात्राओं का प्रतिशत 23 से बढकर 49 प्रतिशत हो गया है। विश्वविद्यालय के कुलपति प्रो. अरविन्द कुमार शुक्ला ने स्वागत उद्बोधन दिया। साथ ही कहा कि उन्नत खेती की दिशा में वर्तमान में उल्लेखनीय काम हो रहे हैं। अब स्मार्ट एग्रीकल्चर तकनीक आधारित कृषि की जा रही है। इस मौके पर स्कूली छात्राओं ने कृषि पर संवाद भी किया।

कृषि शिक्षा मेला में विभिन्न कृषि विज्ञान केन्द्रों, चुनिंदा स्कूलों तथा अन्य संस्थाओं द्वारा आकर्षक प्रदर्शनी लगाई गई। राज्यपाल मंगूभाई पटेल ने उद्घाटन किया और पूरी प्रदर्शनी देखी। कार्यक्रम के दूसरे सत्र में कृषि का भविष्य एवं भविष्य में कृषि पर विचार मंथन किया गया।

बीएससी के 18 विद्यार्थी आधुनिक कृषि तकनीकों का प्रशिक्षण लेने फिलीपींस व ऑस्ट्रेलिया जाएंगे

एजुकेशन रिपोर्टर | ग्वालियर

कृषि विवि

राजमाता विजयाराजे सिंधिया कृषि विश्वविद्यालय के बीएससी कृषि 18 विद्यार्थी आधुनिक कृषि तकनीकों का प्रशिक्षण लेने फिलीपींस व ऑस्ट्रेलिया जाएंगे। इस प्रशिक्षण के लिए बीएससी कृषि के विद्यार्थियों का चयन किया गया है जिनका 7.5 सीजीपीए रहा था। ऐसे विद्यार्थियों का विवि द्वारा इंटरव्यू लिया गया, जिसके बाद अब उन्हें प्रशिक्षण के लिए विदेश भेजा जा रहा है, प्रशिक्षण के दौरान ऐसे विद्यार्थी कृषि की उन्नत तकनीकों का प्रशिक्षण लेंगे। इसके बाद इस प्रशिक्षण के बारे में अंचल के किसानों को बताएंगे जिससे कृषि को और बेहतर किया जा सके। ऐसे विद्यार्थियों को राज्यपाल मंगू भाई पटेल व प्रदेश के कृषि मंत्री कमल पटेल ने राजमाता विजयाराजे सिंधिया कृषि विश्वविद्यालय 18 विद्यार्थियों को कुलपति प्रो. अरविंद कुमार शुक्ला एवं परियोजना समन्वयक डा. वाईपी सिंह मौजूदगी में अंतर्राष्ट्रीय प्रशिक्षण हेतु विदेश जाने के लिए राजभवन में हरी झंडी दिखाई। भारतीय कृषि अनुसंधान परिषद, नई दिल्ली द्वारा स्वीकृत इंस्टीट्यूशनल डेवलपमेंट कार्यक्रम के अन्तर्गत संचालित राष्ट्रीय कृषि उच्च शिक्षा परियोजना के तहत विश्वविद्यालय से संबद्ध महाविद्यालयों में अध्ययनरत विद्यार्थियों में से 18 विद्यार्थियों का अंतर्राष्ट्रीय प्रशिक्षण हेतु चयन किया गया।

कृषि विवि के विद्यार्थियों से चर्चा करते राज्यपाल

स्वदेश
ग्वालियर, गुरुवार 24 अगस्त 2023

उत्पादन के साथ फसल का सही मूल्य भी मिले : गोस्वाम

नगर संवाददाता ■ ग्वालियर

बीज डालकर फसल उगाना ही कृषि नहीं है। उसे बाजार में सही मूल्य प्राप्त हो, इस पर ध्यान देना होगा। हमें लाभ को उत्पादन से दुगुना करना होगा। वर्तमान में कृषि में काफी तकनीकें अपनाई जा रही हैं, पर उन तकनीकों के प्रयोग के साथ हमें फसलों की मार्केटिंग पर ध्यान देना होगा। यह बात मुख्य अतिथि के रूप में मौजूद बांदा कृषि एवं प्रौद्योगिकी विश्वविद्यालय के कुलपति डॉ. एस. एल. गोस्वामी ने बुधवार को राजमाता विजयाराजे सिंधिया कृषि विश्वविद्यालय के अतंर्गत नाहेप परियोजना एवं एग्री बिजनेस सेंटर सी.ए.आई.ई. द्वारा आयोजित एग्री कनेक्ट के अंतर्गत आयोजित औद्योगिक सम्मेलन में कही। उन्होंने विवि में एग्री बिजनेस सेन्टर होना बड़ी उपलब्धि बताया। साथ ही छात्रों से जॉबसीकर के साथ जॉब प्रोवाइडर बनने का भी आह्वान किया। वहीं कृषि विश्वविद्यालय के कुलपति डॉ. अरविन्द कुमार शुक्ला ने कहा कि एक समय था जब कृषि में नौकरी के अवसर नहीं थे, लेकिन आज कृषि में नौकरी के साथ व्यवसाय की भी अपार संभावनाएं हैं। उन्होंने कहा कि कृषि में आई.ओ.टी. तकनीक का प्रयोग कर कृषि उत्पादों में सेंसर का उपयोग और सिंचाई प्रणालियों को स्वचालित करके फसल क्षेत्रों की निगरानी करने में मदद के लिए डिजाइन किया गया है। इससे खेत की परिस्थितियों को कहीं से भी आसानी से जाना जा सकता है। कार्यक्रम में विद्यार्थियों के लिए तकनीकी सत्रों का भी आयोजन किया गया। प्रथम सत्र में डॉ. नेहा सेनी द्वारा कृषि व्यवसाय में उद्यमिता के अवसर के बारे में बताया।

कृषि विश्वविद्यालय में एग्री कनेक्ट में विचार मंथन

दूसरे सत्र में डॉ. अमित शर्मा द्वा
श्रृंखला एवं अनुबंध खेती की ज
दी। इसके अलावा नानाजी देशमु
चिकित्सा विज्ञान विश्ववि
जबलपुर के निदेशक शिक्षण डॉ.
नायक, अधिष्ठाता कृषि संक
दीपक हरि रानड़े तथा निदेशक
सेवाएं एवं नाहेप परियोजना
अन्वेशक डॉ. वाय.पी. सिंह ने
करते हुए कृषि व्यवसाय को अ
लिए प्रोत्साहित किया। इस अ
विशेष रूप से कुलसचिव
सक्सेना, समन्वय संयोज
अखिलेश सिंह, वैज्ञानिक डॉ
हाडा, आयोजन सचिव डॉ.
मिश्रा, इन्क्यूबिटी, विश्व
कर्मचारी, कृषि विश्वविद्यालय,
यूनिवर्सिटी एवं आई.टी.एम. यू
के छात्र-छात्राएं मौजूद रहे।

"Empowering Excellence"

Enhancing Faculty Competence through International Exposure

RAJMATA VIJAYARAJE SCINDIA KRISHI VISHWA VIDYALAYA, GWALIOR (M.P.)

International exposure for faculty is imperative in today's globalized academic landscape, serving as a catalyst for competence enhancement and knowledge updating. The need arises from the rapid advancements and cross-border collaborations in research and education, necessitating faculty members to stay abreast of international trends and best practices. Such exposure is relevant as it enables faculty to expand their perspectives, enrich their teaching methodologies, and foster interdisciplinary collaborations. The rationale behind international exposure lies in its potential to cultivate a culture of excellence and innovation within academic institutions, thereby enhancing the overall quality of education. It is important because it empowers faculty members to contribute significantly to their fields, promote international research collaborations, and mentor students effectively in a global context.

The outcome of international exposure is multifaceted, ranging from enhanced teaching effectiveness and research productivity to the establishment of lasting international partnerships. Ultimately, this initiative equips faculty with the necessary skills, knowledge, and networks to drive educational excellence and address global challenges in their respective disciplines.

Faculty Exposure to International and National Institute

SN	Name and Designation	Age(Years)	Institute Visited	Date of Visit
1.	Dr. R.K. Singh Scientist Plant Pathology	42	NDSU, North Carolina, US	August 1, 2023, to October 27, 2023
2.	Dr.Sushma Tiwari Scientist, Pt. Biotechnology	41	Murdoch University, Australia	30th July, 2022 to 20th October, 2022
3.	Dr. K.A. Khan Asstt. Professor Agril. Engineering (PHM)	42	Auckland University New Zealand	August 12, 2023, to October 1, 2023
4	Dr. Akhilesh Singh Scientist Agril. Engineering (SWC)	42	IIM Calcutta	January 13 2020 to January 17, 2020
5	Dr. Y D Mishra Scientist Agricultural Extension	43	IIM Calcutta	December 11, 2023, to December 15, 2023

International training at Murdoch University
Perth, Western Australia
(30-07-2022 to 20-10-2022)
Under INSTITUTIONAL DEVELOPMENT PLAN OF RVSKVV, NAHEP

Dr Sushma Tiwari
Assistant Professor
Plant Molecular Biology
& Biotechnology
College of Agriculture
RVSKVV, Gwalior

Dr. Sushma Tiwari, Assistant Professor in the Department of Plant Molecular Biology and Biotechnology at the College of Agriculture, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, Madhya Pradesh, India, underwent international training at Murdoch University, Western Australia, for a period of three months commencing from 30th July, 2022 to 20th October, 2022. The training took place under the guidance of Dr. Rajeev Kumar Varshney, Director of the WA State Agricultural Biotechnology Centre and Director for Crop & Food Innovation, as well as International Chair in Agricultural & Food Security. This training was supported by the Institutional Development Plan of RVSKVV, NAHEP.

The focus of Dr. Tiwari's training was on "Genome Editing and Genome Analysis of Crop Species." The primary advantage of this training was gaining proficiency in CRISPR-Cas9 technology for wheat improvement. Additionally, an MOU was established between Murdoch University and RVSKVV to foster strong collaborative ties.

OUTCOME OF THE VISIT

1. Linkages Developed**:** An MOU has been established between Murdoch University and RVSKVV, facilitating strong collaborations including student and faculty exchange programs, as well as joint research initiatives.
2. New R & D Collaboration**:** Professor Rajeev Kumar Varshney, Director of WA State Agricultural Biotechnology Centre and International Chair in Agricultural & Food Security, has expressed interest in collaborating with RVSKVV on crop breeding and genomics research.

3. New Techniques/Knowledge Acquired: Dr. Sushma Tiwari gained expertise in CRISPR-Cas9 technology and advanced genomics tools for data interpretation during the training.
4. Paper Published: A draft of a review article titled "CRISPR-edited wheat for food security and climate resilience" has been submitted to Professor Rajeev K Varshney and is expected to be published soon.
5. Practical Utility of the Visit's Outcome: The outcomes of the visit will be applied practically through a research project focused on using CRISPR-Cas9 technology in major crops of Madhya Pradesh (Wheat, soybean, chickpea) to enhance resilience against biotic and abiotic stresses, and to improve yield and nutritional parameters.

About the Murdoch University, Western Australia:

Murdoch University, located in Perth, Western Australia, is a prominent public institution that also has campuses in Singapore and Dubai. Established on 25 July 1973, it became the state's second university and enrolled its inaugural undergraduate cohort in 1975. The university derives its name from Sir Walter Murdoch (1874–1970), the esteemed Founding Professor of English and former Chancellor of the University of Western Australia.

Known for its research excellence, Murdoch University is a member of Innovative Research Universities Australia (IRU Australia). The university comprises nine distinguished schools *viz.,*School of Arts, School of Business and Governance, School of Education, School of Engineering and Information Technology, School of Health Professions, School of Law, School of Psychology and Exercise Science, Sir Walter Murdoch School of Public Policy and International Affairs, and School of Veterinary and Life Sciences.

SUGGESTED FOLLOW-UP ACTION:

1. External Research Project: Initiate an external research project aimed at enhancing popular varieties of crops in Madhya Pradesh (MP) by incorporating important traits through advanced genetic techniques.
2. Establishment of Gene Editing Technology and PCII Lab Certification: Establish a state-of-the-art facility for gene editing technology at RVSKVV and pursue certification from the appropriate regulatory bodies such as PCII (Plant Quarantine and Inspection Certification of India).
3. Knowledge Sharing:Share acquired expertise with fellow scientists and students at RVSKVV to enhance teaching and research capabilities, particularly in the field of genetic improvement and biotechnology.

International training at University of Auckland, New Zealand
(12 August to 01 October, 2023)
Under INSTITUTIONAL DEVELOPMENT PLAN OF RVSKVV, NAHEP

Dr KhurshidAlam Khan
Assistant Professor
College of Horticulture,
RVSKVV, Mandsaur

Dr. KhurshidAlam Khan, Assistant Professor at the College of Horticulture, RVSKVV, Mandsaur, Madhya Pradesh, participated in international training at the University of Auckland, New Zealand. The training spanned from August 12, 2023, to October 1, 2023, supported by the Institutional Development Plan of NAHEP, RVSKVV, Gwalior. The primary objective of this training was to gain advanced technical and practical knowledge in drying and dehydration technology.

Key benefits of attending the international training at the University of Auckland included:

- Exposure to the latest advancements in drying and dehydration technology.
- Hands-on experience in both theoretical concepts and practical applications of drying food and biological materials.
- Training in mathematical modelling of the drying process, enhancing understanding and application in research and industry contexts.

Comprehensive Report on International Training

During the international training at the University of Auckland, several key activities and learning experiences were undertaken:

Theoretical Lectures: The Department of Chemical and Materials Engineering at the University of Auckland organized theoretical lectures to provide a foundational understanding of drying technology. Topics covered included the role of drying in preservation, heat and mass transfer mechanisms during drying, factors influencing drying rates, changes in food properties during drying and methods to minimize these changes, and an overview of commonly used drying technologies in food industries, including different types of dryers and their operational characteristics.

Focused Training on Drying Technologies: Significant emphasis was placed on training in specific drying technologies such as freeze drying, spray drying, and atmospheric freeze drying. These sessions provided practical insights into the operation and application of these technologies in various contexts.

Laboratory Tour and Safety Induction: Before commencing practical sessions, a comprehensive tour of the laboratories within the Department of Chemical and Materials Engineering was conducted by Peter Martin, Head of Laboratory Safety. This included an introduction to laboratory safety protocols and procedures, ensuring familiarity with safety measures required for independent work, even during late hours. Specialized training on operating a freeze dryer was also provided by Ray Hoffman, a Lab Technician in the Food Engineering Lab of the department.This training not only enriched my understanding of drying technology but also equipped me with practical skills and safety knowledge essential for conducting research in this field effectively.

Apple

Kiwi fruit

Figure 2: Freeze dried samples

Study on Drying Kinetics and Mathematical Modelling of the Drying Process of Kiwi and Apple Slices

During my study, I focused on understanding the drying kinetics and employed mathematical modeling to characterize the drying process of kiwi and apple slices. Here are the key details and methodologies used:

Moisture Ratio Calculation: The moisture ratio (MR) for kiwi fruit and apple samples at each moisture content was calculated using Equation (1):

$$MR = \frac{M_t - M_e}{M_i - M_e} \tag{1}$$

Where:

- MRMRMR: Moisture ratio (dimensionless)
- MtM_tMt: Moisture content at a given time ttt
- MiM_iMi: Initial moisture content
- MeM_eMe: Equilibrium moisture content

This equation was further simplified in Equation (2):

$$MR = \frac{M_t}{M_i} \tag{2}$$

Mathematical Modeling: Mathematical modelling plays a crucial role in studying the drying process, understanding support mechanisms, and optimizing operational parameters of dryers. It helps in avoiding product degradation, optimizing energy use, and minimizing equipment stress.To analyze the drying behavior of kiwi and apple slices, five thin-layer drying models were employed:

- Page Model
- Henderson and Pabis Model
- Midilli and Kucuk Model
- Logarithmic Model
- Peleg Model

These models were fitted to the experimental moisture ratio (MR) data obtained during freeze drying of kiwi and apple slices. Each model was evaluated to determine its suitability in representing the drying characteristics of the fruits.(Table 1: List of Thin-Layer Drying Models)

This comprehensive approach allowed for a detailed understanding of the drying kinetics and facilitated the selection of an appropriate drying model for kiwi and apple slices based on experimental data and model performance.

Table 1: Thin layers drying Models	
Model	**Equation**
Page Model	$MR = \exp(-kt^n)$
Henderson and Pabis Model	$MR = a\exp(-kt^n)$
Midilli and Others Model	$MR = a\exp(-kt) + bt$
Logarithmic Model	$MR = a \exp(-kt) + c$
Peleg Model	$MR = 1 - t/(a + bt)$

Evaluation of Drying Models for Kiwi Fruit and Apple Slices

In my study, various thin-layer drying models were employed to elucidate the drying behavior of kiwi fruit and apple slices. MATLAB (version 12) was utilized with the Trust Region algorithm for non-linear regression analysis to determine the drying rate constant (kkk) and coefficients (a,b,c,a, b, c,a,b,c, and nnn) of the fitted models.

Statistical Analysis: To assess the goodness of fit of each model, several statistical parameters were calculated:

- **Root Mean Square Error (RMSE):** This metric quantifies the differences between predicted and experimental moisture ratio (MR) values. A lower RMSE indicates a better fit of the model to the data.
- **Adjusted R2R^2R2 (Coefficient of Determination):** This parameter evaluates the model's fitting ability while adjusting for the number of predictors. A higher R2R^2R2 value closer to 1 suggests a better fit of the model.

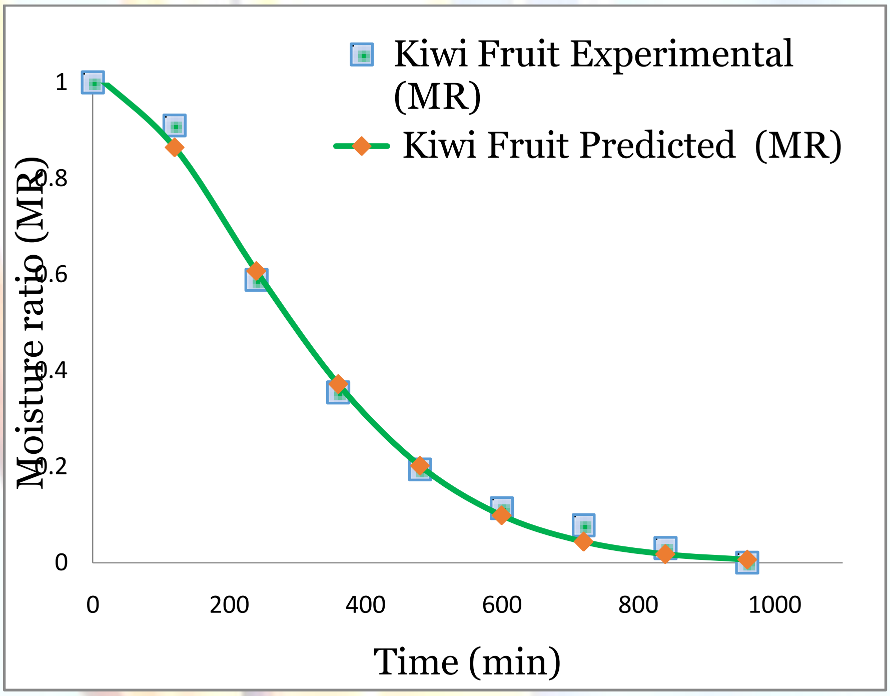
Selection of the Best Model: The obtained constant values and statistical parameters (adj. R2R^2R2 and RMSE) were compiled and presented in Table 2. This table served as a reference to identify the most suitable drying model for kiwi fruit and apple slices based on the experimental data. Ideally, the selected model should have a high adj. R2R^2R2 value approaching 1 and a low RMSE value approaching 0, indicating optimal agreement between predicted and observed MR values.

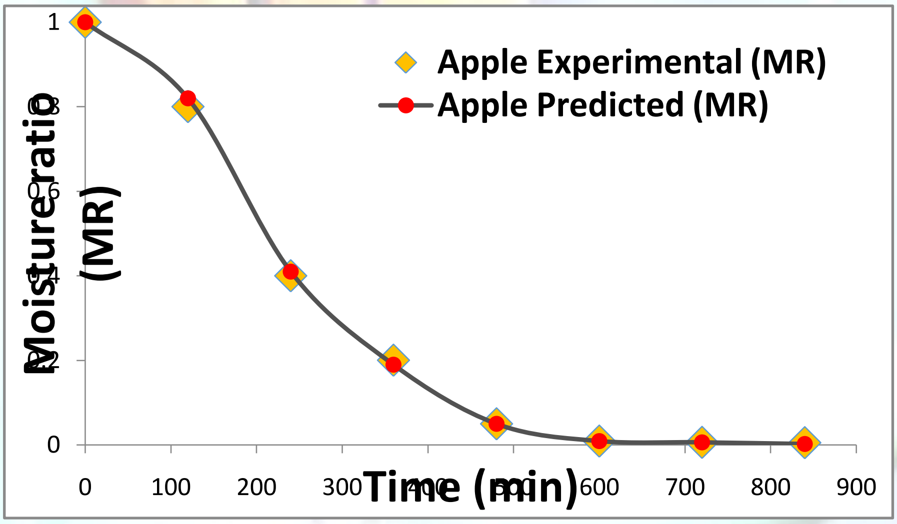
By rigorously evaluating these models, my study aimed to provide insights into the drying kinetics of kiwi and apple slices, facilitating informed decisions regarding drying process optimization and model selection in food drying applications.

Table 2: Fitting of mathematical models to drying curves of kiwi &apple

Model	Constants/ Statistical Parameters	Freeze Drying of kiwi fruit	Freeze Drying of apple
Page Model	n	1.06	1.73
Equation	k	0.001547	0.00010
$MR = \exp(-kt^n)$	RMSE	0.01334	0.07792
	adj. R^2	0.9783	0.9648
Henderson and Pabis Model	n	1.044	1.748
	k	0.001545	0.000104
Equation	a	0.9935	0.9951
$MR = a\exp(-kt^n)$	RMSE	0.01381	0.03324
	adj. R^2	0.9821	0.9814
Midilli and Others Model	a	1.002	1.025
Equation	b	-0.000006	-0.00022
$MR = a\exp(-kt) + bt$	k	0.002069	0.004845
	RMSE	0.0118	0.02893
	adj. R^2	0.9942	*0.9979*
	a	1.016	1.192
Logarithmic Model	c	-0.0205	-0.1690
Equation	k	0.002014	0.004212
MR = a exp(- kt)+c	RMSE	0.01094	0.07414
	adj. R^2	0.9988	0.9682
Peleg Model	a	369.4	190.4
Equation	b	0.7981	0.5885
$MR = 1 - t/(a + bt)$	RMSE	0.03094	0.07451
	adj. R^2	0.9701	0.9674
a, b, c, k, n constants; *t* time; *adj.* R^2= coefficient of determination; *RMSE*= root mean square error			

The *Midilli et al. model* is found to be the best model for describing the drying behaviour of apple slices. In case of kiwi fruit, *Logarithmic model* is reported to be the best model for kiwi fruit drying as given below:





Atmospheric Freeze Drying Experiments

During my training, I had the opportunity to engage with scientists specializing in atmospheric freeze drying (AFD) at the University of Auckland. Notably, Prof. Siew Young Quek, Director of the Future Food Research Centre at the University, along with Meng Wai and Yiran Xu, are leading research in this innovative drying technology.

Experimental Setup and Training: AFD experiments were conducted in the Thermofluid Laboratory of the Mechanical Engineering Department, located at the University of Auckland's Newmarket campus. I received hands-on training in operating the AFD system from Martin Ryder, a technician in the Thermofluid Lab. The AFD setup includes a specialized low-temperature cool air generation component developed by Prof. Meng Wai. Additionally, Dr. Anarghya, an instrumentation engineer in the Thermofluid Lab, installed the data acquisition system (DAS). This DAS records crucial parameters such as product temperature, atmospheric air inlet and outlet temperatures, and relative humidity at 30-second intervals. These precise measurements are essential for conducting thorough drying kinetics studies.

Collaborative Research Plans: Following discussions with Prof. Siew Young Quek, Meng Wai, and Yiran Xu, a comprehensive study on the atmospheric freeze drying of mint leaves and meat slices using the AFD system was planned. This collaborative effort aims to advance our understanding of AFD technology and its applications in preserving and processing food products.

This experience not only enhanced my practical skills in AFD technology but also deepened my collaboration with leading researchers in the field, paving the way for impactful research in food science and technology.

Drying of Mint Leaves and Meat Slices Using Atmospheric Freeze Drying

During the experimental phase, both mint leaves and meat slices were dried until they reached a constant weight. Regular measurements of weight, water activity, and color were taken at intervals of one and a half hours. Each sample underwent drying in three replicates.

Specific Drying Conditions: The drying process for meat slices involved maintaining an air temperature of -5°C throughout the procedure. However, after conducting a thorough literature review and consulting with project professors, it was concluded that drying medicinal and aromatic plants like mint leaves at such low temperatures (-5°C) as used for meat is unnecessary. For these types of products, any temperature below 10°C is sufficient to preserve their medicinal and aromatic compounds effectively.

Energy Efficiency and Technology Adoption: Energy efficiency is a crucial consideration in the operation of AFD systems. It has been established through comparisons and observations that the AFD system offers significant energy savings compared to traditional freeze drying methods commonly used in food processing industries. Importantly, products dried using the AFD system exhibit comparable quality to those dried using conventional freeze drying techniques.

Advantages of AFD Technology: The adoption of new technologies by food processing industries hinges on their advantages over existing methods. The AFD system not only conserves energy but also maintains product quality, making it a viable alternative to conventional freeze drying. This underscores its potential to enhance efficiency and sustainability in food processing operations.

This study highlights the potential of AFD technology to optimize drying processes while preserving product quality, thereby paving the way for its broader adoption in food industry practices.

**Figure:3 (i) AFD set-up,
(ii) data acquisition system,
(iii) dried mint leave, (iv) meat slice**

Visit to New Zealand Food TechPack Tech (FTPT) Exhibition

The New Zealand Food TechPack Tech (FTPT) Exhibition stands as the largest trade show in New Zealand dedicated to food manufacturing, packaging, and processing technologies. This annual event, organized by the New Zealand Government, serves as a premier platform for exhibitors to unveil newly developed processed food products, machinery, and innovative solutions tailored for the food processing industries. Key global issues such as food safety, food security, packaging, and logistics are also addressed comprehensively.

I had the privilege of being nominated by the Dean of the Faculty of Engineering to attend this prestigious event, alongside other faculty members from the Department of Chemical Engineering. Participating in the FTPT Exhibition provided me with a valuable opportunity to gain insights into the latest advancements in food processing and packaging technologies at an international level.

This experience not only broadened my understanding of current industry trends but also enabled me to explore cutting-edge developments that are shaping the future of food technology. It was a significant step towards enhancing my knowledge and professional network within the global food processing community.

Outcomes of the Visit

Linkages Developed: Following the visit, a proposal has been collaboratively prepared and submitted to establish a long-term relationship between RVSKVV, Gwalior, and the University of Auckland Faculty of Science Future Food Centre. Currently, the proposal is in the discussion and faculty consultation phase, aiming to foster strong academic and research ties between the two institutions.

New Techniques/Knowledge Acquired: During the visit, I acquired knowledge about two novel technologies: Atmospheric Freeze Drying (AFD) and Cool Air Drying (CAD). These emerging technologies are currently at the forefront of research within the scientific community, offering innovative approaches to food preservation and processing.

Publication and Collaborative Research: Furthermore, I participated in a collaborative research project focused on herb drying. This joint effort is expected to result in a co-authored publication in the near future, highlighting our findings and contributions to the field.

These outcomes underscore the value of international collaborations and continuous learning in advancing research and innovation in food technology and processing.

Practical Utility of the Visit's Outcome

The practical utility of my visit lies in the application of Cool Air Drying (CAD) technology, particularly beneficial for medicinal and aromatic plants. Unlike traditional high-temperature air drying methods that can degrade essential volatile compounds in these sensitive crops, CAD preserves these compounds effectively. This technology enhances the quality and market value of dried medicinal and aromatic plants, ensuring retention of their therapeutic properties and aromatic profiles.

Suggested Follow-Up Action

To capitalize on these insights, the next steps involve designing and developing a prototype "Cool Air Dryer." This device will facilitate further research and experimentation in optimizing CAD for various medicinal and aromatic plants. Subsequently, a detailed research proposal will be prepared and submitted to funding agencies in the near future. This initiative aims to advance CAD technology, expand its applications, and promote sustainable practices in the drying of sensitive agricultural products.

This strategic approach not only enhances research capabilities but also contributes to the development of innovative solutions in agricultural processing, benefiting both industry stakeholders and consumers alike.

International training at North Dakota State University
Fargo, North Dakota, USA
(August 1, 2023, to October 27, 2023)

Under INSTITUTIONAL DEVELOPMENT PLAN OF RVSKVV, NAHEP

Dr Rakesh Kumar Singh
Scientist
Plant Pathology
College of Agriculture
RVSKVV, Indore

Dr. R. K. Singh, Scientist in Plant Pathology at RVSKVV College of Agriculture, Indore, Madhya Pradesh, underwent international training at North Dakota State University (NDSU) in Fargo, North Dakota, USA. The training took place from August 1, 2023, to October 27, 2023, under the guidance of Dr. Upinder Gill, Assistant Professor in the Department of Plant Pathology at NDSU. This initiative was supported by the Institutional Development Plan of NAHEP, RVSKVV, Gwalior.

The training focused on Molecular Plant Pathology, with specific emphasis on techniques such as VIGS (Virus-Induced Gene Silencing), phenotyping, gene cloning, and bacterial competent cells relevant to wheat rust pathogens.

OUTCOME OF THE VISIT

- We have decided to collaborate on editing a book focused on rust diseases affecting various crops. Our US counterparts have expressed keen interest in this collaborative effort. We plan to submit a proposal for a collaborative project between India's Department of Biotechnology (DBT) and Department of Science and Technology (DST) and their US counterparts whenever such opportunities are advertised.
- The book will cover topics including VIGS (Virus-Induced Gene Silencing), phenotypic characterization of wheat wild relatives for rust disease resistance, gene cloning using plasmid vectors, bacterial competent cells, Agro-inoculation, RNA isolation, and molecular and pathological characterization of stem rust pathogens for race identification.
- We have already initiated and completed the editing of a jointly authored book on rust diseases affecting crops worldwide.

- The hands-on experience with molecular tools, techniques learned, and personal interactions with scientists at North Dakota State University (NDSU) have provided us with invaluable knowledge and insights, paving the way for new avenues in research.

About the Department at Fargo, North Dakota, USA:

The department of Plant Pathology at **Fargo, North Dakota** boasts a distinguished lineage of scientists. In the early 1900s, H.L. Bolley, the inaugural plant pathologist at the university, played a pivotal role in establishing a certified seed program in the state. His research addressed significant soil-borne diseases like flax-sick soil (*Fusariumwilt*) and common root rot of wheat.

Subsequently, pioneering scientists such as Wanda Weniger, the first female faculty member at the ND Agricultural Experiment Station, conducted extensive studies documenting cereal grain diseases statewide. H.H. Flor, during his tenure at NDSU, formulated the gene-for-gene theory elucidating interactions between virulence genes in pathogens and resistance genes in hosts.Dr. Rakesh Kumar Singh worked at the Wheat Rust Laboratory in the Department of Plant Pathology at NDSU, Fargo.

SUGGESTED FOLLOW-UP ACTION:

- **Establishment and Initiation of New Project Proposal:** Launching a new project proposal focusing on diseases affecting chickpeas and the development of new varieties.
- **Sharing Expertise:** Collaborating with fellow scientists to initiate new initiatives in research and teaching, leveraging my expertise in the field.



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Powered by Triple Camera

National training at Indian Institute of Management, Calcutta under INSTITUTIONAL DEVELOPMENT PLAN OF RVSKVV, NAHEP

Dr.Akhilesh Singh
Scientist (Agril. Engineering)
DES, RVSKVV, Gwalior

- Dr. Akhilesh Singh participated in a five-day Management Development Programme (MDP) on Project Management at the Indian Institute of Management, Calcutta, from January 13-17, 2020. This intensive course offered a thorough exploration of project management, featuring sessions led by distinguished faculty members. Throughout the programme, Dr. Singh acquired extensive knowledge and practical insights into several critical aspects of project management, including:

- Overview of Project Management: Understanding the foundational principles and framework of managing projects.
- Project Planning/Building: Techniques for effectively planning and structuring projects to meet organizational goals.
- Project Financing: Exploring methods of financing projects, including budgeting, cost estimation, and financial management.
- Project Scheduling: Learning tools such as Gantt charts and Critical Path Method (CPM) for efficient scheduling of project activities.
- Project Control - Earned Value Method: Techniques to measure project performance and progress using earned value analysis.
- Project Selection and Assessing Project Risk: Criteria for selecting viable projects and assessing associated risks.
- Project Management Software: Introduction to software tools that facilitate project management and enhance efficiency.
- Interpersonal Effectiveness in Managing Projects: Developing the soft skills necessary for effective team management and leadership.
- Theory of Constraints & Critical Chain Project Management: Learning to manage projects under constraints and optimizing project timelines.
- Contract Management and Arbitration: Insights into managing contracts and resolving disputes through arbitration.
- Public-Private Partnerships for Projects: Understanding the dynamics of collaboration between public and private sectors in project execution.

The programme also featured participant presentations, which served as an excellent platform for knowledge exchange and peer learning. It was a remarkable learning experience, enhanced by various exercises focused on project planning, execution, and teamwork. Additionally, the discussion and analysis of renowned management case studies, both successful and unsuccessful, provided valuable real-world context to the theoretical concepts covered.

My participation in this programme was sponsored by ICAR-NAARM, Hyderabad, under the NAHEP Component-2. The course was led by distinguished IIM faculty members, including Prof. Subrata Mitra, Prof. Abhishek Goel, Prof. Preetam Basu, Prof. Purusottam Sen, Prof. Bhaskar Chakrabarti, and Prof. R. Rajesh Babu. Additionally, engaging with co-participants from a range of organizations, such as State Agricultural Universities (SAUs), NABARD, multinational corporations, banks, and a consultancy firm from Australia, further enriched the learning experience.


INDIAN INSTITUTE OF MANAGEMENT CALCUTTA

Indian Institute Of Management Calcutta

This is to certify that

Dr. Akhilesh Singh

participated in the

Management Development Programme

on

Project Management

held during

January 13 - 17, 2020

at

Management Development Centre, IIM Calcutta

(Prof. Subrata Mitra)
Programme Director

(Prof. Leena Chatterjee)
Chairperson-CMDP

National training at Indian Institute of Management, Calcutta under INSTITUTIONAL DEVELOPMENT PLAN OF RVSKVV, NAHEP

Dr Yagya Dev Mishra
Scientist (Ag. Extension)
DES, RVSKVV, Gwalior

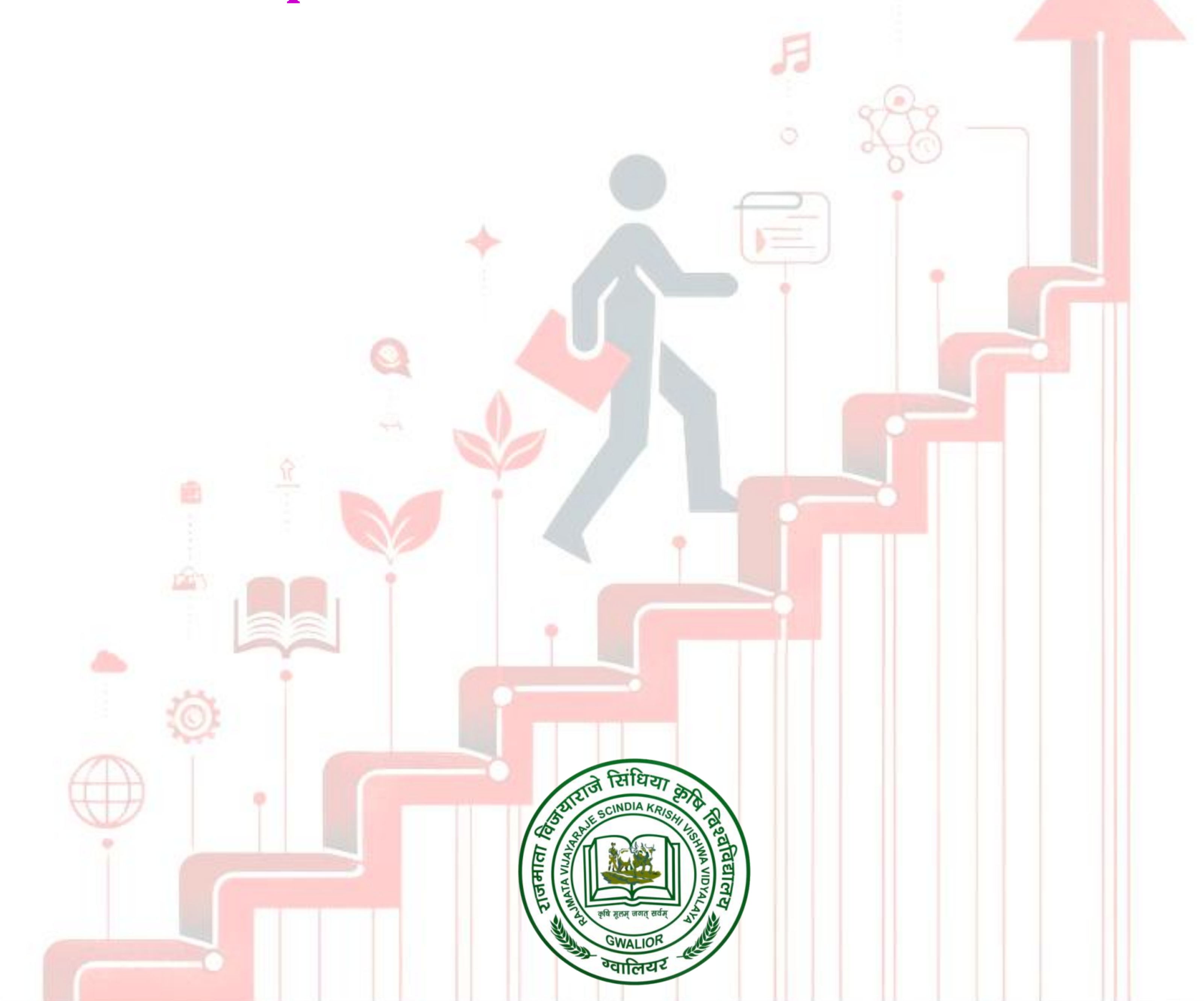
Dr. Yagya Dev Mishra participated in a five-day Management Development Programme (MDP) on Leadership and Team Building at IIM Calcutta from December 11-15, 2023. Over the course of these five days, Dr. Mishra engaged in various sessions focused on leadership and team building, gaining valuable insights through topics such as:

- Micro Jab: Programme Overview
- Basic concepts on leadership and team building
- Nature of Conflict: Concept and Exercises
- Intra-team Decision Making: Concept and Exercises
- Interpersonal effectiveness: Concept
- Emergent Leadership: Concept and Exercises
- Leadership Styles: Diagnosis and Concept
- Leading Change: Case of transforming SBI
- Team questionnaire: Diagnosis and concepts
- Negotiation skills
- Intra- and Inter-Team Decision Processes: Exercise
- Crisis Leadership (Case of Nokia)
- Attitude Survey: Diagnosis and Concept
- Sharing of key learning

The programme provided an exceptional learning experience through various exercises on teamwork and leadership. It was particularly enlightening to analyze and learn from well-known cases of both management success and failure. Additionally, engaging with senior executives from renowned multinational corporations, private sector firms, and Navratna companies as fellow participants greatly enhanced the overall experience.


INDIAN INSTITUTE OF MANAGEMENT CALCUTTA
Management Development Programme on
"Leadership & Team Building"
December 11 - 15, 2023
Venue: IIM Calcutta
CALCUTTA
CALCUTTA
PROF. CHETAN JOSHI

List of Deliverables for Holistic Development of Students and Faculties



RAJMATA VIJAYARAJE SCINDIA KRISHI VISHWA VIDYALAYA, GWALIOR (M.P.)

Year-2024

In Offline Mode

SN	Topic	Date
1.	**5 Days** Certificate Course on Grape Cultivation & Processing	5-9 June,2024
2.	**5 Days** Certificate Course on Production and Processing of Medicinal and Aromatic Crops	5-9 June,2024
3.	**10 Days** Value Added Certificate Course Hands on Practice for Bio/Waste Management	20-29 May,2024
4.	**5 Days** Certificate Course on Landscape Gardening	6-10 June,2024
5.	**05 Days**Certificate Course on Horticulture Nursery Management	6-10 June,2024
6.	**05 Days**Certificate Course on Protected Cultivation of Vegetable Crops	6-10 June,2024
7.	**05 Days** Certificate Course on Recent Advances in Modern Organic Agriculture	5-9 June,2024
8.	**Five Days** Value Added Certificate Course on "Eco-Friendly Solutions: Waste Papers and Bio-Waste Recycling Techniques"	15-21May 2024
9.	**Five Days** Value Added Certificate Course on “Hands on Practice for Bio-waste Management”	15-17 May 2024
10.	**5 Days** Value Added Certificate Course on “Hands-On training on Processing of Fruits, Vegetable and Food crops”	20-24 May 2024
11.	**5 Days**Certificate course on Bio waste management under Mission Life Awareness	20-29 May 2024
12.	**Five Days** Value Added Certificate Course on “Hands on Practice for Bio-waste Management”	7-11 June 2024

Year-2023

SN	Topic	Date	Mode
1.	Yes, I Can	7 February 2023	Offline
2.	Positive Psychology for work life balance	1 March 2023	Offline
3.	Writing project proposals and Mobilizing Resources	2 March2023	Offline
4.	**5 days** lecture series on Principles of Genetics & Plant Breeding	1-5 February 2023	Offline
5.	Entrepreneurship ideas for Agriculture Graduate	10- 13 February 2023	Online
6.	Mechanization for Rural industries	11 October 2023	Online
7.	Precision Water Management andFertigation	4 April 2023	Offline
8.	Role of sustainable Agriculture in Millets for Food, Nutrition and Climate Security	19 June 2023	Online
9.	बदलते पर्यावरणीय परिदृश्य में श्री अन्न की उपयोगिता एवं भविष्य की संभावनाएं	29 May 2023	Offline
10.	श्री अन्न फसलों का प्रसंस्करण एवं मूल्य संवर्धन	29 May 2023	Offline
11.	सावा का आहारी महत्व एवं उत्पादन हेतु उन्नत तकनीक	29 May 2023	Offline
12.	NEP -2020 in Agriculture	12 August 2023	Offline
13.	Livestock and poultry business development	20-24 December 2023	
14.	Commercial Floriculture	29 Sep -10 Oct 2023	Offline
15.	Start Up Funds and recommendation Entrepreneurship ideas for Agriculture Graduates	10-13 February 2023	offline
16.	Analysis of Agricultural Data using Statistical and Data Mining Techniques	11 -20 July 2023	online
17.	Training cum certificate Course on Development and Communication Skill	05-14 June 2023	online
18.	Long term Fertilizer Nitrogen Management in Crop Production Soil Health	22-23 November 2023	Offline
19.	Industrial Conclave on Agri- Connect 2023	23-24 August 2023	online

Year-2022

SN	Topic	Date	Mode
1.	Light Emitting Diodes in Plant Growth and Development	01 April 2022	Online
2.	Education to Employment	25April -18 May 2022	Offline
3.	1. Plant Breeding in Modern Era, 2. The Journey of Biotechnology from Transgenics to Gene Editing, 3. Strategies and Technological Innovations for Sustaining Pulses Production in India	25 - 27 May 2022	Offline
4.	3 D Food Printing - the technologies, opportunities and challenges for customised food development	21 June 2022	Online
5.	Students Entrepreneurship Development training program	1 - 30 November 2022	Offline
6.	Entrepreneur opportunities in remote sensing technique in crop area and production assessment.	26 April 2022	Online
7.	Farming system for higher income and employment.	29 April 2022	Online
8.	Designing Integrated Farming Systems for Livelihood Security and Environmental Sustainability: A Step towards Entrepreneurship Development.	24 June 2022	Online
9.	Soils: Where food begins	5 December 2022	Online
10.	Principal of genetics	27 February 2023	Online
11.	Principles of plant breeding	28 February 2023	Online
12.	Breeding of Field crops	2 March 2023	Online
13.	Career opportunity in film making (Bollywood, OTT, Television Industry)	12 -13 May 2022	Offline
14.	Entrepreneurship Development Through Roof Top /Terrace Gardening	18 May 2022	Offline
15.	Entrepreneurship development through Floriculture and landscaping	19 May 2022	Online
16.	Field Trip and a lecture on the development of mega nursery for	15 September 2022	Offline

	entrepreneurship development		
17.	**5 days** online training program on “Innovations in plant propagation and hi-tech nursery management”	25 - 29 April 2022	Online
18.	Environment day celebration	05 June 2022	Offline
19.	Yoga day	21 June 2022	Offline
20.	Orientation Program for I year students	07 July 2022	Online
21.	Tree plantation program by students and faculties	08 July2022	Online
22.	Interactive session between students and faculties	29 July2022	Online
23.	Orientation Program about GRM for II-year students	29-07-2022	Online
24.	English learning class in Language Lab	18 August 2022	Online
25.	Interactive session between students and faculties	26 August 2022	Online
26.	Orientation Program about GRM for I year students	26 August 2022	Online
27.	“5 days training on improving transfer of IT knowledge “(MS-office, Outlook, Goggle drive)	12-16 September 2022	Online
28.	Interactive session between students and faculties	30 September 2022	Online
29.	A motivational lecture on Opportunities of self-employment in the field of horticulture	13 October2022	online
30.	World Soil Day	5-12-2022	Offline
31.	Entrepreneurship Skill Development in Agriculture	26 May 2022	online
32.	Training on JAVA and HTML Language	06 - 18 June 2022	Offline
33.	Entrepreneurial development through hand-on-training in oyster mushroom	6 -7 December 2022	Online
34.	Environment day celebration	03 June 2022	Online
35.	Seed production and quality control: An Entrepreneurial venture	16 June 2022	Online
36.	Application of drone in agriculture: a way for entrepreneurship generation	12-16September2022	Online
37.	Start-up opportunities in Agriculture and Allied Sectors	17 -21 October 2022	Online

38.	Brain storming: An Interactive session	09 March 2022	Online
39.	Waste Water treatment technology to control the water pollution	10 March 2022	online
40.	Self-Motivation and self-discipline: a must be successful	25 February 2022	Online
41.	One day workshop on Education	10 January 2022	Online
42.	Nursery management for entrepreneurship development	28 January 2022	Online
43.	Hydroponics & organic farming A new Concept for entrepreneurs	17 January 2022	Online
44.	Sensor based Technology for Agripreneur	19 January 2022	Online
45.	Improving the visibility indicators and productivity of sate Agricultural universities	27 January 2022	Online
46.	Entrepreneurship and skill Development- Enhancing the capacity to develop, Manage and Organise a Business	25 February 2022	Online
47.	Entrepreneurship Development Through Roof Top /Terrace Gardening	19 February 2022	Online
48.	Skill based entrepreneurship development programme on Argo based entrepreneurship	01 - 30 Nov. 2022	Offline
49.	Technology Intervention for Sustainable Development	11 April 2022	online
50.	ca^{+2}/CALMODULIN –MEDIATED Abiotic stress signalling in plants and portable stress mitigation Strategies	12 April 2022	Online
51.	Entrepreneurship Development through Hand on Oyster Mushroom cultivation	06-07 December 2022	offline
52.	International Women Day and Azadi Ka Amrut Mahotsav	08 March 2022	Offline
53.	Recent Trends on Mushroom Technology	29 March 2022	Online
54.	Training Program on Agri Journalism	15-19 May 2022	Online
55.	e-Extension in Agriculture and Allied Sector	9-13 May 2022	Online

Year-2021

In Online Mode

SN	Topic	Date
1	Introduction and Application of RS & GIS	13 September 2021
2	Can Agro-forestry based systems revitalize he eco-balance	7 July 2021
3	Management of Agri-business start-ups & establishing business process (International)	21 June 2021
4	Food and Nutrition Security Challenges & opportunities (International)	16 June 2021
5	Novel Strategies for Iron & Zinc Bio fortification of cereal grains (International)	1 April 2024
6	Agro-ecology: Principal and Application (International)	2 April 2021
7	Data Management analysis and Interpretation	06-11 September, 2021
8	Dos and Don'ts during Covid -19	16 August 2021
9	Handling mental health issue amidst the pandemic	16 August 2021
10	Women rights and cyber crime	05 October 2021
11	Urban farming for young entrepreneur	21 January 2021
12	Scope & Start-up opportunities in food processing &Agro based industries	1 November 2021
13	Brain Storming academia –Industry and other stakeholder workshop	1-2, November 2021
14	intellectual property rights Two days' workshop on understanding and filing	25-26, January, 2021
15	Communication skill for professional	23-24, June 2021
16	Weed Science research in India: way forward and scope for	17 May 2021

	entrepreneurship opportunity	
17	Disasters, their origin and management aspects in India	4 December 2021
18	Underutilized horticultural genetic resources of Andaman & Nicobar Islands	4 December 2021
19	Physical Fitness for healthy lifestyle	17 September 2021
20	Integrated fish farming system models for variables Agricultural production, environmental sustainability and socio economics benefits	26 October 2021
21	Remote sensing in the field of environment/ Agriculture	7 July 2021
22	Diet for fitness	30 September 2021
23	Phytoremediation	5 July 2021
24	Declining water resources and remedial measures	22 March 2021
25	Managing water in field crops under changing climate scenario	22 March 2021
26	Sustainable management of economically Important NTFPs of central India for their conservation and sustaining livelihood of dependent communities	7 July 2021
27	Role of trees outside forest in combating environment challenges	7 July 2021
28	Exploring business opportunities through mushroom cultivation technologies	22 September 2021
29	Workshop on data management, analysis and interpretation	6-11 September, 2021
30	Vegetable seed production	16September2021
31	Pomegranate- a fruit for doubling farmers income	12 August 2021
32	Doubling Soybean production in India: speed breeding and precision crop management	26 February 2021

33	Entrepreneurship skill development	25-30 January, 2021
34	Agro-forestry & its Eco-system Services	6 January 2021
35	Agriculture environment management, biogas, solar etc.	17 February 2021
36	Introduction to agriculture its challenges and organic as the daily solution	16 February 2021
37	Seed Management	18 February 2021
38	Entrepreneurship opportunity through alternate farming system	16 February 2021
39	Commercial Cultivation of medicinal plant	1 -5 February, 2021
40	Research Publication in SCI and Scopus indexed journals	13 January 2021
41	Research Publication in SCI and Scopus indexed journals	13 January 2021
42	Improving climate resilience and nutritional quality of crops: Maize as an example (International)	15 January 2021
43	Floriculture in India & COVID-19 way forward	12 January 2021
44	Soil less farming – Hydroponics	31 December 2020- 2 January 2021
45	Training Program for Personality Development and Communication Skill of students"	25-30 October 2021 8-13November 2021 22-27 November 2021
46	Start UP Master class	24-30 April 2021
47	Value Addition and Marketing of various Products from Herbal and Medicinal Plants	1 November 2021
48	Marketing and Export Opportunities in Agriculture Produce international Specification (GAP), International Market Requirement.	1 November 2021
49	Processing, Value addition and Marketing of Medicinal Plant Products for Entrepreneurship Development	29 December 2021

50	Two Days Online Training Program on communication Skill and Professionals	23-24 June 2021
51	Development Training Program	18-21 May 2021
52	Can Agroforestry based systems revitalize the Eco-Balance	7 July 2021
53	Online training programme on Personality Development	18-21 May 2021
54	Online training programme on Personality Development	11-12 June 2021
55	World Water Day	22 March 2021
56	Management of Infertility in Cattle	15 October 2021

Year-2020

In Online Mode

SN	Topic	Date
1.	Webinar on soil health: role of microorganisms and soil organic matter	06 July 2020
2.	Training on personality development and employability skills	30 April -30 May 2020
3.	Entrepreneurship opportunities through alternate Horticulture based farming system	16 July 2020
4.	One-week online faculty development program on “online Teaching and Learning practices	23-31 October, 2020
5.	One-week online faculty development program on “online Teaching and Learning practices	24 November - 02 December, 2020
6.	On-farm skill development through soil and water conservation technologies: A buffer against production risk in the face of climate risk	25 July 2020
7.	3 days E workshop on start-up opportunity & emerging trends in agriculture domain	22-24, December, 2020
8.	Online Seminar: scope of study abroad in agriculture	18 December 2020
9.	ICT Application in Agriculture	24 December 2020
10.	Training on Business support services	31 December 2020-02 January 2021
11.	National seminar on PMFME Scheme empowering the rural youth for livelihood security	9 December 2020
12.	Career opportunities in electronic media for agricultural graduates	4 June 2020`
13.	Virtual training on entrepreneurial motivation	09 April- 02 May 2020
14.	Virtual training on entrepreneurship	15-27 June, 2020

	as a career option	
15.	Start-up initiative and entrepreneurship in Agri and food processing domains for youth	09-13 June 2020
16.	Online session on skill development for arbitrageurs	3-7 June 2020
17.	Online training on developing start-ups core values for aspiring entrepreneurs	3-7 June, 2020
18.	Turn Obstacle in to opportunity	12 May 2020
19.	Personality development Training	18-21, May 2020
20.	Introduction to industry readiness for Agriculture students	1 June 2020
21.	Self Sufficient Agriculture Graduates	2.06.2020
22.	Entrepreneurship development through floriculture and land scaping	31.05.2020
23.	Career Opportunities in Agriculture field	3.06.2020
24.	Sensitization workshop on AMS	13-14 February 2020
25.	Sankalp Ki shakti	31.01.2020
26.	NAHEP project Launch Workshop	9.01.2020
27.	Opportunity for Agriculture graduate and scientist abroad	11.12.2020
28.	Becoming new age performer of students of College of agriculture, Indore	12-18 October, 2020
29.	Opportunities in custom Hiring Entrepreneurship of Farm Implements	26 December 2020
30.	Technical Knowhow about Govt. Schemes for Budding Food processing Entrepreneurs	4 December 2020
31.	Computer Skill online training on Basic Excel	14-21 October 2020
32.	Hi-tech Interventions for Agriculture Development and Catalysing Agri-Start-ups	17 August 2020
33.	Online International Student and Faculty Development Program on Innovation Food Processing	29 June - 1 July 2020

	Technologies: Value Addition, Food Safety and Security	
34.	Employability Skill and Interview Skills	14-19 May 2020
35.	Career Opportunities in Agriculture: An Interactive Session for Agri-Graduates	28 May 2020
36.	Entrepreneurship Development	19-23 May 2020
37.	Victory over COVID-19 for Agriculture Professional and Faculties	14 -16 July 2020
38.	Landscape Development	25-29 May 2020
39.	Excelsior	30April – 4 May 2020
40.	Blossom	5-9 May 2020
41.	Sky is the Limit	12 -16 May 2020
42.	Momentum	12 -16 May 2020
43.	Refining Personality	11-15 May 2020
44.	Language and Communication Skill	5-9 May 2020
45.	Employability Skill	18-22 May 2020
46.	Personality Development	25-29 May 2020

Year-2019

In Online Mode

SN	Topic	Date
1.	Employment Generation among Rural Youth through Agripreneurship	30 July 2019
2.	e-Extension	3 December 2019
3.	Design Thinking for Agricultural Implements	17 December 2019

Urban Forest Report

Overview, Importance, and Implementation

RAJMATA VIJAYARAJE SCINDIA KRISHI VISHWA VIDYALAYA, GWALIOR (M.P.)

Overview of Project Junglevas

A Snapshot of Goals, Milestones and Success Metrics

1. Introduction to Urban Forests

Urban forests encompass trees, vegetation, and green spaces within cities—such as parks, street trees, residential gardens, and green roofs and walls. These vital ecosystems enhance the health and well-being of city residents by improving air quality, mitigating the urban heat island effect, and supporting biodiversity, while also offering social and economic benefits.

2. Importance of Urban Forests

Environmental Benefits:

Air Quality Improvement: Urban trees filter pollutants like carbon dioxide (CO_2), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), and particulate matter, while also producing oxygen, enhancing overall air quality in cities.

Climate Regulation: Trees offer shade that cools urban areas, mitigating the urban heat island effect and reducing the demand for air conditioning. This leads to lower energy consumption and fewer greenhouse gas emissions.

Water Management: Urban trees help manage stormwater by absorbing rainwater and filtering pollutants, which reduces the risk of urban flooding.

Biodiversity Support: Urban forests create habitats for birds, insects, and other wildlife, promoting biodiversity and maintaining ecological balance in city environments.

Social Benefits:

Health and Well-being: Green spaces help reduce stress, enhance mental health, and encourage physical activity. Regular exposure to nature can also decrease the risk of chronic diseases such as heart disease and respiratory issues.

Aesthetic and Recreational Value: Urban forests beautify cityscapes and offer areas for activities like walking, jogging, and picnicking. They provide a peaceful retreat from city life, fostering social interaction and community connections.

Educational Opportunities: Urban forests serve as living classrooms, offering valuable learning experiences about ecosystems, biodiversity, and environmental stewardship for schools and communities.

Economic Benefits:

- **Energy Savings:** Urban trees provide shade that lowers cooling costs, leading to substantial energy savings for both households and businesses.
- **Tourism and Investment**: Attractive green spaces draw tourists, investors, and new residents. Urban forests enhance eco-tourism opportunities and contribute to sustainable tourism and economic development.

Benefits of Mud Houses

- Mud houses, or earthen and adobe structures, have a long history of use worldwide. As the emphasis on sustainability and eco-friendly living increases, mud houses are experiencing a resurgence as a cost-effective, environmentally conscious, and culturally rich alternative to contemporary construction methods.

Key benefits of mud houses:

1. **Environmental Sustainability**

   - **Eco-friendly Materials**: Mud houses are built using natural, locally sourced materials such as earth, clay, sand, straw, and water. This reduces the need for energy-intensive construction materials like cement, steel, and concrete, significantly lowering the environmental impact.
   - **Biodegradable and Non-toxic**: Since the materials used in mud houses are organic and biodegradable, they don't contribute to long-term waste or pollution. In contrast, conventional construction materials generate non-degradable waste.
   - **Low Carbon Footprint**: The production and transportation of mud and other materials for mud houses involve minimal energy consumption, thus reducing the overall carbon footprint of construction.

2. **Energy Efficiency**

- **Natural Insulation:** Mud has excellent thermal mass properties, meaning it can absorb, store, and release heat over time. This keeps the interior of mud houses cool in summer and warm in winter, reducing the need for artificial heating and cooling systems.
- **Reduced Energy Consumption**: Due to their natural insulating properties, mud houses are energy-efficient, leading to reduced energy costs for heating and cooling.

3. **Cost-Effectiveness**

- **Affordable Materials:** Mud and other natural materials used in construction are often available locally, making them inexpensive compared to modern construction materials like bricks, cement, and steel.
- **Low Construction Costs**: Building a mud house typically requires less investment in machinery, skilled labor, and expensive building techniques. Many communities rely on traditional knowledge and local builders, keeping costs down.
- **Minimal Maintenance**: With proper care, mud houses are long-lasting and require little maintenance. Occasional repairs to the structure can be done using readily available natural materials.

4. **Health and Comfort**

- **Non-toxic Living Environment**: Mud houses do not contain harmful chemicals or synthetic materials found in many modern homes, contributing to better indoor air quality and a healthier living environment.
- **Humidity Regulation**: Mud walls help regulate indoor humidity by absorbing excess moisture from the air and releasing it when needed. This can reduce the risk of mold growth and improve indoor air quality.
- **Acoustic Insulation**: Mud houses provide excellent soundproofing due to the thickness and density of the walls, creating a quieter living space.

5. **Resilience and Durability**

- **Earthquake Resistance**: When properly designed, mud houses can be more resistant to earthquakes compared to rigid, concrete structures. Their flexible, absorbent walls help dissipate seismic energy, reducing the risk of collapse.
- **Fire Resistance**: Mud is a naturally fire-resistant material, providing an added layer of safety for residents.

6. **Aesthetic and Cultural Value**

- **Traditional and Cultural Significance:** Mud houses are often part of a region's cultural heritage, with construction techniques passed down through generations. Preserving this architecture helps maintain cultural identity and traditions.
- **Customizable Aesthetics**: Mud houses can be aesthetically appealing with their organic shapes, warm earthy tones, and natural textures. They can also be combined with modern architectural designs for a unique and attractive appearance.
- **Connection to Nature:** Living in a mud house fosters a deeper connection to the natural environment due to the use of natural materials, and the eco-friendly lifestyle it encourages.

7. **Social and Community Benefits**

- **Promotes Local Economy:** Mud house construction often involves the use of local labor, materials, and knowledge, which helps stimulate local economies and support traditional building techniques.
- **Community Engagement**: Building a mud house often involves the participation of the community, promoting collaboration and shared responsibility, which strengthens social ties.

8. **Adaptability and Versatility**

- **Suitable for Various Climates**: Mud houses can be adapted for different climatic conditions. In arid regions, they help keep interiors cool, while in colder areas, they can retain heat effectively.
- **Versatile Construction**: Mud can be molded into various shapes and sizes, allowing flexibility in architectural designs and adaptability to different landscapes and geographic conditions.

Conclusions:

Mud houses offer numerous benefits, from environmental sustainability to cost savings, energy efficiency, and cultural preservation. They provide a healthy, comfortable, and eco-friendly alternative to conventional construction methods while promoting a deep connection to nature. As the world shifts toward sustainable living, mud houses represent a time-tested, viable solution for building a greener future.

The irony of Beekeeping in Urban Forest:

Beekeeping, or apiculture, is the practice of maintaining bee colonies, typically in hives, by humans. It offers a variety of environmental, economic, and personal benefits, making it a valuable and sustainable practice. Below are the key benefits of beekeeping:

1. **Environmental Benefits**

   - **Pollination**: Bees are essential pollinators for many plants, including fruits, vegetables, and flowers. They help improve biodiversity by pollinating wild plants and crops, which in turn increases food production and helps maintain ecosystems.
   - **Supporting Biodiversity:** By providing bees with a safe environment to thrive, beekeeping supports biodiversity. Bees help ensure the health of numerous plant species, which are crucial for wildlife habitats and the balance of natural ecosystems.
   - **Improved Crop Yields**: Beekeeping enhances crop production by ensuring the pollination of crops such as almonds, apples, and berries. Farmers can significantly benefit from the presence of bee colonies in or near their agricultural land.

2. **Health Benefits**

   - **Nutritional Value**: Honey, a primary product of beekeeping, is a natural sweetener packed with antioxidants, vitamins, and minerals. It also has antibacterial and anti-inflammatory properties and is often used as a remedy for sore throats, wounds, and skin conditions.
   - **Propolis and Royal Jelly:** These products, derived from beekeeping, are used in various health supplements due to their potential immune-boosting, anti-inflammatory, and healing properties.

- **Beeswax**: Beeswax is often used in skincare products due to its moisturizing properties. It is also a safe, natural alternative to petroleum-based waxes in various products.

3. **Ecological and Conservation Benefits**

- **Conservation of Bee Populations:** With declining wild bee populations due to habitat loss, pesticides, and climate change, beekeeping plays a vital role in conserving bee species. Managed colonies can help sustain the broader bee population, ensuring their continued role in pollination.
- **Sustainable Forest:** Beekeeping encourages practices that are in harmony with nature, contributing to more sustainable forest . Bees do not damage crops and naturally improve soil fertility and plant growth through pollination.

4. **Personal and Community Benefits**

- **Educational Value:** Beekeeping provides valuable learning opportunities. It helps individuals and communities understand the vital role bees play in food production and environmental health. Many beekeepers become advocates for environmental conservation and sustainable agriculture.
- **Community Engagement:** Beekeeping often fosters collaboration and engagement within communities. Farmers, gardeners, and local businesses can all benefit from the pollination services provided by bees. It can also bring communities together for initiatives like building local apiaries or educating children about bees.
- **Therapeutic Value:** Beekeeping can be a rewarding and relaxing activity that connects individuals to nature. Many beekeepers find the process meditative and therapeutic, promoting well-being and mindfulness.

5. **Sustainability and Organic Farming**

- **Supports Organic Farming:** Organic farmers benefit from beekeeping since bees enhance crop production without the need for chemical fertilizers or pesticides. They promote natural pest control and improve soil health, aligning with the principles of organic farming.
- **Minimal Environmental Impact:** Beekeeping is an environmentally friendly practice that requires little energy or resources. Bees rely on

natural foraging, making beekeeping a low-impact, sustainable way to produce food and other materials.

6. **Bees as Indicators of Environmental Health**

- **Monitoring Ecosystem Health:** Bees are highly sensitive to environmental changes, making them excellent indicators of environmental health. The presence and health of bee colonies can provide valuable information about local ecosystems, including pollution levels and pesticide use.

Conclusions

Beekeeping offers a wide range of benefits, from enhancing food security and biodiversity through pollination to providing economic opportunities and valuable products like honey and beeswax. It supports environmental sustainability, improves human health, and can play a vital role in conservation efforts. By promoting the growth of bee populations, beekeeping contributes to the health of ecosystems and fosters a deeper connection between people and nature.

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JungleVase

HARMONY IN DIVERSITY: URBAN ECO-TOURISM INTEGRATION

URBAN FORESTRY PROJECT FOR RVSKVV , GWALIOR .

www.junglevase.com

Content

Overview

An overview of an eco-tourism set up in 1 acre of land, showcasing bee-keeping, walk-in forest, Eco-houses and the essence of nature in harmony with rural and urban life.

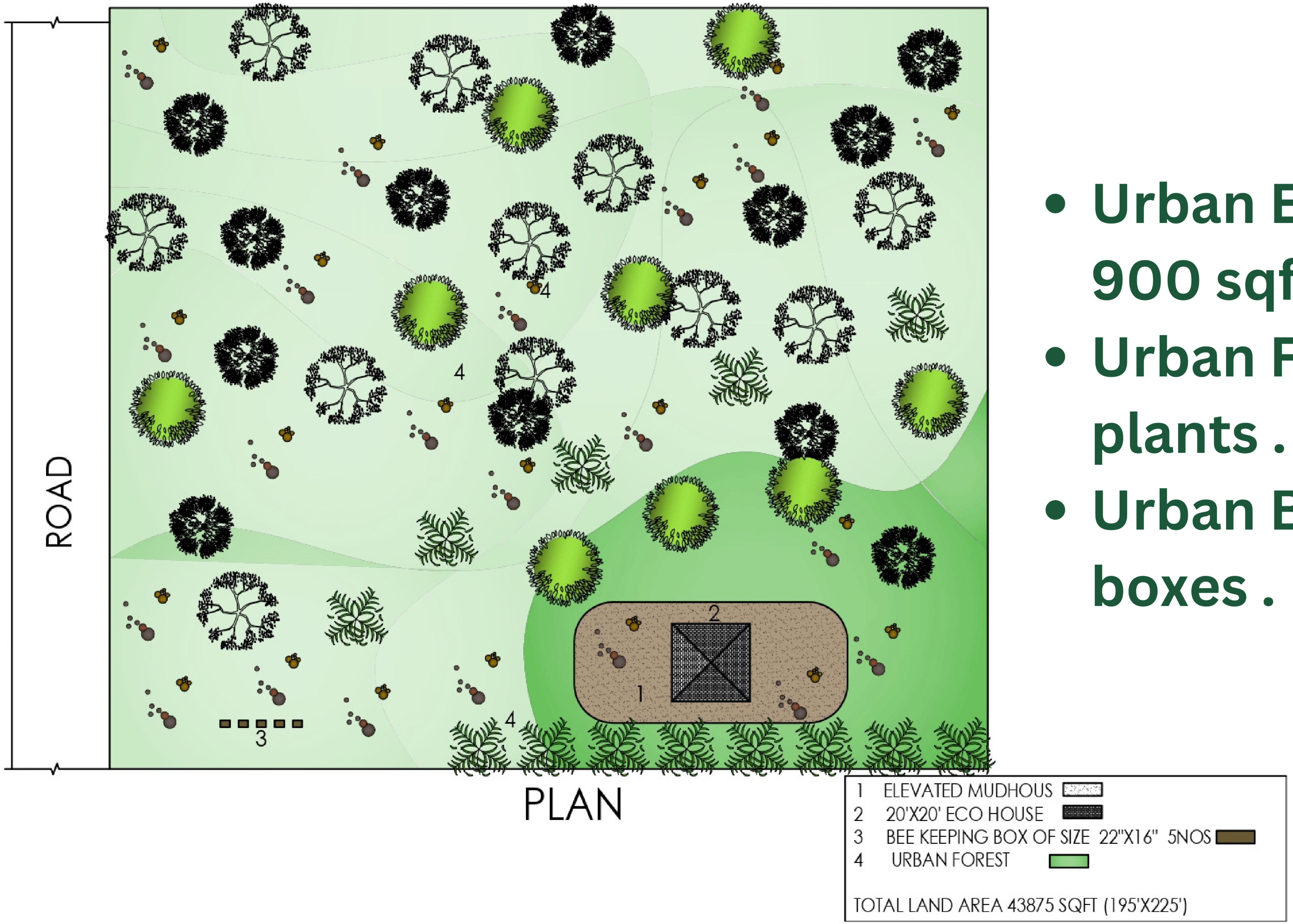
01 Integrated Sustainability: Explore how forestry, beekeeping, and mud house living synergize on one urban plot, showcasing their collective sustainability impact.

02 Immersive Eco-Tourism: Highlight diverse nature-centric experiences offered, inviting visitors to engage in educational tours, cultural immersion, and eco-friendly activities.

03 Community Empowerment: Emphasize community involvement and the economic potential through eco-tourism, fostering local development and sustainable practices.

04 Heritage Conservation & Ecology: Showcasing the preservation of cultural heritage while actively contributing to environmental conservation, promoting a sustainable urban ecosystem.

1 acre Urban Forest 2D -Plan



- **Urban Eco House - 800-900 sqft**
- **Urban Forest - 1000-1200 plants .**
- **Urban Bee keeping - 4-5 boxes .**

The Essence of Forestry

Preserving Nature's Bounty: Forests

- Importance of urban forests in enhancing biodiversity.
- Sustainable practices in forest management.
- Benefits of urban forests in reducing pollution and providing recreational spaces.

Sustainable Forestry Practices

Conservation in Action

- Selective harvesting methods to maintain ecosystem balance.
- Afforestation initiatives to increase green cover in urban areas.
- Community involvement in forest conservation efforts.

Eco-Tourism in Urban Forests

Connecting with Nature

- Opportunities for eco-tourism activities like nature trails and educational tours.
- Promoting environmental awareness through guided forest visits.
- Economic benefits of eco-tourism for local communities.

Buzzing with Beekeeping

Bee-Centric Sustainability

- Importance of bees in pollination and ecosystem health.
- Sustainable beekeeping practices and hive management.
- Products derived from beekeeping (honey, beeswax, propolis) and their uses.

BEEKEEPING AND ECO-TOURISM

Bee-utiful Experiences

- Educational eco-tours showcasing sustainable beekeeping.
- Interactive experiences like honey extraction demonstrations.
- Economic opportunities through beekeeping-related tourism activities.

Embracing Eco-Stays

- Advantages of mud houses in temperature regulation and energy efficiency.
- Use of local and natural materials in construction.
- Cultural heritage and aesthetics of mud house living.

Mud Houses and Eco-Tourism

01
Eco-tourism opportunities through mud house accommodations.

02
Cultural exchange and community engagement.

03
Showcasing sustainable living practices to visitors.

04
Mud house construction provides a multidisciplinary learning experience that promotes practical skills, cultural understanding, environmental consciousness, and community engagement. It offers students opportunities to apply classroom knowledge to real-world projects while making a positive impact on society.

How is it beneficial for the University?

·Educational Opportunities
·Research Initiatives
·Demonstration Site
·Community Engagement
·Environmental Benefits
·Income Generation
·Partnerships and Collaborations
·Networking and Visibility

How is it beneficial for Students?

·Hands-On Learning
·Interdisciplinary Understanding
·Research Opportunities
·Sustainable Practices
·Problem-Solving skills
·Career Development
·Community
·Leadership and Initiative
·Networking and Collaboration

JungleVase

THANK YOU

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Best Practice 2

Effective Natural Resource Management for Biodiversity and Sustainability in a Climate-Impacted World

RAJMATA VIJAYARAJE SCINDIA KRISHI VISHWA VIDYALAYA, GWALIOR (M.P.)

Best Practice 2

Effective Natural Resource Management for Biodiversity & Sustainability in a Climate-Impacted World

RAJMATA VIJAYARAJE SCINDIA KRISHI VISHWA VIDYALAYA, GWALIOR (M.P.)

Effective Approaches and Proven Strategies

Objectives:

To enhance agricultural productivity, resilience, and sustainability amid climate change in Madhya Pradesh, following objectives are crucial to introduce and support resource conservation techniques for efficient management of land, water, and nutrients. This includes developing and promoting practices that ensure sustainable use of natural resources, protect biodiversity, and involve direct collaboration with farmers to adapt and implement effective NRM practices.

- Promote Sustainable Production Practices
- Conduct Strategic Research and Technology Demonstrations
- Enhance Agricultural Resilience and Sustainability
- Implement Resource Conservation Practices
- Improve Crop, Livestock, and Fisheries Production
- Leverage NICRA and KVKs Technology Demonstrations
- Collaborate with Farmers to Address Climate Variability

Context:

Madhya Pradesh faces climate change challenges such as erratic rainfall, rising temperatures, and extreme weather, which impact agriculture and livelihoods. To address these issues, it is crucial to develop and implement adaptation and mitigation strategies. This includes ongoing research, adopting effective mitigation practices, building capacity, and adjusting policies. Effective climate resilience in agriculture involves improved management of land, water, soil, and genetic resources through best practices. RVSKVV is committed to researching and promoting site-specific natural resource management practices suited to the state's agro-climatic conditions. These efforts aim to reduce climate risks, support sustainable agricultural development, and enhance resilience and productivity. By focusing on these strategies, we seek to create a robust agricultural sector that can adapt to climate change and ensure resource sustainability for future generations.

Practice:

Climate Smart Agriculture (CSA) is a strategic approach designed to enhance resilience against climate change while ensuring sustainable profitability for farmers. Through the NICRA project, ICAR has implemented various field-level interventions across natural resource management, crop production, livestock and fisheries, and institutional support to bolster farm families' adaptability to climate impacts.

Climate Smart Agriculture integrates interventions which facilitate necessary resilience in the system against climate change while, safeguarding farmer's profitability and income on sustainable basis. Theses interventions are broadly categorized as knowledge/Weather smart, input smart, Carbon Smart, Nutrient smart technologies, Energy Smart Practices labour smart practices, Community smart and further include institutional interventions based on natural resources management, crop production, livestock and fisheries management.

As we navigate the intricate landscape of sustainable development, the convergence of ecological preservation and livelihood enhancement stands as a paramount goal. Our journey towards enriching human life quality while ensuring survival demands a strategic approach that acknowledges and addresses various challenges and constraints.

Firstly, the challenge of balancing economic development with ecological sustainability remains ever-present. Often, economic activities such as industrialization, agriculture, and urbanization exert significant pressure on natural ecosystems, leading to biodiversity loss, habitat degradation, and climate change. Finding ways to harmonize economic growth with environmental preservation requires innovative strategies and robust policy frameworks.

Secondly, the complexities of local livelihoods and their dependence on natural resources pose another set of challenges. Many communities worldwide rely directly on natural ecosystems for their livelihoods, be it through fishing, agriculture, or forestry. Implementing sustainable practices without jeopardizing these livelihoods demands careful consideration of local socio-economic dynamics, traditional knowledge systems, and adaptive management approaches.

Thirdly, the global scale of environmental issues complicates efforts at local and regional levels. Issues viz., deforestation, pollution, and climate change transcend geographical boundaries, necessitating international cooperation and collective action. Aligning diverse stakeholders, from governments to businesses to civil society, towards a unified goal of ecological sustainability remains a formidable task.

Furthermore, technological and infrastructural limitations in less developed regions hinder the adoption of sustainable practices. Bridging these gaps requires targeted investments, capacity building, and technology transfer initiatives. Additionally, by promoting interdisciplinary collaboration, education and awareness, leveraging technology for sustainable innovation, and fostering inclusive governance, these challenges can be navigated effectively.

Overall, CSA equips farmers with the knowledge, tools, and community resources necessary to navigate the uncertainties of climate change while maintaining productivity and sustainability.

Success:

In the drought-prone areas, the implementation of NRM practices alongside resilient agricultural techniques effectively conserved, managed, and optimally utilized natural resources, thereby enhancing livelihoods and food security. The initiative delivered ecological, economic, and social benefits, and strengthened farmer institutions to ensure ecological balance and strengthened farmer institutions to ensure ecological balance and human survival.

- RVSKVV, Gwalior, has been honored with the prestigious **"Pandit Deendayal Upadhyaya Krishi Vigyan Protshahan Puraskar 2020"** by the Indian Council of Agricultural Research (ICAR), New Delhi, in recognition of its exemplary best practices in agricultural institutions.
- AICRP on Dryland, Indore, **twice awarded Best Centre Award by CRIDA-ICAR** for its contributions in developing innovative NRM practices Faculties received national awards *viz.,* **Water Man Award, Basant Rao Naik Award, and Prof. Sant Singh Memorial Award** from reputed societies for their contributions in NRM.
- Madhya Pradesh recognized seven times with **Krishi Karman Award** for wheat production under challenging climatic

conditions for which RVSKVV received recognition from State Government.

Problems Encountered & Resources Required in Effective adoption of Climate-Resilient Agriculture faces several challenges:

- **Resource and Inputs Constraints:** Limited funding, lack of improved seeds and inadequate technical support from Custom Hiring Centers impede the scalability of sustainable practices.
- **Policy and Regulatory Barriers:** Inconsistent policies and weak enforcement undermine efforts in sustainable resource management, necessitating subsidies for Climate-Resilient Agriculture and policies for earning carbon credits from Climate-Smart Agriculture.
- **Social and Cultural Resistance** challenge community initiatives.
- **Limited internet access and technical support** hinder technological adoption in remote areas.
- **Climate Uncertainty** complicates long-term planning and adaptation strategies.

SAVE WATER

SAVE LIFE

Impact on Natural Resource Management for Sustainable Agricultural Productivity

RAJMATA VIJAYARAJE SCINDIA KRISHI VISHWA VIDYALAYA, GWALIOR (M.P.)

Impact on Natural Resource Management for Sustainable Agricultural Productivity

To ensure food security and sustainable livelihoods, Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya (RVSKVV), Gwalior, has focused its research and extension efforts across 26 districts on enhancing natural resource management (NRM). By promoting climate-resilient agricultural technologies and systems tailored for semi-arid rainfed areas, RVSKVV has significantly advanced the conservation, management, and efficient use of land, water, and biological resources. These NRM technologies have been widely adopted by local farmers, yielding notable ecological, economic, and social benefits. The university conducts research in close collaboration with farmers, addressing ground-level issues and developing location-specific, cost-effective, and eco-friendly farming practices. Additionally, RVSKVV is involved in assessing water quality and creating groundwater quality maps. Key research and extension activities undertaken by RVSKVV include:

- Up scaling and out scaling of natural resource conservation technologies and participatory technology demonstrations.
- Stabilization of gullies and utilization of wasteland through the creation of storm drains.
- Creation of sunken ponds to control soil erosion and enhance water availability.
- Construction of percolation tanks for groundwater recharge and diversion bunds to reduce soil erosion.
- Construction of water harvesting tanks for well recharge on farmers' fields.

- Use of heavy earth-moving machinery for the development of water bodies.
- Studies on rainwater harvesting and recycling to improve productivity for rain-fed crops.
- Rainwater management through economically feasible water harvesting tanks in black soil areas.
- Analysis of siltation patterns in water harvesting tanks constructed in black soil conditions on farmers' fields.
- Conversion of wasteland into water storage tanks and their utilization for increasing crop productivity.
- Enhancing water availability to boost crop productivity through integrated activities and participatory approaches.
- Addressing both water logging and water scarcity issues.
- Mitigating adverse climatic conditions through water harvesting tanks.
- Construction of water conservation measures, water harvesting tanks, and surplus structures.
- Building percolation tanks with seepage control and roof water harvesting systems.
- Documentation of success stories, innovations, and indigenous technical knowledge (ITK) in natural resource management for up scaling.

The overall impacts of NRM activities on the productivity, profitability, and sustainability of rainfed production systems are clearly evident in the target areas (Table 1). Consequently, the NRM initiatives of RVSKVV have gained national and international recognition.

Table1: Overall impacts of NRM activities on the productivity, profitability, and sustainability of rainfed production systems

SN	IMPACT	Benchmark year	In 2014-15
1	Average yield of crops (kg/ha)	790	1520
2	Crop yields during drought (kg/ha)	500	1200
3	Area under fallows (ha)	11.11	9.0
4	Cropping intensity (%)		
	Farmers adopting technology outside ORP village	**No of farmers**	**Area (ha)**
5	Solving of Dual Problems of Water Logging and Water Scarcity	-	2.39/2.43
	Increasing Productivity Through Dovetailing Participatory Mode	-	0.96/2.43
	Conversion of Wasted Land to Water Storage Tank and Its Utilization for Increasing the Crop Productivity	-	1.44/4.85
	Construction of water conservation harvesting tanks and surplus structures	-	2.39/2.43
	Mitigating Adverse Climatic Conditions through Water Harvesting Tank in Malwa Region	-	0.48/4.85
	Construction of percolation tank and its seepage control	-	0.96/0.97
	Creation of sunken pond to arrest the runoff water for its efficient utilization	-	0.96/0.97
	Summer Deep ploughing of the cultivated fields and eradication of weeds	1	4.78/12.14
	Introduction of new promising varieties of important Kharif (soybean)	1	23.92/12.14
	Introduction of new promising varieties of important Rabi(Chickpea)	1	23.92/12.62
	Developing suitable integrated farming system	1	2.39/0.97
	Spreading of excavated soil from tanks and leveling of the fields, shaping, bringing new area under cultivation	-	2.39/2.43
	Treatment of degraded land and bringing it into cultivation	1	0.48/0.49
6	**Farmers adopting technology outside ORP**	**No of farmers**	**Area ha**
	Increasing Productivity Through Dovetailing Participatory Mode	2	5
	Conversion of Wasted Land to Water Storage Tank and Its Utilization for Increasing the Crop Productivity	4	10

	Construction of water conservation harvesting tanks and surplus structures	2	2
	Mitigating Adverse Climatic Conditions through Water Harvesting Tank in Malwa Region	10	10
	Construction of percolation tank and its seepage control	5	2
	Creation of sunken pond to arrest the runoff water for its efficient utilization	2	5
	Summer Deep ploughing of the cultivated fields and eradication of weeds	45	45
	Introduction of new promising varieties of important Kharif (soybean)	75	75
	Introduction of new promising varieties of important Rabi(Chickpea)	75	75
	Developing suitable integrated farming system	5	5
	Spreading of excavated soil from tanks and leveling of the fields, shaping, bringing new area under cultivation	10	10
	Treatment of degraded land and bringing it into cultivation	25	25
7	Whether ORP interventions helped in reducing fodder shortage		YES
8	Whether ORP interventions helped in reducing water shortage		YES
9	Whether ORP interventions helped in reducing migration		YES
10	Whether ORP interventions helped in improving groundwater		YES

The RVSKVV team has achieved significant milestones in boosting farm productivity and income through natural resource management, particularly in water conservation and dryland farming. Their efforts have focused on crop improvement and agronomic technologies for dryland crops. Notable advancements include the use of heavy earth-moving machinery for soil and water conservation, such as developing water harvesting tanks, percolation tanks, drainage line treatments, and deep tillage operations to enhance water availability for crops in the targeted villages. The outcomes of these soil and water management activities have been highly promising, garnering widespread acceptance and appreciation for their positive impact on the socio-economic conditions of local farmers. Success stories from this research have been widely published to promote and encourage the broader adoption and enhancement of these practices.

Celebrating Excellence

Awards and Recognition for Outstanding Achievements under NRM

RAJMATA VIJAYARAJE SCINDIA KRISHI VISHWA VIDYALAYA, GWALIOR (M.P.)

Awards and Recognition for

Outstanding Achievements under NRM

In the drought-prone districts of Madhya Pradesh, the implementation of NRM practices alongside resilient agricultural techniques effectively conserved, managed, and optimally utilized natural resources, thereby enhancing livelihoods and food security. The initiative delivered ecological, economic, and social benefits, and strengthened farmer institutions to ensure ecological balance and human survival.

Feathers on the cap

- RVSKVV, Gwalior, has been honored with the prestigious **"Pandit Deendayal Upadhyaya Krishi Vigyan Protshahan Puraskar 2020"** by the Indian Council of Agricultural Research (ICAR), New Delhi, in recognition of its exemplary best practices in agricultural institutions.
- The AICRP on Dryland, Indore, has been twice awarded **the Best Centre Award by CRIDA-ICAR** for its outstanding contributions to developing innovative natural resource management (NRM) practices.
- Our faculty members have received national accolades, including the **Water Man Award, Basant Rao Naik Award, and Prof. Sant Singh Memorial Award** from esteemed societies, acknowledging their significant contributions to NRM.
- Madhya Pradesh has been recognized **seven times with the Krishi Karman Award** for exceptional wheat production under challenging climatic conditions, with RVSKVV receiving special recognition from the State Government for its role in these achievements.

Awards and Recognition for Outstanding Achievements NRM

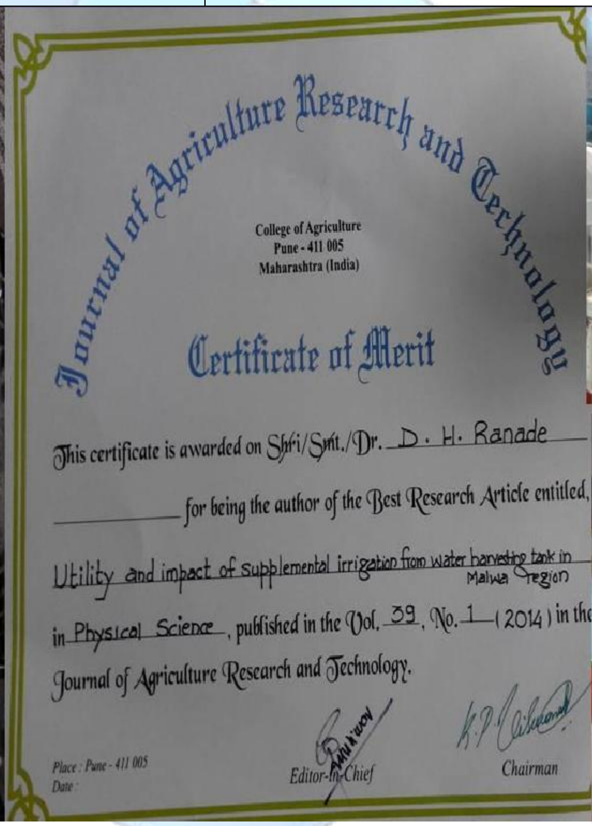
SN	Name of the award	Year	Organization	Contribution made
1	State Level Award M.P. Young Scientist's Award	1991	MAPCOST, Bhopal MP	Research paper presentation
2	National Award Dr. VASANT RAO NAIK AWARD	2009	ICAR	Exemplary Research in field of rainwater and dryland agriculture
3	National Award Best research article award in Journal of Agriculture research andtechnology volume 39(2014)	2016	College of Agriculture, Pune(MS)	
4	National Award Dr. VASANT RAO NAIK AWARD	2020	ICAR	
5	National Award Water heroes – Jal Nayak 2021	2021	Ministry of Jal Shakti, New Delhi	For supporting country-wide efforts on water conservation and sustainable development of water resources


इंदौर | गुरुवार • 8 जुलाई 2010

सिटी भास्कर 18

डॉ. रानडे को बसंतराव नाईक अवॉर्ड

इंदौर » भारतीय कृषि अनुसंधान परिषद नई दिल्ली द्वारा कृषि महाविद्यालय में कार्यरत वैज्ञानिक डॉ. दीपक हरि रानडे का चयन बसंतराव नाईक अवॉर्ड 2009 के लिए किया गया है। यह पुरस्कार उन्हें कृषक प्रक्षेत्र पर जल संरक्षण एवं शुष्क खेती के क्षेत्र में किए गए उल्लेखनीय अनुसंधान एवं विस्तार कार्यों के लिए प्रदान किया जाएगा। इस पुरस्कार के अंतर्गत प्रशस्ति पत्र एवं एक लाख रुपए की राशि प्रदान की जाएगी। यह पुरस्कार डॉ. रानडे को केंद्रीय मंत्री शरद पवार 16 जुलाई को नई दिल्ली में आयोजित कार्यक्रम में प्रदान करेंगे।


Journal of Agriculture Research and Technology

College of Agriculture
Pune - 411 005
Maharashtra (India)

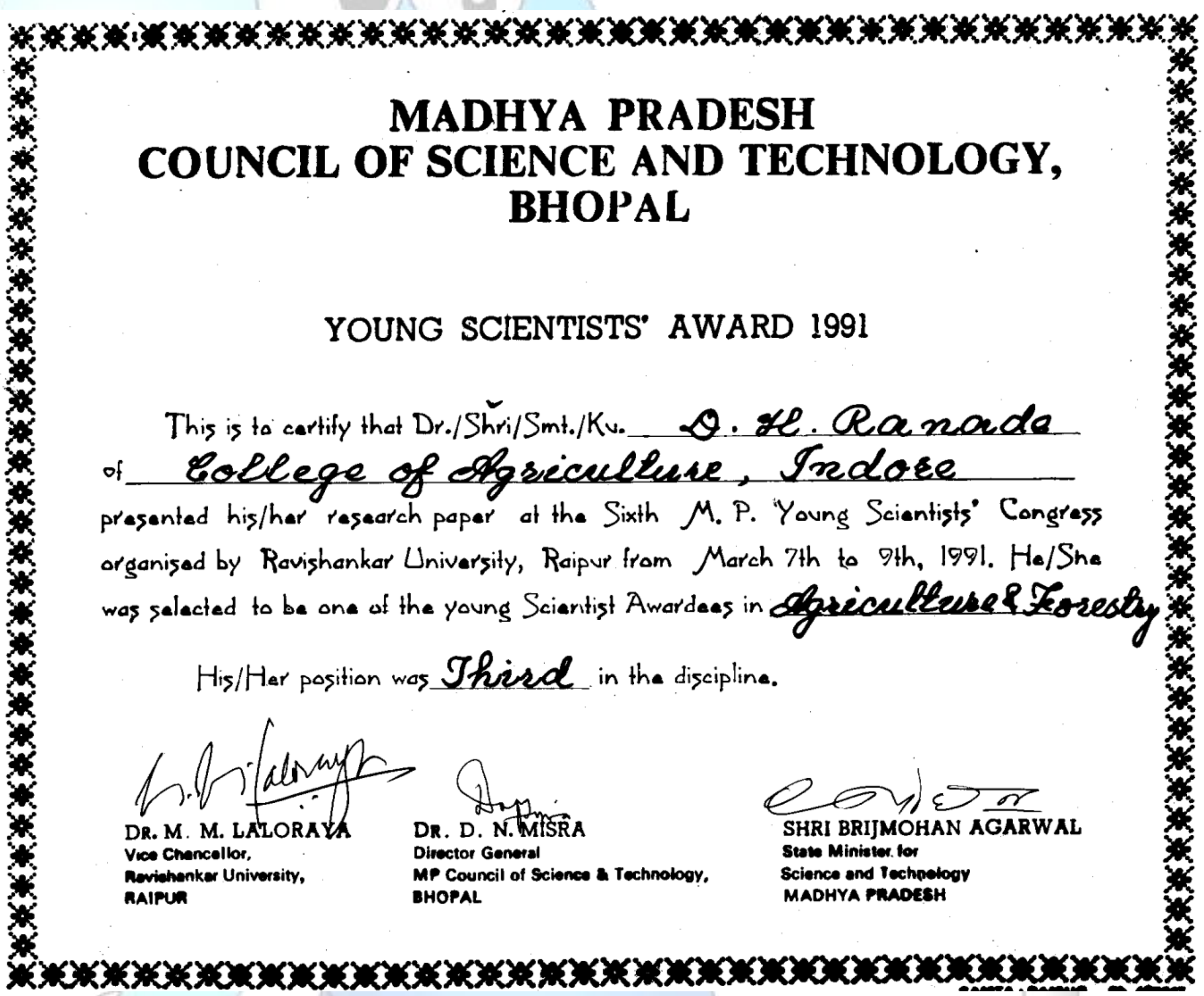
Certificate of Merit

This certificate is awarded on Shri/Smt./Dr. D. H. Ranade for being the author of the Best Research Article entitled, Utility and impact of supplemental irrigation from water harvesting tank in Malwa region in Physical Science, published in the Vol. 39, No. 1 (2014) in the Journal of Agriculture Research and Technology.

Place : Pune - 411 005
Date :

Editor-in-Chief

Chairman



MADHYA PRADESH
COUNCIL OF SCIENCE AND TECHNOLOGY,
BHOPAL

YOUNG SCIENTISTS' AWARD 1991

This is to certify that Dr./Shri/Smt./Ku. D. H. Ranade of College of Agriculture, Indore presented his/her research paper at the Sixth M. P. Young Scientists' Congress organised by Ravishankar University, Raipur from March 7th to 9th, 1991. He/She was selected to be one of the young Scientist Awardees in Agriculture & Forestry

His/Her position was Third in the discipline.

DR. M. M. LALORAYA
Vice Chancellor,
Ravishankar University,
RAIPUR

DR. D. N. MISRA
Director General
MP Council of Science & Technology,
BHOPAL

SHRI BRIJMOHAN AGARWAL
State Minister for
Science and Technology
MADHYA PRADESH


Indian Council of Agricultural Research

National Award for Application of Agricultural Technologies

VASANT RAO NAIK AWARD FOR RESEARCH APPLICATION IN AGRICULTURE 2020

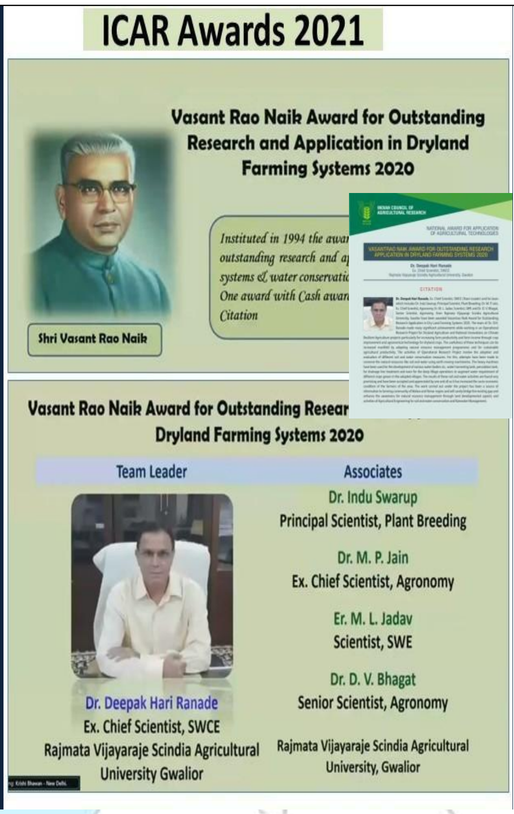
is presented to

Dr. Deepak Hari Ranade
(Team Leader)
Ex. Chief Scientist, SWCE
Rajmata Vijayraje Scindia Agricultural University
Gwalior, Madhya Pradesh

16 July, 2021
New Delhi

(T. Mohapatra)
Secretary (DARE)
Director General (ICAR)

(Narendra Singh Tomar)
Union Minister of Agriculture & Farmers Welfare
Govt. of India




INDIAN COUNCIL OF AGRICULTURAL RESEARCH

NATIONAL AWARD FOR APPLICATION OF AGRICULTURAL TECHNOLOGIES

VASANTRAO NAIK AWARD FOR OUTSTANDING RESEARCH APPLICATION IN DRYLAND FARMING SYSTEMS 2020

Dr. Deepak Hari Ranade
Ex. Chief Scientist, SWCE
Rajmata Vijayaraje Scindia Agricultural University, Gwalior

CITATION

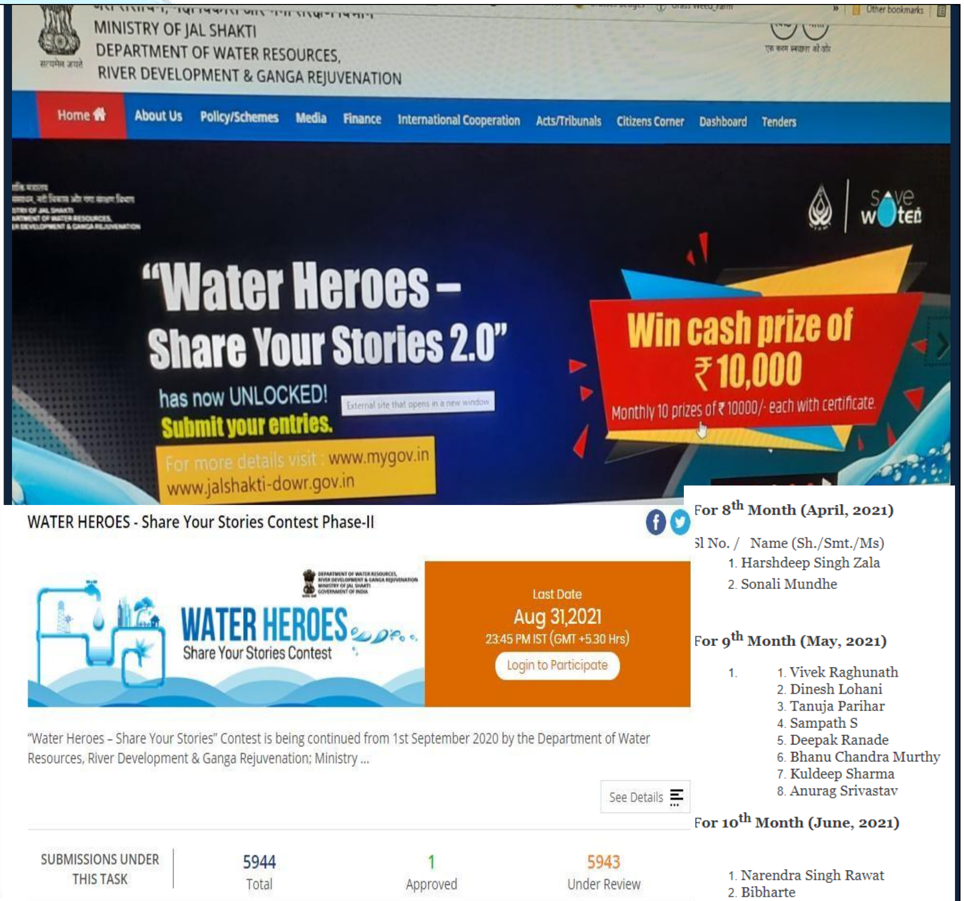
Dr. Deepak Hari Ranade, Ex. Chief Scientist, SWCE (Team Leader) and his team which includes Dr. Indu Swarup, Principal Scientist, Plant Breeding; Dr. M. P. Jain, Ex. Chief Scientist, Agronomy; Er. M. L. Jadav, Scientist, SWE and Dr. D. V. Bhagat, Senior Scientist, Agronomy, from Rajmata Vijayaraje Scindia Agricultural University, Gwalior have been awarded Vasantrao Naik Award for Outstanding Research Application in Dry Land Farming Systems 2020. The team of Dr. D.H. Ranade made many significant achievements while working in an Operational Research Project for Dryland Agriculture and National Innovations on Climate Resilient Agriculture projects particularly for increasing farm productivity and farm income through crop improvement and agronomical technology for dryland crops. The usefulness of these techniques can be increased manifold by adopting natural resource management programmes and for sustainable agricultural productivity. The activities of Operational Research Project involve the adoption and evaluation of different soil and water conservation measures. For this, attempts have been made to conserve the natural resources like soil and water using earth moving machineries. The heavy machines have been used for the development of various water bodies viz., water harvesting tank, percolation tank, for drainage line treatment and even for the deep tillage operations to augment water requirement of different crops grown in the adopted villages. The results of these soil and water activities are found very promising and have been accepted and appreciated by one and all as it has increased the socio-economic condition of the farmers of the area. The work carried out under the project has been a source of information to farming community of Malwa and Nimar region and will surely bridge the existing gap and enhance the awareness for natural resource management through land developmental aspects and activities of Agricultural Engineering for soil and water conservation and Rainwater Management.

Dr. VASANT RAO NAIK AWARD 2020

Celebrating Excellence

डीएफए डॉ. रानाडे को वाटर हीरोज पुरस्कार

ग्वालियर। राजमाता विजयाराजे सिंधिया कृषि विवि के वैज्ञानिक एवं अधिष्ठाता कृषि संकाय डॉ. दीपक हरि रानाडे की प्रविष्टि को जल शक्ति मंत्रालय द्वारा वाटर हीरोज प्रतियोगिता में पुरस्कार के लिए चुना गया है। मंत्रालय द्वारा 10 हजार रुपए के नकद पुरस्कार से सम्मानित किया जाएगा। डॉ. रानाडे ने बताया कि जल संसाधन, नदी विकास और गंगा कायाकल्प जलशक्ति मंत्रालय द्वारा 1 सितंबर 2020 से 31 अगस्त 2021 के बीच यह प्रतियोगिता आयोजित की जा रही है। इस प्रतियोगिता में अब तक 5912 प्रविष्टियां जल संसाधन मंत्रालय तक पहुंची हैं। इनमें उन्होंने अपनी प्रविष्टि रिसन तालाब के उद्देश्य एवं उपयोगिता बताते हुए वीडियो फिल्म के माध्यम से भेजी थी। इस फिल्म में बताया गया था कि भूमि जलस्तर को बढ़ाने में रिसन तालाब बहुत मददगार हैं। ये तालाब में आए पानी को जमीन में सोखकर भूजल को रिचार्ज करता है साथ ही मिट्टी के कटाव के कारण निचले क्षेत्रों में होने वाले नुकसान से भी बचाता है।



Water heroes award 2021 by Ministry of water resources Jalshakti Mantralaya, New Delhi

Enhancing Sustainability

Natural Resource Management for Ecological Balance, Biodiversity Conservation, and Climate Resilience in Madhya Pradesh

A CASE STUDY ON NRM UNDER NICRA

RAJMATA VIJAYARAJE SCINDIA KRISHI VISHWA VIDYALAYA, GWALIOR (M.P.)

Empowering Agriculture

Advancing Sustainable Practices and Resilience

Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, is dedicated to advancing sustainable agricultural practices in Madhya Pradesh by conducting strategic research and technology demonstrations. Our goal is to bolster agricultural resilience against climate change and variability, ensuring long-term resource availability. Through proactive research and extension activities, the university aims to optimize natural resource management practices to boost agricultural productivity, sustainability, and resilience.

Our initiatives tackle various climatic vulnerabilities such as drought, excess water, soil health issues, heat waves, and cold spells. We implement resource conservation strategies to enhance the efficiency of natural resource management. Additionally, we provide improved inputs for crop, livestock, and fisheries production under the evolving climate scenario. The Technology Demonstration Component of NICRA and KVKs plays a crucial role in promoting developed Natural Resource Management Practices (NRM), encompassing land, water, and nutrient management. These initiatives offer valuable opportunities to collaborate closely with farmers, effectively addressing current climate challenges with appropriate solutions.

1. "Building Climate Resilience: Strategies for Sustainable Agriculture"

Madhya Pradesh faces increasing challenges from climate change, including unpredictable rainfall, rising temperatures, and extreme weather events that threaten agricultural productivity and livelihoods. Addressing these challenges requires the development of effective adoption and mitigation strategies. It is essential to focus on both short-term climate variability and long-term climate change impacts on agriculture through sustained research, capacity building, developmental activities, and policy adjustments. Moreover, there is a critical need to establish and strengthen strategic knowledge systems in key sectors such as water, agriculture, energy, and health to ensure resilience against climate impacts.

Climate-resilient agriculture necessitates careful and enhanced management of natural resources such as land, water, soil, and genetic resources through the implementation of best practices. RVSKVV is actively engaged in researching and promoting location-specific natural resource management practices tailored to Madhya Pradesh's agro-climatic conditions. These efforts are aimed at mitigating climate risks and fostering sustainable agricultural development in the region.

2. **"Advancing CSA: Enhancing Resilience and Sustainability**

Climate Smart Agriculture (CSA) emphasizes adopting advanced technologies and practices to enhance resilience against climate change while ensuring sustainable profitability and income for farmers. The NICRA project by ICAR implements various interventions aimed at improving natural resource management, crop production, livestock, fisheries, and institutional support at the grassroots level. Each village receives tailored interventions based on its climate vulnerability and resource availability, thereby enhancing the adaptive capacity of farming communities to cope with climate change impacts.

These interventions are broadly classified into knowledge-smart, input-smart, and community-smart categories. Knowledge-smart interventions include weather-smart strategies such as ICT-based advisory services, contingency planning, insurance, and the use of abiotic and biotic stress-tolerant crop varieties.

The Input Smart Interventions encompass several categories of advanced technologies. Water Smart Technologies include practices like Direct Seeded Rice, Rainwater Harvesting, In-Situ Moisture Conservation, Micro Irrigation Systems, Trenching, and Mulching. Carbon Smart Technologies focus on practices such as In-Situ Crop Residue Management, Conservation Tillage, Zero Tillage, and Green Manuring. Nutrient Smart Technologies involve methods like Leaf Colour Chart utilization, Soil Testing for precise fertilizer application, and the application of Liquid Biofertilizers and Nutrient Foliar Sprays. These innovations aim to optimize resource use efficiency while enhancing agricultural productivity and sustainability.

Energy Smart Practices such as Direct Seeded Rice, Conservation Tillage, Solar Energy utilization, and Biogas adoption are crucial for sustainable agriculture. Labour Smart Practices include Mechanical Transplanting, Direct Seeded Rice techniques, and mechanization, optimizing labor efficiency.

Additionally, addressing local farmer challenges necessitates Community Smart Interventions like Seed Banks, Fodder Banks, Machine Banks, and Community Service Centers. These community-level resources serve as vital hubs for addressing village-specific needs and enhancing agricultural resilience.

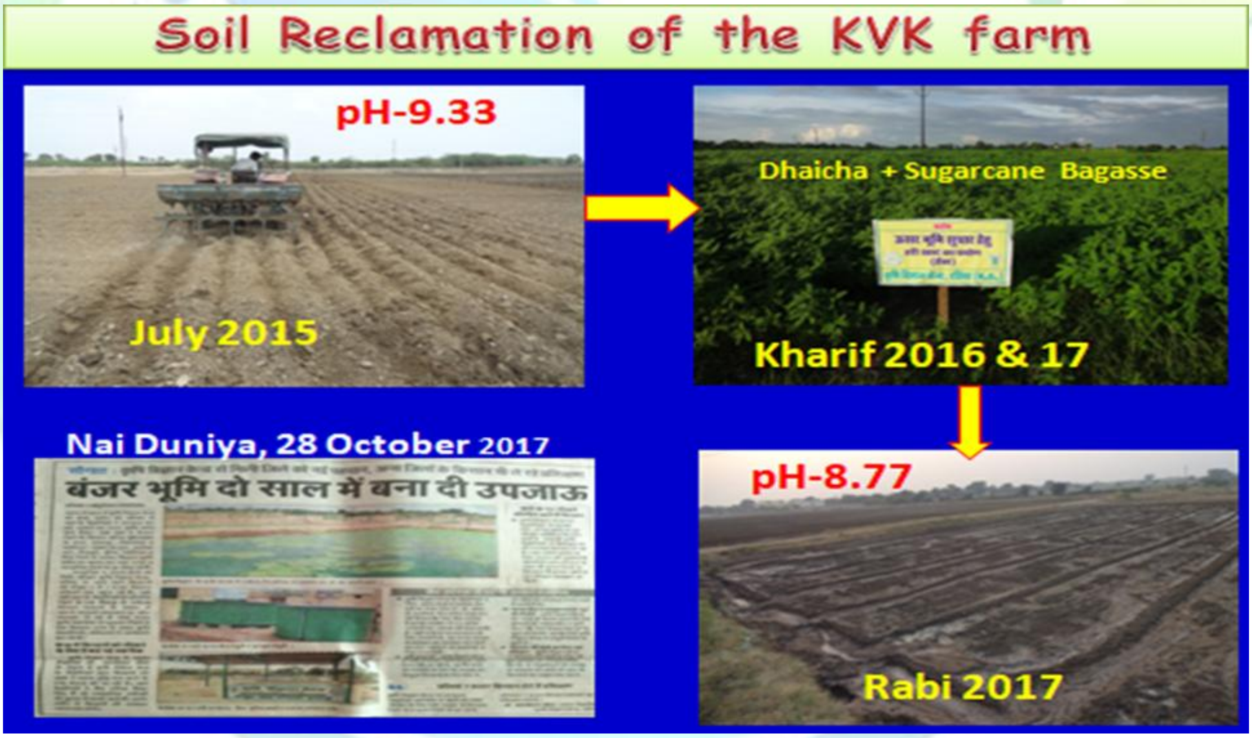
This approach offers an opportunity for advanced studies aimed at effectively managing climate change impacts, including the development of monitoring and response mechanisms to current weather patterns. By generating new quantitative data about the agricultural environment and potential outcomes of different management strategies, uncertainties in crop productivity can be minimized. Quantification is crucial, and computer simulations can play a key role in providing such information, especially in areas characterized by high seasonal climatic variability and susceptibility to extremes. These tools enable quantitative comparisons of various management and mitigation options, facilitating informed decision-making for sustainable agricultural practices.

Integrating climate-smart agriculture (CSA) practices such as Remote Sensing, Geographic Information Systems (GIS), Precision Agriculture, Climate Modeling Software, Drones, AI, and IoT applications into higher education systems is pivotal in equipping future agricultural professionals and researchers to tackle the complexities posed by climate change and ensure sustainable agricultural production.

These activities are actively pursued under the NICRA project by ICAR at the KVK farm in Datia, focusing on natural resource management to enhance sustainable production and biodiversity conservation.

Reclamation soil of Datia KVK farm

The KVK farm, left fallow for a century, required extensive soil reclamation efforts due to erosion caused by rainwater. Soil samples were collected before and after the application of green manure. Initially, the soil pH was highly alkaline at 9.33. Over subsequent years, Daincha was sown in 2014-15 and Sun Hemp in 2015-16 and 2016-17, with each crop cycle starting in late June. Before flowering, the green manure was incorporated into the soil using a disc harrow. As a result of these practices, the soil pH decreased from 9.33 to 8.77, indicating successful remediation efforts.



Rain water harvesting demonstration units

The KVK farm previously had an inactive old slope dam and a seasonal rivulet that drained rainwater away from the farm. To enhance water retention, the slope dam was refurbished, and two new ponds were built in the seasonal drain. These three rainwater harvesting structures now have a combined capacity of storing 2941.38 cubic meters of rainwater, which can irrigate an area of 42.02 hectares on the farm. Additionally, Pond No. 2 is designated for fish culture.Farmers visiting the KVK are inspired to adopt rainwater harvesting practices after witnessing these improvements firsthand.

Defunct stop dam at KVK farm

Stored rain water in stop dam after

Technology Exhibition

A technology exhibition showcasing various advancements, including climate-resilient agriculture models, printed materials, posters, charts, and graphs, was organized at the administrative building of KVK. Live exhibits of field and horticultural crops were featured, displaying seeds and live specimens. The exhibition also highlighted tools for reducing drudgery among farm women, such as seed treating drums and spiral graders, alongside farmer-friendly publications in folder and booklet formats. Farmers, along with public representatives, extension officers, district administration authorities, NGOs, FPOs, SHGs members, and input dealers, visited the exhibition from 2015-16 to 2019-20. A total of 339,985 visitors attended, observing technologies related to climate resilience in agriculture, natural resource management (NRM), crop production, livestock, and fisheries. This initiative inspired many attendees to adopt these innovations on their farms.

Visit of Public representatives and district administration officers

Soil testing lab

In 2016-17, KVK Datia district established a dedicated soil testing laboratory. Prior to this, KVK utilized a small portable soil testing kit (*Mrida Parikshak*) to analyze soil samples from farmers starting in 2014-15. The newly equipped laboratory now offers comprehensive testing for all essential soil nutrient parameters. KVK Datia actively analyzes soil samples not only from local farmers but also from fields provided by the district agriculture department. To date, the soil testing lab has analyzed a total of 8,000 soil samples from farmers' fields, contributing significantly to informed agricultural practices in the region.

Soil analysis in soil testing lab

Farm implement workshop

Agricultural mechanization plays a pivotal role in enhancing agricultural efficiency by ensuring timely farm operations, reducing operational costs, and optimizing the use of inputs such as seeds, fertilizers, pesticides, water, and machinery. It also contributes to improving the quality of agricultural produce, minimizing labor-intensive tasks, increasing land and labor productivity, and elevating the dignity of labor in farming communities.

Recognizing the varied needs and resources across different regions, Krishi Vigyan Kendra, Datia, has established an agricultural implements workshop. This initiative aims to showcase the efficiency and significance of various farm implements in agricultural operations. The workshop offers a range of implements available for hire, including Summer deep ploughs, levelers, cultivators, harrows, rotavators, bund formers, seed drills, zero seed drills, happy seed drills, power sprayers, hand-held hoes, tillers, SRI paddy markers, reapers, multi-crop threshers, tractor-operated seed graders, spiral graders, chip-making machinery, bud chippers, seed treating drums, maize shellers, and groundnut shellers. These resources are pivotal in demonstrating and promoting effective mechanization strategies tailored to the specific needs of the region.

Agro forestry demonstration unit

Agro forestry represents an environmentally sustainable land use approach that enhances overall yield by integrating annual food crops with perennial tree crops and/or livestock on the same plot of land. This system holds potential for restoring degraded lands, diversifying ecosystem services such as carbon sequestration and biodiversity enhancement, and improving soil fertility and stability. Trees in agro forestry systems contribute additional organic matter, prevent erosion, and enhance microclimatic conditions. There are substantial areas like boundaries, bunds, and wastelands that can benefit from adopting agro

forestry practices. Recognizing this opportunity, KVK Datia has initiated the planting of agro forestry species viz., Teak (*Tectona grandis*), Popular (*Populus alba*), Mahogany (*Swietenia macrophylla*), Khamer (*Gmelina orborea*), Neem (*Azadirachta indica*), Bakayan (*Cascabela thevetia*), Mulberry (*Morus alba*), Siras (*Albizea lebbeck*), Temarind (*Tamarindus Indica*), Mahua (*Madhuca longifelia*), Gulmohar (*Delorix regca*), Kadam (*Neotamrekia cadamba*), Gudhal (*Hibiscus rosasinsis*) and Kaner (*Cascabela thevetia*) on farm bunds and wastelands to showcase the benefits of this system to farmers. Visitors to KVK Datia are inspired to adopt agro forestry practices after observing these plantations, which demonstrate the potential of integrating trees into agricultural landscapes to enhance productivity and sustainability.

Agro forestry Plantation

Establishment of progeny orchard

At KVK Datia, a Progeny Orchard was established in 2015-16 to demonstrate high-density plantation techniques for fruit crops and to produce grafted plants from mother plants for sale or distribution to farmers. The orchard features varieties such as Gwalior-27, Allahabad Safadi, and L-49 guava, Bhagwa and Mridula pomegranate, Kagzi lime, Vikram and Parimalini lime, budded sweet orange, Nagpuri mandarins, budded kinnu, and PKM-1 drumstick, all planted using high-density methods to maximize space utilization. These plants are meticulously maintained to ensure true-to-type fruit plants for propagation and to showcase the benefits of high-density planting. In 2018, new fruit varieties including Thai guava, custard apple, apple ber, and sapota were also added to the KVK orchard. During 2019-20, 3500 guava saplings were propagated through air layering and distributed to farmers across the district.

Currently, KVK Datia is preparing 7000 saplings of guava, pomegranate, lime, and sweet orange through air layering, slated for distribution in the upcoming year. Additionally, 450 seedlings of PKM-1 drumstick have been prepared and provided to anganwadi workers in a nutritional smart village initiative. These efforts aim to promote sustainable horticulture practices and enhance fruit cultivation across the region.

Lime plantation

Sweetlime Plantion

Orange Plantion

Kinnu Plantion

Pomegranet Plantion

Thai Guava

Karaunda

Guava Saplings

GUAVA FARM FRESH HARVEST

दतिया

दतिया में भी शुरू होगा अनार, संतरा, किन्नू का उत्पादन

कृषि विज्ञान केंद्र पर महिलाओं से चर्चा करते महानिदेशक।

भारतीय कृषि अनुसंधान परिषद पूसा नई दिल्ली के महानिदेशक डॉ. त्रिलोचन महापात्र ने शनिवार को कृषि विज्ञान केंद्र का निरीक्षण किया। उन्होंने कृषि विज्ञान केन्द्र द्वारा चलाई जा रही गतिविधियों की जानकारी ली।

केंद्र प्रमुख डॉ. आरकेएस तोमर ने महानिदेशक को बताया कि आगामी वर्षों में कृषि विज्ञान केन्द्र पर आम, अमरूद, अनार, संतरा, मौसम्बी, किन्नू, नीबू इत्यादि फलदार पौधों का उत्पादन प्रारंभ हो जाएगा। इन्हीं पौधों की उच्च गुणवत्ता की पौध तैयार करने का कार्य भी प्रारंभ किया जाएगा। इसके अलावा कड़कनाथ मुर्गीपालन, मत्स्य पालन एवं मत्स्य पालन हेतु बीज, वर्मी कम्पोस्ट, बीजीए, अजोला इत्यादि का उत्पादन केन्द्र पर प्रारंभ कर दिया जाएगा। मृदा परीक्षण प्रयोगशाला में 4000 नमूनों का विश्लेषण किया गया है जिनमें 8000 के स्वास्थ्य कार्ड तैयार कर लिए गए हैं। इसके पश्चात टीम ने कृषि विज्ञान केंद्र में प्रशिक्षणरत महिलाओं से भी चर्चा की। उन्होंने महिलाओं को किसी न किसी व्यवसाय से जुड़ने की सलाह दी। टीम में कुलपति डॉ. अनिल कुमार सिंह, डॉ. अरविन्द कुमार, डॉ. पीके घोष, डॉ. ओपी चतुर्वेदी, डॉ. अनुपम मिश्रा, डॉ. एसके श्रीवास्तव, डॉ. आरएस यादव शामिल रहे। टीम ने केंद्र प्रमुख डॉ. तोमर एवं उनकी टीम द्वारा जिले में किए जा रहे कार्यों की सराहना एवं प्रशंसा की जिनमें कि विशेष रूप से कृषि विज्ञान केन्द्र प्रक्षेत्र की भूमि जिसका पीएच मान 9.2 के ऊपर था उसको उपजाऊ भूमि बनाने का कार्य किया है।

बंजर धरती पर लगाए फलदार पौधे

पत्रिका न्यूज़ नेटवर्क
patrika.com

कृषि विज्ञान केंद्र दतिया जहां दो साल पहले तक सिर्फ कटीली वनस्पति थी लेकिन कृषि वैज्ञानिकों की लगन और मेहनत की से यहां खेती होने के साथ फलदार पौधे भी लगे हैं। उस वक्त यहां सिर्फ इमारत के अलावा आसपास कटीली झाड़ियां ही थीं। 01 जुलाई 2016 में यहां केंद्र शिफ्ट होने के बाद कृषि वैज्ञानिकों की टीम ने ऐसा बदलाव किया कि यहां पहुंचने वाला व्यक्ति आश्चर्यचकित हो जाता है।

भविष्य में खाद तैयार करेंगे

कृषि विज्ञान केंद्र के कार्यक्रम समन्वयक डॉआर के एस तोमर के अनुसार भविष्य में केंद्र में वर्मी कम्पोस्ट एवं जैविक खाद तैयार किए जाने की योजना है। जमीन की उर्वरा शक्ति को बढ़ाने के लिए ढेंचा की फसल लगाई है जिससे जमीन का ऑर्गेनिक मटेरियल बढ़ेगा।

BGA demonstration unit

Blue-green algae (Cyano bacteria) play a crucial role in enhancing nitrogen sustainability in rice fields. By supplementing chemical fertilizers with blue-green algae, farmers can potentially conserve up to 30% of commercial fertilizers. These organisms not only fix biologically available nitrogen and add organic matter to the soil but also produce growth-promoting substances, solubilize insoluble phosphates, and improve the efficiency of fertilizer use by crop plants. Furthermore, they amend the physical and chemical properties of the soil, thereby reducing greenhouse gas emissions like nitrous oxides.

At the KVK farm, a demonstration and production unit for blue-green algae has been established with a capacity of 5 quintals per year. The produced blue-green algae is distributed to rice growers in the district. Visitors to the farm are encouraged to adopt blue-green algae production on their own farms, provided with inoculum for initiation. Currently, five farmers have started producing blue-green algae, marking a positive shift towards sustainable agricultural practices in the region.

Training, utilization and Ready to sell Blue-green algae

पत्रिका

दतिया

जानकारी • 15 से 20 फीसदी तक बढ़ी उत्पादकता,पहले प्रयोग के बाद सामने आया नतीजा

'काई से बढ़ती है धान की पैदावार'

कृषि अमृत

15 सितम्बर–13 (द्वितीय पक्ष)

धान की खेती में पहली बार नील हरित काई का प्रयोग

दतिया। कृषि विज्ञान केन्द्र दतिया म.प्र. के कार्यक्रम समन्वयक डॉ. आर.के.एस. तोमर ने बताया कि जिले में प्रमुख धान उत्पादक ग्राम भलका प्रगतिशील कृषक रामवेन्द्र सिंह ने 100 बीघा में धान की खेती में "नील हरित काई" का प्रयोग किया। डॉ. तोमर ने बताया कि सामान्यतः जलाशय में पायी जाने वाली काई ही है। जिसका रंग नीला एवं हरा होता है। यह एक प्रकार का जैविक खाद है। नील हरित शैवाल (काई) लगभग 40 प्रजातियों में वायुमंडल में पाई जाने वाली नत्रजन को स्थिरीकृत करने की क्षमता होती है। नील हरित काई धान के खेत में की लगभग 30 कि.ग्रा./हे. नाइट्रोजन स्थिरीकृत करती है जो कि डेढ़ बोरी यूरिया के बराबर होती है। नील हरित काई से धान की उपज में 15 से 20 प्रतिशत वृद्धि होती है। नील हरित काई 800 कि.ग्रा. जीवांश पदार्थ प्रदान करती है। जिससे भूमि की भौतिक, रासायनिक एवं जैविक दशा में सुधार होता है। इसके अतिरिक्त नील हरित काई कई तरह के लाभदायक अमीनो अम्ल एवं विटामिन उत्सर्जित करती है जो कि पौधों की वृद्धि में सहायक होते हैं। अघुलनशील फॉस्फोरस घुलनशील में बदल जाता है। जल तंत्र पर कीट प्रकोप कम हो जाता है। ऊसर भूमि में उपयोग करने से सुधार होता है। पर्यावरण सुरक्षित होता है। वैज्ञानिक डॉ. बी.एस. कंसाना ने बताया कि नील हरित काई की रोपाई के 7–12 दिन बाद 10 कि.ग्रा./हे. हिसाब से उपयोग करना चाहिए। उपयोग करने के बाद खेत में 8 से 10 से.मी. तक पानी 4–5 दिनों तक स्थिर रखना चाहिए। इस अवसर पर केन्द्र के वैज्ञानिक डॉ. वाई.पी. तिवारी एवं दो दर्जन किसान उपस्थित थे।

Azolla demonstration unit

Azolla, known for its rapid growth, can double its biomass within 2-3 days and can be cultivated through various methods such as low-cost brick/concrete tanks (size: 2 meters length x 1 meter breadth x 20 cm depth), nursery plots, farm ponds, canals, ditches, and earthen tanks covered with polythene sheets. This versatile plant serves multiple purposes including organic fertilizer, water purifier, and livestock feed, offering numerous benefits such as enhancing soil health, improving fertilizer efficiency, nitrogen fixation, biomass production, and soil moisture retention.

Azolla is highly valued as livestock and poultry feed due to its richness in proteins, essential amino acids, vitamins (including vitamin A, vitamin B12, and Beta Carotene), and minerals essential for livestock health. It is recognized as a cost-effective protein source because it can synthesize from a wide range of readily available resources. At KVK premises, a demonstration and production unit for Azolla has been established with a capacity of 40 quintals per year. KVK has distributed 60 quintals of Azolla to farmers across the district, promoting its adoption and benefits in agricultural and livestock practices.

Vermi compost demonstration unit

Vermi composting technology, while globally recognized, remains somewhat underutilized in many regions. It offers an alternative approach to managing organic residues, emphasizing resource recycling over land filling or incineration. Vermi composting aligns with environmentally sound principles that prioritize resource conservation and sustainable practices. In areas with severe organic matter deficiencies, the addition of compost alone can yield significant agricultural benefits. Moreover, vermi composting can create opportunities for low or semi-skilled employment, making it socially advantageous in certain contexts.

To promote Integrated Nutrient Management (INM) in agriculture, KVK Datia actively raises awareness, conducts training sessions, and demonstrates the benefits of vermi compost production in NICRA operational areas. The vermi composting unit, established under the RKVY scheme during 2016-17 at KVK Datia, has a production capacity of 250 quintals per year. The vermi compost produced is utilized in fruit plantations and is also sold to urban gardeners, promoting local nutrient production and sustainable recycling systems that are both economical and eco-friendly.

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खेती-किसानी

ग्रामीण युवाओं को दिया वर्मी कम्पोस्ट का प्रशिक्षण

युवाओं को किया जागरूक

पत्रिका न्यूज नेटवर्क
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दतिया. कृषि विज्ञान केन्द्र दतिया द्वारा दो दिवसीय ग्रामीण युवकों के लिए व्यावसायिक प्रशिक्षण अंतर्गत वर्मी कम्पोस्ट उत्पादन तकनीक विषय पर प्रशिक्षण आयोजित किया गया। प्रशिक्षण में युवकों को वर्मी कम्पोस्ट एवं वर्मी वॉश उत्पादन करने के लिए वैज्ञानिकों द्वारा संपूर्ण जानकारी उपलब्ध कराई।

उल्लेखनीय है कि जिले में उद्यानिकी व अन्य विभागों के सहयोग से वर्मी कम्पोस्ट यूनिट बनाई गई है। लेकिन कई कृषक वर्मी कम्पोस्ट का उत्पादन नहीं ले पा रहे है। इसलिए प्रशिक्षण के लिए उन्हीं कृषकों को बुलाया गया जिनके पास वर्मी कम्पोस्ट तैयार करने के लिए यूनिट उपलब्ध है।

प्रशिक्षण कार्यक्रमों में किसानों को संबोधित करते वैज्ञानिक।

प्रशिक्षण के दौरान वरिष्ठ वैज्ञानिक एवं प्रमुख डॉ. आरकेएस तोमर ने कृषकों को बताया कि कम एवं असंतुलित मात्रा में उर्वरक प्रयोग करने, सघन फसल चक्र अपनाने, उच्च उत्पादक किस्मों के प्रयोग व कार्बनिक खादों का उपयोग बंद होने के कारण भूमि की उर्वरा शक्ति कम हो रही है।

अतः वर्मी कम्पोस्ट ही ऐसा उपाय है जो कि आसानी से बनाया जाकर उपयोग किया जा सकता है। उन्होंने कृषकों को यह भी जानकारी दी कि कितने कृषकों द्वारा वर्मी कम्पोस्ट का उत्पादन किया जाता है और यदि नहीं किया जा रहा है तो जो भी तकनीकि समस्या है उसका निदान केन्द्र के वैज्ञानिकों द्वारा तकनीकी सलाह के माध्यम से किया जाएगा। वहीं वैज्ञानिक डॉ. बीएस कसाना ने कृषकों को वर्मी कम्पोस्ट की तकनीकी जानकारी प्रजेन्टेशन के माध्यम से दी।

उन्होंने वर्मी वॉश तैयार करने के बारे में भी विस्तारपूर्वक जानकारी दी। इसी क्रम में वैज्ञानिक डॉ. एके सिंह ने भी कृषकों को वर्मी कम्पोस्ट उत्पादन से जुड़ी समस्याओं का निदान किया एवं वर्मी कम्पोस्ट बनाकर कीट व बीमारियों से कैसे सुरक्षा की जाए के बारे में बताया। प्रशिक्षण के दौरान वैज्ञानिक डॉ. केके यादव, वाईपी रिछारी ने भी विभिन्न जानकारियां प्रदान की।

वर्ष 07, अंक 152. पत्रिका समाचार पत्र समूह 8 राज्य, 37 संस्करण . मध्यप्रदेश, राजस्थान, छत्तीसगढ़, कर्नाटक, गुजरात, तमिलनाडु, पश्चिम बंगाल और दिल्ली से प्रकाशित


कैंचुआ खाद इकाई
सतह विधि द्वारा उत्पादन

Production, utilization and Ready to sell Blue-green algae

Natural Farming Product demonstration unit

Jeevamrut, a traditional Indian bio pesticide and organic manure, is crafted through a distinctive fermentation process blending cow dung, cow urine, jaggery, pulses flour, soil, and water. It stands out for its cost-effectiveness and dual benefits for plants and soil. Farmers can significantly reduce expenses on fertilizers and pesticides by utilizing this potent traditional remedy.

It serves as a potent organic source rich in Nitrogen, Potassium, Phosphorus, and essential micronutrients crucial for robust plant growth and development. This holistic organic manure also acts as a natural deterrent against pests and diseases, ensuring healthier plants. What sets Jeevamrut apart is its quick preparation time; unlike other organic manures that may take months, Jeevamrut can be ready within a week. Its benefits extend to maintaining soil pH balance, enhancing soil aeration, and fostering beneficial bacterial activity. Suitable for all types of plants, this solution utilizes readily available raw materials commonly found in rural areas and farms. Since its establishment in 2019-20 at KVK Datia, the Jeevamrut unit has had a production capacity of 250 liters per year. The produced Jeevamrut is utilized in fruit plantations and is also sold to urban gardeners, contributing to sustainable agricultural practices and promoting organic farming methods.

Integrated fish farming unit

The Integrated Farming Unit was established within the premises of KVK Datia during the 2016-17 periods. Integrated fish farming involves cultivating multiple commodities in a designated area. At this unit, a poultry cage has been set up over the fish pond, facilitating the direct supply of poultry waste into the pond. This waste serves as organic manure, significantly boosting the primary production of the pond. This innovative setup not only optimizes resource utilization but also lowers cultivation costs. By integrating poultry and fish farming, the unit promotes sustainable practices that enhance productivity and efficiency in agricultural operations.

Hydroponic fodder production unit

Hydroponics technology provides a viable solution to address the scarcity of green feed, particularly during dry seasons and in urban areas where land for forage production is limited. Known for its high intake, palatable, and digestible properties, hydroponics is preferred over cereal grains and other concentrate feeding methods. The Hydroponics unit at KVK Datia was established in 2017-18 using locally sourced and low-cost materials, serving as a model unit for visiting farmers.

Its primary objective is to inspire farmers to adopt this technology for their dairy animals, thereby enhancing productivity and ensuring consistent feed availability. By showcasing the benefits of hydroponics, KVK Datia aims to encourage sustainable farming practices that optimize resource use and improve livestock management in challenging agricultural environments.

Natural Resource Management: On Farmers Field

Efficient management of natural resources is crucial for enhancing the adaptive capacity and resilience of farming communities, especially in regions prone to frequent droughts and varying rainfall patterns. The success of crop production hinges on effective water conservation strategies for deficit rainfall and managing excess water to retain moisture in the soil for extended periods, thereby supporting arable crop growth. Location-specific in-situ moisture conservation measures, efficient harvesting of excess water, and judicious use of harvested water for supplementary irrigation play pivotal roles in sustainable agriculture.

Additionally, adopting efficient irrigation methods, increasing cropping intensity with harvested water, well recharge initiatives, improved drainage systems for heavy rainfall scenarios, soil health management practices, green manuring, soil nutrient application based on soil testing, zero tillage, direct sown rice, and dry sowing of wheat are key approaches that have been emphasized and demonstrated. The impact of these technologies on enhancing resilience from 2011-12 to 2019-20 is significant. They have contributed to improving agricultural productivity, mitigating climate risks, and enhancing the overall resilience of farming communities. These practices promote sustainable farming methods that conserve natural resources and ensure long-term agricultural viability amidst climatic uncertainties.

Rain Water Harvesting

The NICRA project has actively demonstrated various rainwater harvesting technologies in its villages from 2011-12 to 2019-20. The primary goal has been to educate farmers on the importance of harvesting rainwater and its effective utilization during periods of moisture stress, thereby mitigating the impacts of rainfall variability. Given the climatic stress and fluctuating crop productivity caused by unpredictable monsoons, interventions focused on showcasing rainwater harvesting techniques.

These demonstrations aimed to enhance irrigation potential and reduce rainwater runoff by recycling and recharging groundwater. Technologies included the construction of individual farm ponds, temporary check dams, renovated cemented check dams, community ponds, and percolation ponds in NICRA villages. The utilization of harvested rainwater, facilitated through Management Information Systems (MIS) or other methods, has been shown to significantly increase crop productivity, profitability, and water-use efficiency. These initiatives underscore the importance of sustainable water management practices in enhancing agricultural resilience and ensuring farm sustainability amid climatic uncertainties.

In NICRA villages of Datia, a total rainwater storage capacity of 488,490 cubic meters was established through the construction of 31 farm ponds, renovation of 21 check dams and percolation tanks, and installation of 22 polythene check dams from 2011-12 to 2019-20. These interventions covered an area of 915.63 hectares and benefitted 723 farmers in NICRA villages (see Table below).

Stored Rainwater (Cubic meter) through different RWH structures, Area coverage (ha) and farmers benefited during 2011-12 to 2019-20

Particulars	Farm ponds	Renovation of check dams	Community ponds	Percolation tanks	Temporary Check dams	Total	Remark
Constructed (No.)	31.00	21.00	02	09	22.00	74.00	Fish culture in farm Ponds
Volume of water Harvested (m^3)	38780	193510	60400	54710	133090	488490	
Area (ha) With supplemental Irrigation kharif	0.40	25.00	13.00	=	92.00	117.40	
Area Under Rabi Cultivation (ha)	65.83	386.90	107.00	=	345.50	798.23	2011-12 to 2015-16
No. of farmers benefitted	32.00	323.00	66.00	=	302.00	723.00	

The implementation of these rainwater harvesting structures significantly enhanced water availability and management in the region. They facilitated the recharge of 193 nearby open wells, ensuring their sustained water levels until April instead of drying up by December as previously observed. This extension of water availability enabled farmers to cultivate Rabi crops such as wheat and vegetables, thereby improving agricultural productivity and livelihoods in the area.

FARM POND

Renovation of defunct check dam

Renovation of community pond


Percolation tanks

Ground water (Bore and Open well recharge)

Rainwater harvesting structures such as farm ponds, poly check dams, stop dams, and percolation tanks constructed on hillocks in NICRA villages of Datia significantly contributed to recharging bore and open wells downstream. From 2011-12 to 2019-20, these structures successfully recharged a total of 193 bore and open wells, storing approximately 62,000 cubic meters of water (See Table below).

Ground water recharge through rainwater harvested in water harvesting structures

Year	No. of bore & Open wells recharged	Storage Capacity in Open Wells (M^3)	Area (ha)
2011-12 to 2019-20	193	62000	124

Dry open well in June **Recharged Well in September**

The recharged bore and open wells have extended irrigation potential for farmers' fields until April, a critical improvement from the previous capability lasting only until December. This additional water availability covers an area of 124 hectares, facilitating the cultivation of wheat and vegetables beyond the traditional cropping season. These initiatives demonstrate the effective utilization of harvested rainwater to enhance agricultural productivity, sustain livelihoods, and mitigate water scarcity challenges in the NICRA villages of Datia.

Lifesaving irrigation in kharif crops

Climatic stress: Low yield of Soybean due moisture stress because of long dry spells during different stages.

Intervention: Lifesaving irrigation at critical stage through harvested rain water.

Average yield and economics of soybean under lifesaving irrigation

Year	Area (ha)	No. of Demos	Intervention	Grain Yield (q/h)	Cost of cultivation (Rs/ha)	Net return (Rs/ha)	BC ratio
2013-14 To 2016-17	26	51	Rainfed cultivation	10.74	15397	9749	1.56
			Life saving irrigation	14.05	15912	17378	2.08

The harvested rainwater from rainwater harvesting structures was utilized for life-saving irrigation in soybean crops. This practice was demonstrated by 51 farmers across 26 hectares from 2013-14 to 2016-17. Higher yields were achieved in soybean compared to areas without life-saving irrigation. Results showed a 33% increase in soybean yield under life-saving irrigation conditions. Additionally, this practice resulted in an additional net return of ₹7635 per hectare, with a higher benefit-to-cost ratio compared to rainfed conditions.

Climatic stress: Low yield of Groundnut due to moisture stress because of long dry spells during different crop growth stages.

Intervention: Life saving irrigation at critical stage through harvested rain water.

Average yield and economics of groundnut under lifesaving irrigation

Year	Area (ha)	No. of Demos	Intervention	Grain Yield (q/h)	Cost of cultivation (Rs/ha)	Net return (Rs/ha)	BC ratio
2015-16 To 2016-17	9.40	20	Rainfed cultivation	10.60	18180	14315	1.76
			Life saving irrigation	15.12	18555	27697	2.46

The harvested rainwater collected under rainwater harvesting structures was used for life-saving irrigation in groundnut crops. This method was demonstrated by 20 farmers across 9.4 hectares from 2015-17 to 2016-17. The results showed a significant 42% increase in yield compared to areas without life-saving irrigation. Additionally, this practice generated an additional net return of Rs. 13,382 per hectare, with a higher benefit-to-cost ratio compared to the traditional farming practices of groundnut.

Life saving irrigation in groundnut during dry spells

Climatic stress: Low yield of Black Gram due to moisture stress because of long dry spells during different crop growth stages.

Intervention: Life saving irrigation at critical stage through harvested rain water.

Average yield and economics of black gram under life saving irrigation

Year	Area (ha)	No. of Demos	Intervention	Grain Yield (q/h)	Cost of cultivation (Rs/ha)	Net return (Rs/ha)	BC ratio
2015-16 To 2016-17	8.60	23	Rainfed cultivation	4.75	16285	4325	1.26
			Life saving irrigation	6.75	16710	13007	1.80

The rainwater harvested under rainwater harvesting structures was used for life-saving irrigation in black gram. This practice was demonstrated by 23 farmers across 8.60 hectares in 2015. The results showed a notable 42% increase in yield compared to areas without life-saving irrigation. Moreover, this approach yielded a higher net return of Rs. 8682 per hectare and a better benefit-to-cost ratio (0.54) compared to traditional farming practices.

Diversification through vegetables production from harvested water

Climatic stress: Low income from field crops under rainfed condition.

Intervention: Raising high value vegetable crops through harvested rain water for income generation in climatic variability to livelihood security farmers.

Farmers in adopted villages exclusively cultivated field crops under rainfed conditions. Rainwater harvested from rainwater harvesting structures was used to recharge open wells located in low-lying areas. These recharged wells provided irrigation support extending into March and April. The increased irrigation potential facilitated the cultivation of high-value vegetable crops such as tomato, brinjal, cauliflower, cabbage, chili, okra, onion, cowpea, pumpkin, bottle gourd, and cucumber. By transitioning to the production of high-value vegetable crops, farmers achieved net returns ranging from Rs. 70,430 to Rs. 215,344 per hectare.

Average Yield (q/ha), net return (Rs/ha) of different vegetables crops irrigated from open well recharged through harvested rain water during 2011-12 to 2019-20

Crop	Area (ha)	Yield (q/ha)	cultivation Cost (Rs./ha)	Net return (Rs./ha)	B.C. ratio
Tomato	20	210	36222	179515	**6.06**
Chilli	14	156	33842	90453	**4.12**
Okara	02	154	22957	70430	**4.07**
Kharif onion	02	211	35391	175689	**5.96**
Brinjal	04	153	310125	80208	**3.62**
Cauliflower	01	185	55638	129725	**3.33**
Cabbage	01	195	58963	140731	**3.50**
Cowpea	01	322	21340	162758	**8.62**
Pumkin	01	109	54842	170453	**4.10**
Bottleguard	01	15.36	55777	208523	**4.73**
Spongeguard	01	220	57086	215344	**4.77**
Cucumber	**01**	**151**	**56712**	**182758**	4.22

BRINJAL CROP

Chilli

Cauliflower

Mustard production with supplemental irrigation on Rabi fallow land

Climatic stress: Low yield and income from mustard due to non-availability of pre sowing and supplemental irrigation under rainfed condition.

Intervention: Pre-sowing irrigation and one supplemental irrigation to mustard from harvested rain water stored in different rainwater structures.

Average yield and net return of mustard with pre irrigation through harvested rainwater

Particulars	Before Inter vention	After intervention								
		2011	2012	2013	2014	2015	2016	2017	2018	2019
Area(ha)	20	85	105	109	65	57	42	21	66	**12**
Yield(q/ha)	9.30	12.73	15.15	12.84	16.31	18.12	15.89	23.89	23.99	**18.06**
Cost of cultivation (Rs/ha)	13000	13500	13779	14550	17000	19130	19520	21270	21270	**21210**
Net income (Rs/ha)	27913	38190	54800	44940	53834	76668	69996	71559	71359	**51030**
Total income generation from total area (Rs Lakh)	**2.98**	**20.32**	**36.03**	**89.43**	**68.90**	**66.70**	**29.39**	**15.02**	**54.23**	**6.12**

Pre irrigation in mustard field

Protective irrigation in mustard

Rainwater harvested in Rainwater Harvesting Structures (RWHS) was utilized to cultivate the low-water-demand cash crop, mustard. From 2011-12 to 2019-20, mustard was successfully grown in a 562-hectare area using harvested rainwater. The intervention involved providing one pre-irrigation and one supplemental irrigation at the 35-40 days after sowing (DAS) stage from Bori bandhan, as well as renovating defunct old water harvesting structures to meet the crop's water requirements.

On average, a production of 19.20 quintals per hectare of mustard was achieved using harvested rainwater, resulting in an average net return of Rs. 59,153 per hectare and a beneficial CB ratio of 2.98. Over the course of 9 years, total revenue of Rs. 386.14 lakh was generated from 755 hectares through the effective utilization of harvested rainwater.

Enhancing water use efficiency through micro irrigation system

Between 2011-12 and 2015-16, sprinkler irrigation was demonstrated by 41 farmers across an area totaling 34.50 hectares. The aim was to enhance irrigation efficiency, specifically for chickpea and field pea cultivation. Results showed that the average yield of chickpea increased by 30.45% and field pea by 38.01% compared to traditional farming practices. This improvement translated into additional net returns of Rs 12,891 per hectare for chickpea and Rs 12,482 per hectare for field pea, along with a higher benefit-cost ratio.

Climatic stress: Farmers used traditional irrigation (flood irrigation) method for raising the productivity in chickpea and field pea. There is need to save water by efficient irrigation method to increase water use efficiency to cope up with climate variability.

Intervention: Sprinkler irrigation in Rabi pulses.

Average yield and net return of chickpea and field pea under sprinkler irrigation

Year	Crop	No. of Demos /area (ha)	Intervention	Yield (q/ha)	Cultivation Cost (Rs./ha)	Net return (Rs./ha)	B.C. ratio
2011-12 to 2015-16	Chickpea	25/28	Flooded irrigation	12.47	19254	25024	2.35
			Sprinkler irrigation	17.21	18312	37921	3.11
2015-16	Field Pea	16/6.50	Flood irrigation	16.42	24720	16330	1.66
			Sprinkler irrigation	21.42	23863	28812	2.17

Sprinkler irrigation in Chickpea

Summer deep ploughing

Climatic stress: Low and uncertainty of productivity of soybean due to recurrent intermittent drought/erratic rainfall.

Intervention: Summer deep ploughing in Soybean. Summer deep ploughing improves soil porosity, water intake rate and reduces the run off, whereas deep summer ploughing during month of April enhanced the water holding capacity, breaks soil capillary and retard evaporation to stabilized/enhance productivity of rainfed soybean.

Average yield and economics of Soybean, rain water use efficiency, moisture (%) and weed count under summer deep ploughing

Year	Area (ha)	No. of Demo	Intervention	Yield (q/h)	Cost of Cultivation (Rs/ha)	Net return (Rs/ha)	BC ratio	RWUE (kg/ha/mm)	Moisture % at harvest	Weed Count (per m^2)
2011-12 to 2016-17	258.4	150	No summer Deep ploughing	12.23	14621	15565	2.10	1.94	7.66	17.13
			Summer deep ploughing	15.57	15670	22936	2.48	2.49	8.72	7.48

During 2011-17, deep ploughing for soil and moisture conservation was demonstrated by 150 farmers across a total area of 258.4 hectares. Results indicated a 25.23% increase in average yield compared to traditional farming practices. This improvement led to additional net returns of Rs. 7,371 per hectare, accompanied by a higher benefit-cost ratio. Moreover, the soil moisture percentage at harvest increased by 0.72% compared to farmers' practices, and weed counts were reduced to 9.65 per square meter within 20 days of sowing. Deep ploughing also enhanced rainwater use efficiency, particularly beneficial during summer months.

Summer Deep Ploughing

Soybean Crop after Summer Deep Ploughing

Ridge and furrow method

Climatic stress: Low and uncertainty of productivity of maize due to intermittent drought/water lodging condition.

Intervention: Demonstrations of in *situ moisture* conservation practices, viz. ridge and furrow planting method were taken up in maize to cope intermittent dry spell during crop growth period to stabilized/enhance productivity of rainfed condition

Table-29: Average yield, economics of maize, water use efficiency and moisture (%) under ridge and furrow sowing method.

Year	Area (ha)	No. of Demo.	Intervention	Yield (q/h)	Net return (Rs/ha)	BC ratio	% Moisture at harvest	Rainwater use efficiency (kg/ha/mm)
2018-19	4.40	11.00	Flatbed method	20.45	32930	1.33	1.56	1.84
			Ridge and furrow	39.45	63086	2.65	2.74	3.55

The ridge and furrow planting method for soil and moisture conservation was demonstrated by 11 farmers across 4.40 hectares during 2018-19. This method resulted in a significant improvement in maize yield, increasing by 92% to 19 quintals per hectare compared to traditional farmer practices. As a result of in-situ moisture management, farmers experienced additional returns of Rs. 7,675 per hectare and achieved a benefit-cost ratio of 0.55. Furthermore, the moisture percentage at harvest and rainwater use efficiency (measured in kilograms per hectare per millimeter) was also notably higher with the ridge and furrow planting method.

Maize crop under ridge and furrow method of sowing

Ridge and furrow method

Climatic stress: Low and uncertainty of productivity of Blackgram due to intermittent drought/water lodging condition erratic.

Intervention: Demonstrations of in *situ moisture* conservation practices, viz. ridge and furrow planting method were taken up in black gram to cope intermittent dry spell during crop growth period to stabilized/enhance productivity in rainfed condition.

Average yield, economics of black gram, water use efficiency and moisture (%) under ridge and furrow sowing method.

Year	Area (ha)	No. of Demo.	Intervention	Yield (q/h)	Net return (Rs/ha)	BC ratio	% Moisture at harvest	Rainwater use efficiency (kg/ha/mm)
2018-19 to 2019-20	5.20	13.00	Flatbed method	7.45	25596	2.43	1.78	0.67
			Ridge and furrow	11.17	47856	3,79	3.01	1.02

The ridge and furrow planting method for soil and moisture conservation was demonstrated by 13 farmers across 5.20 hectares during 2018-2020. This method resulted in a significant improvement in blackgram yield, increasing by 50% to 3.72 quintals per hectare compared to traditional farming practices. As a result of in-situ management, farmers experienced additional returns of Rs. 22,260 per hectare and achieved a higher benefit-cost ratio of 1.37. Furthermore, both soil moisture retention and rainwater use efficiency were notably enhanced with the ridge and furrow planting method.

Blackgram crop under ridge and furrow method of sowing

Climatic stress: Low and uncertainty of productivity of soybean due to intermittent drought/erratic rainfall.

Intervention: Demonstrations of in *situ moisture* conservation practices, viz. ridge and furrow planting method were taken up in Soybean to cope intermittent dry spell during crop growth period to stabilized/enhance productivity in rainfed condition.

Average yield, economics of Soybean, rainwater use efficiency and moisture (%) under ridge and furrow sowing method.

Year	Area (ha)	No. of Demo.	Intervention	Yield (q/h)	Net return (Rs/ha)	BC ratio	% moisture at harvest	Rainwater use efficiency (kg/ha/mm)
2013-14 to 2017-18	22.20	56.00	Flatbed method	11.11	15582	1.67	1.57	1.68
			Ridge and furrow	14.56	23257	2.23	2.84	2.23

The ridge and furrow planting method for soil and moisture conservation was demonstrated by 56 farmers across 22.20 hectares during the period of 2013-2018. This method effectively managed moisture during heavy rainfall and dry spells, leading to a notable 31.05% increase in soybean yield. Implementing this technique resulted in an additional net profit of Rs. 7,675 per hectare and a benefit-cost ratio of 0.56. Post-harvest, the soil moisture percentage increased by 0.91%, and rainwater harvesting efficiency improved by 0.55%.


Sowing of soybean with Ridge and Furrow **Collection of rainwater in furrows**


Soybean crop in ridge and furrow method of sowing

Broad bed and furrow method

Climatic stress: Low and uncertainty of productivity of soybean due to intermittent drought/erratic rainfall.

Intervention: Broad bed and furrow sowing method of Soybean.

In-situ soil and water conservation, along with effective drainage technology, are essential for managing deep black soils. The Broad Bed and Furrow (BBF) system involves creating a broad bed of 90 cm width, a furrow of 45 cm width, and sowing crops with a row spacing of 30 cm. This technology offers several advantages, such as conserving rainwater in furrows, improving drainage to handle excess water, and ensuring proper aeration in both the seedbed and root zone.

Average yield, economics, rain water use efficiency and moisture (%) under broad bed furrow method of sowing of Soybean.

Year	Area (ha)	No. of Demo.	Intervention	Yield (q/h)	Net return (Rs/ha)	BC ratio	% Moisture at harvest	Rainwater use efficiency (kg/ha/mm)
2012-13 to 2016-17	15.2	31.00	Flat bed method	11.39	14859	1.95	7.85	1.55
			Broad bed furrow	17.25	29711	2.73	8.93	2.50

The BBF technology was demonstrated by 31 farmers on a 15.2-hectare area during 2012-2016. Soybean crops grown using this technology showed significantly higher yields compared to traditional farming practices. The impact of the Broad Bed and Furrow (BBF) system was notable: it enhanced water absorption and storage capacity in the soil profile, thereby improving soil properties and resilience during extended dry periods.

Specifically, the BBF system increased soybean yield by 51.44%. Farmers adopting this technique experienced an additional net profit of Rs. 14,852 per hectare compared to conventional practices. Furthermore, there was a 61.29% increase in rainwater use efficiency (Kg/ha/mm) and a 1.08% increase in soil moisture after harvest, underscoring the system's effectiveness in optimizing water utilization and soil moisture retention.

Sowing of Soybean wit h BBF

Collection of rain water in furrows


Early growth stage of soybean in BBF

Matured crop of soybean in BBF

Sowing across the slope

Climatic stress: Low yield of groundnut sowing along the slope due to drys pells during crop growth period. Farmers in NICRA villages frequently face challenges with groundnut cultivation, particularly during extended dry spells that coincide with critical stages like pegging, flowering, and pod formation. As a result, these farmers often experience low pod yields due to insufficient moisture availability.

Intervention: Sowing of groundnut across the slope planting across the slope Planting across the slope aids in moisture conservation and efficient moisture utilization, which can mitigate the adverse impacts of erratic rainfall. This method creates obstructions to water flow at each furrow, functioning akin to small bunds that promote uniform water distribution.

Average yield, economics, rainwater use efficiency and moisture % under across the slope of sowing.

Year	Area (ha)	No. of Demo.	Intervention	Yield (q/ha)	Cost of cultivation (Rs/ha)	Net return (Rs/ha)	BC ratio	RWUE (kg/ha/mm)	Moisture % at harvest
2011-12 to 2014-15	13.95	62.00	Sowing with slope	11.20	14744	31492	3.14	1.60	7.33
			Sowing across the slope	15.02	14744	44371	4.03	2.21	8.07

The sowing across slope technology was demonstrated by 62 farmers across a 13.95-hectare area during 2011-2015 for groundnut cultivation. This method effectively managed moisture during dry spells, resulting in a 34% increase in average groundnut yield. Implementing this technique led to an additional net profit of Rs. 11,730 per hectare compared to traditional farming practices. Moreover, there was a 38.12% improvement in rainwater use efficiency and a 0.74% increase in soil moisture after harvest, highlighting the technology's success in optimizing water utilization and enhancing soil moisture retention.

Sowing of groundnut across the slope

Sowing of groundnut across the slope

Direct Sown Rice

Climatic stress: High production costs and the substantial water requirements are significant constraints in rice cultivation. Efficient irrigation and management practices are crucial for conserving water and enhancing water use efficiency to adapt to climate variability.

Intervention: Direct seeding of rice eliminates the need for labor-intensive nursery raising and transplanting operations. This technology has shown the potential to enhance water productivity by 15-18%, primarily by reducing the water-intensive process of puddling. It also reduces labor, energy usage, and cultivation costs, while lowering methane emissions and increasing overall system profitability by 10-15%.

Additionally, direct seeded rice contributes to improved soil health within the rice-based production system. Choosing short-duration paddy varieties facilitates early paddy harvest, enabling timely sowing of wheat and minimizing the risk of heat stress during wheat maturity.

Average Yield and economics of Rice, labour, water and time saving under direct sown as well as transplanted rice.

Year	Area (ha)	No. of Demo	Intervention	Yield (q/h)	Cost of cultivation (Rs/ha)	Net return (Rs/ha)	Labour saving (man/days)	Quantity of water used (m^3/ha)	Days to maturity
2013-14 to 2019-20	13.8	33.00	Transplanted Rice	43.35	33778	57132	47	2800	145
			Direct sowing Rice	41.05	26724	65174	4	1400	130

The Direct Seeding of Rice (DSR) technology was demonstrated by 33 farmers across a 13.80-hectare area during 2011-2015. This method showcased higher net returns with reduced water and labor requirements. While the yield was 5% lower compared to traditional transplanting methods, the net profit reached Rs. 65,174 per hectare, which was Rs. 8,042 higher than traditional practices.

DSR effectively reduces production costs by Rs. 7,054 per hectare and saves 33 mandays of labor typically required for nursery raising and transplanting. Moreover, DSR conserves 1,400 cubic meters of irrigation water and allows for rice maturation 15 days earlier than transplanted rice, facilitating timely sowing of wheat.

Rice crop under direct sowing method

Zero tillage method of sowing

Climatic stress: Terminal heat stress significantly impacts wheat productivity in the district. The elevated temperatures (>30°C) during the grain-filling stage are a major constraint in achieving high wheat yields. Over the past decade, in Datia district of Madhya Pradesh, India, there has been a notable increase in temperatures above normal levels during the 10th, 11th, and 12th standard meteorological weeks (5th to 25th March). These changing climatic patterns have led to increased temperatures during the reproductive phase of the wheat crop, adversely affecting yield due to delayed sowing.

Intervention: Zero-tillage involves directly drilling wheat into unploughed rice fields immediately after rice harvest using a zero till ferti seed drill. This practice offers a sustainable alternative to traditional planting methods in rice-wheat cropping system areas. Its benefits include significant savings in fuel and water, reduced greenhouse gas emissions, and the recycling of crop residues rather than burning them, thereby minimizing environmental hazards.

Sowing of wheat by Zero tillage

Wheat germination under zero tillage

Wheat crop under zero tillage

Wheat crop under zero tillage method of sowing

Effect of Zero tillage sowing method of sowing on the average yield, net return of wheat, irrigation and dry weight of weed at harvest

Year	Area (ha)	No. of Demo	Intervention	Sowing date	Yield (q/h)	Cost of cultivation (Rs/ha)	Net return (Rs/ha)	No of irrigation	Dry weed at harvest (g/m^2)
2013-14 to 2014-15	10	20.00	Conventional method	-	36.02	**24396**	29633	4	33.50
			Zero tillage method	-	40.84	21850	39414	3	29.40

Zero tillage technology for wheat was demonstrated by 20 farmers across a 10-hectare area during 2013-2015. The results showed that zero tillage significantly increased wheat yields by 13.3% compared to conventional sowing methods in both years. The average cost of cultivation under zero tillage was Rs. 21,850 per hectare, which was lower than the Rs. 24,396 per hectare incurred with conventional sowing methods. This resulted in an additional net return of Rs. 9,781 per hectare with zero tillage compared to conventional methods.

Zero tillage also offered additional savings, including Rs. 2,546 per hectare in cultivation costs, one irrigation, and 20 liters of diesel per hectare over conventional practices. Moreover, wheat planted using zero tillage emerged 12 days earlier than with conventional methods, helping to avoid terminal heat stress during the reproductive phase. Additionally, weed dry weight at harvest was reduced by 13.94% on average over the two-year period.

Soil health Management

Climatic stress: The yield of crops and soil fertility can deteriorate due to the indiscriminate use of chemical fertilizers, inadequate utilization of organic manures, and the burning of wheat crop residues.

Intervention: Soil test-based fertilizer recommendations, along with the addition and production of compost and vermi compost, recycling of bio-waste, and green manuring, are essential practices for sustainable agriculture.

Soil Health Cards

Soil Health Card (SHC): Soil fertility information provided by SHCs enables farmers to maintain soil fertility and enhance productivity through targeted application of fertilizers.

A total of 1500 soil samples were collected from 4 adopted villages within the district. These samples underwent analysis for pH, EC, organic carbon (OC%), and available nitrogen (N), phosphorus (P), and potassium (K). Based on these soil test results, customized recommendations for fertilizers and manures were made to farmers for application in their crop fields. Every household in the adopted villages has received a Soil Health Card.

The Soil Health Cards, generated from the analytical data, provide farmers with specific nutrient application recommendations for major crops. The average soil fertility status of each village is summarized in the table below.

This redraft provides a clear and concise overview of the Soil Health Card program, emphasizing its role in guiding farmers towards sustainable soil management practices.

InitialSoilfertilitystatusofoperationalvillagesonthebasisofSoiltesting

Village	pH	EC (dsm^{-1})	OC (%)	Available Nutrient(kg/ha)		
				N	P_2O_5	K_2O
Sanora	7.40	0.19	0.30(L)	141.25VL)	15.38(M)	233.12(L)
Baroudi	7.29	0.19	0.31(L)	137.51VL)	14.90(M)	234.37(L)
Rajpur	7.36	0.28	0.35(L)	154.29VL)	15.74(M)	233.31(L)
Kharag	7.52	0.21	0.507(M)	204.43(L)	28.1(H)	406.19(H)
Avg.	**7.39**	**0.21**	**0.36**	**159.37**	**18.53**	**276.74**

The initial analysis of soil samples indicates that the soil was neutral in pH with a moderate salt concentration. The majority of soils were found to have medium to low levels of organic carbon, and very low to low levels of nitrogen. Additionally, the soil was observed to range from medium to high in phosphorus and from medium to high in potassium across the adopted villages.

Soil test campaign **Preparation of Soil health card**

Soil health card distribution camp Soil health card 2014-15

On-farm production of organic inputs through the NADEP composting method addresses climatic stress and soil fertility deterioration caused by the inadequate use of organic manure.

The NADEP method involves constructing a permanent tank using mud, clay bricks, or cement blocks. This method is particularly effective in areas with limited moisture and is ideal for composting after the rainy season and during dry periods. The structure retains nutrients, moisture, and air in the soil, thereby enhancing plant growth during stressful periods.

On farm production of organic inputs through NADEP compost

Climatic stress: Low yield of crops and soil fertility deterioration due to ignorance use of organic manure

Intervention: NADEP method uses a permanent built tank of mud or clay bricks or cement blocks. This is good where moisture is limiting, and is the best way to make compost after the rains have finished and during dry season. The soil enables to retain nutrients, moisture, and air for betterment of growth of plants in stress period.

On farm production of compost (tones), Nutrient and revenue saving.

Year	No. of units	Compost Production (t/year/unit)	Total Production (t/year)	Nutrients status		
				Nutrients	Quantity (t/year)	Cost (Rs/year.)
2012-13to 2018-19	52	186	1116	NP K	5.58 8.92 10.60	64372 357120 305150
				Total	**25.10**	**726642**

Note: The values of nitrogen (N), phosphorus (P), and potassium (K) were calculated based on the available nitrogen (0.65%), phosphorus (0.52%), and potassium (0.92%) content in NADEP compost.

The NADEP composting method was demonstrated by producing compost on 52 farmers' fields within the project's operational area. These efforts yielded 1116 tonnes per year of compost manure from the constructed NADEP composting units. The application of compost manure in farmers' fields resulted in significant savings in chemical fertilizers, specifically 5.58 tonnes per year of nitrogen, 8.92 tonnes per year of phosphorus, and 10.60 tonnes per year of potassium. Additionally, this practice generated an annual revenue of Rs. 726,642.

Effect of compost with NADEP on the yield (kg/ha), cost of cultivation (Rs/ha) and net return (Rs/ha) of wheat.

Crop	Area (ha)	No. of Demo.	Intervention	Yield (q/ha)	Cost of cultivation (Rs/ha)	Net return (Rs/ha)	B.C. ratio
Wheat	20.00	52.00	RDF120:60:40, NPK (Kg/ha)	39.30	32050	46550	2.45
			75%NPK+30t/ha compost	46.70	29650	63750	3.15

The NADEP compost preparation method was demonstrated by 52 farmers, resulting in the production of 1116 tonnes of compost. This compost was applied to a total area of 20 hectares across their fields from 2013 to 2018.

The application of NADEP compost in wheat crops led to significant savings of 25% in nitrogen, phosphorus, and potassium fertilizers, alongside an 18.83% increase in yield based on demonstration results on farmers' fields. Furthermore, the integrated use of NADEP compost reduced the cost of cultivation by Rs. 2400 per hectare in wheat crops.

Wheat crop under INM

On farm production of vermi compost

Climatic stress: Depletion in soil fertility due to neglecting organic manure

Intervention: The application of vermi compost in soil alters soil properties, enhancing the availability of air and water, which promotes root growth. This improvement facilitates better absorption of water and nutrients, especially beneficial in rainfed conditions. Additionally, vermicompost improves the structural stability of soil, thereby preventing soil erosion and enhancing soil fertility over time.

On farm total production of vermi compost during 2011-12 to 2018-19 in NICRA villages

Year	No of Vermi units	Total production of vermin compost (t/year)	Nutrients status		
			Nutrients	Quantity (tones/year)	Value (Rs./year)
2011-12 To 2018-19	3 units/year	6.5	N PK	0.46 0.69 0.69	5313 27600 19473
			Total	**1.84**	**52386**

Note: Value of N, P and K were calculated on the basis of available N, P and K (01% N, 1.5% P and 1.5 %K) in Vermicompost.

A vermi compost production program was initiated on farmers' fields, with the construction of 3 units in collaboration with the state horticulture department to enable on-farm vermi compost production. Farmers collectively produced 6.5 tons per year of vermi compost through these units, resulting in savings equivalent to 0.46 tons of nitrogen, 0.69 tones of phosphorus, and 0.69 tons of potassium annually. Monetarily, this initiative was estimated to generate Rs. 52,386 per year.

Vermi compost units in NICRA village of Datia district

Effect of vermicompost on the yield and net income of chilli and Tomato

Crop	Area (ha)	No. of Demo.	Intervention	Yield (q/ha)	Cost of cultivation (Rs/ha)	Net return (Rs/ha)	B.C. ratio
Chilli	7.00	9.00	RDF (120:80:80)	95.00	34000	61000	2.79
			75%NPK+3t/ha vermicompost	120.00	31250	88750	3.84
Tomato	10.00	11.00	RDF (120:80:80)	120.00	36425	71575	3.12
			75%NPK+3t/ha vermin compost	150.00	32340	102660	4.71

The application of vermicompost in chili and tomato crops resulted in significant benefits: it saved 25% of nitrogen, phosphorus, and potassium fertilizers, and increased yields by 26.31% and 25.00%, respectively. These outcomes were observed across 17 hectares of fields belonging to 20 farmers during 2011-2019.

Moreover, integrating vermicompost into cultivation practices reduced cultivation costs by Rs. 2750 per hectare in chili crops and Rs. 4085 per hectare in tomato crops. As a result, there was an additional net return of Rs. 27,750 per hectare for chili and Rs. 31,085 per hectare for tomato crops.

Chilli and Tomato production with Vermicompost in NICRA village of Datia district

Soil fertility enhancement through green manuring

Climatic stress: Low yield of mustard due to poor soil fertility

Intervention: Green manuring using the leguminous crop Dhaincha (Sesbania aculeata) in mustard crops.

Green manuring with Dhaincha (Sesbania aculeata) enhances soil structure, promotes better aeration, improves water infiltration, facilitates root growth, and reduces the risk of soil erosion. Incorporating green manure increases organic matter, leading to improved soil physical conditions such as reduced bulk density, increased total pore space, enhanced water-stable aggregates, improved soil hydraulic conductivity, and suppression of weeds.

Average yield and net income of mustard under green manuring during 2013-14 to 2014-15.

Year	Area (ha)	No. of Demo.	Interventions	Dose of nitrogen (Kg/ha)	Yield of (q/ha)	Cost of cultivation (Rs/ha)	Net return (Rs/ha)	B:C ratio
2012-13 to 2014-15	18.50	29.00	No green manuring	80	12.32	16250	25218	2.73
			Green manuring	60	16.28	16910	28787	3.42

Comparison of soil fertility status before and after green manuring

Characters	Soil fertility status		% increase/Decrease
	Before GM	After GM	
Bio Gas production(q/)	-	245.5	-
PH	6.8	7.2	+5.9
EC (dsm-^{1})	0.38	0.42	+10.52
OC (%)	0.25	0.38	+33.17
P (kg/ha)	19.14	11.95	37.5
K (kg/ha)	215.04	253.12	+17.7

The demonstrations evaluated the impact of green manuring with Dhaincha (Sesbania aculeata) + 60:40:20:20 NPKS kg/ha on mustard crops across 18.50 hectares of land belonging to 29 farmers during 2012-2015. The results showed a 32% increase in mustard seed yield compared to conventional farmer practices. Additionally, there was a higher net return of Rs. 3569 per hectare and a benefit-cost ratio of 0.69, surpassing the outcomes of conventional practices.

This technology proved effective in enhancing crop yield, soil organic carbon (SOC) and soil organic matter (SOM), and essential nutrient levels, thereby improving soil fertility. Green manuring also resulted in reduced dry weight of weeds compared to conventional practices, demonstrating its weed suppression benefits. Furthermore, green manuring saved 20 kg of nitrogen per hectare and led to cost savings of Rs. 260 per hectare.

Incorporation of Daincha in to the soil **Green manure crop Daincha (*Sesbaniaaculeate)***

Promotion of tree plantation to mitigate climatic variability:

Climatic stress: Deforestation and neglect of agro forestry planting

Intervention: Tree planting initiatives focused on degraded ridge land in NICRA villages

To enhance survival rates, planting was conducted on bunds after trench digging across the entire area. Approximately 40% of the area was covered with plants, involving participation from 12 farmers. Block plantations of Teak and Bamboo were established, totaling 7,928 plants across 8 hectares, including various fruit and forest species (refer to Table 44). Despite poor rainfall, nearly 70-80% of the plants survived.

This initiative has significantly raised awareness among farmers about the role of trees in improving soil and water conservation, enhancing microclimate, and promoting carbon sequestration in the long term. For instance, Subabool trees provide fodder for small ruminants during lean periods, thereby aiding in climate resilience against dry spells, drought, high temperatures, and erratic rainfall. Tree plantation efforts also contribute to water conservation, biodiversity preservation, and soil amelioration.

Name of plant species and no. of agroforestry plants planted on farmers field during 2011-20

Name of plant species	Before NICRA	After NICRA
Teak (*Tectonagrandis*)	25	4600
Khamer (*Gmelinaorborea*)	0	365
Neem (*AzadirachtaIndica*)	250	700
Siras (*Albizealebbeck*)	0	235
Temarind (*TamarindusIndica*)	02	102
Subabool *(Leucaenaleucocephala)*	45	700
Aonla *(Phyllanthus emblica)*	11	123
Guava *(Psidiumguajava)*	09	243
Ber *(Ziziphus mauritiana)*	40	233
Bambo (BambusaVulgaris)	21	636

Chill + Agroforestry

Blackgram + Agroforestry

Problems Encountered and Resources Required:

The farmer's faced multiple constraints and challenges while adopting climate resilient agricultural technologies. Major constraints faced by the farmers such as:

Resource and inputs Constraints: Limited funding, unavailability of improved seed, lack of savings, inadequate services through Custom Hiring Centers and technical expertise hindered the implementation and scalability of innovative practices.

Policy and Regulatory Barriers: Inconsistent policies and inadequate enforcement undermined efforts to promote sustainable resource management. There is an urgent need to provide subsidies on the adoption of CRA and also policy for earning carbon credits on the adoption of CSA practices.

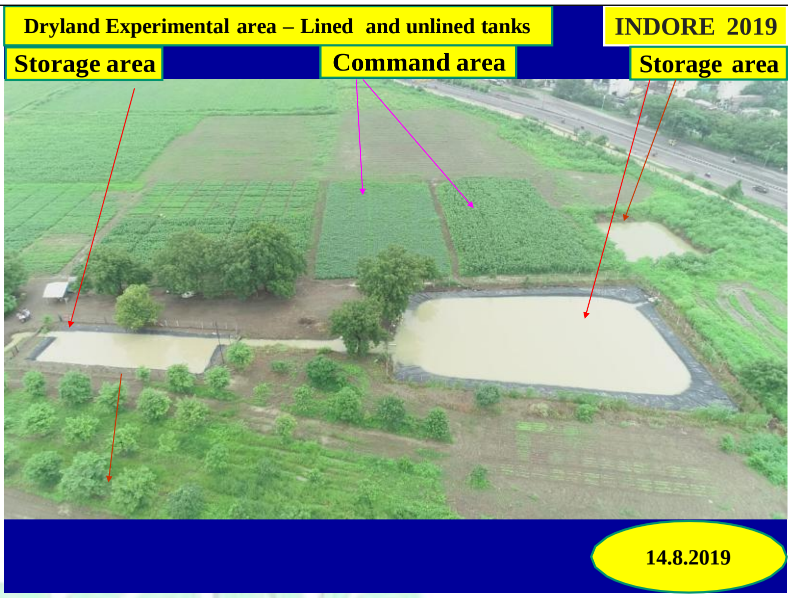
Social and Cultural Resistance: Resistance to change and conflicts over resource access and rights challenged community-based initiatives and poor acceptance towards adoption of novel practices.

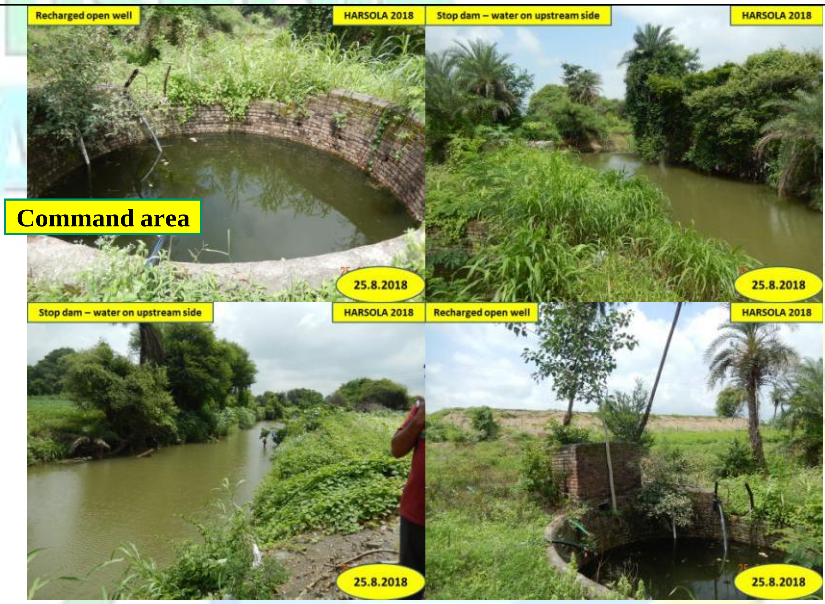
Technological Challenges: Limited access to reliable internet connectivity and technical support impeded the adoption of advanced technologies in remote areas.

Climate Uncertainty: Uncertainty in climate projections and variability complicated long-term planning and adaptation efforts.

SUCCESS STORIES ON RESEARCH AND APPLICATION IN AREAS OF NATURAL RESOURCE MANAGEMENT, WATER CONSERVATION AND DRY LAND FARMING SYSTEMS (2024)

RAJMATA VIJAYARAJE SCINDIA KRISHI VISHWA VIDYALAYA, GWALIOR (M.P.)


Dryland Experimental area – Lined and unlined tanks
INDORE 2019
Storage area
Command area
Storage area
14.8.2019


Recharged open well
HARSOLA 2018
Stop dam – water on upstream side
HARSOLA 2018
Command area
25.8.2018
25.8.2018
Stop dam – water on upstream side
HARSOLA 2018
Recharged open well
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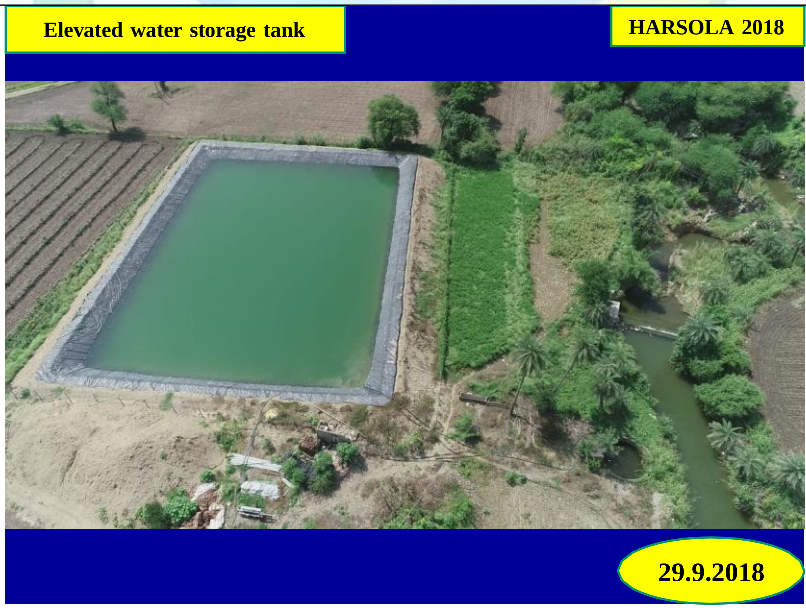

Elevated water storage tank
HARSOLA 2018
29.9.2018

The operational wing of All India Coordinated Research Project for Dryland Agriculture, RVSKVV campus College of Agriculture, Indore i.e. Operational Research Project for Dryland Agriculture, an integrated long-term research project with clearly defined goals and milestones, was in operation at College of Agriculture, Indore (M.P.) from 1.4.1986 to 31.3.2018. Similarly the research team of the AICRPDA is also involved in National Innovations On Climate Resilient Agriculture (NICRA) (Technology Demonstration Component) project activities with well defined goals for enhancing productivity on sustainable basis under rainfed system since 2011. Many significant achievements have been made by the team of the scientists working at this centre particularly for increasing farm productivity and farm income through natural resource management mainly water conservation and dryland farming aspects with crop improvement and agronomical technologies for dryland crops. The usefulness of these techniques have been found to be increased manifold by adopting natural resource management programmes for sustainable agricultural productivity in rainfed areas of Malwa region.The activities of particularly Operational Research Project and NICRA in general, involve the adoption and evaluation of different soil and water conservation measures. For this, attempts have been made to conserve the natural resources like soil and water using earth moving machineries. The heavy machines have been used for the development of various water bodies viz., water harvesting tank, percolation tank, for drainage line treatment and even for the deep tillage operations to augment water requirement of different crops grown in the adopted villages. The results of these soil and water activities are found very promising and have been accepted and appreciated by one and all as it has increased the socio-economic condition of the farmers of the area. Based on the research work carried out, various research papers and articles in the form of success stories have been published by the team of scientists for its wide scale publicity and encouraging the farmers for the adoption, enhancement and promotion. The work carried out under the project has been a source of information to farming community of Malwa and Nimar region and surely successful in bridging the existing gap and enhancing the awareness for **natural resource management through land developmental aspects and activities of Agricultural Engineering for soil and water conservation and rainwater Management in rainfed areas. Wide scale adoption of these resource conservation techniques has also been the significant achievement of the project. The overall impact of the programs of activities of the ORP on the production productivity/profitability /sustainability of the relevant rainfed production system is very visible in the domain area. Documentation of various success stories also provides enough evidences for the success and acceptability of the ORP in rainfed regions. Many awards of national repute have been received for these commendable research and extension activities and many success stories have been emerged and adopted widely. Various Certificates of honour from APC, PS and Director also awarded to ORP team.**

I	SUCCESS STORIES
Based on the study, following most significant points have been emerged and they are as follows:	
I (A)	**Success stories and Significant outputs of the project work: (2004-2010)**

Straightening of gully and utilization of wasteland at Jaitpura (Creation of storm drain)

- In very first year in the new ORP site (2005), firstly the gully portions to be straightened was identified and then farmers were explained the idea of the drainage line treatment required for these fields. Subsequently, the drainage line treatment for safe disposal of runoff was carried out after the harvest of the rabi crop. This area was so severely affected by uncontrolled runoff that it was fragmented into several pieces making very little pieces suitable for cultivation. In this area, using backhoe loader machines, a diversion drain of 200m with uniform cross section was constructed to divert the runoff water from entering into the field. The excavated soil was then used to fill the existing gullied and undulating portions of the field to make it one piece. Due to this activity, a new area of 0.25 ha could be made suitable for cultivation during forthcoming kharif season. This activity not only made available extra land for cultivation but also increased market rate of the field by Rs. 1 lac.

Construction of percolation tank for ground water recharge and provision of diversion bund for reducing the soil erosion.

- In the year 2005, the project area experienced only 660 mm rainfall. Even then in the percolation tank, which was developed as entry point activities, allowed the nearby open well to retain sufficient water that was used for irrigation and other agricultural purposes even in the month of December 2005 and thus also providing supplemental water other than the tube well water. Therefore, a good rabi crop is ensured due to availability of sufficient ground water for irrigation.

Effect of tillage on the development of weeds and crop yields at Jaitpura

- Since the new site for the project work was approved in the month of June, only the sites for the deep tillage operation could be identified during the kharif season 2004. During Rabi, the deep tillage through crawler tractor drawn MB plough was carried out in the month of January 2005. At one site, the deep tillage operations helped in removing the weeds mainly Saccurum Spontaneum which is a dangerous weed. At this site, no crop could be taken up due to severe infestation of the Saccurum Spontaneum. At the same this plot resulted in very poor yield of soybean in kharif season. The deep tillage operations could remove about 10 tonnes of root biomass of weed as against only 1 tonne and 100kg from tractor drawn MB plough and cultivator respectively. In this study, the performance evaluation of deep tillage and farmers practice would be made. Two plots of about 0.8 ha and 0.2 ha respectively were made cultivable due to deep tillage which could be brought under new cultivation in the following Rabi season.

Construction of water harvesting tank for well recharge in the farmer's field at Baroli

- One water-harvesting tank was developed in the farmers' field during 2004 so that the stored water could be utilized for the irrigation of crops during moisture stress period. The participation of the farmer was fully ensured and approximately 25% of the cost of tank was bourne by the farmers in terms of kind (mainly for roof water harvesting and diverting water to a defunct open well through pipe filter). The land for the development of the tank was donated or sacrificed by the farmer from the part of cultivated fields. The stored water is being utilized during the stress period or even for the paleva while sowing wheat, gram etc. The well is being recharged through the runoff water and the ground water is being tapped for irrigating the crops.

Construction of water harvesting tank in the farmers fields at Jaipura.

- In the year 2004, due to non-availability of ground water, lot of area could not be brought under cultivation during rabi season. It is therefore; decided to increase the runoff water storage in the selected farmer's field which is otherwise runs out of the field after creating sheet erosion losses and development of washes. For this purpose, a suitable site in the filed was selected and an excavated tank has been developed using crawler tractor. The farmers were asked to operate his tractor along with MB plough so that the excavated soil can be piled up to serve as side bunds on the tank using crawler tractor. A tank of 3000 cu.m. storage capacity thus has been excavated by ensuring farmers participation. He has not only provided his 3500 sq.m. cultivable land but also invested about 10000/- for MB plough operation. The excavated tank collected the runoff water in the forthcoming rainy season, which could be utilized during the stress period for irrigating the crops.

Jaitpura 2005

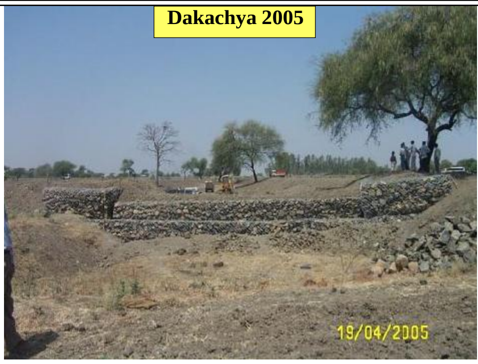
Jaitpura 2005

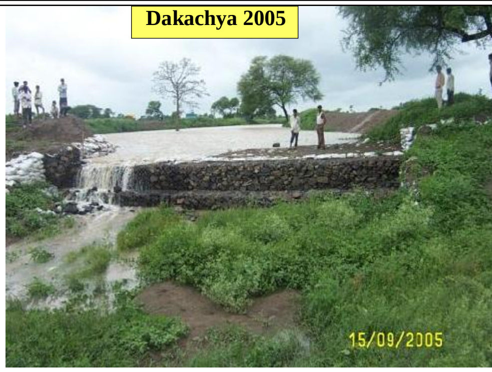
Use of heavy earth moving machineries for the development of water bodies.

- Three water-harvesting tanks were created in the farmers' fields during 2003-04 so that the stored water could be utilized for the irrigation of crops during moisture stress period. The participation of the farmers was fully ensured for this and approximately 50% of the cost of tank was bourne by the farmers in terms of kind or labours/use of tractors, trolley and implements like MB plough, leveler etc. The land for the development of the tank was donated or sacrificed by the farmers either from the wasteland/unused land or from the part of cultivated fields. Similarly, during 2004-05, two more water harvesting tanks were created in the farmers fields in the adjoining villages Dakachya and Baroli so that the stored water could be utilized for the irrigation of crops during moisture stress period and even for recharging the ground water. In one case, the participation of the farmer was fully ensured for this and approximately 65% of the cost of tank was bourne by the farmer in terms of kind or labours/use of tractors, trolley and implements like MB plough, leveler etc. The land for the development of the tank was donated or sacrificed by the farmers either from the wasteland/unused land or from the part of cultivated fields. The stored water is being utilized during the stress period or even for the paleva while sowing wheat, gram etc. These tanks also increased the water storage in the villages by 12000 cu.m.

Dakachya 2005

Dakachya 2005





Creation of sunken pond for controlling soil erosion and enhancing water availability.

- The sunken pond which was developed in 2005-2006 in a gullied portion, every year collecting again collected a huge amount of runoff water making full advantage of the boulder waste weir. It has resulted in increased storage of runoff water and its efficient utilization for the pre-sowing irrigations in the adjoining fields. It has also effectively recharged the nearby open well and providing additional ground water to the farmers.

Up scaling and out scaling of technology and Participatory technology demonstration. Natural resource conservation programme for increasing productivity in the region (2007-2010).

- In 2009-2010, two suitable sites one in Muradpura and another at Mavlakhedi were identified for the construction of water conservation measures, water harvesting tanks and surplus structures so that the farmers could construct tanks in their own field for storing the runoff water/increasing the ground water recharge/managing the excess runoff to be used mainly for irrigating the crops and for ground water recharge. These tanks are having storage capacity of 14000 cu.m. each. Thus, till 2010 in all, 10 tanks (five in Panod and one tank each in Khudel, faraspur, Muradpura, Mavlakhedi and Hatod were constructed under the technical guidance of ORP team. The farmers from their own sources arranged the funds for the same. At all the places, suitable surplus arrangements were made as per the requirement. These tanks have retained sufficient runoff water for its use either as surface water or ground water. Similarly, few more sites have been identified where suitable soil and water conservation structures would be constructed through participatory mode to demonstrate the first-hand information to the villagers and to generate awareness amongst them for soil and water conservation measures in the subsequent years under ORP activities. Wide publicity is also being given to different techniques through media for their adoption at larger scale.

Development of water harvesting tank/sunken tanks and its effect on crop productivity- Studies on Rain Water Harvesting and recycling for improving the productivity for Rain fed Crops (2008-2010).

- Due to non-availability of ground water, lot of area could not be brought under cultivation during rabi season many a times in this village. It is therefore; decided to increase the runoff water storage in the selected farmer's field which is otherwise runs out of the field after creating sheet erosion losses and development of washes. A suitable site in the filed was selected considering all the hydrological aspects in January 2008 and an excavated tank has been developed in March 2008 through participatory approach. The idea was mainly to provide the technical guidance and sharing the cost to the tune of 50% from the project side and to motivate the farmers for devoting a portion of his land for the construction of tank besides 50% cost so that the stored water could be utilized during the stress period. Before the site selection, it was ensured that the site retains the water without causing any appreciable losses in the storage. For this purpose, back hoe loader machines were used for the excavation purpose and dumper were used for transporting and spreading the excavated only top black soil (available up to 2 m) in the nearby fields which was severely affected by rill and sheet erosion process. The farmers then engaged the tractor drawn levelers for spreading the excavated materials and making the fields almost leveled. The yellowish soil excavated beyond 2m was also used for the construction of side bunds and peripheral bunds of the farmers and also for the construction of farm roads. The inlet of the tank is provided on the either side bund facing the cultivated field. The outlet is constructed so that it safely drains off the excess water into a natural waterway. The other details are as follows:

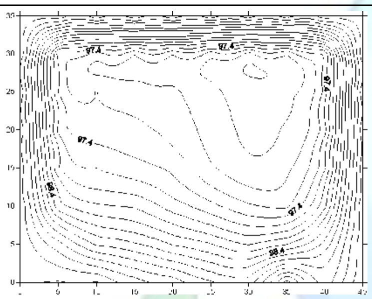
Catchment area: 20 ha, **Storage capacity:** 0.65 ha.m, **Maximum depth: 2.75**m

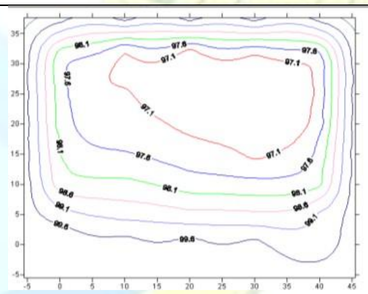
The excavated tank collected the runoff water in the following rainy season in 2008 and farmer also filled it with available ground water in the nearby tubewell as its discharge was not sufficient enough to be used directly for pre sowing irrigation through the border. Subsequently three irrigations to wheat grown in 4 ha and one irrigation to chick pea in 2 ha was provided through the conjunctive use of surface and ground water stored in the tank in the first year itself. Similarly, in 2009, the tank was filled with the runoff water and the stored water was used mainly during the rabi season for providing irrigations to adjoining crops.

Construction of water harvesting tank in panod (2008)

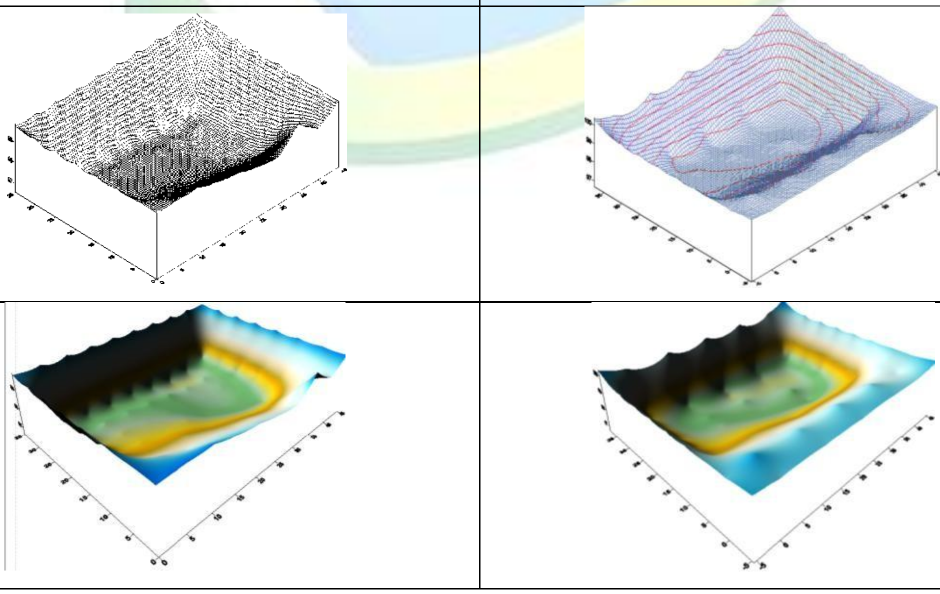
Silting pattern of water harvesting tanks constructed in black soils in farmers' field conditions of Malwa region:

- It was observed that higher silt deposition was observed in excavated tanks constructed using JCB machines than the tanks where bulldozer was used for compacting the side bunds. Similarly, the tank where excavated soil was spread immediately on the nearby upstream fields received higher silt load along with the runoff water. The channelised flow into the tank through earthen channel also resulted in much silt deposition in the tank than the tanks receiving runoff water through natural drainage lines in form of sheet from entire area serving as inlet. Though, the rectangular shaped tanks recorded more silt deposition than the circular tanks, they are preferred due to its compactness and utilization of a land portion demarcated for tank. Also, the circular tank, not easier to construct, leaves few portions of the field unused due to its shape and interferes with the regular shape of the field. The above study also suggested that while constructing tanks using JCB machines, attempts should be made to make the side bunds flatter in accordance with the recommended side slopes and as compact as possible.





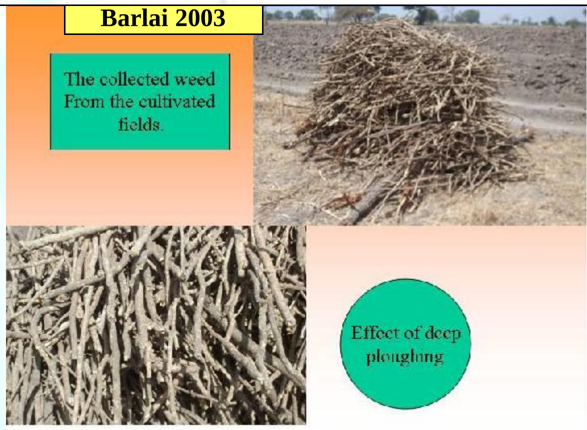
2006	**2007**



Contour map and 3-D view of the tank (Prasanna) showing silt deposition.

Effect of tillage on the development of weeds and crop yields.

- During Rabi season since there was no crop in the fields due to poor rainfall and no limited moisture after the harvest of soybean, the deep tillage through crawler tractor drawn MB plough was carried out in the month of January 2005. At one site, the deep tillage operations helped in removing the weeds mainly *Saccurum spontaneum* which is a dangerous weed. At this site, no crop could be taken up due to severe infestation of the *Saccurum spontaneum*. At the same, this plot resulted in very poor yield of soybean in kharif season. The deep tillage operations could remove about 10 t of root biomass of weed as against only 1 t and 100kg from tractor drawn MB plough and cultivator respectively. In this study, the performance evaluation of deep tillage and farmers practice would be made. Two plots of about 0.8 ha and 0.2 ha respectively were made cultivable due to deep tillage which could be brought under new cultivation in the following Rabi season. In the present study during the year 2005, 12 acre of weed infested fields were then ploughed using a crawler tractor drawn M.B. Plough which turned the soil up to 45 cm. At this depth, the deep roots were quite visible and were then destroyed due to deep ploughing operation. The destroyed roots were collected and removed from the fields. The removal of such weeds in large quantity will certainly allow production of good crop despite the formation of dead furrows and slight disturbance in the field leveling while operating MB plough. However, chances of field disturbance can be avoided if reversible plough is used while deep ploughing.



Documentation of success stories/innovations/ITK on natural resource management for upscaling:

1. Straightening of gully and utilization of wasteland
2. Construction of percolation tank for ground water recharge
3. Suitability of Modified NRCS seed drill for soybean based cropping system
4. Effectiveness of Gabion Structures in Retaining Silt Load and water storage In Gullied Portions
5. Effect of tillage on the development of weeds and crop yields
6. Construction of diversion drain and reclamation of wasteland
7. Effectiveness of percolation tank for ground water recharge.
8. Construction of storage cum recharge structure
9. Effect of tillage on the development of weeds and crop yields
10. Water harvesting tank for storing runoff water

Documentation of success stories on natural resource management for upscaling through publications in print media:

कृषि उत्पादन बढ़ाने के लिए कैसे करें नालों का सरलीकरण

हमारे प्रदेश के मालवा निमाड़ क्षेत्र में पाई जाने वाली मिट्टी में जलक्षरण की प्रवृत्ति अत्यधिक पाई जाती है। सामान्य मिट्टी नमी को काफी हद तक सोख लेती है और संतृप्त होने पर करीब अप्रवेश्य हो जाती है। मालवा क्षेत्र में इस कारण भू-सतह पर काफी मात्रा में जल बहने से भू-क्षरण होता है और गहरी नालियां कृषि योग्य भूमि को काटते हुए बढ़ती जाती हैं। इन नालियों से पानी बहने से जहां नालियों । बढ़ती हैं वहीं कई जगह ये नालियां सर्पाकार हो जाती हैं तथा भूमि को कई हिस्सों में बांटकर कृषि योग्य भूमि की उपयोगिता समाप्त कर देते हैं। इन क्षेत्रों को पुनः कृषि योग्य बनाने हेतु इनका सरलीकरण किया जाना आवश्यक है।

इस हेतु उपयुक्त स्थानों पर कम लागत वाली तकनीक काम में ली जा सकती है। आड़े-तिरछे व कम गहरे नालों के पानी को खेतों से सीधे निकालने पर खेतों को कटने व टुकड़ों में बंटने से रोका जा सकता है। इसके लिए आवश्यक है कि ऐसे नालों को सीधे मुख्य नाले से जोड़ा जाए। इस कार्य के लिए पहले मिट्टी की ऊपरी उपजाऊ सतह को बुलडोजर की सहायता से खुरचकर एक स्थान पर एकत्रित कर लिया जाता है। बाद में नाले को सीधी लाइन से खोदकर फिर खुदाई से निकली मिट्टी से इन आड़े तिरछे नालों को पाट दिया जाता है। अंत में खुरची गई ऊपरी सतह की उपजाऊ मिट्टी को इन नालों में भरकर फसल उगाने लायक बना दिया जाता है। ऐसा ही एक प्रयास पिछले दिनों सांवेर ब्लाक के गांव बारोली में कृषक जगदीश सिंह व जसवंत सिंह के सर्पाकार बंटे हुए खेतों में किया गया। बंटे होने के कारण ये खेत पिछले 15-20 वर्षों से कृषि के लिए उपयुक्त नहीं थे। इनके सुधार हेतु अखिल भारतीय शुष्क खेती परियोजना, कृषि महाविद्यालय इंदौर के भूमि एवं जल संरक्षण वैज्ञानिकों ने उक्त तकनीक का प्रयोग कर बेतरतीब नाले की लंबाई 110 मीटर से घटाकर 90 मीटर कर दी जिससे इसकी चौड़ाई व गहराई एक सी होकर आसपास की जमीन खेती योग्य बन गई। इस तकनीक का उपयोग कर न केवल 1800 वर्गमीटर जमीन कृषि उपज बढ़ाने के काम आई बल्कि बेतरतीब नाले से होने वाला अनियंत्रित मृदा क्षरण भी रुक गया। इस पर कुल खर्च 8800 रुपए आया। नाले के सरलीकरण के इस प्रयास से कृषकों को पहले ही वर्ष में सोयाबीन, गेंहू, मटर व चने की अच्छी उपज मिली। नालों के सरलीकरण के लिए रबी फसलों की कटाई के बाद का समय सबसे उपयुक्त होता है क्योंकि इस समय किसान भाई अपने खाली समय का सदुपयोग कर सकते हैं। यहां इस बात का ध्यान रखना चाहिए कि पूरी निर्माण प्रक्रिया मानसून के पहले ही समाप्त हो जाना चाहिए।

■ दीपक हरि रानाडे, महेशचंद्र चौरसिया, अरविंदसिंह तोमर

पानी के लिए पुराने तरीके पर लौटे

भारतीय अनुसंधान परिषद् और कृषि कॉलेज इन्दौर द्वारा किसानों को तालाबों के निर्माण के लिए समझाया जा रहा है। पहले तो किसानों ने इसमें रुचि नहीं दिखाई, लेकिन बरसात की कमी, भूजल स्तर का काफी नीचे गिरना और बिजली समस्या ने किसानों को पुराने पानी के स्रोतों को अपनाने के लिए मजबूर किया।

इसी तारतम्य में कृषि कॉलेज इन्दौर के वरिष्ठ वैज्ञानिक जल एवं मृदा संरक्षण डॉ. दीपक रानाडे ने गांव डकाच्या के किसान शिवनारायण चौधरी से मिलकर उन्हें तालाब निर्माण के लिए प्रेरित किया। चूंकि चौधरी पूर्व में कई बोरिंग अपने खेतों में लगा चुके थे और उसका परिणाम उन्हें उतना अच्छा नहीं मिला, जितना मिलना चाहिए था। डॉ. रानाडे ने बताया कि जिले में यह अपने तरह का पहला तालाब है। तालाब निर्माण से पहले मिट्टी का परीक्षण किया गया, क्योंकि मालवा की काली मिट्टी की संरचना ऐसी है कि वह सिकुड़ता ज्यादा है और दरारें पड़ जाती है, जिससे पानी रिस जाता है। बीच खेत से होकर गुजर रहे नाले पर उन्होंने तालाब निर्माण के लिए योजना बनाई। तीन चार बीघा जमीन जो पड़त पड़ी थी, उस पर तालाब निर्माण शुरू किया गया।

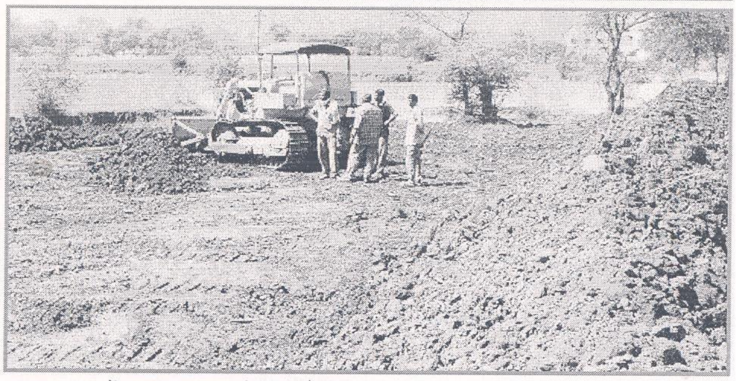
किसानों को तालाब बनाने की समझाइश दे रहे वैज्ञानिक

करीब ढाई से तीन लाख रुपए खर्च कर बनाया जा रहा यह तालाब 150 बाय 30 मीटर का है। इसकी गहराई करीब दस फुट है। पानी निकासी की जगह तार जाली का स्ट्रक्चर बनाया गया है, जिसे केबीएन संरचना कहते हैं। जाली के बीच में पत्थरों को भरा गया। इसे नीचे 6 बाय 6 फुट का और उसके बाद ऊपर 3 बाय 3 फुट का बनाया गया। इसको तीन भागों में विभाजित कर इस तरह बनाया गया है कि ज्यादा पानी आने पर कोई नुकसान न हो। खुदाई के लिए जेसीबी मशीन और ट्रेक्टर लगाए गए हैं। तालाब में दस हजार क्यूबिक मीटर पानी एकत्रित होगा, जिससे करीब पचास बीघा जमीन पर सिंचाई हो सकेगी। डॉ. रानाडे और उनके सहयोगी दीपक पाटीदार ने बताया कि सिंचाई के अलावा अगर किसान चाहे तो मछली पालन भी कर सकेंगे, जिससे उन्हें अतिरिक्त लाभ होगा। तालाब से निकली मिट्टी को उन्होंने खेतों में डलवा दिया, जिससे उबड़-खाबड़ खेत ठीक हो गए और नई मिट्टी ऊपर डलने से उपजाऊ भी ज्यादा हो गई। डॉ. रानाडे ने बताया कि अब ग्रामीण आकर उनसे मिल रहे हैं और खासकर बड़े किसान, जिनके पास जमीन ज्यादा है, वे इस तरह के तालाबों का निर्माण करना चाहते हैं उनका कहना है कि इस पर शासन की तरफ से कोई मदद नहीं दी जा रही है, सिर्फ कृषि कालेज इन्दौर के वैज्ञानिक किसानों को तकनीकी जानकारी देते हैं। अगर शासन थोड़ा सहयोग करे तो वह दिन दूर नहीं, जब हर गाँव में निजी तालाब नजर आने लगें।

किसान शिवनारायण चौधरी ने बताया कि जगह-जगह बोरिंग करवाने के बावजूद उन्हें पानी नहीं मिल रहा था और पैसे की खराबी के साथ-साथ पानी का स्तर भी काफी नीचे जा रहा था। इनसे छुटकारा पाने के लिए हम पुरानी पद्धति की ओर लौटे और तालाब निर्माण करवाया। अब हम अच्छी तरह से अपनी खेती कर सकेंगे।

साभार : चौथा संसार

खेतों का समतलीकरण



मालवा में ज्यादातर जलग्रहण क्षेत्रों की भौगोलिक स्थिति ऐसी है कि इनमें उच्चतम रेखा बहुत ही स्पष्ट व ऊंची होती है। इस कारण वर्षाकाल के दौरान बहता हुआ अनियंत्रित जल मैदानी क्षेत्रों में आने के पहले इनसे लगी हुई भूमि को बेतरतीब कई हिस्सों में काटते हुए बढ़ता है। इससे जहां भूमि के कटने से उसकी उर्वरता कम होती है वहीं निचले हिस्सों में कटी हुई मिट्टी गाद के रूप में जमा होकर नदी-नालों को पूर देती है जिससे खेतों में जल निकासी में बाधा व फसलोत्पादन में कमी आती है।

लगातार भू-क्षरण से कुछ क्षेत्र ढलानदार हो असमतल हो जाते हैं और इनपर पानी एकत्र होने लगता है। ये मुख्य खेत से अलग-थलग पड़ उचित देखभाल के अभाव में अकृषि क्षेत्रों में बदल जाते हैं। इंदौर जिले के बारोली गांव के एक खेत में ऐसा ही भूमि का टुकड़ा पाया गया जो नालों के बेतरतीब फैलने व गहरे होने से असमतल टापू में बदल गया था। मुख्य समस्या थी कि यह टुकड़ा भूक्षरण से अन्य खेतों से निचले स्तर पर पहुंच चुका था। समाधान था समुचित जल निकास व्यवस्था। इस प्रयास में दूर से आने वाले नालों को बुलडोजर की सहायता से सीधा कर मिट्टी की ऊपरी उपजाऊ सतह को खुरचकर इन आड़े, तिरछे नालों को पाटकर फसल उगाने लायक बना दिया गया।

नाले को सीधा करने के लिए मात्र 5600 रुपए खर्च कर खेत के अकृषि योग्य असमतल टुकड़े के लगभग 2000 वर्गमीटर क्षेत्रफल को कृषि योग्य समतल भूमि में परिवर्तित किया गया तथा नाले की लंबाई 70 मीटर से घटकर केवल 40 मीटर रह गई। महत्वपूर्ण बात यह है कि समतल किया हुआ खेत अन्य खेतों की तुलना में कम ऊंचाई पर रह जाता है। आसपास के खेत अन्य खेतों की तुलना में लगभग 10-12 सेमी ऊंचाई पर रहते हैं। देखा जाए तो यह कुछ हद तक सीढ़ीदार खेतों का आभास देता है।

यद्यपि सीढ़ीदार खेतों का उपयोग पहाड़ी क्षेत्रों में जल एवं मृदा संरक्षण कार्यों हेतु किया जाता है जहां पर इन खेतों की चौड़ाई लगभग तीन से पांच मीटर रखी जाती है। मालवा में भी इस प्रकार की खेती की संभावना है। अंतर केवल यह होगा कि यहां खेतों की चौड़ाई 25-30 मीटर हो सकती है। सैद्धांतिक सीढ़ीदार खेती का व्यावहारिक रूप में परिवर्तन कर मालवा में अकृषि योग्य क्षेत्रों को कृषि योग्य बनाया व जल-मिट्टी संरक्षण का कार्य कर खेतों की उर्वरता को बचाया जा सकता है। खेतों के समतलीकरण के लिए रबी फसलों के कटने के बाद का समय सबसे उपयुक्त होता है क्योंकि किसान खाली समय का सदुपयोग कर सकते हैं। इस बात का खास ध्यान रखा जाना चाहिए कि खेतों के समतलीकरण की पूरी प्रक्रिया मानसून के पहले समाप्त हो जाए।

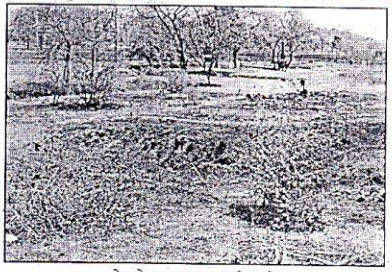
■ दीपक हरि रानाडे, अरविंदसिंह तोमर

८ जून २००१ ७ नईदुनिया चौपाल

टेढ़े-मेढ़े नालों को सीधा कर अनुपयोगी भूमि कृषि योग्य बनाई गई

डॉ. दीपक हरि रानडे एवं एम.सी. चौरसिया

मालवा क्षेत्र में कम समय में अधिक तीव्रता वाली वर्षा की आवृत्ति अधिक पाई गई है। यहाँ की मिट्टी काली होने के कारण इस तेज वर्षा से पानी की काफी मात्रा इकट्ठी हो कर बहने लगती है। जब यह जल अनियंत्रित होकर कृषि योग्य भूमि से बहता है, तो भारी मात्रा में मिट्टी बह जाती है। वर्षा एवं जल बहाव, थमने पर कृषि भूमि पर छोटी-छोटी नालियाँ बन जाती हैं। धीरे-धीरे ये नालियाँ गहरे नालों के रूप में परिवर्तित हो जाती हैं। मिट्टी के कटाव की मात्रा भिन्न-भिन्न मिट्टियों में भिन्न-भिन्न पाई जाती है। काली



टेढ़ा-मेढ़ा नाला, उपचार के पहले

मिट्टी में यह मात्रा अधिकतम देखी गई है। मालवा क्षेत्र में काली मिट्टी के बहुतायत में होने से अधिकतर क्षेत्र मृदा क्षरण से प्रभावित है। यहाँ की काली मिट्टी में मोंटमोरेलोनाइट खनिज की अधिकता के कारण गीली होने पर फूलने एवं सूखने पर सिकुड़ने का गुण होता है, जिससे इस मिट्टी में कटाव अपेक्षाकृत अधिक होता है। इस मिट्टी के कण, तेज बहते हुए पानी द्वारा आसानी से बिखरकर बहने लगते हैं। साथ ही तीव्रता से बहता हुआ पानी जमीन को काटकर छोटे एवं बड़े नाले बना देता है, जो बाद में चौड़े एवं गहरे हो जाते हैं। ये नाले ऊपर की ओर बढ़ते हुए खेती योग्य मूल्यवान भूमि को बरबाद कर देते हैं। इस क्षेत्र की कृषि योग्य भूमि में ऐसे नाले निरंतर बढ़ते जा रहे हैं। ये नाले किसी भी खेत में बेतरतीब एवं अस्त-व्यस्त तरीके से बन सकते हैं, जिसमें उस खेत की उपयोगिता लगभग खत्म हो जाती है।

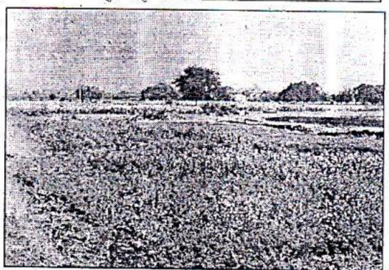
एक आकलन के अनुसार वर्ष १९९५-९६ में प्रति व्यक्ति भूमि उपलब्धता ०.१८ हैक्टेयर थी, जो वर्ष २००१ तक आते-आते ०.१४ हैक्टेयर हो गई है। भू-संसाधनों पर जनसंख्या के लगातार बढ़ते दबाव के कारण भूमि की उपलब्धता कम होती जा रही है। अतः ऐसी स्थिति में अनुपयोगी भूमि या अन्य कारणों से समस्याग्रस्त भूमियों को फसलोत्पादन हेतु उपयोग में लाना आवश्यक है।

बेतरतीब बनने वाले नाले और उससे होने वाला नुकसान प्रत्यक्ष रूप से इंदौर के प्रसिद्ध जैन तीर्थ गोम्मटगिरि से १ कि.मी. दूर ग्राम पीपल्यातापा के स्व. बलीरामजी के खेत में देखा जा सकता है। सन् १९८४ में लगभग समतल बताया गया खेत उचित रखरखाव के अभाव में नालों द्वारा कई भागों में बाँटा जा चुका है। मुख्य नाले की लंबाई लगातार बढ़ रही है। सन् १९९२ में जो लंबाई [illegible] मीटर थी, आज यह [illegible] मीटर हो गई है। इस नाले की अधिकतम चौड़ाई १२ मीटर एवं न्यूनतम चौड़ाई २.७ मीटर है। इसकी गहराई १ मीटर से ३.३ मीटर तक पाई गई है। इस प्रकार की विषम परिस्थितियों का सुधार अत्यंत महँगा व अव्यावहारिक हो जाता है। किसान की जागरूकता ऐसी स्थिति निर्मित होने से रोक सकती है। यदि अनियंत्रित जल अपवाह को धीमी गति और अलग-अलग कई स्थानों से सुरक्षित तरीके से निकाल दिया जाए तो खेत को खराब होने से बचाया जा सकता है। इस प्रकार की विषम परिस्थितियों से बचने के लिए खेत की मेढ़बंदी या मेढ़ बंधान, सुरक्षित निकास मार्ग एवं वानस्पतिक तथा खुले पत्थरों की संरचना से जल अपवाह की गति को कम करना आवश्यक है। कुछ हद तक गेबियन संरचनाओं का उपयोग कर कम लागत में गहरे नालों का उपचार किया जा सकता है।

ऐसी परिस्थितियों (उथले नालों का गहरे नालों में बदलना) से बचने के लिए उपयुक्त स्थानों पर कम लागत की तकनीक काम में लाई जा सकती है। आड़े-तिरछे व कम गहरे नालों के पानी को सीधा करके खेत से निकाला जाए तो खेतों को कटने व टुकड़ों में बँटने से रोका जा सकता है। इस हेतु आवश्यक है कि इस नाले को सीधा कर मुख्य नाले में जोड़ा जाए। इसमें यह सावधानी बरतना होगी कि इससे आगे वाले किसान की भूमि को कोई नुकसान न पहुँचे। इस कार्य में पहले मिट्टी की ऊपरी उपजाऊ सतह को बुलडोजर की सहायता से खुरचकर एक स्थान पर एकत्रित किया जाता है। बाद में नाले को सीधी लाइन से खोदकर फिर खुदाई में निकली हुई मिट्टी से इन आड़े-तिरछे नालों को पाट दिया जाता है। अंत में खुरची गई ऊपरी सतह की उपजाऊ मिट्टी को इन नालों में भरकर फसल उगाने के लायक बना लिया जाता है।

> मिट्टी के कण, तेज बहते हुए पानी द्वारा आसानी से बिखरकर बहने लगते हैं। साथ ही तीव्रता से बहता हुआ पानी जमीन को काटकर छोटे एवं बड़े नाले बना देता है, जो बाद में चौड़े एवं गहरे हो जाते हैं। ये नाले ऊपर की ओर बढ़ते हुए खेती योग्य मूल्यवान भूमि को बरबाद कर देते हैं।

इस प्रकार बनाए गए नाले की चौड़ाई बुलडोजर की ब्लेड की चौड़ाई के बराबर (यानी लगभग चार मीटर) होती है। इस कार्य को प्रारंभ करने के पहले यह ध्यान रखें कि नाले की गहराई बहुत अधिक यानी १.५ मीटर से ज्यादा न हो अन्यथा खर्च अधिक आएगा।



उपचार के बाद, नाला सीधा करने के बाद उपयोग में लाई जा रही भूमि

ऐसा ही एक प्रयास साँवेर ब्लॉक के बारोली ग्राम के श्री जगदीशसिंह तथा श्री जसवंतसिंह के खेत पर किया गया। उनके खेत का यह टुकड़ा सर्पाकार नाले के कारण कई भागों में बँट गया था। इसी वजह से पिछले १५-२० वर्षों से यह खेत अनुपयोगी पड़ा था। इस समस्या के निराकरण हेतु क्रियात्मक अनुसंधान परियोजना कृषि महाविद्यालय इंदौर के वैज्ञानिकों द्वारा तकनीकी सलाह दी गई। इसके उपचार हेतु बुलडोजर का प्रयोग कर इस नाले के पानी का निकास एक सीधी रेखा में किया गया। इसमें खेत का ढलान नाले का आकार व उसका ढलान इत्यादि बातों का ध्यान रखा गया। इस उपचार से बेतरतीब व बेढंगे नाले की लंबाई ११० मीटर से घटकर मात्र ९० मीटर रह गई। साथ ही इसकी चौड़ाई व गहराई एक-सी होकर आसपास की जमीन खेती योग्य हो गई।

इस पर कुल खर्च मात्र ८८०० रु. हुआ। इस प्रकार से १८०० वर्गमीटर जमीन न केवल कृषि उपज बढ़ाने में काम आई। वरन उस बेढंगे नाले से होने वाला अनियंत्रित मृदा क्षरण भी रुक गया। इस नाले के सरलीकरण से श्री जगदीशसिंह एवं श्री जसवंतसिंह को पहले वर्ष में ही सोयाबीन, गेहूँ, मटर व चने की उपज मिली बल्कि इस प्रयास से उक्त कृषि भूमि की बाजार मूल्य में भी अत्यधिक वृद्धि हुई। पहले इस जमीन से [illegible] भी नहीं मिलती थी इसमें पिछले साल ५ क्विंटल सोयाबीन, २ क्विंटल चने मिले जिसके करीब ४००० रुपए मिले।

(लेखकगण कृषि महाविद्यालय, इंदौर के कृषि वैज्ञानिक हैं।)

industry and that had resulted in roots and that was the only thing Punjab. after completion.

Water conservation scheme pays off

Amit Dube & Punya Priya Mitra
Indore, November 26

IT IS a veritable oasis in a desert and all this thanks to the series of small ponds and percolation tanks that dot the base of Reoti range in Sanver in Indore district.

At a time when most of the tube-wells and wells of the entire Sanver block, which has already been declared as a dark block due to depleted ground water, are bereft of water, the wells and tube-wells dotting in and around Baroli and Ringnodia villages are an envy of the other villagers since they are still full of water and are being used for irrigation.

The project under National Water Catchment Area Development Scheme was launched in April 1999 and the impact of the project is there for all to see. The water level in the area has increased all round and even though there has been very little rain, there is water in the tube-wells and they are being recharged due to the water in the ponds - that is mainly rainwater collected as runoff from the entire Reoti range. Earlier, the entire runoff water went waste during the monsoon. Now with the help of Gabion structure ponds and percolation tanks that consist of loose check boulders, the rainwater is prevented from going waste. The percentage of sowing in the region is over 40 and even without the winter rains the farmers of the area are confident that they are going to get a good harvest.

The contrast is there for all to see since in village Palia which is around 7 km from there, the situation is so bad that only 20 per cent of the fields have been brought under cultivation due to lack of water and drying tube-wells.

Green fields near the Chetna Kendra in village Baroli. (Inset): The map of the village.

HT PHOTO RAJENDRA MALVIYA

Tackling Drought

Kamal, a farmer in Ringnodia village, is very happy with the benefits the project has given him. He said that his well is around 60 feet deep and at present it has around 10-12 feet of water in it. He is using it to irrigate his fields and, after one irrigation, it takes him around a week for the well to recharge itself.

Same is the story at the Chetna Kendra just outside Baroli village. The well there has 15 feet water and the recharging is so good that water comes back to its original level within 12 hours. He has no doubt that the efficient recharging of the well is due to the project, for before the project was started the water level in his well was much lower. A look at the other farms in the neighbourhood also shows the impact of the project. There are flourishing crops all around and sufficient water.

Rajubai, who has a farm outside Ringnodia, just at the base of the Reoti range – has a well that is 40 feet deep, and now it has 8 feet of water in it. She also has a tube-well that is 350 feet and it is still giving water. Her lands are full of green vegetables that she is supplying to Indore.

The number of cattle heads has also increased in the Baroli village from 43 to more than 400 thanks to the water in the ponds.

6 दैनिक भास्कर इं·दौ·र इंदौर रविवार, 23 जनवरी 2005

जेतपुरा में बन गया एक और तालाब

इंदौर, 22 जनवरी•नसं। कृषि महाविद्यालय द्वारा सांवेर तहसील के ग्राम जेतपुरा को गोद लेने के बाद गांव में जल संग्रहण के लिए एक और तालाब बनकर तैयार हो गया। वहां पूर्व में भी एक तालाब बनाया जा चुका है।

भारतीय कृषि अनुसंधान परिषद नई दिल्ली ने सूखी खेती की क्रियात्मक अनुसंधान परियोजना शुरू की है। इंदौर जिले में इस परियोजना के लिए परिषद ने कृषि महाविद्यालय को अधिकृत किया है। कालेज द्वारा जेतपुरा में एक किसान के खेत में तालाब बनाने का काम शुरू किया गया था जो शनिवार को पूरा हो गया। इससे तीन हजार घन मीटर क्षेत्र में सिंचाई हो सकेगी।

इस काम को अंजाम दे रहे कालेज के प्रमुख वैज्ञानिक डा. आर.ए. शर्मा का कहना है वास्तव में यह प्रदर्शन मात्र था यानी किसानों को बताया गया कि वर्षा का पानी एकत्र कर उसका उपयोग सिंचाई के लिए किस तरह किया जा सकता है। इसके अलावा वहां पहाड़ी के पास जल मोड़ बंधान बनाए गए हैं जिससे बहकर आने वाला बारिश का पानी सीधे खेत तक नहीं पहुंचेगा। पहाड़ी से आने वाले पानी से फसल नष्ट भी हो जाती है और जमीन का कटाव भी होता है।

ढीले पत्थरों की संरचना

जेतपुरा में ढीले पत्थरों की संरचना भी जगह-जगह की गई और बताया गया कि उससे फसल का बचाव और पानी का सिंचाई में बेहतर उपयोग कैसे किया जा सकता है। इसके लिए पत्थरों के बीच जालियां लगाई गई हैं जिससे पानी छनकर खेत में पहुंचता है।

क्या होता है कांस का पौधा?

खेत में कांस नामक एक पौधा होता है जिसकी जड़ें डेढ़ से दो फीट गहरी होती हैं। इन पौधों की बहुतायत होने पर फसल नहीं पनपती। जेतपुरा में कांस की जड़ें मशीन द्वारा निकालकर किसानों को शिक्षित किया जा रहा है।

अनुपयोगी जल का इस तरह हो रहा है उचित उपयोग

हर्षलसिंह राठौड़

इंदौर। इस साल कृषि महाविद्यालय में फसल ने आश्चर्यजनक परिणाम दिखाए हैं। कृषि महाविद्यालय में इस बार न केवल अच्छे बीज उत्पन्न किए गए हैं, वरन गर्मी के मौसम में वह फसल भी लगाई गई है जिसके लिए यह मौसम उपयुक्त नहीं माना जाता है और यह सब संभव हो रहा है पर्याप्त पानी के कारण। जल संरक्षण की बात को ध्यान में रखते हुए कृषि महाविद्यालय में यह अहम निर्णय लिया गया था, जिसके परिणाम आज हम सभी के समक्ष है।

खेत और तालाब दोनों का है ध्यान

कृषि महाविद्यालय परिसर में भी लगातार गिरते भूजल स्तर और बढ़ती पानी की आवश्यकता को देखते हुए एक ऐसा प्रयास किया गया जो निश्चित ही स्वागत योग्य है। महाविद्यालय द्वारा सन् 2000 में एक तालाब का निर्माण किया गया जिसमें न केवल बरसात के पानी को सहेजा जाता है वरन उस जल को भी सहेजा जाता है, जिसे व्यर्थ समझकर हम यूँ ही बहने देते हैं। इस तालाब में पिपल्याहाना गाँव से बहकर आने वाले पानी को एकत्रित किया जाता है जिसका उपयोग खेतों में सिंचाई के लिए होता है। 5000 क्यूबिक मीटर की क्षमता वाले इस तालाब में अब वर्ष भर पानी रहता है। तालाब के एक ओर पत्थरों की दीवार कुछ इस तरह से बनाई गई है कि बारिश में तालाब की क्षमता से अधिक पानी हो जाने पर पानी खेतों में न आने पाए और सही दिशा में बह निकले। वहीं खेत का वह भाग जिसका ढलान तालाब की तरफ है वहाँ भी पत्थरों की दीवार को तार के जाल से बाँधा गया है ताकि दीवार टूटे भी नहीं और खेत की मिट्टी पानी के साथ तालाब में न जाने पाए और पत्थरों की दीवार के सहारे रुक जाए।

लैब में टेस्ट करके करते हैं सिंचाई

कई सालों से बने इस तालाब के कारण आज न केवल सिंचाई बेहतर ढंग से हो पा रही है वरन भूजल स्तर भी काफी बढ़ा है। पानी सिंचाई के लिए उपयुक्त है या नहीं इसके लिए कॉलेज में भूमि परीक्षण के साथ जल परीक्षण लैब भी बनाई गई है, जहाँ समय-समय पर पानी जाँचा जाता है। यही नहीं माह में एक बार तालाब की सफाई भी की जाती है। चूँकि तालाब के पानी का प्रयोग प्रतिदिन होता है इसलिए तालाब में पानी ज्यादा मात्रा में ज्यादा दिन तक रह नहीं पाता जिसका परिणाम यह होता है कि पानी में न तो अधिक गंदगी नजर आती है और न ही दुर्गंध उत्पन्न हो पाती है। यही नहीं इस कारण यह पानी फसल के लिए भी उपयुक्त साबित हो रहा है।

उद्देश्य पूर्ण हो रहा है

कृषि महाविद्यालय के डीन श्री एसएल नाईक का कहना है कि जिस उद्देश्य को लेकर तालाब का निर्माण किया गया था, वह उद्देश्य आज पूरा हो रहा है। कॉलेज परिसर के खुदे 5 कुएँ और 7 ट्यूबवेल में इस बार पानी पर्याप्त मात्रा में है। चूँकि तालाब के पानी से ही सिंचाई अच्छे से हो जाती है इसलिए कुएँ और ट्यूबवेल का पानी केवल पीने के काम में ही लिया जा रहा है। तालाब के बनने से न केवल कॉलेज परिसर के भूमिगत जल स्रोतों में पर्याप्त पानी है, वरन आसपास के क्षेत्रों का भी भूजल स्तर बढ़ा है। इसके अलावा खेती भी इस वर्ष बहुत अच्छी हो रही है। तालाब का एक भाग खुला रखा गया है ताकि पशु भी पानी पी सकें।

इस मौसम में हो रही है मूँग की खेती

फॉर्म इंचार्ज डॉ. एमके सक्सेना बताते हैं कि इस बार आश्चर्यजनक फसल उत्पन्न हुई है। गेहूँ की फसल में तीन से चार बार सिंचाई की आवश्यकता होती है और यह जरूरत तालाब के पानी से ही पूरी की गई थी। इस साल गेहूँ 460 क्विंटल उत्पन्न हुआ और चना 360 क्विंटल। मूँग की खेती जो अमूमन बारिश में होती है वह महाविद्यालय में गर्मी के मौसम में की जा रही है और इसकी भी सिंचाई तालाब के पानी से ही हो रही है। इस मौसम में मूँग के बीज उत्पन्न करने का मुख्य उद्देश्य यह है कि जब मूँग की खेती का दौर प्रारंभ हो तब किसानों के पास उन्नत बीज हो। तीन हैक्टेयर में जेएम 721 और एचयूएम 1 मूँग के बीज उत्पन्न किए जा रहे हैं।

जल संरक्षण से कृषि बनेगी फायदेमंद सौदा

वर्षा की कमी और गिरते वाटर लेवल के चलते वर्तमान में खेती के लिए जल संरक्षण सबसे अहम मुद्दा बन गया है। वैज्ञानिकों के प्रयासों से जहां जल संरक्षण की कई नई तकनीकें विकसित हो गई हैं, वहीं किसान वर्ग भी खेती को आर्थिक रूप से लाभदायक बनाने के लिए इस ओर ध्यान देने लगे हैं।

■ संजय गुप्ता

इंदौर। बिन पानी सब सून की उक्ति खेती के लिए बिल्कुल सही बैठती है। जिन किसानों के पास पानी पर्याप्त है, वे खरीफ, रबी के अलावा जायद फसलें भी आराम से ले रहे हैं और दूसरे किसानों की तुलना में दोगुना लाभ ले रहे हैं।

क्या है जल संरक्षण

बारिश के पानी को भविष्य के लिए सहेजना ही जल संरक्षण है। इसके लिए स्टॉपडेम, रिसन तालाब, जल संग्रहण तालाब आदि का निर्माण किया जाता है। कृषि अनुसंधान संस्थान, इंदौर में डॉ. दीपक हरि रानडे, जीतेंद्र सिंह, नवीन कुमार और रेणु शुक्ला की एक टीम इसी विषय पर रिसर्च कार्य कर रही है। डॉ. रानडे बताते हैं कि वर्तमान में जल संरक्षण के लिए संग्रहण तालाब किसानों के लिए सबसे अधिक फायदेमंद होता है।

संग्रहण तालाब– यह तालाब ऐसी जमीन पर बनाया जाता है जिसमें रिसन नहीं होता है। इन तालाबों में वर्षा का और बहकर आया पानी जमा हो जाता है, जिससे किसान रबी की फसलों के अलावा जायज फसलों की भी इस पानी से सिंचाई कर पाते हैं। डॉ. रानडे बताते हैं कि किसानों को तालाब ऐसी जमीनों पर बनवाना चाहिए जहां वर्षा का पानी बहकर आता हो साथ ही जमीन में रिसन की समस्या न हो। इससे तालाब में पानी का संग्रह अच्छा होता है। ये तालाब जमीन के आधार पर गोलाकार, वर्गाकार, सर्पिलाकार आदि आकार के होते हैं।

रिसन तालाब– इस तरह के तालाब वाटर लेवल बढ़ाने के लिए बनाए जाते हैं। ये ऐसी जमीनों पर बनते हैं जिसमें पानी रुकता नहीं है, बल्कि रिसकर जमीन के अंदर चला जाता है। सामान्यतः किसानों के लिए ये तालाब अधिक लाभदायक नहीं होते हैं।

स्टॉपडेम– यह वर्षा के पानी को अस्थायी रूप से रोकने का तरीका होता है। इस विधि में किसी गहरी जमीन या नाले में थोड़ी-थोड़ी दूरी पर पत्थर, रेत की बोरी आदि की मदद से अस्थायी जल संग्रहण टैंक बना लिए जाते हैं, इससे जहां वाटर लेवल बढ़ता है, वहीं वर्षा अंतराल ज्यादा होने पर इनसे सिंचाई भी की जा सकती है।

किसानों ने बनवाए तालाब

कृषि कॉलेज इंदौर में वर्ष 2000 में मात्र 1लाख 85000 रुपए की लागत से 70 लाख लीटर की क्षमता वाला तालाब बनाया गया था। डॉ. रानडे बताते हैं कि इसी से प्रेरित होकर कई किसानों ने उनकी टीम की मदद से अपने खेतों में तालाब बनवाए हैं। ग्राम पानोड़ में किसान लक्ष्मणसिंह चौहान, ग्राम डकाच्या में किसान संतोष चौधरी आदि ने अपने खेतों में तालाब बनवाए हैं।

जल संरक्षण से लाभ

1. किसान खरीफ, रबी के अलावा खाली समय में सब्जियां भी ले सकते हैं।
2. वर्षा के दिनों में अंतर अधिक होने पर फसलें सूखने लगती हैं, उस समय यह संरक्षित जल फसलों के काम आता है।
3. गेहूं की फसल को तीन बार पानी मिल जाता है, जिससे उत्पादन डेढ़ गुना तक मिल जाता है।
4. अधिक उन्नत बीजों के लिए अधिक पानी की जरूरत होती है। इस संरक्षित जल से यह कमी पूरी हो जाती है।
5. आर्थिक रूप से भी यह अधिक महंगा नहीं पड़ता है, साथ ही पानी के कारण मिले अतिरिक्त उत्पादन से यह खर्चा भी दो सालों में ही पूरा हो जाता है।

■ नेहा ठाकुर

रूफ वाटर हार्वेस्टिंग के साथ-साथ शहर में वाटर रिचार्जिंग के अन्य तरीकों को भी आजमाया जा रहा है। एग्रीकल्चर कॉलेज में अपनाई गेबियन स्ट्रक्चर तकनीक ने न केवल सिंचाई के लिए पर्याप्त पानी उपलब्ध कराया, बल्कि क्षेत्र में भूजल स्तर को भी सुधारा।

एग्रीकल्चर कॉलेज ने संवार दिया क्षेत्र को

इंदौर। बारिश आते ही सभी को वॉटर रिचार्जिंग की चिंता होने लगी है। नीचे जाते भूजल स्तर को देखते हुए शहर में कई लोगों ने वाटर रिचार्जिंग के लिए रूफ वाटर हार्वेस्टिंग को अपनाया, तो कुछ ने इसके लिए कवायद शुरू कर दी है। इस मुद्दे की जानकारी अधिक से अधिक लोगों तक पहुंचाने की मुहिम में राज एक्सप्रेस ने गेबियन स्ट्रक्चर के बारे में जानकारी संजोने का प्रयास किया है।

इंदौर के रहवासियों को रूफ वाटर हार्वेस्टिंग के संबंध में जागरूक करने के इस अभियान में बहुत हद तक सफलता मिल रही है। राज एक्सप्रेस के दफ्तर में फोन लगाकर इस संबंध में जानकारी हासिल करने वालों की संख्या भी कम नहीं रही। कुछ ने तो बाकायदा रूफ वाटर हार्वेस्टिंग और वाटर रिचार्जिंग के अन्य तरीकों को अपनाने के लिए प्रयास शुरू कर दिए हैं।

गांवों के लिए भी कारगर

इसी कड़ी में कृषि महाविद्यालय कैम्पस में वॉटर रिचार्जिंग के लिए गेबियन स्ट्रक्चर को अपनाया गया है। महाविद्यालय के वैज्ञानिकों का कहना है कि इस स्ट्रक्चर को यदि ग्रामीण इलाकों में अपनाया जाए, तो काफी हद तक सिंचाई की समस्या से निजात पाई जा सकती है। इससे न केवल भूजल स्तर बढ़ाने में मदद मिल रही है, बल्कि उच्च श्रेणी की गुणवत्ता वाली फसल भी ली जा सकती है।

सबसे आसान और टिकाऊ तकनीक

गेबियन स्ट्रक्चर पानी रोकने की सबसे आसान और टिकाऊ तकनीक है। इस प्रक्रिया के तहत वर्षा जल बहाव वाले नालों और छोटी नालियों को एक तालाब में मिलाया जाता है। इन नालों पर छोटे-छोटे स्टॉपडेम बनाए जाते हैं। यह स्टॉपडेम एरन (बड़े पत्थर) को जमाकर बनाया जाता है, जिसमें सीमेंट का उपयोग नहीं होता है। पत्थरों की मजबूती के लिए लोहे की जाली से उन्हें कसा जाता है। बारिश में इन नालों से पानी ओवरफ्लो होकर बड़े तालाब में जमा हो जाता है। तालाब में भी एरन जमाकर ढलान पर सीढ़ीनुमा संरचना बनाई जाती है। इन सभी संरचनाओं को लोहे की जाली से कसा जाता है, जिससे मिट्टी का क्षरण तो रुकता ही है, साथ ही लम्बी अवधि के लिए पानी भी जमा हो जाता है। स्ट्रक्चर को नुकसान पहुंचाए बगैर अतिरिक्त पानी बह जाता है, जिसे छोटी-छोटी नालियों के रूप में खेतों की ओर मोड़ दिया जाता है। रिचार्जिंग और वाष्पीकरण के लिए यह तरीका अत्यंत कारगर साबित हुआ है।

गेबियन स्ट्रक्चर से होती है सिंचाई

एग्रीकल्चर कॉलेज क्षेत्र में सन 2003 में बनकर तैयार हुए गेबियन स्ट्रक्चर से कैम्पस की लगभग 60 एकड़ भूमि की सिंचाई की जाती है। 150 मीटर लंबे तालाब में सात हजार क्यूबिक मीटर पानी आ जाता है।

आसपास के इलाके भी हो गए समृद्ध

एग्रीकल्चर कॉलेज के सीनियर साइंटिस्ट डीएच रानाड़े का कहना है कि इस स्ट्रक्चर से न केवल एग्रीकल्चर कॉलेज में सिंचाई की समस्या का समाधान हुआ है, बल्कि आसपास के इलाकों का भूजल स्तर भी सुधरा है। आसपास के इलाकों में अब गरमियों में बोरिंग सूखने की समस्या नहीं है, जो कुछ साल पहले तक लोगों के लिए परेशानी का सबब बना हुआ था।

सालभर नहीं होती पानी की दिक्कत

एग्रीकल्चर कॉलेज में अपनाए मॉडल की बदौलत क्षेत्र के बोरिंग भी सालभर आबाद रहते हैं। आसपास के रहवासियों को भी पानी के लिए दिक्कतों का सामना नहीं करना पड़ता। वैज्ञानिकों के अनुसार इस पद्धति का उपयोग ग्रामीण इलाकों में किया जा सकता है।

एक गाँव, दो तालाब और ढेर-से फायदे

डॉ. दीपक हरि रानडे

ग्राम डकाच्या इंदौर जिले की साँवेर तहसील में इंदौर से २० कि.मी. की दूरी पर आगरा-मुंबई राष्ट्रीय राजमार्ग के किनारे स्थित है। वैसे तो यह एक संपन्न ग्राम है, परंतु यहाँ दो-दो बड़े तालाब होने के बावजूद गाँव भूजल की कमी से प्रभावित रहता है। उदाहरण के तौर पर कृषक शिवनारायण ने अपने खेत में करीब १४ ट्यूबवेल करवाए, जिनमें से केवल दो से ही सीमित मात्रा में पानी मिल रहा है, जिससे कुछ ही खेतों में रबी फसलों की सिंचाई की जा सकती है। ऐसे कई और उदाहरण हैं जो यह दर्शाते हैं कि ग्राम डकाच्या भूजल की कमी से ग्रसित है।

क्षेत्र की मिट्टी काफी उपजाऊ है और यदि फसलों में एक या दो अतिरिक्त सिंचाई प्रदान की जाए तो उत्पादन में वृद्धि हो सकती है। काली मिट्टी से जल-अपवाह काफी मात्रा में होता है और यदि इसे उचित स्थान पर एकत्रित किया जाए तो इस संग्रहीत जल का उपयोग फसलों की सिंचाई, मछली पालन इत्यादि में किया जा सकता है। इस हेतु तालाब बनाना ही एकमात्र उपाय है।

इसी अवधारणा को ध्यान में रखते हुए ग्राम डकाच्या में अप्रैल-२००५ में एक वर्षा जल प्रबंधन परियोजना (जो कि कृषि अनुसंधान परिषद नई दिल्ली द्वारा पोषित है) प्रारंभ की गई है। इस परियोजना का मुख्य उद्देश्य वर्षा जल प्रबंधन हेतु आर्थिक रूप से संभावित जल संग्रहण तालाबों का विश्लेषण करना है।

सामान्यत: कई क्षेत्रों में काली मिट्टी के नीचे की परत मुरम की होती है, जिसमें से पानी रिसकर नीचे चला जाता है। ऐसी जगह जल संग्रहण तालाब न बनकर वह जल रिसन तालाब बन जाता है। हालाँकि जल रिसन तालाब के भी अपने फायदे हैं। परंतु यदि किसी किसान ने एक बड़ी राशि खर्च कर अपने खेत के एक हिस्से में ऐसा तालाब बनाया हो तो उसे उसमें पानी न रुकते देखकर काफी निराशा होती है। सौभाग्य से डकाच्या क्षेत्र में गहरी काली मिट्टी है और उसके नीचे पीली मिट्टी की परत पाई जाती है।

सामान्यत: तालाब ३ प्रकार से बनाए जा सकते हैं। पहाड़ी क्षेत्रों में बंधान बनाकर, समतल क्षेत्रों में खोदकर व नालों के आसपास खोदकर तथा बंधान बनाकर। चूँकि डकाच्या क्षेत्र में पहाड़ी क्षेत्र शामिल नहीं है अत: दो प्रकार के तालाब यहाँ बनाए गए।

ये तालाब कृषक बंधु संदीप पटेल व प्रसन्ना के खेत में उचित स्थान पर समतल क्षेत्र को खोदकर बनाए गए। यह स्थान इस प्रकार चुना गया जहाँ ऊपर के खेतों से पानी बहकर आता हो। सामान्यत: तालाब खोदने के लिए जेसीबी मशीन का उपयोग किया जाता है। खोदी गई मिट्टी को डम्पर या ट्रैक्टर-ट्रॉली के माध्यम से खेत के निचले व असमतल हिस्सों में डालकर उसे समतल बनाया गया। साथ ही खोदी गई मिट्टी से ही तालाब के प्रक्षेत्र को बंधान का रूप देकर आयातकार रूप दिया गया।

चूँकि यह तालाब जमीन को खोदकर बनाया है, इसलिए इसके टूटने की संभावना नहीं होती है। तालाब बनाने के दौरान यह सुनिश्चित होना चाहिए कि तालाब भरने पर खेतों में जल भराव की समस्या न होने पाए। इस साल एक अगस्त-२००५ की भारी बारिश ने इन दोनों तालाबों को भर दिया है और इनमें क्रमश: ३०५० और २९३० घनमीटर जलराशि एकत्रित की गई।

दूसरे प्रकार के तालाब के निर्माण हेतु शिवनारायण चौधरी के खेत का चयन किया गया। आगरा-मुंबई राजमार्ग से आने वाली एक पुलिया से आने वाला जल-अपवाह इस खेत के बीच से निकलता है। इस कारण यह भूमि दो हिस्सों में बँट गई है। इन दोनों भूमियों के बीच में एक लंबा व चौड़ा सर्पाकार नाला बन गया था। इसी नाले को गहरा व चौड़ा कर मिट्टी के बंधान की सहायता से तालाब निर्माण का प्रयास किया गया। नाले के खोदे गए हिस्से में जल संग्रहीत किया जाना था व मिट्टी के बंधान की सहायता से एक निश्चित मात्रा का जल रोककर अतिरिक्त जल को निकास प्रदान करना था।

कई जगह सीमेंट की सहायता से स्टॉपडेम बनाकर पानी कई जगहों पर रोका गया है, परंतु यह देखा गया है कि इन स्टॉपडेमों में गेट के माध्यम से जल सितंबर माह में ही रोका जा सकता है। साथ ही काली मिट्टी के फैलने व सिकुड़ने की क्षमता के कारण इनमें टूटफूट की संभावना भी काफी बनी रहती है। अत: जल निकासी के लिए गेबियन संरचना, जो कि लचीली व टिकाऊ होती है, का निर्माण किया गया। एक अगस्त २००५ जैसी भारी बारिश व उसके उपरांत होने वाले जल-अपवाह को संग्रहीत कर अतिरिक्त जल को सुरक्षित तरीके से खेत से बाहर निकालने में गेबियन अधिक कारगर होते हैं। इस भारी जल-अपवाह के दौरान गेबियन संरचना को तकनीकी रूप से कोई नुकसान नहीं पहुँचा बल्कि मिट्टी के बंधान की कुछ मिट्टी बह गई। अत: सहज ही अनुमान लगाया जा सकता है कि गेबियन संरचना के अभाव में मिट्टी का बंधान कभी भी टूट सकता था। केवल मिट्टी के बंधान से बनाए गए तालाबों में टूटफूट के समाचार अन्य स्थानों से बारिश के दौरान सुने जा चुके हैं। अत: दूसरे प्रकार के तालाब निर्माण में अतिरिक्त सावधानी के साथ-साथ जल निकास के लिए लचीली व टिकाऊ गेबियन संरचना का निर्माण भी आवश्यक है।

एक अगस्त २००५ की बारिश के बाद लगभग २०-२५ दिनों तक बारिश न होने से सोयाबीन की फसलों को नुकसान होने की आशंका थी। इस दौरान उक्त तालाबों से किसानों ने फव्वारा सिंचाई पद्धति से फसलों में जान डाली और फसल को बचाया। सितंबर की बारिश से न केवल ये तालाब पुन: भर गए बल्कि इस बारिश से रबी फसलों की संभावना भी बढ़ गई।

परियोजना के उद्देश्यों के अनुसार इन तालाबों में मछली पालन को प्रोत्साहन देने हेतु इनमें मछलियों के बच्चे, जो कि मत्स्य विभाग इंदौर से प्राप्त किए गए, छोड़े गए हैं। परियोजना का उद्देश्य न केवल जल संग्रहण को बढ़ावा देना है, बल्कि इन तालाबों के अन्य उपयोगों से किसान की आमदनी को बढ़ाना भी है।

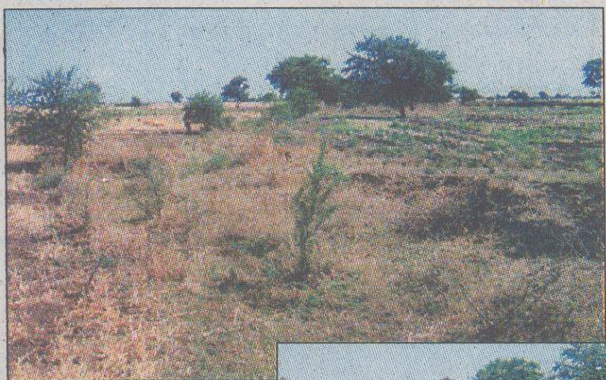
जल एवं मृदा संरक्षण की उपयोगी तकनीक

• डॉ. दीपक हरि रानडे एवं एम.सी. चौरसिया

मालवा क्षेत्र सामान्यतः तो पठार क्षेत्र है परंतु कई खेतों के पास छोटी-मोटी ऊँची पहाड़ियाँ भी होती हैं।

मालवा क्षेत्र की औसत वर्षा लगभग १००० मि.मी. है। इस क्षेत्र में काली मिट्टी पाई जाती है, जिसमें जल-अपवाह की मात्रा अन्य किस्म की मिट्टियों की तुलना में अधिक होती है। अतः पहाड़ी क्षेत्रों से लगी हुई कृषि भूमियों में भू-क्षरण की संभावना अधिक बनी रहती है क्योंकि इन पहाड़ी क्षेत्रों से (जो कि प्रायः वनस्पति व मृदारहित होती है) बहता हुआ पानी (जल-अपवाह) तेजी से नीचे स्थित कृषि भूमियों की तरफ भागता है। यह जल-अपवाह इन कृषि भूमियों में भू-क्षरण को बढ़ावा देता है व खेतों को कई नालियों के रूप में बदल सकता है। यह समस्या उस समय और गंभीर हो जाती है जब कई खेतों से निकलने वाला जल-अपवाह एक जगह एकत्रित होकर किसी खास खेत से गुजरता है। इस प्रकार जल-अपवाह की मात्रा व गति बढ़ने के कारण यह खेत कई हिस्सों में बँट जाता है और कृषि योग्य नहीं रह जाता है। हालाँकि इस समस्या का समाधान आसान नहीं होता है परंतु कुछ परिस्थितियों में उचित जल निकास नालियों के निर्माण से इस समस्या से काफी हद तक छुटकारा पाया जा सकता है।

ऐसा ही एक प्रयास क्रियात्मक अनुसंधान परियोजना (शुष्क खेती) कृषि महाविद्यालय, इंदौर के वैज्ञानिकों द्वारा इस परियोजना के अंतर्गत साँवेर तहसील के ग्राम जैतपुरा में किया गया। जैतपुरा से मुंडला हुसैन व धनखेड़ी मार्ग पर स्थित कृषक छगनलाल इस समस्या से कई वर्षों से ग्रसित थे। उनके खेत से पहाड़ी क्षेत्र व उनसे लगे कई खेतों का जल-अपवाह बरसात के दिनों में तेजी से बहता था। इस कारण खेत में सर्पाकार नालियाँ बनकर वह कई हिस्सों में बँट चुका था। इस भूमि के कुछ ही हिस्सों में फसलोत्पादन संभव हो पाता था। साथ ही भू-क्षरण के कारण इनके खेत की उत्पादन क्षमता भी काफी कम हो गई थी। इस समस्या का समाधान मुख्य रूप से था जल-अपवाह को इनके खेतों से दूर रख जल का सुरक्षित निकास किया जाए।



उपचार के पहले ▲
उपचार के बाद ►

इस कार्य हेतु जे.सी.बी. मशीन का उपयोग कर इनके खेत के ठीक सामने एक २२५ मी. लंबी व गहरी नाली (जिसकी गहराई १.३० मी. व चौड़ाई १.२० मी. रखी गई) खोदी गई। इस नाली को प्राकृतिक रूप से बहने वाले एक बड़े नाले से जोड़ दिया गया। इस समरूप नाली से बरसात के दिनों में ऊपरी खेतों से आने वाला जल-अपवाह खेतों में न जाते हुए उस प्राकृतिक नाले से निकलने लगा। इस नाली की खुदाई से निकलने वाली काली मिट्टी को खेत के निचले हिस्सों, गड्ढों व नालियों में भरकर उस क्षेत्र को समतल कर दिया गया। इस प्रकार लगभग २५०० वर्ग मी. का नया हिस्सा समतल होकर खेती करने योग्य बनाया।

मार्च २००५ में किए गए इस कार्य का परिणाम अगस्त २००५ में सामने आया। छगनलाल ने जुलाई माह में पूरे खेत में सोयाबीन लगाई। १ अगस्त २००५ को लगभग ८ इंच बारिश इस क्षेत्र में नापी गई। वर्षा की इस तीव्रता से सहज ही अनुमान लगाया जा सकता है कि पहाड़ी क्षेत्र से कितनी मात्रा में जल-अपवाह हुआ होगा। यह सभी जल-अपवाह छगनलाल के खेत से निकल सकता था और भारी तबाही मचा सकता था, यदि इस जल निकास नाली का निर्माण नहीं किया जाता। इस नाली की दशा देखकर सहज ही कल्पना हो उठती है कि इनकी उपयोगिता खेतों को बचाने में कितनी सार्थक है।

छगनलाल इन सभी प्रयासों से काफी खुश हैं। वे जानते हैं कि इस नाली की बदौलत उन्होंने न केवल अपनी फसल, खेत की मिट्टी इत्यादि को बचाया है बल्कि पूर्व में कई टुकड़ों में बँटे खेत के समतल हो जाने से इसका बाजार मूल्य भी बढ़ गया है।

अतः जल एवं मृदा संरक्षण की इस तकनीक से मालवा क्षेत्र में पाई जाने वाली ऐसी भौगोलिक परिस्थितियों का मुकाबला कर भूमि क्षरण को रोककर कृषि उत्पादन व कृषि योग्य भूमि के क्षेत्र में वृद्धि की जा सकती है। ■■

सफलता गाथा

मछली–मछली, वर्षा पानी

डा. दीपक हरि रानडे, जितेन्द्र सिंह और नवीन कुमार
शुष्क खेती परियोजना, कृषि महाविद्यालय, इंदौर, म.प्र.

इंदौर से 20 कि.मी. की दूरी पर आगरा–मुंबई राष्ट्रीय सड़क मार्ग के किनारे सांवरे तहसील का एक ग्राम डकाच्या है, वैसे तो यह एक सम्पन्न ग्राम है। यहां बहुत सारे किसानों के पास कृषि के आधुनिक यंत्र–ट्रैक्टर व पशुधन मौजूद हैं। इस गांव का कुल रकबा 1250 हैक्टर है और लगभग इसमें 302 ट्यूबवैल मौजूद हैं। मगर दुख की बात यह है कि यह गांव दो बड़े–बड़े तालाबों की मौजूदगी के बावजूद भू–जल की कमी से प्रभावित रहता है। उदाहरण के तौर पर कृषक श्री शिवनारायण ने अपने खेत में करीब 14 बोरिंग (ट्यूबवैल) खोदे थे जिनमें से केवल दो ही सीमित मात्रा में जल प्रदान करते हैं, जिससे रबी फसलों की सिंचाई भी कुछ ही खेतों में की जा सकती है। ऐसे तमाम उदाहरण सामने हैं जो यह दर्शाते हैं कि ग्राम डकाच्या में भू–जल का टोटा है, मगर गर्व की बात यह है कि इस क्षेत्र की मिट्टी काफी उपजाऊ है और यदि फसलों को एक या दो अतिरिक्त सिंचाई प्रदान की जाये तो उत्पादन में बढ़ोतरी की जा सकती है। चूंकि काली मिट्टी से जल अपवाह काफी मात्रा में होता है और यदि इसे उचित स्थान पर एकत्रित किया जाये तो इस संग्रहित जल का उपयोग फसलों की सिंचाई, मछली पालन इत्यादि में किया जा सकता है। इसे संग्रहित करने हेतु तालाब का निर्माण ही एकमात्र उपाय होगा जोकि किसान–व्यक्तिगत रूप से अपने खेत के हिस्सों में बना सकते हैं।

इस अवधारणा को ध्यान में रखते हुए ग्राम डकाच्या में अप्रैल 2005 से एक वर्षा जल प्रबंधन परियोजना जो कि भारतीय कृषि अनुसंधान परिषद्, नई दिल्ली द्वारा पोषित है, प्रारंभिक की गयी है। इस परियोजना का उद्देश्य वर्षा जल प्रबंधन हेतु आर्थिक रूप से संभावित जल संग्रहण तालाबों का विश्लेषण करना है।

सामान्यतः कई क्षेत्रों में काली मिट्टी के नीचे की परत मुरम की होती है जोकि पानी को रोककर संग्रहित नहीं कर पाती बल्कि उसे जमीन में रिसा देती है। इस प्रकार जल–संग्रहण तालाब न बनकर वह जल–रिसन तालाब हो जाता है। हालांकि जल–रिसन तालाब के भी अपने फायदे हैं, परंतु यदि किसी किसान भाई ने एक बड़ी राशि खर्च कर अपने खेत के एक हिस्से में ऐसा तालाब बनवाया हो तो उसे जल की रिसाव दर से संग्रहित न होने वाले तालाब को देखकर काफी निराशा होती है। सौभाग्य से डकाच्या क्षेत्र में गहरी काली मिट्टी है और उसके नीचे की परत पीली मिट्टी की पायी जाती है जिसमें प्रसाव दर नगण्य होती है और वर्षा जल को इस प्रकार खोदे गये तालाब में काफी दिनों तक संग्रहित किया जा सकता है।

और कारवां आगे बढ़ा

परियोजना के दौरान ऐसे कुल तीन क्षेत्रों का चुनाव किया गया जहां पर वर्षा जल को संग्रहित किया जा सके। सामान्यतः तालाब तीन प्रकार से बनाये जा सकते है। पहाड़ी क्षेत्रों में बन्धान बनाकर, समतल क्षेत्रों में खोदकर व नालों के आस–पास खोदकर व बन्धान बनाकर। चूंकि डकाच्या क्षेत्र में पहाड़ी क्षेत्र शामिल नहीं है अतः दो प्रकार के तालाब यहां बनाये गये।

खोदे गये तालाब कृषक–बन्धु श्री संदीप पटेल व श्री प्रसन्ना के खेत में उचित स्थान देखकर बनाये गये। यह स्थान इस प्रकार चयनित किया गया कि इस क्षेत्र में आने वाला जल–अपवाह ऊपर के खेतों से आता हो। सामान्यतः तालाब खोदने के लिए जे.सी.बी. मशीन का उपयोग किया जाता है। खोदी गयी मिट्टी को डम्पर या ट्रैक्टर–ट्रॉली के माध्यम से खेत के निचले व असमतल हिस्सों में डालकर उसे समतल बनाया गया। साथ ही खोदी गयी मिट्टी से ही तालाब के प्रक्षेत्र को बन्धन का रूप देकर आयताकार रूप दिया गया।

इस प्रकार बनाये गये तालाब की खासियत यह होती है कि तालाब में पानी भरने के उपरान्त अतिरिक्त जल जैसा पूर्व में (तालाब निर्माण के पूर्व) जिस जल–मार्ग से बहकर निकलता था, वैसा ही अब तालाब भरने के बाद निकलता है। चूंकि यह तालाब जमीन को खोदकर बनाया जाता है, इसके टूटने की सम्भावना बिल्कुल भी नहीं होती है। तालाब बनाने के दौरान यह सुनिश्चित होना चाहिए कि तालाब भरने पर खेतों में जल भराव की समस्या न होने पाये। सन् 2005 की भारी बारिश ने इन दोनों तालाबों को भर दिया था और इसमें क्रमशः 3050 और 2930 घन मी. जलराशि एकत्रित की गयी।

दूसरे प्रकार के तालाब के निर्माण हेतु श्री शिवनारायण चौधरी के खेत का चयन किया। यह कृषि भूमि आगरा–मुंबई सड़क राष्ट्रीय सड़क मार्ग से आने वाली एक पुलिया

कृषक जगत
संपूर्ण कृषि अखबार

6

कृषक जगत
29 जनवरी से 4 फरवरी 2001

गेबियन- एक बहु लाभकारी संरचना (ढांचा)

● डॉ. दीपक हरि रानडे,
● ललित कुमार जैन,
● अरविंद सिंह तोमर
● सुनील विश्वकर्मा
तदर्थ परियोजना,
कृ. महाविद्यालय, इंदौर (म.प्र.)

मालवा क्षेत्र में नालों में काली मिट्टी की जमा हो रही गाद भराव को रोकने के लिए जिन ढांचों (संरचनाओं) का उपयोग किया जा रहा है उन्हें गेबियन कहते हैं. ये कैसे उपयोग की जाएं, इनके क्या लाभ हैं आदि की जानकारी इस परियोजना पर कार्यरत कृषि वैज्ञानिकों द्वारा प्रस्तुत लेख में दी जा रही है.

मोन्टमोरिलोनाइट मृतिका की मात्रा अधिक होने के कारण मालवा-निमाड़ की मिट्टी में सूखने पर सिकुड़ने एवं गीली होने पर अत्यधिक फैलने की प्रवृत्ति होती है. यह मिट्टी गीली होने पर सहजता से टूट जाती है और वर्षा की भारी बूंदों व तेज बहते हुए जल के साथ ये सूक्ष्म कण विस्थापित हो शीघ्रता से दूर चले जाते हैं. मिट्टी की ऊपरी सतह पर पानी की भारी बूंदों के टकराने से यह कण विछिन्न हो, पानी से संतृप्त सतह पर पुनः गिरकर ढाल से बहकर आने वाले अपवाहित जल द्वारा दूर ले जाए जाते हैं. इस प्रकार भारी वर्षा उपरांत उपजाऊ मिट्टी की अत्यधिक मात्रा, बहते हुए अपवाहित जल द्वारा भी मिट्टी के काटने से मिट्टी के कण अलग होकर दूर ले जाए जाते हैं. अधिक ढाल तथा ऊँचे स्थानों पर भूमि के कटनेप से छापरे व नाले बन जाते हैं जो समय के साथ-साथ गहरे व आगे बढ़ते जाते हैं. ये नाले समयोपरांत, आगे की ओर बढ़ते हुए कृष्य भूमि व घास मैदानों को काटते हुए निचले प्रवाह में अधिक गहरे व चौड़े होते जाते हैं व बाद में इसमें बागली नाले बन जाते हैं. इन नालों को फैलने, बढ़ने व कृषकों के खेतों को बीहड़ में बदलने से रोकने के लिए इनका स्थिरीकरण किया जाना अत्यावश्यक है. नालों के स्थिरीकरण से तालाबों में संग्रहण क्षेत्रों से आने वाली गाद को प्रभावी ढंग से रोका जा सकता है.

एक वैज्ञानिक अध्ययन के अनुसार इंदौर जिले में गंभीर नदी पर बने यशवंत सागर बांध में प्रतिवर्ष 18 टन/हेक्टेयर/वर्ष की दर से गाद का जमाव हो रहा है, फलस्वरूप इसकी जल संग्रहण क्षमता में लगातार कमी होती जा रही है.

नालों का स्थिरीकरण करने के लिए विभिन्न प्रकार की संरचनाएं, जिसमें कांक्रीट संरचनाएं भी शामिल हैं, उपयोग किया जाता है. यह संरचनाएं, मालवा-निमाड़ क्षेत्र की काली मिट्टी की फैलने व सिकुड़ने की प्रवृत्ति के कारण टूट-फूट होने से अपेक्षित कार्य समुचित ढंग से नहीं कर पाती हैं. जिससे मानव श्रम, धन व समय का अपव्यय होता है. कांक्रीट संरचनाओं के स्थान पर काली मिट्टी की प्रवृत्ति को ध्यान में रखकर लचीली, मजबूत, अर्धस्थायी संरचनाएं जो जगह पर ही उपलब्ध सामग्री के उपयोग से अकुशल श्रमिकों द्वारा अपेक्षित उद्देश्यों को पूरा कर सके, नालों के स्थिरीकरण हेतु बनाई जाना चाहिए.

ऐसी ही एक लचीली व मजबूत संरचना, पत्थर के टुकड़ों को तार की बुनी हुई जालियों में जमा कर बनाई जाती है, गेबियन कहलाती है. ये संरचनाएं पानी के साथ घुलकर आने वाली मिट्टी के कणों को रोकने में सहायक सिद्ध हुई हैं. साथ ही इन संरचनाओं की लागत समान उद्देश्यों की पूर्ति हेतु बनाई गई कांक्रीट सरंचनाओं की तुलना में लगभग एक चौथाई पाई गई है.

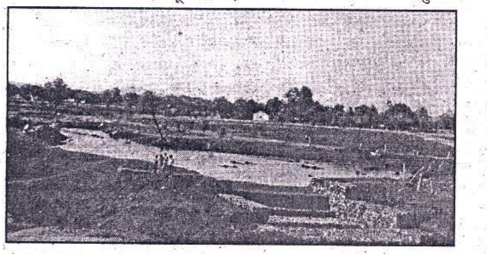
भारतीय कृषि अनुसंधान परिषद, नई दिल्ली द्वारा उपरोक्त बिंदुओं को ध्यान में रखते हुए मालवा क्षेत्र की काली मिट्टी में नालों के पुनरुद्धार हेतु अर्ध स्थायी संरचनाओं की उपयुक्तता नामक एक तदर्थ परियोजना,

प्रदेश के जवाहर लाल नेहरू कृषि विश्वविद्यालय जबलपुर के कृषि महाविद्यालय, इंदौर परिसर हेतु स्वीकृत की गई है. इस परियोजना के माध्यम से मालवा क्षेत्र में गेबियन संरचनाओं के उपयोग से नालों का स्थिरीकरण किया जाना प्रस्तावित है. तीन वर्षीय इस परियोजना की कुल लागत सोलह लाख साठ हजार सात सौ साठ रुपए हैं. इस परियोजना के निम्नलिखित उद्देश्य हैं:-

- काली मिट्टी क्षेत्रों में नालों का स्थिरीकरण.
- कृषि भूमि के कटाव को रोकने के लिए नालों के बढ़ने की प्रक्रिया रोकना.
- महंगी कांक्रीट संरचनाओं का विकल्प तलाशना एवं
- उचित स्थानों पर गेबियन संरचनाओं के माध्यम से अप्रवाहित जल संग्रहित करना.

परियोजना के प्रथम चरण में कृषि महाविद्यालय, इंदौर में 50 लाख लीटर जल संग्रहण क्षमता वाले तालाब का निर्माण मात्र 1,45,000 रुपए में तालाब के आगम एवं निकास स्थानों पर गेबियन संरचनाओं के उपयोग के साथ किया गया है. इस तालाब में कृषि महाविद्यालय, इंदौर परिसर के पास ग्राम पिपल्याहाना के ट्यूबवेलों से निकला अतिरिक्त जल, महाविद्यालय अनुसंधान प्रक्षेत्र से बहने वाला अप्रवाहित जल व वर्षा उपरांत समीपस्थ क्षेत्रों से बहकर आने वाला जल संग्रहित हो रहा है.

इस तालाब में इस वर्ष की ग्रीष्म ऋतु में लगभग 50 लाख लीटर पानी की उपलब्धता, समीपस्थ रहवासियों व क्षेत्रीय नागरिकों के लिए कौतूहल का विषय बन गया है.



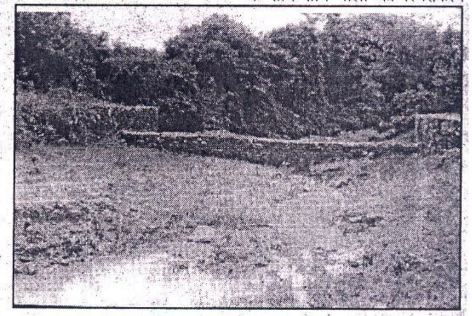
इन गेबियन संरचनाओं का उपयोग पूर्व में भी इंदौर जिले के ग्रामीण क्षेत्रों में हिंगोनिया व पिपल्यातफा गांवों में सफलतापूर्वक किया जा चुका है. परंतु शहर से 24 किलोमीटर दूर होने के कारण इन संरचनाओं तक पहुंचना हर किसी व्यक्ति के लिए सुलभ नहीं था, वहीं शहर के करीब होने, स्थान की उपयुक्तता व पहुंचने की सुलभता से कृषि महाविद्यालय, इंदौर परिसर में बनाई गई गेबियन संरचनाओं का प्रदर्शन महत्व, शहरी क्षेत्र में किए गए पहले सार्थक प्रयास होने से ग्रामीण क्षेत्रों की तुलना में बढ़ गया है. फलस्वरूप, इस अल्प अवधि में अनेक कृषक, कृषि विभाग के प्रचार-प्रसार अधिकारी एवं कुछ जिज्ञासु प्रशासक व राजनेता समय-समय पर इस गेबियन संरचनाओं युक्त तालाब का अवलोकन करते रहे हैं.

मालवा क्षेत्र में पारिस्थितिक उपलब्धता से कृत्रिम रूप से जल के आगम एवं निकास स्थानों पर गेबियन संरचनाओं के उपयोग के बिना भी तालाब का निर्माण किया जा सकता है. इन स्थानों पर मिट्टी बंधान का उपयोग कर अप्रवाहित जल का संग्रहण किया जा सकता है तथा प्राकृतिक नालों के माध्यम से अतिरिक्त जल का निकास किया जाता है.

तालाब में दीर्घ अवधि तक एकत्रित जल का संग्रहण, तालाब के भू सतह गुणों पर निर्भर करता है. तीव्र गति से रिसाव होने की दशा में संग्रहित जल 15-20 दिनों में जमीन में रिस जाता है. इंदौर-उज्जैन राजमार्ग पर चेतना केन्द्र के समीप ग्राम बारोली में इसी प्रकार का एक रिसन तालाब, कृषि महाविद्यालय, इंदौर की क्रियात्मक अनुसंधान परियोजना द्वारा क्षेत्र के तीन कृषकों द्वारा प्रदत्त भूमि पर जून 1991 में बनाया गया है. इस रिसन तालाब का जलागमन क्षेत्र लगभग 8 हेक्टेयर है जो संपूर्ण पहाड़ी क्षेत्र है.

अतः इस तालाब में काफी मात्रा में जल अप्रवाहित होकर आता है. तालाब की भू सतह में मुरम की अधिकता होने से संग्रहित जल का पूर्ण रिसाव, जमीन के अंदर हो जाता है. इस तालाब के निर्माण से करीब 100 मीटर दूरी पर बने कुएं में जल की उपलब्धता हमेशा बनी रहती है. इस कुएं के मालिक कृषक के अनुसार वे पिछले पंद्रह वर्षों में दो-तीन सिंचाई प्रति वर्ष से अधिक सिंचाई कभी नहीं कर सके, परंतु रिसन तालाब के निर्माण के बाद वे अब चार अतिरिक्त सिंचाई कर पाने में समर्थ हुए हैं. इस प्रकार रिसन तालाबों के निर्माण से कुओं में जल आपूर्ति बढ़ाकर अतिरिक्त सिंचाई की संभावना बढ़ाई जा सकती है.

लगातार बहने वाले जल के अप्रवाहित होने से नालों की लंबाई व चौड़ाई बढ़ने व फैलने की संभावना अधिक बढ़ जाती है. जिसका प्रभाव कृषि योग्य भूमि के आकार में लगातार कम होने के रूप में होता है. इसके साथ ही भू क्षरण अधिक होने से कृषि योग्य भूमि में पैदावार कम होती जाती है. इन-



उपरोक्त समस्याओं को ध्यान में रखते हुए नालों का प्रसार रोकना अत्यंत आवश्यक हो गया है. इस कार्य हेतु गेबियन संरचनाओं का उपयोग भी प्रभावी रूप से किया जा सकता है.

इस दिशा में नाले के स्थिरीकरण प्रक्रिया की उपयोगिता देखने हेतु इंदौर जिले के ग्राम उमरिया खुर्द में लगभग 600 मीटर लंबे नाले में 5 गेबियन संरचनाएं बनाई गई हैं. इस नाले का जलागम क्षेत्र, समीप के पहाड़ी क्षेत्र व कृषि योग्य भूमि है जिसके कारण इस नाले में काफी तीव्र गति से बहता अप्रवाहित जल बड़ी मात्रा में मिट्टी कणों को अपने साथ बहाकर ले जाता है.

तीव्र गति से बहते हुए इस अप्रवाहित जल को भूमि में रिसाव हेतु उपयुक्त समय नहीं मिल पाता. फलस्वरूप भू जल-भरण की प्रक्रिया लगभग नगण्य हो जाती है. परियोजना के प्रथम वर्ष में ही यह पाया गया कि इन गेबियन संरचनाओं ने जल अप्रवाह गति को काफी कम कर दिया है जिसके फलस्वरूप मिट्टी के कणों को क्षारित होने से बचाया जा रहा है तथा दो समीपस्थ गेबियन संरचनाओं के बीच रूके हुए जल को भूमि में रिसाव हेतु पर्याप्त समय मिल रहा है. इस प्रकार तकनीकी दृष्टि से सही बनाई गई उपयुक्त आकार की गेबियन संरचनाएं, प्रथम वर्ष से ही नाले के स्थिरीकरण के अपने अपेक्षित उद्देश्य को प्राप्त करने में अग्रसर होने के साथ इस प्रकार के कार्यों में लगने वाले धन, समय व खर्च को काफी हद तक कम कर देती हैं. इस प्रकार इन बहुउपयोगी गेबियन संरचनाओं का उपयोग तालाब निर्माण के साथ-साथ नालों का स्थिरीकरण करने में कर व्यर्थ बह जाने वाले जल अप्रवाह की मात्रा व भू-क्षरण को काफी हद तक कम किया जा सकता है. इस प्रकार की गतिविधियां जहां एक ओर पर्यावरण को संतुलित करती हैं वहीं दूसरी ओर बहुमूल्य जल-बूंदों का संग्रहण सतही तथा भू-गर्भीय अवस्था में करने में सहायता प्रदान करती हैं.

इस प्रकार से संग्रहित जल का उपयोग कम नमी वाली अवस्था में खरीफ फसलों एवं रबी फसलों की सिंचाई हेतु किया जा सकता है. यह प्रयोग कृषि महाविद्यालय, इंदौर परिसर में किया जा रहा है. अल्प वर्षा (केवल 437.6 मि.मी. औसत 1000.0 मि.मी. की तुलना में) की परिस्थितियों के बावजूद संग्रहित सतही जल व सदुपयोग सिंचाई कार्यों हेतु लगातार किया जा रहा है.

संस्थापित 1946- भोपाल, सोमवार 29 जनवरी से 4 फरवरी 2001

वर्ष-55 अंक-18 मूल्य रु 6/- पृष्ठ-24

Plate 5.4

Extension through popular article.

जल शक्ति अभियान : कृषक संगोष्ठी सह किसान मेले में सांसद ने कहा

जल संरक्षण को आंदोलन बनाएं हर बूंद बचाने का संकल्प करें

धार। नईदुनिया प्रतिनिधि

धार में जल शक्ति अभियान के तहत आयोजित संगोष्ठी को संबोधित करते हुए सांसद छतरसिंह दरबार। ●नईदुनिया

कार्यक्रम में उपस्थित जिले के किसान, जनप्रतिनिधि, अधिकारी और नागरिक। ●नईदुनिया

जल शक्ति अभियान अंतर्गत कृषक संगोष्ठी सह किसान मेले का आयोजन शनिवार को कृषि विज्ञान केंद्र में किया गया। मुख्य अतिथि छतरसिंह दरबार ने कहा कि स्वच्छता अभियान की तरह ही देश में जल संरक्षण को लेकर जल शक्ति अभियान की शुरुआत प्रधानमंत्री द्वारा की गई है। इसका उद्देश्य पूरे देश में पानी को लेकर जागरूकता और जल संरक्षण को बढ़ावा देना है। जिस तरह देशवासियों ने स्वच्छता अभियान को एक आंदोलन का रूप दे दिया वैसे ही जल संरक्षण के लिए आंदोलन की शुरुआत करें। हम सब साथ मिलकर पानी की हर बूंद बचाने के संकल्प करें।

राजमाता विजयाराजे सिंधिया कृषि विश्वविद्यालय ग्वालियर के कुलपति प्रोफेसर एसके राव ने वैज्ञानिक पद्धति से पानी की कमी का सामना कर रहे विकासखंडों में जल संरक्षण और रेन वाटर हार्वेस्टिंग पर विशेष ध्यान देने पर जोर दिया। कलेक्टर श्रीकांत बनोठ ने पौधारोपण एवं जल को कम से कम व्यर्थ कर जल के अधिक से अधिक जल संरक्षण करने के लिए प्रेरित किया। एसपी आदित्य प्रतापसिंह ने 13 विकासखंडों में बन रही गोशालाओं में पौधारोपण का आह्वान किया। मुख्य कार्यपालन अधिकारी जिला पंचायत संतोष वर्मा ने कहा कि प्रमुख जलस्रोतों को सहेजना एवं वैज्ञानिक तरीकों द्वारा जल संरक्षण कर बेहतर उपयोग करें। कार्यक्रम में कृषकों के हित में कृषि वैज्ञानिकों द्वारा लिखी गई पुस्तकों का विमोचन, प्रदर्शन इकाइयों का उद्घाटन एवं कौशल विकास के प्रतिभागियों को प्रमाण पत्र वितरित किए गए। डॉ. गुंजा वास्केल, गौरव सारस्वत, भूपेंद्र कुर्मी, जितेंद्र नायक, धीरज शर्मा एवं चुन्नीलाल पटेलिया ने सराहनीय योगदान दिया। संचालन डॉ. जीएस गाठिए एवं आभार डॉ. जेएस राजपूत ने माना।

धार, नालछा एवं बदनावर चिह्नित

कृषि विज्ञान केंद्र धार के प्रधान वैज्ञानिक एवं प्रमुख डॉ. केएस किराड़ ने कहा कि संचय जल, बेहतर कल थीम के साथ इसके अंतर्गत देश के 256 जिलों के अधिक प्रभावित 1 हजार 592 विकास खंडों पर जोर दिया जा रहा है। पहले चरण में धार जिले के विकासखंड धार, नालछा एवं बदनावर को अत्यधिक पानी के दबाव वाले क्षेत्र में चिन्हित किया गया है। डॉ. डीएच रानाड़े, प्रधान वैज्ञानिक, मृदा एवं जल संरक्षण इंदौर ने मृदा एवं जल संरक्षण की प्रमुख तकनीकी से किसानों को अवगत कराया। साथ ही फसलों की जल मांग एवं आवश्यकता पर तकनीकी बिंदुओं से अवगत कराया। विशिष्ठ अतिथि डॉ. आर. नागर ने कृषकों को पारंपरिक जल स्रोतों का नवाचार एवं रीचार्ज तकनीक के बारे में बताया। डॉ. एसएस धाकड़ वैज्ञानिक ने भी प्राकृतिक संसाधन विकास एवं उन्नत बुवाई तकनीकी के बारे में कृषकों से चर्चा की। मेड़ नाली पद्धति, क्यारी पद्धति, मल्चिंग, टपक सिंचाई एवं स्प्रिंकलर पद्धति अपनाने की वैज्ञानिक सलाह प्रस्तुतीकरण के माध्यम से दी गई।

डॉ. जीएस गाठिये ने कहा कि कृषि में जल की बचत के लिए टपक या फव्वारा सिंचाई, कम पानी चाहने वाली फसल एवं किस्में, मृदा की जल धारण क्षमता बढ़ाने के लिए कार्बनिक खाद, गर्मी में गहरी जुताई एवं घरों का पानी जलस्रोतों में उतारकर पानी की बचत कर सकते हैं। डॉ. एसएस चौहान मृदा वैज्ञानिक ने कहा कि कृषि के साथ-साथ सभी कृषकों को घरों में छत का पानी इकट्ठा कर ट्यूबवेल, तालाबों कुओं आदि में संरक्षित करना चाहिए।

राज एक्सप्रेस

जल शक्ति अभियान अंतर्गत कृषि विज्ञान मेले का आयोजन

पांच सौ से अधिक किसान

खेती-किसानी

कृषि वैज्ञानिकों ने जल संरक्षण और कम पानी में अधिक उत्पादन लेने के गुर बताए

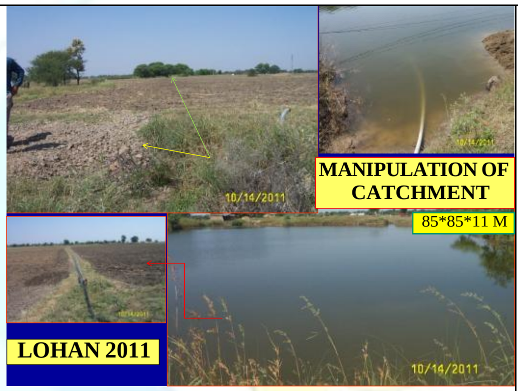
प्रकृति की अमूल्य धरोहरों को सहेजने का जिम्मा हमारा : विधायक

खेतों में तालाब खोदें, पानी का संरक्षण होगा : डॉ. भार्गव

I (B)	Success stories and Significant outputs of the project work (2010-2024)

Conversion of Wasted Land to Water Storage Tank and Its Utilization for Increasing the Crop Productivity

- This study was under taken by Operational Research Project for Dryland Agriculture RVSKVV, Campus, College of Agriculture, Indore in a village Lohan, District Dewas (M.P.) during 2011. In this village, it was observed that one-hectare portion of a cultivable land was lying unused for several years. This area was converted into huge water harvesting and runoff from above portion was diverted through underground pipeline for filling it. The increased available water through a developed tank in unused/underutilized area into agricultural use gave so much confidence in the farmer that he brought more area under wheat which requires more irrigation. It is concluded that sincere efforts can be made to bring unused / underutilized area into agricultural use which can increase the total production and gross income of the farmer. Similarly, the availability of water in the form of surface storage also helps in crop diversification, supplementing it during moisture stress/dry spells and reaping high remunerative crops.



Crop diversification due to availability of additional surface water in the tank during 2011 -2014.

Area	Season	Year			
		Before 2010	2011 -12	2012-13	2013-14
11 ha	*Kharif*	Soybean (11 ha)	Soybean (11 ha)	Soybean (11 ha)	Soybean (11 ha)
	Rabi	Wheat (3 ha)	Wheat (11 ha)	Potato (5 ha)	Potato (5 ha)
	Rabi	Chickpea (8 ha)	-	Wheat (6 ha)	Wheat (5 ha)
	Tank capacity – 60000 cu.m. In 2011, 11 ha pre sowing irrigation for rabi, 1/3 of storage water which amounts to 18 cm/ha in vertisols. 11 ha area was provided with two more subsequent irrigations each of 7 cm.			Late wheat variety (5 ha) after harvest of potato	Late wheat variety (5 ha) after harvest of potato

Increasing Water Availability For Enhancing Crop Productivity Through Dovetailing Activities And Participatory Mode

- In a study through dovetailing the various activities for some development work, a suitable site was selected and converted into a huge water storage body through participatory approach. It helped to develop a water storage body of sufficient size which not only retained huge amount of runoff but also recharged the nearby open well and tubewell. The activity made possible to bring additional 4 ha area under wheat (Now it is 7 ha wheat, 2 ha chickpea and 1 ha other crops) and allowed farmer to diversify his cropping pattern and he could grow potato, summer maize, vegetables and sweet potato for his own use and family which was otherwise not possible before. It was also observed that immediately after the construction of the tank, the productivity of both the *kharif* and *rabi* crops increased. Similarly, the area under wheat increased tremendously than chickpea because of increased water availability for sufficient irrigation water to grow wheat crop which require 2-3 more irrigation than chickpea. Further, this also reduced the amount of runoff which was otherwise leaving the watershed area without aiding to surface and sub – surface storage. The increased water availability also brought new area under high remunerative *rabi* crops and increased their productivity on sustainable basis**.**

Solving of Dual Problems of Water Logging and Water Scarcity in Nimar Region.

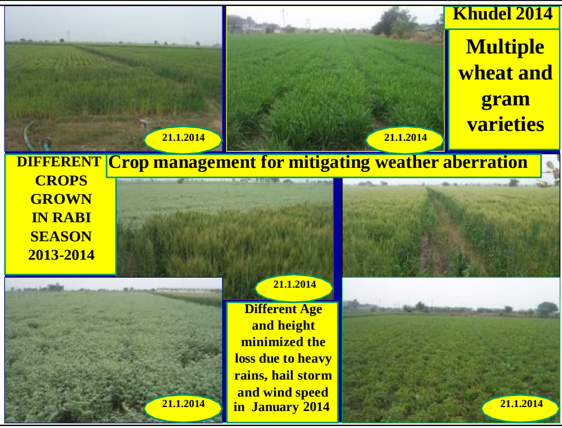
- After the treatment, it was also observed that the 15 ha cultivated fields of other adjoining farmers also improved tremendously and thus allowing growing both *kharif* and *rabi* crops to their satisfaction. No longer, these fields are suffering due to water logging and severe weed infestation resulting in higher yield levels of *kharif* crops. This also allowed these farmers to carry out timely intercultural operation and sowing of *rabi* crops. During 2014-15, in a study it is concluded that assessing the site-specific problem and then providing its solution scientifically can enhance the crop productivity in the fields otherwise lying unused or underused due to various reasons related to natural resource management aspects. In the present case too, a dual problem of water logging and water scarcity was tackled successfully by following principles of soil and water management through providing suitable drainage system and by constructing water storage structure in participatory mode by dovetailing and convergence process. Many site-specific problems related to natural resource management still exist in the region and can be tackled scientifically.

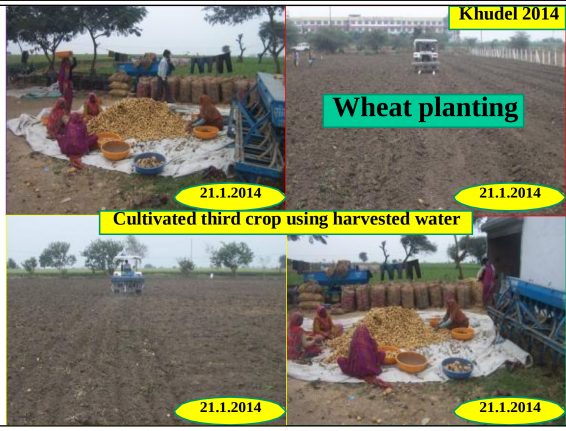
Land use area before water harvesting tank and installation of sub surface drainage system

Crops and their conditions				
Kharif crops	Maize	Groundnut	Pegionpea	Green gram
Area (ha)	1.0	0.5	0.5	0.5
Weed	Severe	Severe	Moderate	Severe
The yield levels were almost 1/3 of normal yields				
Rabi crops	Wheat	Gram	-	-
Area (ha)	0.5	0.5		
The yield levels were almost 1/3 of the normal yields.				
About 1.5 ha was kept fallow due to water stagnation and limited water availability during *rabi*				
About 15 ha area of other farmers was also getting affected due to water stagnation problem. Fields were heavily infested with weeds.				
Irrigation from open well – 1 or 2 during *kharif* and only once in *rabi*				

Mitigating Adverse Climatic Conditions through Water Harvesting Tank in *Malwa* Region.

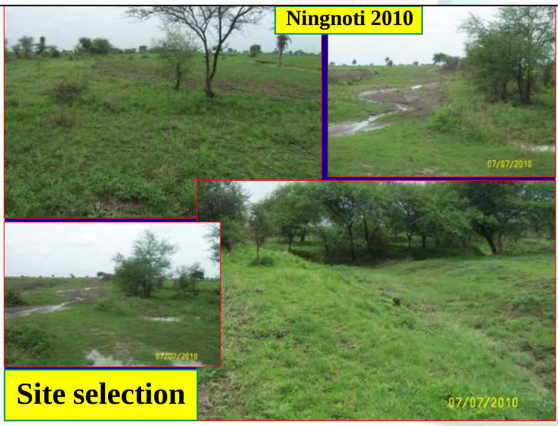
- The activity of excavation of water harvesting tank since 2007 in the individual farmer's field was extremely useful in arresting the runoff, bringing the fields into leveled condition through spreading of excavated soil in depressed area thus in avoiding even temporary water logging and reducing the chances of soil erosion. It also enhanced the water availability and allowed him to adjust the cropping sequence, including changing the timing of sowing, planting, spraying, and harvesting. This helped him to take advantage of the changing duration of growing seasons and associated heat and moisture levels with appreciable increase in the crop productivity by turning the mono-cropped area into multi-cropped/crop diversified area. The conjunctive use of ground and harvested surface water allowed him to alter the time at which fields are sowed or planted. It also helped the farmer to regulate the length of the growing season to better suit the adverse climatic conditions. These adaptation strategies helped the farmer and saved his crops from total failure and minimized losses compared to adjoining farmers.

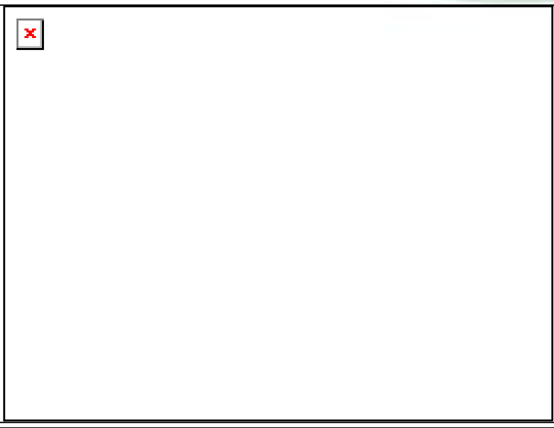


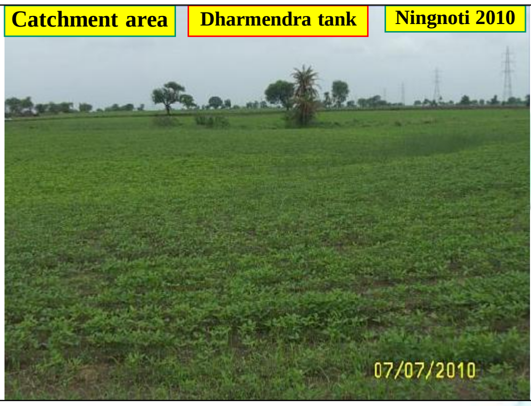


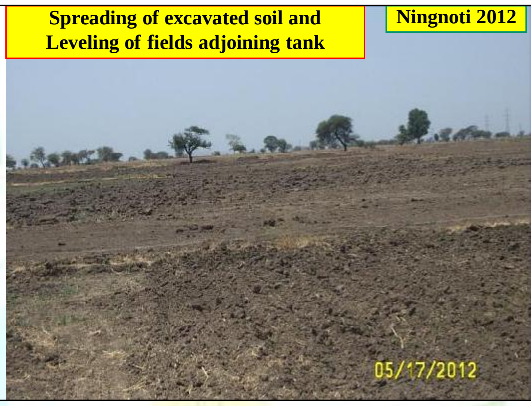
Up scaling and out scaling of technology and Participatory technology demonstration. Natural resource conservation programme for increasing productivity in the region: Construction of water conservation measures, water harvesting tanks and surplus structures, renovation and reshaping of tanks.

- In 2009-2010, two suitable sites one in Muradpura and another at Mavlakhedi were identified for the construction of water conservation measures, water harvesting tanks and surplus structures so that the farmers could construct tanks in their own field for storing the runoff water/increasing the ground water recharge/managing the excess runoff to be used mainly for irrigating the crops and for ground water recharge. These tanks are having storage capacity of 14000 cu.m. each. Thus till 2016 in all, 15 tanks (in Panod, Dakachya, Khudel, faraspur, Muradpura, Mavlakhedi, Ningnoti and Hatod were constructed under the technical guidance of ORP team. The farmers from their own sources arranged the funds for the same. At all the places, suitable surplus arrangements were made as per the requirement. These tanks have retained sufficient runoff water for its use either as surface water or ground water.









Creation of water bodies in farmers fields

Renovation and reshaping of the tank along with construction of outlet ensured increased amount of runoff water and allowed the farmers to grow other crops than wheat and chickpea like potato, berseem, garlic in village Ningnoti in the field of Chandan Singh.

Summer deep ploughing

- Further in 2010-11and 2011-12, farmers were provided technical guidance to use reversible MB plough for deep tillage operation atleast once in a three year. The farmers of the new ORP site Gaddukheri were not aware of this plough so they were shown this plough and one farmer purchased it and provided various farmers on custom hiring. Even the department of farmer's welfare launched a project HALDHAR for providing reversible plough to the farmers on hiring basis and even given subsidy of 50% for the same. This was possible mainly due to consistently advocating by the ORP team and several demonstrations on the deep tillage in this region since a long time.

Deepening and desilting of the tank.

- During 2011-12, farmer of Barlai village was advised for deepening and desilting of the tank. This has helped the farmer to increase the water storage capacity by almost 900 cu.m. which he could get without any expenditure as the desilted soil was purchased by the neighbouring farmers for spreading in their fields to fill the depressions and to increase the fertility status. Thus the farmer could enhance the storage capacity almost free of cost in village Barlai during June 2011.

Development and construction of percolation tank.

- During April 2011, one NGO contacted the ORP team for technical guidance for the construction of a tank in the village Hathunia. One suitable site was selected and a percolation tank was developed under the technical guidance of ORP team. The subsequent monsoon, not only retained huge amount of runoff water but also helped in recharging the adjoining wells and tubewell in addition to saving the fields for getting eroded due to uncontrolled runoff.

Development and construction of water harvesting tank

- During April 2012, one farmer from Ningnoti village contacted the ORP team for technical guidance for the construction and renovation of a tank in the village. The existing tank of very small size was renovated with the provision of a cemented outlet which works as retaining wall and outlet simultaneously. The farmers invested about 2.5 lakh from his own side. The subsequent monsoon, not only retained huge amount of runoff water but also helped in cultivating the farmer various crops like potato, Berseem and new varieties of wheat which require higher amount of irrigation water. The farmers used the stored water for pre sowing irrigation and again filled the tank from other tubewells so that the water can be utilized in the day time with higher discharge rate. Thus, he did not require staying in the field during night hours as the electricity is supplied only during late night hours.

Construction of percolation tank and its seepage control and roof water harvesting

- During May 2014, a water harvesting tank of 30 m x 30 m x 6 m was constructed in the premises of an industry through technical guidance as a result of motivation in a training programme at KVK Dewas by the ORP team. The excavated soil was utilized ad spread in the adjoining fields to make its leveled. Soybean in kharif and wheat in Rabi was plated in this new field. Since the tank was underlained by basaltic murrum as expected, he was advised to put sealant material in the tank in May itself and a tarpaulin sheet of 120 gsm costing 70000/- was laid in the tank to collect the runoff collected through roof water harvesting and diverted into the tank. The tank is still filled in the month of March 2015. This is a result of a HRD programme and faith in scientist community posed by the end user. For this purpose, the owner invested 3.4 lac from his side itself.

- The sunken pond which has been developed in 2011-12, every year collecting again collected a huge amount of runoff water making full advantage of the cemented waste weir. It has resulted in increased storage of runoff water and its efficient utilization for the pre sowing irrigations in the adjoining fields. It has also effectively recharged the nearby open well and providing additional ground water to the farmers.
- The deep ploughed fields not only retained rainwater but also reduced the runoff from the fields due to reduced bulk density and breaking of hard crust below seed zone. This also allowed to better growth and larger potatoes in the field than the unploughed field. This also reduced the number and amount of irrigation water required during rabi 2015 and has been proven to be performing better in scanty rainfall season.

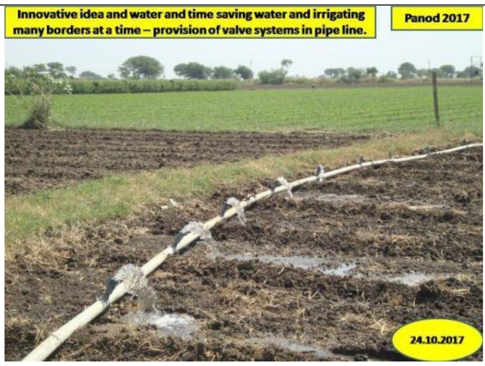
Bringing degraded land to agricultural use impact of soil and water conservation activities and integrated approach.

- Technical guidance was also provided during 2015-16 for the reclamation and treatment of degraded land at Tankapara, Jagdalpur for bringing new area under cultivation and for soil and water conservation on sustainable basis. It was also observed that due to construction of various soil and water conservation measures, the total soil moisture conservation increased as evident from the surface storage in the sunken pond, leveled fields, due to diversion bunds and drains and increased ground water recharge. It has been observed that due to increased recharge the open well constructed in this portion are fully recharged and retaining water up to within 1 m from the soil surface which is otherwise not possible in the untreated area. This has increased its utilization by crops leading to satisfactory growth of crops and plants grown on the reclaimed portion.

Bringing degraded land to agricultural use impact of soil and water conservation activities and integrated approach in Tankpal, Jagdalpur (chhatisgrah)

Innovative and Efficient Water Management practice for Irrigating Rabi Crops through Harvested Water in Malwa Region

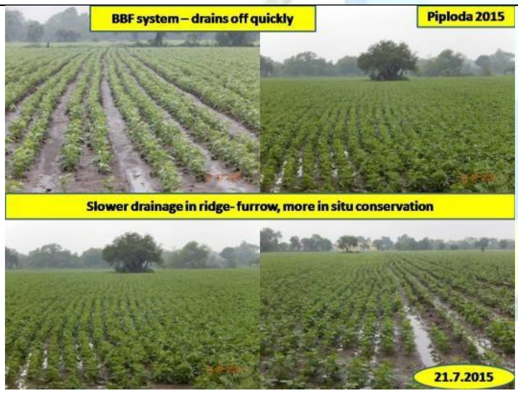
- Provision of water harvesting tank in individual farmer's field is found extremely useful in arresting the runoff and thereby allowing the farmers to adjust the traditional farming/irrigation practices for the better utilization and efficient irrigation efficiency. During 2016-17, the surface irrigation practices have been modified to avoid the laborious and exhaustive work to avoid the over irrigation and wastage of water. These innovative practices have been found to be very effective and do not require continuous monitoring and can be operated by unskilled labour with better and efficient irrigation.
- Thus, by using the modified border irrigation system (device), it can be clearly pointed out that the border irrigation is no more labour and time-consuming work and can be operated by unskilled labour with better and efficient irrigation. It is to be highlighted that many farmers of the region visiting his farm and trying to use such useful innovative idea in their fields too. Further, it is to inform that this innovative idea came only after the construction of water harvesting tank in his field through one ICAR funded project by ORP team. The availability of the water in the tank gave him confidence and only then this innovative idea came in his mind during the discussion at the site.

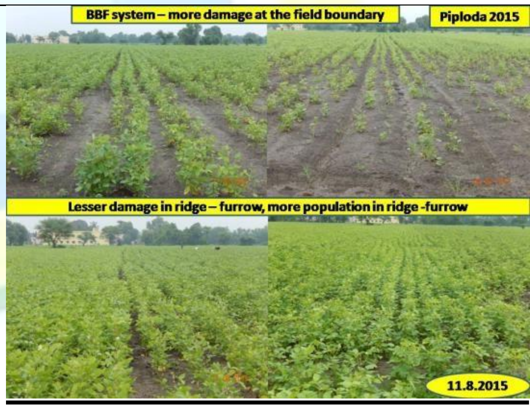


Irrigating many borders at a time Uniform movement of water front in all borders

Evaluation of In-Situ Moisture Conservation Practices and Assessment of Improved Seeding Implements to Mitigate Dry Spells

- In a study conducted in Malwa region during 2015 and 2016, performance of raised bed planter and modified traditional seed drill for enhancing soybean yield and farm income was evaluated. It was observed that in both the years, higher soybean yield was recorded under modified traditional seed drill than that of raised bed planter. This was mainly due to several factors viz. timely sowing, better germination and survival of soybean plants, better moisture conservation, better weeding and interculture, better plant population which was not found in case of fields sown with raised bed planter.





- Technical guidance was also provided in 2014-2015 for bringing new area under cultivation in village Gaddukhedi by deepening of silted up tank and spreading of excavates soil into degraded land. Further, deep ploughing was also carried out to bring virgin land into cultivation. Soil and water conservation measures also constructed for producing crops on sustainable basis.

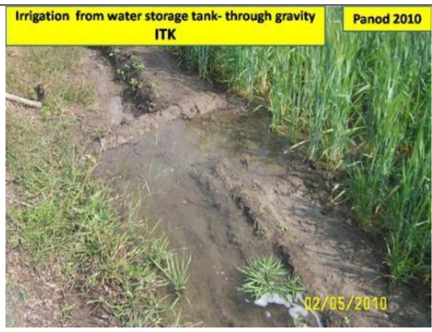
Crops
In new area

Desilting of community tank and spreading of soil on participatory basis

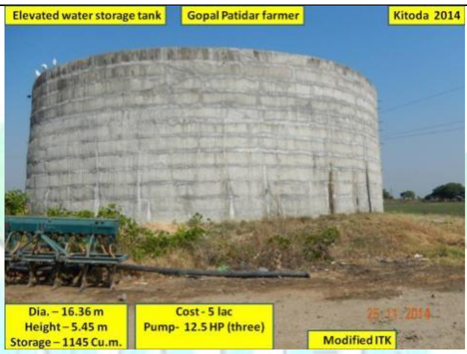
- A community tank of village Bisakhedi in 2016 was desilted for increasing its storage capacity on participatory basis as 50% cost of the work was bourne by the villager. In all, 3000 cu.m. was dsilted and spread into the adjoining areas for increasing fertility and leveling of the fields.

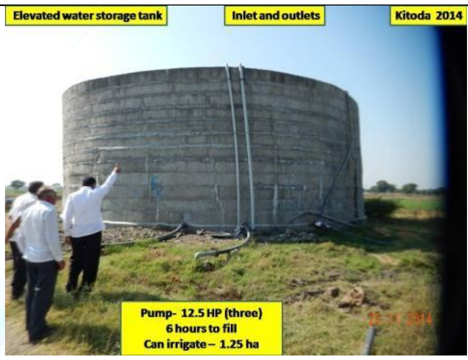
Modified Traditional Water Harvesting System for Irrigation in Malwa and Nimar Region (2013-14)

- In Malwa and Nimar region of Madhya Pradesh, it has been observed that by using traditional knowledge of pond/talab for irrigation through gravity and modifying it and replacing it with elevated overhead cemented tank for storing additional runoff water otherwise going waste and utilizing it for irrigating adjoining fields with micro irrigation system not only enhances the farm productivity and income, but also provides a technique for better rainwater management. The, elevated masonry water storage is constructed and it is filled with pumped water from the water harvesting tank so that an additional storage of rainwater is made for its utilization during rabi through gravity. The modified traditional water harvesting system increases additional runoff storage, provides irrigation to rabi crops through gravity, reduce the land loss for the construction of water storage tank for gravity irrigation and serves as an alternate to water storage structure for irrigation through gravity.



Traditional system of filing pond/talab with tubewell water and then using it for irrigation



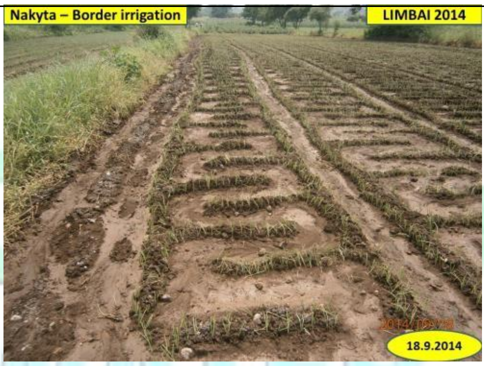


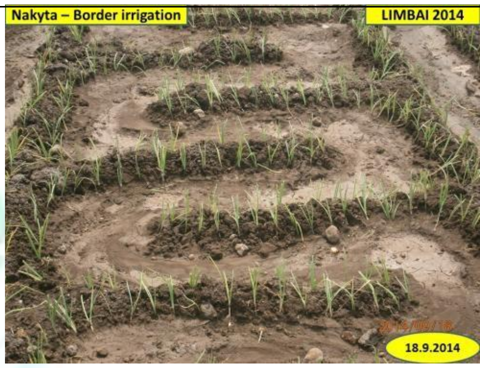
Modification of traditional system filing of pond/talab with tubewell water

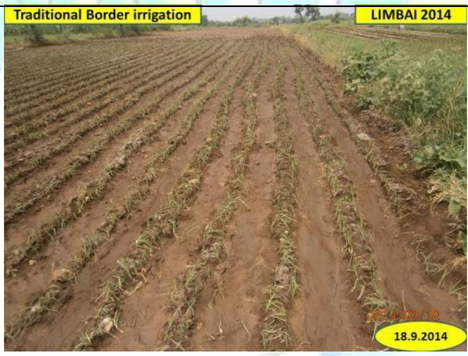
- Results revealed that the local variety gave the lowest yield due to various obvious reasons. Despite delayed monsoon, the grain yields recorded by all varieties were statistically at par but superior to local. However, overall the farmers prefer JS 9560 due to its four seeded pods and short duration. The farmers liked a new variety RVS 2001-04 due to its four seeded pods (more than 50 % pods having four seed), higher productivity, net return and B: C ratio. JS 9560 is also possessing four seeded pods, high yielding and maturing 7 to 8 days earlier than local varieties and thus making it suitable for the farmers willing to grow potato after soybean.
- To demonstrate the potential of promising chickpea varieties in 2014-2015, field demonstrations on ten locations were conducted and yield data are presented in table. The result revealed that all the improved varieties gave significant higher yield as compared to local varieties grown by the farmers. The highest grain yield was obtained in case of variety Jaki 9218, followed by JG 6 as against local check. The Economics of growing of chickpea varieties is also given in table. It is evident from the table that B:C ratios was in case of the improved varieties are all at par with each other. However, local variety fetched higher market value than the other varieties due to bold seeded nature. The overall results signifies that by growing improved varieties of chickpea, farmers of the area can enhance their crop-productivity and net profit due to cultivation of chickpea.

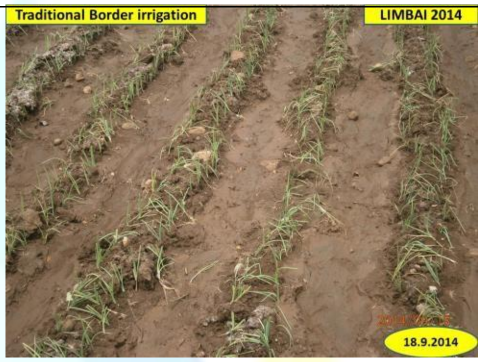
Modified and innovative border irrigation (*NAKTYA*) practice in Nimar region of Madhya Pradesh

- In tribal dominated region of Nimar (Rajpur block, district Barwani), It has been observed that for irrigating onion, garlic, cotton, wheat farmers adopt an innovative practice. These villages are located geologically so located that most of the cultivated fields are small, sloppy and irregular in shape. Therefore farmers try hard to make it uniformly sloppy fields. The depth of the soil is very less that is why these fields are prone to erosion. It is therefore, it has been observed that while irrigating the crops uneven distribution of the water takes place and water moves out of the field rapidly. In this situation of sloppy, undulating and smaller fields' farmers use a modified border irrigation known as ***NAKTYA*** practice.



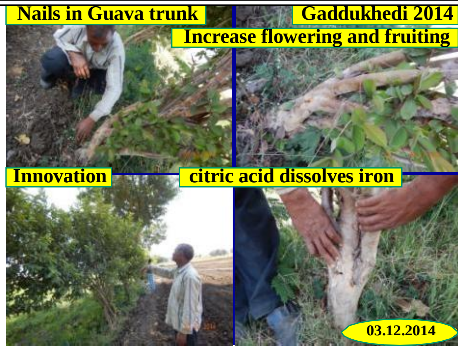






Traditional and modified border irrigation systems.

- In 2009, in village Panod, 75 Guava plants were obtained from the various nurseries and planted at only limited locations in the farmer's fields. Due to very good rainfall distribution and the care the farmers took, most of the plants are survived and growing well. Even in few plants fruiting started. During 2010, various Guava plants were obtained from the various nurseries and planted at few locations in the farmer's fields in village Gaddukhedi. So far, the most of plants are surviving. Their survival was ensured in the following summer months and under severe moisture stress conditions. Thus plants are growing well and these are bearing fruits mainly Guava at both the places. Plants at Panod are providing 5kg fruits almost daily during October 2013, 15 mango plants also planted in 2013 in Gaddukhedi and these are growing well.



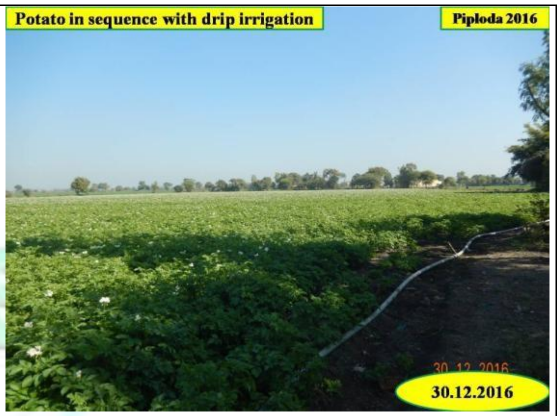
Elevated Lined Water Storage Tank For Integrated Farming System

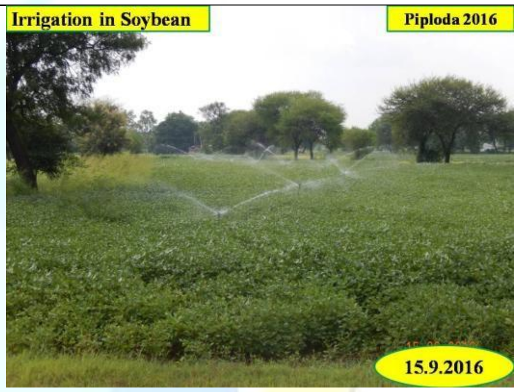
- For this purpose, with technical guidance a farmers in village Harsola got constructed a huge elevated water storage tank in January 2018 by utilizing 3500 sq.m. land and by spending 6.50 lakh. The size of the tank is 57 m x 45 m at top and 44 m x 33 m at bottom with a depth of 7 m. The depth of the tank below the actual land surface is 3.3 m (created through excavation) and above the surface is 3.6 m (created through forming of side bunds with proper side slopes all around). The tank is lined with 500 micron HDPE sheet with proper anchoring on all sides of tank. Since it is provided with side bunds all around, the tank will not be arresting runoff water. The tank is constructed in such a way that it would only collect the pumped water and only rain water falling over it. The estimated storage capacity of this tank is 14623 cu.m. For the safety and to avoid the accident, the tank area is fenced from all around with chain link. The success story of the farmer also indicates that how the watershed programmes and watershed development activities undertaken through village panchayat can improve the farming situation through participatory approach.

- The yield data of soybean and other parameters recorded during both 2015 and 2016 under different land configurations systems of Ridge – furrow system and Raised bed – furrow system created using different modified traditional seed drills and raised bed planters at different locations have been shown in Table. It clearly shows that in both the years, the yield levels under Raised bed – furrow system were lower than that of the farmer's practice i.e. Ridge – furrow system created with modified traditional seed drill.

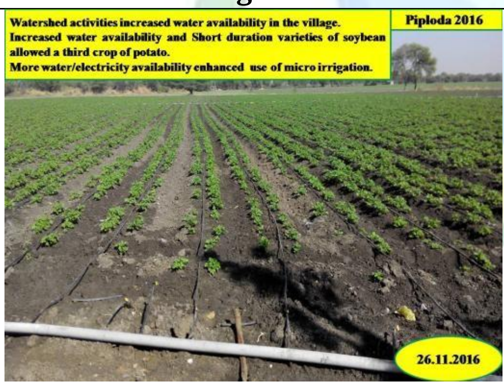
- Development of sunken ponds in gullies retains the appreciable amount of runoff water for some time during rainy and post rainy season. This stored water used by the farmers for irrigating the adjoining fields during *kharif* and for pre-sowing irrigation in *rabi* season.
- The use of drip irrigation system in potato not only saved the irrigation water but also allowed the farmer to take third crop after potato i.e. wheat. However, it is observed that for cultivating wheat, farmers have to provide either pre sowing irrigation through flood or irrigation through border method after dry sowing of wheat. The use of sprinkler before or after sowing resulted in uneven and poor germination of wheat.

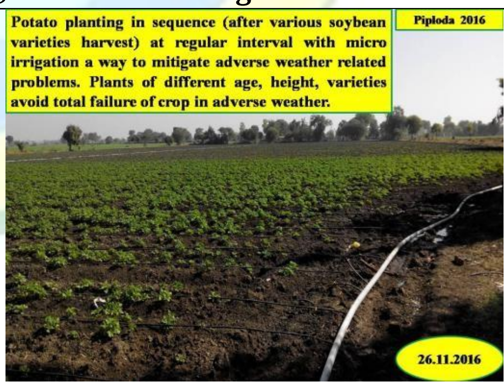
Theme	Soybean	Gram	Wheat
RWM	2016	2016	
FP	No arrangement for supplement irrigation		
Mean Yield (kg/ha)	1120	1086	5100
IP	Use of harvested water in sunken ponds developed under watershed programme.		
Area (ha)	10	10	10
farmers	10	10	10
Mean Yield (kg/ha)	1800 (2016)	1800	6000
Irrigation required	3 cm	5 cm (palewa)	
Yield Advantage	Increased area under rabi cultivation and enhanced productivity through additional irrigation to adjoining crops. Life saving irrigation to kharif crops.		



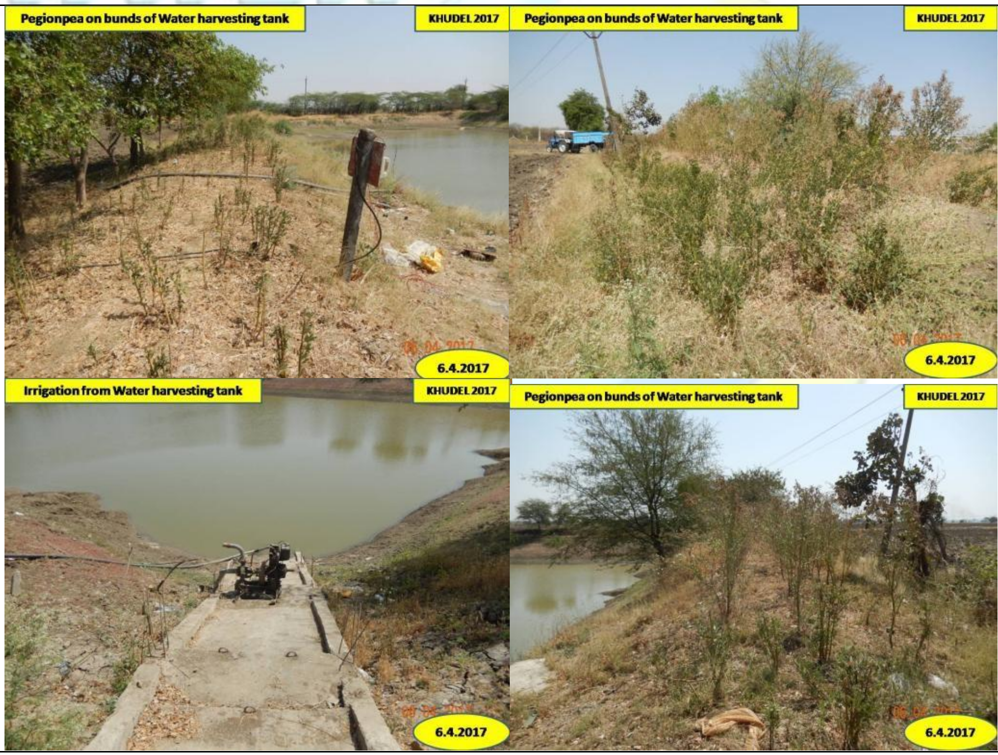


Irrigation from sunken pod, use of micro irrigation





Use of harvested water in Khudel for chickpea after potato and wheat



Pegionpea on the bunds of water harvesting tank

<u>Advantage of activities/demonstrations carried out under PREPAREDNESS</u>
<u>Rain water management</u>

1. Opening, deepening and clearing of new and existing drainage not only helped in safe disposal of runoff but also saved the experimental area from being inundated and water logged. It also diverted the runoff water, avoided over topping of drains and saved lower fields from being eroded due to uncontrolled runoff.

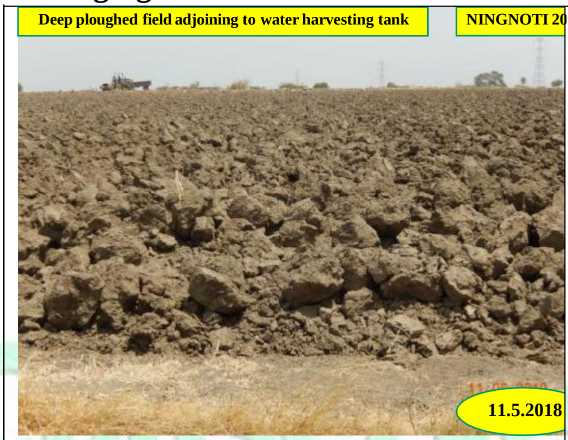
2. Deep ploughing and chisel ploughing very effectively broke the hard soil layer below root zone, destroyed and removed even deep-rooted weeds. It also ensured better rainwater management and recharging of lower profile and thereby reducing the amount of runoff water from these fields. The advantage of deep ploughing realized in rabi season as crop emergence was found to be better in these plots than other plots.
3. Leveling of fields with tractor drawn plough and levelers resulted in better rainwater management and ensured better germination of crops in the leveled fields.
4. Spreading of excavated soil into the soil washes and eroded fields enhanced fertility and field condition to cultivate higher productivity of crops than previous field conditions.
5. Excavation of a new percolation tank at the lowest boundary of AICRPDA fields not only collected the excess runoff water several time in the monsoon season but also got percolated for enhancing ground water recharge. The collection of runoff water for its recharge also saved the other fields located outside the research area from severe erosion and avoided damage to the crops.
6. Profile study was also carried out to estimate the seepage/percolation rate of the soil at on station and on farm before the tank; construction so that depending upon the properties of the soil strategy can be worked out for the better utilization of stored runoff water. This helped in locating the lined and unlined tanks for effective rainwater management.
7. **7.** The excess water from the lined tank got collected in the unlined tank which got filled several times during rainy season and recharged the ground water with huge amount of runoff water which was otherwise going out of fields for further causing erosion and crop damage in the lower area. This ensured and followed the watershed concept of keeping **KHET KA PANI KHET ME.**

Use of chisel plough for deep ploughing and weed control

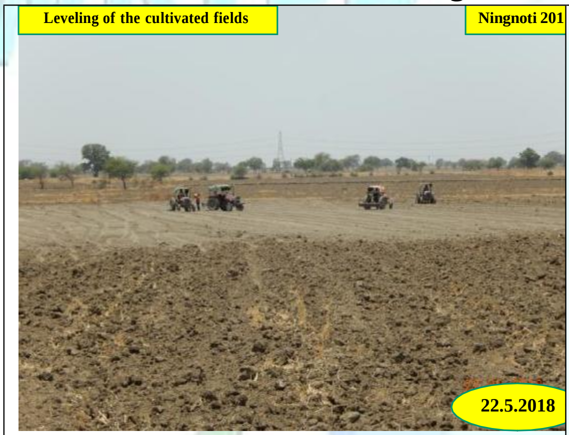
Percolation tank

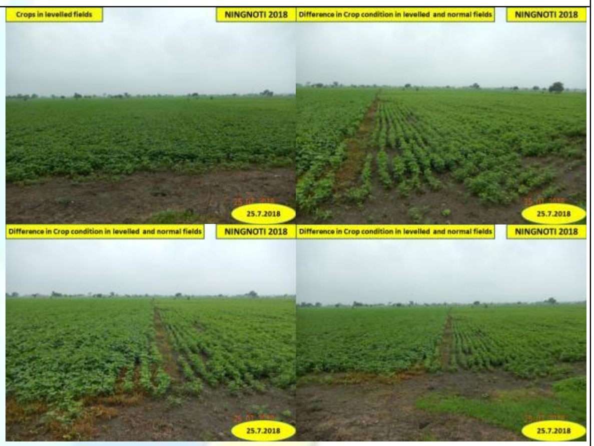
PREPAREDNESS

A. **15 farmers carried out deep ploughing using reversible MB plough during summer season and this helped to break the hard soil layer to allow more storage in the soil profile during rainy season as reduced runoff due to deep ploughing which allowed recharging more.**



B. **Leveling by tractor drawn plough and levelers brought many fields under leveled and uniform also ensured better germination in the leveled field than otherwise.**





C. **The spreading of excavated soil from the existing community tank and from the newly excavated fields also enhanced the fertility level of the soil in the farmers' fields and brought them in leveled conditions ensuring better productivity from the same.**

D. In Bisakhedi, excavated soil from the newly developed tank was used for reclaiming gullied portion in the cultivated fields. In the reclaimed portion, kahrif and rabi crops were grown successfully after almost 25 years

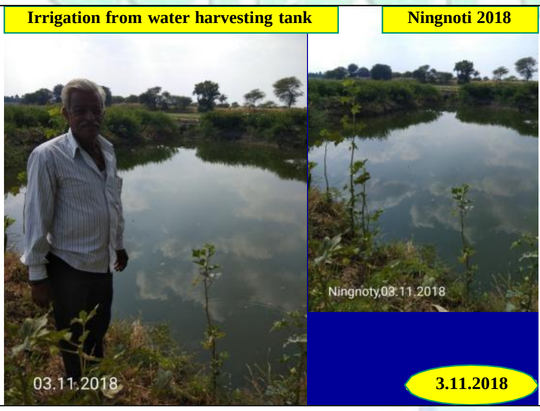
E. Construction of five excavated tanks during 2018-19 retained and stored the huge amount of runoff water in these tanks and decreased the offsite damage and erosion from the lower fields due to retarded runoff amount and velocity.

Table: Details of new tanks construction during 2018-19 through participatory approach.

S. N.	Farmer's Name	Village	Tank Dimension(m)					Capacity (m^3)	Land holding (ha)	JCB hrs provided
			Top		Bottom		Depth			
			L	W	L	W				
1	Goutam Singh	Ningnoti	21.5	14.5	15	9	4	893.5	4.25	80
2	Abhay Singh	Ningnoti	15	11	11.2	10.3	4.5	630.81	0.87	80
3	Ishwar Singh	Ningnoti	57.5	15.5	53.5	11.5	2	1506.5	5.00	110
4	Raju Upmanyu	Bisakhedi	33	11	29.7	6.3	2	550.11	3.00	80
5	Pawan	Bisakhedi	26	14.5	17.5	15.6	2.7	877.5	4.25	50

F. The bunds of these tanks are also planted with pegion pea, cowpea, ladies fingers, beans, tomato, brinjal etc. which were used for house hold purpose and even for selling. These practices helped the farmers to save the money which was required for purchasing these vegetables for daily use.

G. **Though the stored water during 2018-19 rainy seasons was not used for irrigating kharif crops during dry spell, it was used for pre sowing irrigation for rabi crops. These empty tanks then were used as storage tank for tubewell water for its better management using bigger size pump for speedy and timely irrigation the fields for saving time, labour and money.**



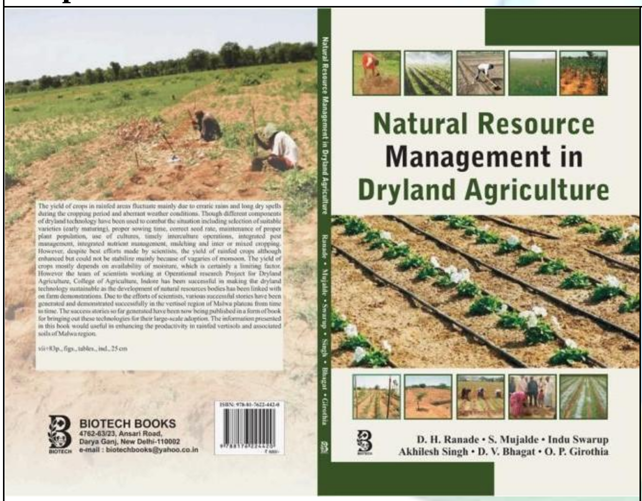
H. **With the enhanced availability of irrigation, farmers also got convinced for its efficient utilization by micro irrigation. They also adopted drip irrigation system and used it for irrigation onion and garlic crop for the first time.**

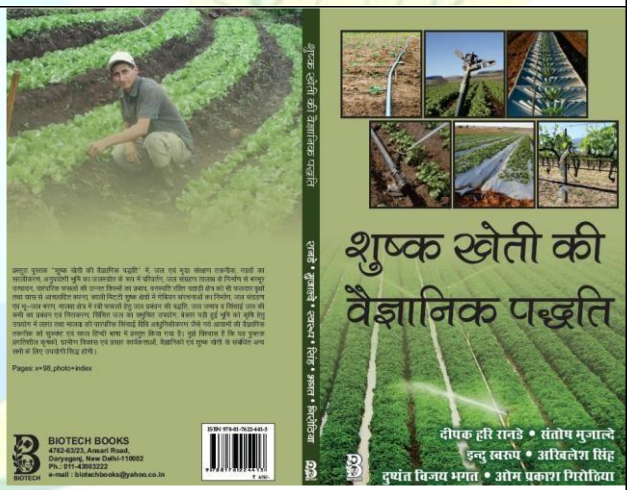
The experiences gathered from the construction of these five water harvesting tanks through participatory approach under NICRA during 2018-19 suggested that the construction of tanks not only beneficial to bigger farmers but also helpful to enhance productivity and farm income to small farmers who construct the small sized tanks even in a smaller portion of their fields. All these tanks not only provide supplemental irrigation water but also collect the tubewell water to serve as storage tanks for providing irrigation at higher rate (using bigger pump submersible pandoobbi pump) than tubewell water to save labour, time and expenditure. Storage of tubewell water in these tanks and it subsequent use for irrigation with higher rate for better rainwater and irrigation water management. The excavated soil available during the construction of these tanks can be spread in the uneven and eroded fields to make them uniform, leveled and more fertile for increasing productivity. The gullied portion of the fields can also be reclaimed using the excavated soil to make these suitable for cultivation of kharif and rabi crops. With the enhanced availability of irrigation, farmers also got convinced for its efficient utilization by micro irrigation. They also adopted drip irrigation system and used it for irrigation onion and garlic crop for the first time. With the success and advantages of theses tanks in the very first year, the farmers are overwhelmed and motivating other farmers to adopt this technology. It is a perfect example of coordination between scientists and farmers. The surprising and encouraging results and impacts of these tanks, proved the hypothesis wrong that the construction of water harvesting tanks is not professionally beneficial not to the small and marginal farmers but only to large and big farmers.

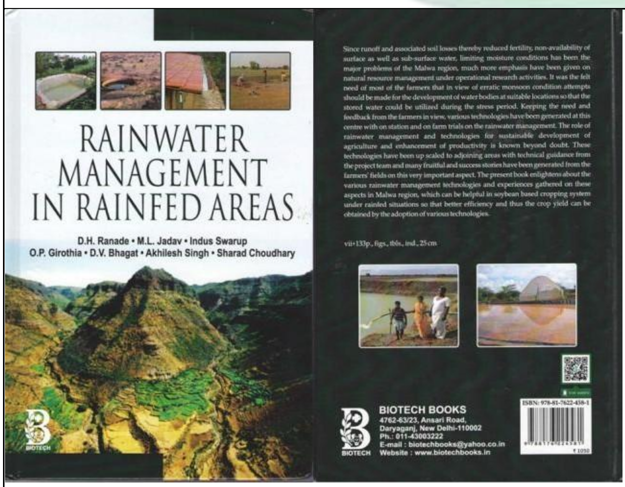
- With the help of ORP team, the farmers got constructed two Deenbandhu biogas plants of 3 cu.m. each at a cost of Rs 21000/-. The idea of slurry pump was also used by the farmer and in this village Piploda, the cow dung is being directly thrown into a tank for its mixing with water. The mixture is then directly being pumped into the inlet. The gas is being used for the domestic purpose and slurry is being used as compost fertilizer.

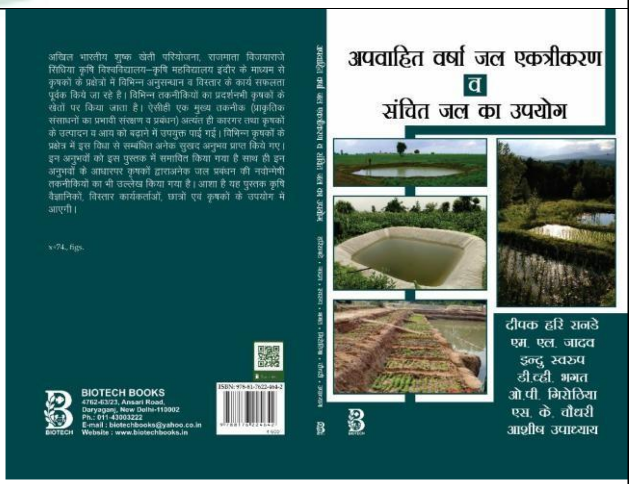
	
Construction of bio gas plant	Vermi compost
	
Bio gas plant	Mixing of cow dung and water and then pumping into inlet pipe
	

- Detailed information was gathered and documented for the pumps being used by the farmers for irrigation purpose by the farmers. Bigger pumps of 3-5 HP are more popular than the smaller one. In order to make the judicious use of available water, few farmers have been convinced to take alternate crops viz. Potato, onion, garlic etc. using micro irrigation system. Even, they have been convinced to provide supplemental irrigation in soybean during long dry spells through sprinkler irrigation.
- **Documentation of ITK for Natural Resource management:**
  1. Deep Ploughing
  2. Pond/Talab for Irrigation through Gravity
  3. Inter culture Operation
  4. Burnt Mobile Oil as sticking material for seed treatment
  5. Vegetative fencing
  6. Loose Stone waste weir (Pathar Bandhan)
  7. Stone Bund on hill slope
  8. Use of hard plastic sheet for seed box of a seed drill
  9. Provision of wooden attachment in the seed drill for making broad bed in soybean
  10. Using stored water from tank and replanting of dried up tank area with rabi crops as water recedes.
  11. Burnt Mobile Oil as Termite treatment and reducing evaporation rate
  12. Provision of GI attachment in the seed drill for making borders in wheat
  13. Putting a iron nail in the trunk of Guava plants
  14. Elevated water harvesting/storage tank for irrigating rabi crops
- **Documentation of innovative, success stories and traditional practices and improvement in traditional water harvesting methods and water saving devices and practices**





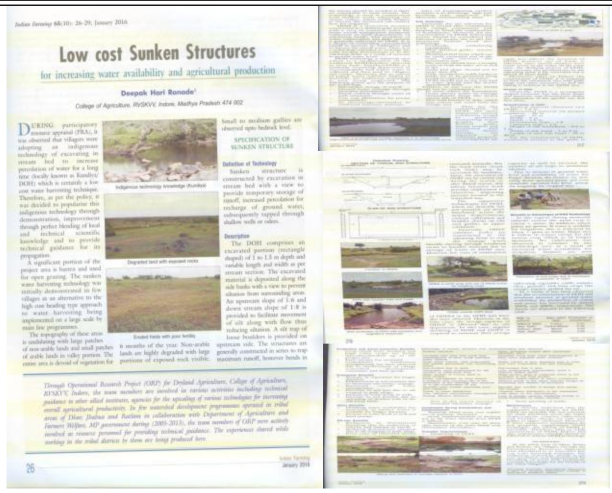




परंपरा

सिंचित जल के समुचित उपयोग के लिए नकट्या पद्धति

डा. दीपक हरि रानडे, संतोष मुजाल्दे और डा. इन्दु स्वरूप



Indian Farming 65(10): 26-29; January 2016

Low cost Sunken Structures

for increasing water availability and agricultural production

Deepak Hari Ranade[1]

College of Agriculture, RVSKVV, Indore, Madhya Pradesh

SPECIFICATION OF SUNKEN STRUCTURE

Definition of Technology

26 Indian Farming January 2016

पारम्परिक फसलों से अधिक उपज

Innovative Approaches

for Managing harvested irrigation water for rabi crops in Malwa region

जल संग्रह

गेबियन संरचनाओं का निर्माण क्यों और कैसे

डॉ. दीपक हरि रानडे

शुष्क खेती क्रियात्मक अनुसंधान परियोजना, कृषि महाविद्यालय, इन्दौर 452001 (मध्य प्रदेश)

नई तकनीक

सिंचाई की पारंपरिक विधि का आधुनिकीकरण

दीपक हरि रानडे, संतोष मुजाल्दे और डा. इन्दु स्वरूप

शुष्क खेती क्रियात्मक अनुसंधान परियोजना, इन्दौर-452001 (मध्य प्रदेश)


Natural Resource Management
for tackling dual problems of water logging and irrigation water scarcity
Deepak Hari Ranade, Santosh Mujalde and Indu Swarup


Natural Resource Management
through land developmental process with heavy farm machinery
Deepak Hari Ranade


जल उपयोग
रबी फसलों में प्रभावी जल प्रबंधन


जल संग्रह तालाब के निर्माण से भरपूर उत्पादन


वैज्ञानिक अनुभव
पहाड़ी क्षेत्रों में भी फलदार वृक्ष और घास


जल एवं मृदा संरक्षण


Bringing degraded land to agricultural use
impact of soil and water conservation activities and integrated approach
D. S. Thakur, O. K. Sharma and D. H. Ranade
Indira Gandhi Krishi Vishwa Vidyalaya, Campus Jagdalpur (Chhattisgarh) 492 012


समन्वित कृषि प्रणाली से संभव है
भरपूर कमाई


सिंचाई की पारंपरिक
विधि का आधुनिकीकरण


Innovative and efficient water
management practice
through value system in pipeline


पट्टीदार सिंचाई हेतु
जल प्रबंधन एवं जल बचत प्रणाली


जल संग्रहण तालाबों से समेकित कृषि प्रणाली


नवीन व सस्ती सिंचाई पद्धतियां


जल संग्रहण तालाब के निर्माण से
भरपूर उत्पादन - एक सफल गाथा


Effectiveness and utility of percolation tanks

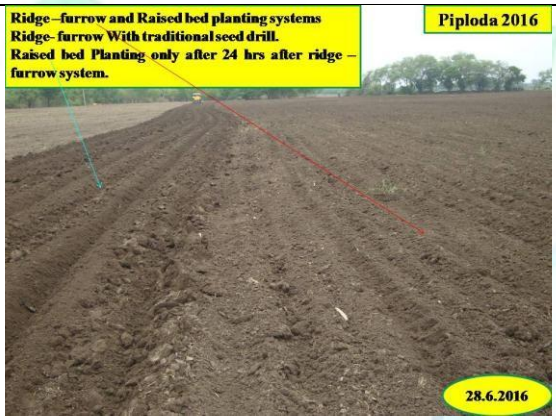
खेत तालाब से आई जीवन में हरियाली

Importance and benefits of farm pond

Successful approach for integrated farming system

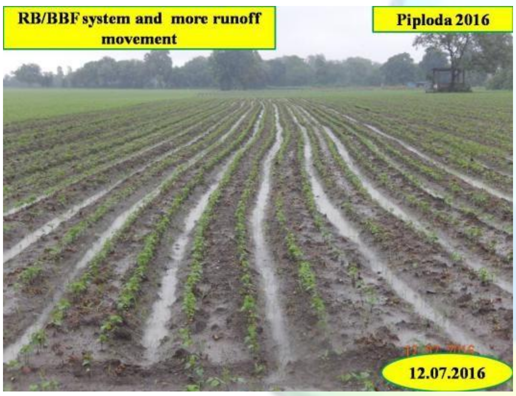
- It is clear from the data that sorghum and maize performed very well when these were cultivated along with soybean in strips. The new varieties of these crops resulted in higher B:C ratio than the traditional cultivars. Farmers were also interested to cultivate these crops as an alternative to soybean in part of their fields. Sorghum can also be grown as fodder crop for the feeding of animal. Sorghum and maize can also be used for preparation of daily food items.
- The yield data clearly indicated that though the yields levels were relatively lower than normal years. However, the improved practices i.e. RDF + 30 kg S/ha resulted in higher yield of Soybean than the farmers practice. This resulted in higher net return and B:C ratio from the improved practice. The table also indicated that the application of 30 kg S/ha also increased the soybean yield in comparison to farmers practice. All the treatments were significantly different from each other. The study reveals the importance of Sulphur application in these soils, which are deficient in Sulphur.
- The newly purchased RB/BBF planter was also found not properly working in the higher moisture (at field capacity) level at which normal seed drill works quite satisfactorily. Thus the raised bed planter delays the sowing by 1-2 days. The raised bed planting also resulted in lower yield than that with the traditional modified seed drill. Therefore, the raised bed planter purchased in 2015 in the same village also converted into traditional seed drill by removing various features of the raised bed planter.

Evaluation of land configuration systems in soybean		
Theme	Soybean	
RWM	2015	2016
FP (modified over flat sowing)	Ridge and furrow system	
Mean Yield (kg/ha)	535	2090
IP	Raised bed planting/BBF	
Area (ha) covered	1	1
Number of farmers	1	1
Mean Yield (kg/ha)	399	1740
Yield Advantage (% increase over FP)	- 25 %	- 16.7 %
Cost of cultivation (Rs/ha) for FP	16000	16000
Net returns (Rs/ha) for FP	3583	64460
BCR for FP	1.21	4.8
Cost of cultivation (Rs/ha) for IP	17000	17000
Net returns (Rs/ha) for IP	- 328	49950
BCR for IP	0.96	3.9



RB/BBF and Ridge –furrow (28.6.2016)

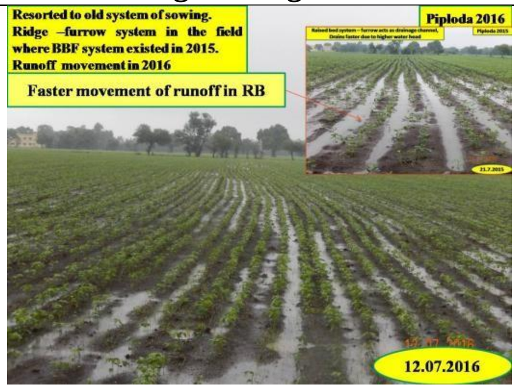
RB/BBF planting(28.6.2016)



RB/BBF drains off quickly

Slower drainage in ridge and furrow

RB and Ridge –furrow system (26.7.2016)



Faster drainage in RB/BBF in 2015, 2016

- The use of cycle hoe was more comfortable as well as economical for interculturing as compared to manual method and hand hoes. The width of operation with cycle hoe was found maximum (30 cm) as compared to other methods.

Cycle Hoe

Hand Hoe

- Overall the farmers prefer JS 2029 due to its four seeded pods and short duration. The farmers liked a new variety JS 2029 due to its four seeded pods (more than 50 % pods having four seed), higher productivity, net return and B: C ratio. JS 9560 is also possessing four seeded pods, high yielding and maturing 7 to 8 days earlier than local varieties and thus making it suitable for the farmers willing to grow potato after soybean. In general, the yield of soybean affected very badly and recorded poor yield due to adverse monsoon and prolonged dry spell in between the rainy season.

Soybean JS 20-29

Soybean JS 335

Success stories NICRA activities (2011-2024)

Details of surface water bodies constructed on farmers' field at Nignoti/Bisakhedi village

SN	Name of Farmers	Length (m)	Width (m)	Depth (m)	Capacity (m^3)	Year
1	Balu Nathu Singh (5.5 ha)	37	16	4	1384	2011
2	Prakash Singh (1 ha)	31	16	6	1716	2012
3	Dhamendra Singh (6 ha)	30	24	4	2144	2012
4	Desilting of community tank				2250	2016
5	Goutam Singh (4.25 ha)	21	14	4	893	2018
6	Abhay Singh (0.87 ha)	15	11	4.5	630	2018
7	Ishwar Singh (5.75 ha)	57	15	2	1506	2018
8	Raju Upmanyu (3.75 ha)	33	11	2	550	2018
9	Pawan Choudhary (4.5 ha)	26	14	2.7	877	2018
10	Bhisham Singh (5 ha)	40	15	4	1960	2019
11	Prahlad Singh (2 ha)	21	14	5	1470	2019
12	Balu Singh tank reshaped it by desilting and widening by investing 3 lac (120 m x 25m x 3 m)				6020	2019
	Enhanced water availability				18250	

Tanks constructed

Success Story

Tank status

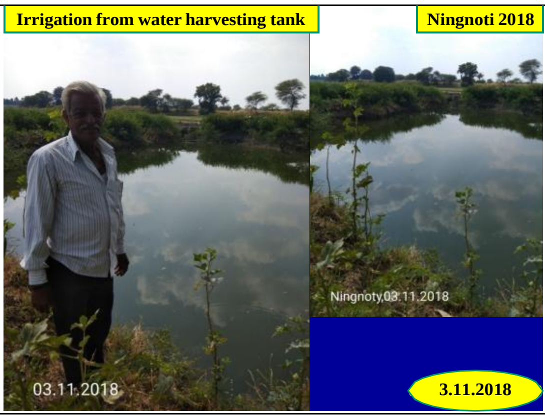
Use of micro irrigation systems

DETAILS OF TANK CONSTRUCTED DURING 2018-19

Village	Name	Land holding (ha)	Tank capacity (cu.m.)
Nignoti	Goutam Singh	4.5	893
Nignoti	Abhay Singh	0.87	630
Nignoti	Ishwar Singh	5.75	1506
Bisakhedi	Raju Upmanyu	3.75	550
Bisakhedi	Pawan Choudhary	4.5	877

Use of micro irrigation systems

Tank at marginal farmer's field



Tank status

Irrigation and diversification of crops

Irrigation scheduling in Rabi crops from water harvesting tank (2018-19)

Crop and area (ha)	Irrigation water amount (m^3)							
	I	II	III	IV	V	VI	last	Total
Onion (Kharif)-0.25							129.6	129.6
Garlic - 0.12	64.8	32.4	43.2	54.0	54.0	43.2		291.6
Fenugreek -0.25	129.60	140.4						270.0
Wheat-0.25	151.2	194.4	216.0	216.0				777.6
Onion (Rabi)-0.25	108.0 (Flood)	54.0 (Drip)	43.2 (Drip)	43.2 (Drip)	43.2 (Drip)			291.6
								1760.4

Irrigation scheduling

Seed yield (kg/ha), Return (Rs/ha) and B: C ratio of different cropping sequence of on farm (Village-Ningnoti) in 2018-19

Crop and Crop sequence	Seed yield (Kg/ha)	Cost of Cultivation (Rs./ha)	Return (Rs./ha)		B: C Ratio
			Gross	Net	
Soybean Cv. JS 95-60	1400	20000	49000	29000	2.45
Wheat Cv. HI 1544	6000	30000	120000	90000	4.00
Total Return from sequence (Rs./ha)		50000	169000	119000	3.38
Onion (Kharif) Cv. Alora C.king	21600	50000	108000	58000	2.16
Onion (Rabi) Cv. Alora C.king	11200	50000	89600	39600	1.79
Total Return from sequence (Rs./ha)		100000	197600	97600	1.98
Kharif Soybean Cv.JS 95-60 -	1400	20000	49000	29000	2.45
Rabi Onion Cv. Alora C.king	11200	50000	89600	39600	1.79
Total Return from sequence (Rs./ha)		70000	138600	68600	1.98
Kharif Soybean Cv. JS 95-60	1400	20000	49000	29000	2.45
Rabi Garlic Cv Amleta	6400	50000	192000	142000	3.84
Rabi Maithi (Green leaves) - Local	200	10000	12000	2000	1.20
Total Return from sequence (Rs/ha)		80000	253000	173000	3.16

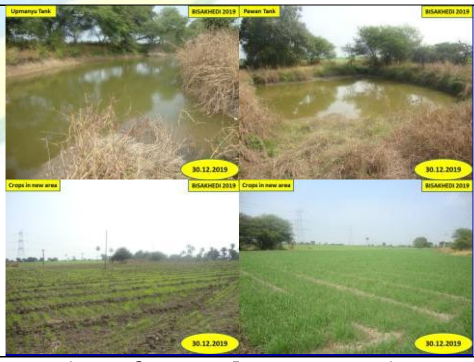
Advantages of tank

Particulars	Before the tank	After the tank construction
Storage of tube well water	Not possible	possible
Excess runoff water storage	Not possible	possible
Conjunctive use of surface and ground water	Not possible	possible
Soil fertility	-	Enhanced
Levelling land	Undulation	Leveled field
Life saving irrigation during prolonged dry spells for kharif crops from runoff water	Was not possible	possible
Investment for tube well	Lot of amount	Nill
Recharging of Nearby tube well	never recharge and have lesser water	Fully recharged and have sufficient water
Soil erosion	Continued	Reduced and controlled
Land reclamation	Not done	Possible, reclaimed 1 ha
Status of cultivated fields	Undulated, not fully suitable for cultivation	Area for cultivation increased due to levelling of fileds
Production of rabi crops	Not possible	Possible
Crops diversification	Not possible	Possible
Farm income	Low	Enhanced
Quantity of runoff	Higher	Reduces appreciably
Irrigation water management	Poor	Better

Before and after tank construction

Site Before tank construction

Bringing new area under cultivation



Site After tank construction

- **HRD for Natural Resource management:**

  Various trainings were imparted and attended as resource person for discussing natural resource aspects with the farmers and field staff of line departments at the project site and even in training halls:

HRD/Capacity building

1. **Trainings organized for stakeholders**

Year	Theme area	Duration	Number of trainings	Number of male trainees	Number of female trainees	Total number of trainees
2010-2020	Rainfed Farming	Regular monthly Training	12 in every year	25-35 per Training to Dept. Of Agriculture and farmers welfare Technical Staff	3	25-35 per Month

Trainings for line departmental personals:Coordinator Dr. D.H. Ranade (2010-11)

S. N.	Title of the Training organized	Attended by	Number of participants/ Dated
1	Cropping and farming systems under changing climatic conditions	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	36 September 20-24, 2010
2	Production, processing and value addition technologies for Medicinal and aromatic plants	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	35 October 25-29, 2010
3	Green house technologies for high value crops	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	35 November 23 -27, 2010
4	Methods of agriculture extension and participation in water management	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	25 December 20-24, 2010
5	Diagnosis of salt affected soils and management of salty water	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	18 January 17-21 2011
6	PRA in context with rural environment	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	15 February 07-11, 2011
7	Value addition for horticultural crops after harvesting	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	18 March 07-11, 2011

Trainings for departmental personals under MPWRSP:Coordinator Dr. D.H. Ranade (2011-12)

S. N.	Title of the Training organized	Attended by	Number of participants/ Dated
1	Utility and constructional details of water conservation structures	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	25 June24-28,2011

2	Methods of agricultural extension and participation in water management	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	23 September 12-16, 2011
3	Improved techniques for fruits, vegetable and nursery management	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	24 November 14-18, 2011
4	Engineering methods for improved irrigation systems	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	25 December 26-30, 2011
5	Strategic for tackling effect of climate change on agriculture	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	20 January 23-27 2012
6	Utility of programme on Gender strengthening and development in agriculture	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	25 February 27-March 3, 2012

Trainings for departmental personals under MPWRSP:Coordinator Dr. D.H. Ranade (2012-13)

S. N.	Title of the Training organized	Attended by	Number of participants/ Dated
1	Water management, crop intensification and diversification in irrigated areas	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	25 June 25-29, 2012
2	Maximizing production and income from farm and horticultural crop through effective water management & drainage	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	24 July 23-27,2012
3	Improved and modern irrigation techniques from increasing water efficiency.	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	25 Sept. 03-07, 2012
4	Field irrigation system and irrigation management	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	23 October 08-12, 2012
5	Measurement of hydrological and weather parameters	Officials of State Agril. Depart., Horticulture dept, Water resources department and KVKs	20 January 02-06, 2013

Trainings for departmental personals under MPWRSP:Coordinator Dr. D.H. Ranade (2013-14)

S. N.	Title of the Training organized	Attended by	Number of participants/ Dated
1	Increasing crop production and income through better Water drainage and water management	Officials of State Agril. Dept., Horticulture dept, Water resources department and KVKs	25 August 02-06, 2013
2	Improved and latest irrigation methods for increasing water efficiency	Officials of State Agril. Dept., Horticulture dept, Water resources department and KVKs	24 September 03-07,2013
3	Organic farming	Officials of State Agril. Dept., Horticulture dept, Water resources department and KVKs	25 October 07-11, 2013
4	Organic farming in horticultural crop	Officials of State Agril. Dept., Horticulture dept, Water resources department and KVKs	20 February 04-08, 2014
5	Training on Soil and management aspects for Youth	Students of Civil Engineering from Engineering college	75 12.9.20 14

06.06.2013

06.08.2013

06.08.2013

06.09.2013

06.09.2013


XXIV Biennial Workshop
of
All India Coordinated Research Project for Dryland Agriculture
(AICRPDA)
26-29 December, 2014
Venue: AICRPDA Centre, Indore (M.P.)
Organized by


Krishi mahotasav 2015
Barai 2015
25.5.2015
Krishi mahotsav 2015
Susner 2015
26.5.2015
Kisan Sangoshthi
PIPLODA 2015
3.9.2015
Kisan Sangoshthi
PIPLODA 2015
3.9.2015
Krishi mahotasav 2015
Dongargaon 2015
25.5.2015
Krishi mahotasav 2015
Barai 2015
25.5.2015
Kisan Sangoshthi
PIPLODA 2015
3.9.2015
Kisan Sangoshthi
PIPLODA 2015
3.9.2015
One day Training on watershed management aspect and exposer visit of water shed committee of IWMP II District Seoni (M.P.)
INDORE 2015
13.7.2015
Krishi mahotsav 2015
Dharampuri block 2015
Krishi mahotsav 2015
Dharampuri block 2015
Krishi mahotsav 2015
Dharampuri block 2015
Training of SADO 2015
Satrati 2015
5.5.2015


Jal Skakti Abhiyan
INDORE 2019
31.8.2019
Jal Skakti Abhiyan
Shujalpur 2019
3.9.2019
Jal Skakti Abhiyan
INDORE 2019
31.8.2019
Jal Skakti Abhiyan
Sonkuchh 2019
4.9.2019


Mela and Sangoshthi
Badnawar 2019
11.9.2019


Technical guidance for elevated partially lined tank
Shivani 2019
30.8.2019
Technical guidance for elevated partially lined tank
Shivani 2019
30.8.2019
Technical guidance for elevated partially lined tank
Shivani 2019
30.8.2019
Technical guidance for elevated partially lined tank
Shivani 2019
30.8.2019

Linkages with stake holders for natural resource management:

S.S. 1: Straightening of gully and utilization of wasteland

Before

After

Gully straightening in ORP

Existing practice: The movement of uncontrolled runoff water develops gullies in the farmer's field. This process remains continue for the years together and increases the gully head advancement phenomenon. This not only increases the deepening and widening process of gully but also converts the cultivated fields into wasteland. Since it is difficult to reclaim the gullied portion, the farmers abandon the fields and do not grow any crop on the same. This allows the formation of serpentine shaped gully because of restricted drainage pattern.

Technology

In May 2000, reclamation process was started with the help of earth moving machinery (bulldozer). In this activity, a serpentine shaped gully with varying depth and width which fragmented the cultivable field, was shaped into a straight-line gully keeping the width and depth almost uniform. While carrying out this operation, it was ensured that the upper fertile topsoil of the newly located gully portion was first scratched and piled at a location. The excavated earth while straightening the gully was filled into the earlier serpentine shaped gully to convert all fragmented portions to one unit. After the completion of filling work, the piled fertile earth was spread over the reclaimed/refilled portion to maintain its fertility. This whole process reduced the total length of gully by 20 m. The total cost incurred for bulldozing work was only Rs. 10,000/-. This not only allowed safe passage of runoff water but also helped the farmer to utilize extra area (0.18 ha) for cultivating different crops. In the subsequent year i.e. 2001, the work of gully straightening continued so that the drainage line treatment in the upper zone is completed. In this phase, a total length of 400 m gully was straightened and the property bunds of adjoining fields were reshaped so that the runoff does not enter in the gully. Due to the bulldozing work, an additional area of 2000 sq. m was brought under cultivation at a total cost of Rs. 5600/-, which was lying unused for the requirement of soil and water conservation measures, mainly for the safe disposal of runoff. Further work on gully straightening and bringing additional area under cultivation was undertaken in the year 2002. In this particular portion of the area, a gully of serpentine shape was made in a straight line as far as possible. Since the gullied portion was low lying due to severe erosion, a sort of terracing was provided in this piece of land with little levelling. Only Rs 25000/- was paid for the bulldozing work, which brought a huge area of 0.50 ha under new cultivation.

Advantage of new technology

S. No.	Particulars	Before	After
1.	Length of gully (m)	310	202
2.	Depth (m)	Variable – 0.5 to 3.5	1.0 - 1.5
3.	Width of gully (m)	Variable	4.0
4.	Cultivable land (ha)	0	0.88
5.	Crops	Nil	Wheat, soybean, gram, pea

Impact of technology

The technology brought about 0.88ha area under cultivation which allowed the farmers to grow crops on it. Even the market price of such land was increased by 5 lacs.

S.S. 2: Construction of percolation tank for ground water recharge

Percolation tank with diversion bund in ORP

Existing practice: The runoff potential of the soils of the experimental area is very high due to their low infiltration rate. The uncontrolled runoff enters into the farmer's fields with higher velocity particularly in the plots adjacent to ridgeline. This not only causes the severe sheet erosion but also develops gullies in the fields. The safe disposal/ storage of this runoff would be beneficial. However so far no attempt has been made to store the water in the farmers fields to allow it to percolate deep into the soil to recharge the ground water. The farmers are not aware of the such technology for the want of technical know-how.

Technology: Since the soil of the area particularly near the ridgeline is underlain by fragmented basalt, the storage of surface water for a longer time is not be possible. However, construction of percolation tank allowed the downward movement of runoff water. Similarly, provision of diversion bund diverted the excess water away from the cultivated fields. The storage or disposal at reduced velocity of the runoff water reduced the process of erosion and also increased the ground water storage.

Advantage of the new technology: The construction of percolation tank resulted in the storage of runoff water in the tank area in the very first year of its construction. Despite many dry spells in year 1999, all the runoff water retained in the tank area got percolated and increased the ground water recharge. This was evident from the presence of higher water level throughout the year in the nearby open well, which provided extra five irrigations to the *rabi* crops in the year 1999-2000. Similarly, in the year 2000, the project area experienced only 436 mm rainfall and even in this dry year, the open well retained 6m water in the month of January, 2001. Though no crop was irrigated by utilizing the well water during the year, the livestock available with the farmers was provided drinking water through the well.

Further, this was also to be noted that all the other open wells in the area remained dry throughout the year. In the year 2001 and 2002 also, the project area again experienced lesser rainfall against the average rainfall of 968mm. Even in these two dry years, the open well still get recharged immediately after first heavy shower and retained reasonable amount of water for providing pre-sowing irrigation to *Rabi* crops. It also provided again the drinking water to the livestock being maintained by the farmer. Once again, it is to be noted that all the other open wells in the area remained dry throughout the year.

Impact of technology:

Thus, the provision of percolation tank near the ridgeline not only retained the runoff to recharge the nearby well but also saved the adjoining field from sheet erosion and further development of gullied portion. Similarly large number of farmers has their interest to provide the technical know-how to construct such tanks at the suitable sites. Infact, in the entire watershed programme the construction of such tanks have been made mandatory by the implementing agencies.

S.S.3: Suitability of Modified NRCS seed drill for soybean-based cropping systemModified NRCS seed drill

Existing practice: In Malwa region the farmers prefer to grow Chickpea during rabi season. Nowadays farmers are interested to grow American Bold Gram (Kabuli Chana) instead of smaller size Gram (Desi Chana) as former fetches a handsome amount in local market. However, the non-availability of seed drills for a bold size grain is the main deterrent in bringing a large area under Kabuli gram. Since breakage in bold gram seed was observed in the regular and existing fluted roller mechanism, the farmers used to sow the bold gram using bullock drawn seed drill which is time consuming and exhaustive. Similarly, some farmers used even the Potato Planter to sow the bold seeded gram to avoid the breakage of seed coat. However, in such Potato Planter four laborer are continuously engaged in putting the seed in the feeding seed cup that is again labour intensive & exhaustive work. Because of such reason, the large area was not grown under Kabuli Chana (gram).

Technology: Recently one improved seed drill has been designed by the **National Research Center for Soybean** (**NRCS**) particularly for Soybean based cropping system and for black soil region. The NRCS seed drill was procured under **NATP Mission Mode Project on Dryland Mechanization** and modified to suit it to farmers requirement. Though these are the minor modifications made in the original NRCS seed drill but found to be very effective in field operations.

Advantage of the new technology: Sowing of American bold gram (*Kabuli chana*) was done by the farmer on an area of about 5 ha. Since breakage in the gram seed was observed in the fluted roller type seeding mechanism and the other means of sowing bold seeded gram like bullock drawn seed drill and potato planter was found to be labour intensive and time consuming, the farmers preferred the NRCS seed drill. Thus, a large number of farmers showed interest in NRCS seed drill after having a look on its performance. As a result, the implement was given on custom hiring to large number of farmers and the implement was used for a cumulative area of about 45 hectare. This generated additional income of Rs. 2710/- to the farmers through custom hiring.

Impact of technology

The introduction of NRCS seed drill has changed this scenario and brought a large area under bold seeded gram. Since no breakage in the seed coat was observed mainly due to gravity feed seeding mechanism in the NRCS seed drill, the farmers of the area were much impressed with the same. As a result the implement was given on custom hiring to large number of farmers and the implement was used in more than 45 ha area for planting of bold seeded Kabuli Chana (gram).

S.S. 4: Effectiveness of Gabion Structures in Retaining Silt Load and water storage InGullied Portions

Gabion as outlet of water harvesting tank at College campus

Before

After

Use of gabion for gully stabilization in village Umariyakhurd

Existing practice: The heavy storms cause severe runoff after flooding the agricultural fields and results in development of washes and deep gullies. The gullies cut their way through the cultivated fields and grasslands and consequently wider and deeper side gullies are developed. Continuous flow of runoff water from these gullies not only increases the gully head advancement phenomenon, but also converts the cultivated fields ultimately into ravines. The stabilization prior to development of gullies in the field is essential through suitable gully control structures. However, the farmers do not bother about such problems and do not construct any structures for natural resource conservation. Permanent masonry structures and/or flexible structure like gabion can be used to stabilize the gullies. Due to the presence of higher percentage of montmorillonite mineral in the clay fraction of soil, the use of expensive masonry structures to stabilize the gullies is found unsuccessful as they crack and collapse following the soil movement

Technology: Flexible structures like gabion can withstand in this situation and thus these low cost, semi-permanent and flexible gabion structures which can be a suitable alternative to expensive masonry structures in controlling, reclaiming and plugging the gullied portion in black soil. In the year 2000, a site was selected in Umariya Khurd watershed where a gully of 660m length was selected and total five number of gabions were constructed at vertical intervals of 1.00, 1.25 and 1.50 m. Similarly, in the College of agriculture Indore campus gabions have been used as inlet and outlet of the tank which is retaining runoff water al the year round.

Advantage of new technology

1. The most of the catchment of gully falls under mountain, which causes flash flood at high velocity. However, the structures are allowing the runoff water to pass through at reduced velocity by increasing time of concentration.
2. The structures are trapping the silt particles, thrashes, vegetative materials flowing along with runoff water and thus, started the process of gully stabilization. During the first year, no case of gabion failure is recorded/observed.
3. The construction of the water harvesting tank min the college campus is now a physical asset and the stored water is being utilized for irrigating the commercial as well as research plots during the stress period and particularly for irrigating the rabi crops even during the drought years.

Impact of technology: Though there was little reduction in the storage volume this indicates that all the gabions are retarding the runoff velocity and trapping the silt on upstream side. At the same time, it is evident from the data that the process of gully stabilization thereby further reduction in gully head advancement and deepening and widening of gullies has started in the first year itself. Similarly, no case of failure of any gabion structure was observed. Now, the gabions have been emerged as an alternative to costly masonary structures. The cost of the gabion structures worked out to be only 1/5th of the concrete structures. The runoff water was trapped, loss of soil was reduced and due to deposition of soil in the gully, the gully was stabilized. The structures not only helped in water harvesting but also provided water to subsequent rabi crop, resulting in increase in production and was found to be economically viable. This also resulted in creation of water harvesting tank which in future will provide water to university research farm.

S.S. 5: Effect of tillage on the development of weeds and crop yields

Deep ploughing and Wheat crop after deep ploughing in ORP

Existing practice: After the harvest of wheat crop, the farmers of the area burn the wheat stable and do not incorporate it as per the scientific recommendations. They simply cultivate the fields using cultivator and blade harrow. This practice not only allows the weed to grow and also do not allow the rain water to move into deeper layers for insitu conservation.

Technology: An Italian plough (three bottom MB plough) which is operated by using crawler tractor was hired and was made available to the farmers of the region for deep ploughing during the summer season. The plough inverted the soil upto the depth of 45 cm. The ploughed soil was kept undisturbed in the sun to destroy the insects, pests and weeds.

Advantage of the new technology: The deep ploughing in the farmers field incorporated about 5t/ha wheat biomass and allowed the rainwater to deeper layers. This helped the farmers to grow wheat and gram in the ploughed area even in the drought years 2000 and 2001. The weed infestation was observed in the unploughed land with almost no weed in the ploughed field. Thus, during these years, the crop could be grown only on the ploughed land due to in-situ moisture conservation. This was the situation crop and no crop. Even the problem of insect damage (semi looper, girdle beetle, blue beetle and stem borer) was very less in the ploughed fields. The deep ploughing even cut the lateral roots of the agro forestry plants grown on the field boundaries which were otherwise interfering with the cultivation operation and reducing the crop yields due to development of suckers.

Impact of technology: The farmers of the area were so impressed with the same that number of farmrs hired the plough for deep ploughing operations. Even in the research plots (15ha) of JNKVV campus Indore were ploughed using the Italian plough. This resulted in additional area of 5ha under cultivation, which was lying fallow for the last 25 years**.**

S.S. 6: Construction of diversion drain and reclamation of wasteland (2006-2010)

1	Name of the farmers	Mr. Chhaganlal	
2	Village	Jaitpura, Indore	
3	Contact details	As above	
4	Details of farm (size, location, water availability)	2.0 ha, Jaitpura	
5	Membership in self-help group, producers cooperative/company, cooperative society)	No	
6	Names of central sector/state schemes utilized by the farmers and the period	ICAR FUNDED ORP PROJECT	
7	Technologies/good agricultural practices/facilities/benefits obtained with details	**Construction of diversion drain and reclamation of wasteland**	
	In the very first year during 2005-06 in the new ORP site, firstly the gully portions to be straightened was identified and then farmers were explained the idea of the drainage line treatment required for these fields. Subsequently, the drainage line treatment for safe disposal of runoff was carried out after the harvest of the rabi crop. This area was so severely affected by uncontrolled runoff that it was fragmented into several pieces making very little pieces suitable for cultivation. In this area, using backhoe loader machines, a diversion drain of 200m with uniform cross section was constructed to divert the runoff water from entering into the field. The excavated soil was then used to fill the existing gullied and undulating portions of the field to make it one piece. Due to this activity, a new area of 0.25 ha could be made suitable for cultivation during forthcoming kharif season. This activity not only made available extra land for cultivation but also increased the market rate of the field by Rs. 2 lac.		
8	Details of results obtained due to the adoption of technologies		
	Due to this activity, a new area of 0.25 ha could be made suitable for cultivation during forthcoming kharif season. This activity not only made available extra land for cultivation but also increased the market rate of the field by Rs. 2 lac.		
	Natural resources saved/conserved like soil, water etc.)	Soil loss reduced drastically	Field converted into serpentine shaped gully due to uncontrolled runoff
	Product quality improvement	Good quality seed	-
9	Marketing strategy – Access to market (through private, cooperative contract farming etc.)	Direct to mandi	
10	Factors contributing to success	New area under cultivation, Provision of Proper drainage	

SOYBEAN CROP IN NEWLY RECLAIMED AREA

S.S. 7: Effectiveness of percolation tank for ground water recharge

1	Name of the farmers	Mr. Ayub and Salim	
2	Village	Jaitpura, Indore	
3	Contact details	As above	
4	Details of farm (size, location, water availability)	3 ha, Jaitpura, Open/step well	
5	Membership	No	
6	Names of central sector/state schemes utilized by the farmers and the period	ICAR FUNDED ORP PROJECT	
7	Technologies	**Effectiveness of percolation tank for ground water recharge.**	
	The entry of runoff water into the cultivated fields nearer to ridgeline can be restricted by retaining it on the upstream side with the help of a bund. The excavated portion on upstream side serves as a storage tank, which receives runoff water from ridgeline. The retained water percolates as the tank is exposed to fragmented basalt and aids to ground water.		
8	Details of results obtained due to the adoption of technologies		
	In the year 2005, the project area experienced only 733 mm rainfall. Even then in the percolation tank, which was developed as entry point activities allowed the nearby open well to retain sufficient water that was used for irrigation and other agricultural purposes even in the month of December 2005 and thus also providing supplemental water other than the tube well water to the adjoining fields. Therefore, a good kharif crop is ensured due to availability of sufficient ground water for irrigation. However, due to non-availability of sufficient water in the well, no rabi crop could be planted. In the year 2006, the project area experienced 1078 mm rainfall. The percolation tank, again allowed the nearby open well to retain sufficient water that was used for irrigation and other agricultural purposes during Rabi 2006. Therefore, a good rabi crop is ensured due to availability of sufficient ground water for irrigation. The provision of percolation tank near the ridgeline not only retained the runoff to recharge the nearby well but also saved the adjoining field from sheet erosion and further development.		
	Natural resources saved/conserved like soil, water etc.)	Soil loss reduced drastically	
	Product quality improvement		-
9	Marketing strategy – Access to market	Direct to mandi	
10	Factors contributing to success	Additional water availability, ground water recharge and more area under irrigation.	
11	Any other relent information		

PERCOLATIONTANK IN JAITPURA

S.S. 8: Construction of storage cum recharge structure

1	Name of the farmers	Mr. J.P. Dixit	
2	Village	Baroli, Indore	
3	Contact details	09425954022	
4	Details of farm (size, location, water availability)	9 ha, Baroli, Open/step well	
5	Membership in self help group, producers cooperative/company, cooperative society)	No	
6	Names of central sector/state schemes utilized by the farmers and the period	ICAR FUNDED ORP PROJECT	
7	Technologies/good agricultural practices/facilities/benefits obtained with details	**Construction of storage cum recharge structure**	
	The uncontrolled runoff coming from the adjoining fields through culvert not only causes severe soil erosion but also drains away from the fields without any added advantage. The runoff water was allowed to store in a tank as surface water and the excess water was diverted through filter material into a nearby defunct open well.		
8	Details of results obtained due to the adoption of technologies		
	The runoff water is not only available as surface water for the use during stress period but also recharged the nearby open well. This has increased the recovery of ground water from the open well and increased the irrigated area from 1 ha to 8 ha after the construction of tank and recharging activities.		
	Natural resources saved/conserved like soil, water etc.)	Water conserved; Soil loss reduced drastically	Severe soil loss, development of washes, lesser ground water
	Product quality improvement	Good quality seed	-
9	Marketing strategy – Access to market	Direct to mandi	
10	Factors contributing to success	New area under cultivation during rabi due to increased water availability.	
11	Any other relent information		



Storage cum Recharge Structure at Baroli

Further deepening in 2009 and condition in Monsoon 2009-10

S.S. 9: Effect of tillage on the development of weeds and crop yields

1	Name of the farmers	Mr. Bauskar	
2	Village	Jaitpura, Indore	
3	Contact details	As above	
4	Details of farm (size, location, water availability)	10 ha, Jaitpura, tubewell	
5	Membership in self help group, producers cooperative/company, cooperative society)	No	
6	Names of central sector/state schemes utilized by the farmers and the period	ICAR FUNDED ORP PROJECT	
7	Technologies/good agricultural practices/facilities/benefits obtained with details	**Effect of tillage on the development of weeds and crop yields**	
	During Rabi season since there was no crop in the fields due to poor rainfall and no limited moisture after the harvest of soybean, the deep tillage through crawler tractor drawn MB plough was carried out in the month of January 2005. At one site, the deep tillage operations helped in removing the weeds mainly *Saccurum spontaneum* which is a dangerous weed. At this site, no crop could be taken up due to severe infestation of the *Saccurum spontaneum*. At the same this plot resulted in very poor yield of soybean in kharif season. The deep tillage operations could remove about 10 t of root biomass of weed as against only 1 t and 100kg from tractor drawn MB plough and cultivator respectively. In this study, the performance evaluation of deep tillage and farmers practice would be made. Two plots of about 0.8 ha and 0.2 ha respectively were made cultivable due to deep tillage which could be brought under new cultivation in the following Rabi season.		
8	Details of results obtained due to the adoption of technologies		
	In the present study during the year 2004-05, 12 acre of weed infested fields were then ploughed using a crawler tractor drawn M.B. Plough which turned the soil up to 45 cm. At this depth, the deep roots were quite visible and were then destroyed due to deep ploughing operation. The destroyed roots were collected and removed from the fields. The removal of such weeds in large quantity will certainly allow production of good crop despite the formation of dead furrows and slight disturbance in the field leveling while operating MB plough. However, chances of field disturbance can be avoided if reversible plough is used while deep ploughing.		
	Natural resources saved/conserved like soil, water etc.)	Weed removed and in situ moisture conservation	Weed infestation and heavy runoff
	Product quality improvement	-	-

9	Marketing strategy – Access to market (through private, cooperative contract farming etc.)	Direct to mandi
10	Factors contributing to success	Weed removal, In situ moisture conservation
11	Any other relent information	

REMOVAL OF WEEDS WITH DEEP TILLAGE IN JAITPURA

S.S. 10: Water harvesting tank for storing runoff water (2010-2018)

1	Name of the farmers	Mr. Bhagwat Singh
2	Village	Panod, Indore
3	Contact details	As above
4	Details of farm (size, location, water availability)	3 ha, Panod Open well, Tube well
5	Membership	No
6	Names of central sector/state schemes utilized by the farmers and the period	ICAR FUNDED ORP PROJECT
7	Technologies	**Water harvesting tank for storing runoff water**
	The runoff potential of the soils of the experimental area is very high due to their low infiltration rate. The safe disposal/ storage of this runoff would be beneficial. The storage of the runoff water would help the farmer to utilize it during the moisture stress period. Thus, attempts should be made to enhance the water availability in the farmer's fields.	
8	Details of results obtained due to the adoption of technologies	
	A suitable site in the field was selected considering all the hydrological aspects in January 2008 and an excavated tank has been developed in March 2008 through participatory approach. The idea was mainly to provide the technical guidance and sharing the cost to the tune of 50% from the project side and to motivate the farmers for devoting a portion of his land for the construction of tank besides 50% cost so that the stored water could be utilized during the stress period. Before the site selection, it was ensured that the site retains the water without causing any appreciable losses in the storage. For this purpose, back hoe loader machines were used for the excavation purpose and dumper were used for transporting and spreading the excavated only top black soil (available up to 2 m) in the nearby fields which was severely affected by rill and sheet erosion process. The farmers then engaged the tractor drawn levelers for spreading the excavated materials and making the fields almost leveled. The yellowish soil excavated beyond 2m was also used for the construction of side bunds and peripheral bunds of the farmers and also for the construction of farm roads. The inlet of the tank is provided on the either side bund facing the cultivated field. The outlet is constructed so that it safely drains off the excess water into a natural waterway. The excavated tank collected the runoff water in the following rainy season and farmer also filled it with available ground water in the nearby tubewell as its discharge was not sufficient enough to be used directly for pre-sowing irrigation through the border. Subsequently three irrigations to wheat grown in 4 ha and one irrigation to chick pea in 2 ha was provided through the conjunctive use of surface and ground water stored in the tank in the first year itself.	
	Natural resources saved/conserved like soil, water	Soil loss reduced drastically
10	Factors contributing to success	Additional water availability and more area under irrigation.

CONSTRUCTION OF WATER HARVESTING TANK IN PANOD (2008)

S.S. 11: Water harvesting tank for storing runoff water (2010 – 18)

1	Name of the farmers	Mr. Vasudeo
2	Village	Gaddukhedi, Dewas
3	Contact details	As above
4	Details of farm (size, location, water availability)	10 ha, Open well, Tube well
5	Membership	No
6	Names of central sector/state schemes utilized by the farmers and the period	ICAR FUNDED ORP PROJECT
7	Technologies	**Coordinated approach for developing water storage and water recharging structure for farm income and crop productivity enhancement - Water harvesting tank for storing runoff water**
The runoff potential of the soils of the experimental area is very high due to their low infiltration rate. The safe disposal/ storage of this runoff would be beneficial. The storage of the runoff water would help the farmer to utilize it during the moisture stress period. Thus, attempts should be made to enhance the water availability in the farmer's fields.		
8	Details of results obtained due to the adoption of technologies	
In a study through dovetailing the various activities for some development work, a suitable site was selected and converted into a huge water storage body through participatory approach. It helped to develop a water storage body of sufficient size which not only retained huge amount of runoff but also recharged the nearby open well and tube well. The activity made possible to bring additional 4 ha area under wheat (Now it is 7 ha wheat, 2 ha chickpea and 1 ha other crops) and allowed farmer to diversify his cropping pattern and he could grow potato, summer maize, vegetables and sweet potato for his own use and family which was otherwise not possible before. It was also observed that immediately after the construction of the tank, the productivity of both the kharif and rabi crops increased. Similarly, the area under wheat increased tremendously than chickpea because of increased water availability for sufficient irrigation water to grow wheat crop which require 2-3 more irrigation than chickpea .Further, this also reduced the amount of runoff which was otherwise leaving the watershed area without aiding to surface and sub – surface storage. The increased water availability also brought new area under high remunerative rabi crops and increased their productivity on sustainable basis.		
Natural resources saved/conserved like soil, water.		Soil loss reduced drastically, water storage increased, recharged ground water
Factors contributing to success		Additional water availability and more area under irrigation.

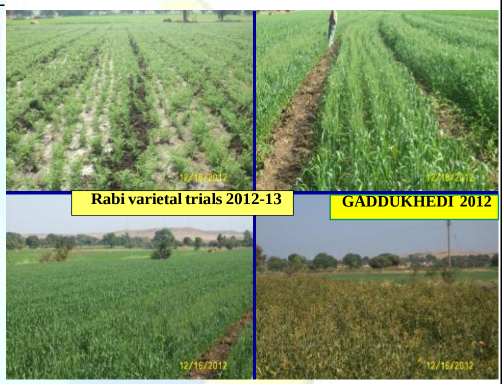

GADDUKHEDI 2011
03/16/2011

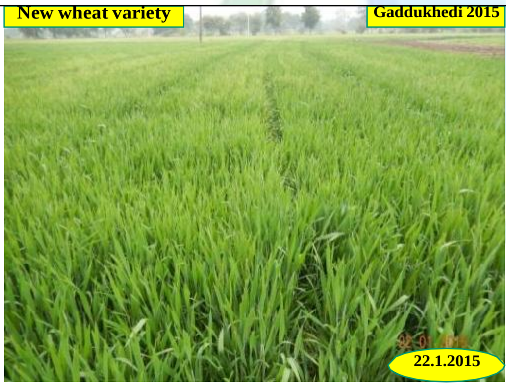

EXPLORING NEW SITES
GADDUKHEDI 2011


GADDUKHEDI 2011
10/14/2011

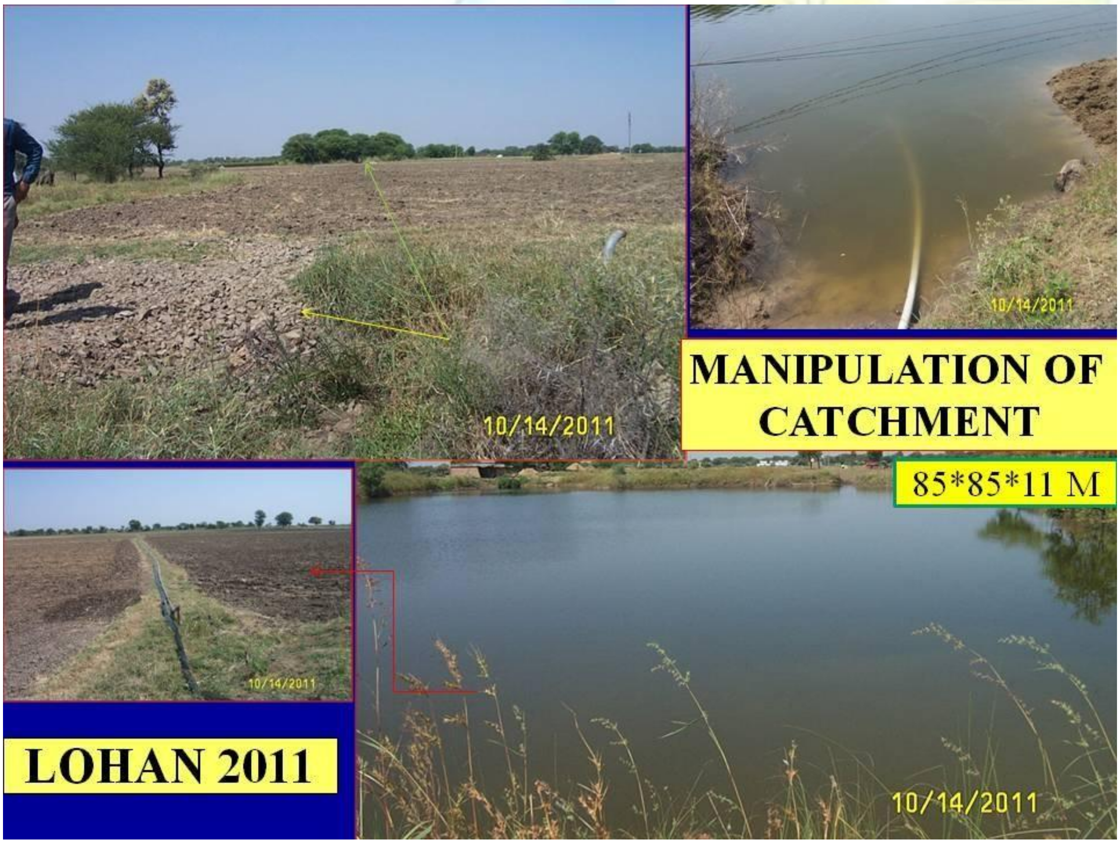

RECHARGED OPEN WELL
GADDUKHEDI 2011
10/14/2011


ADDITIONAL STORAGE
GADDUKHEDI 2011
UTILIZATION OF HARVESTED WATER

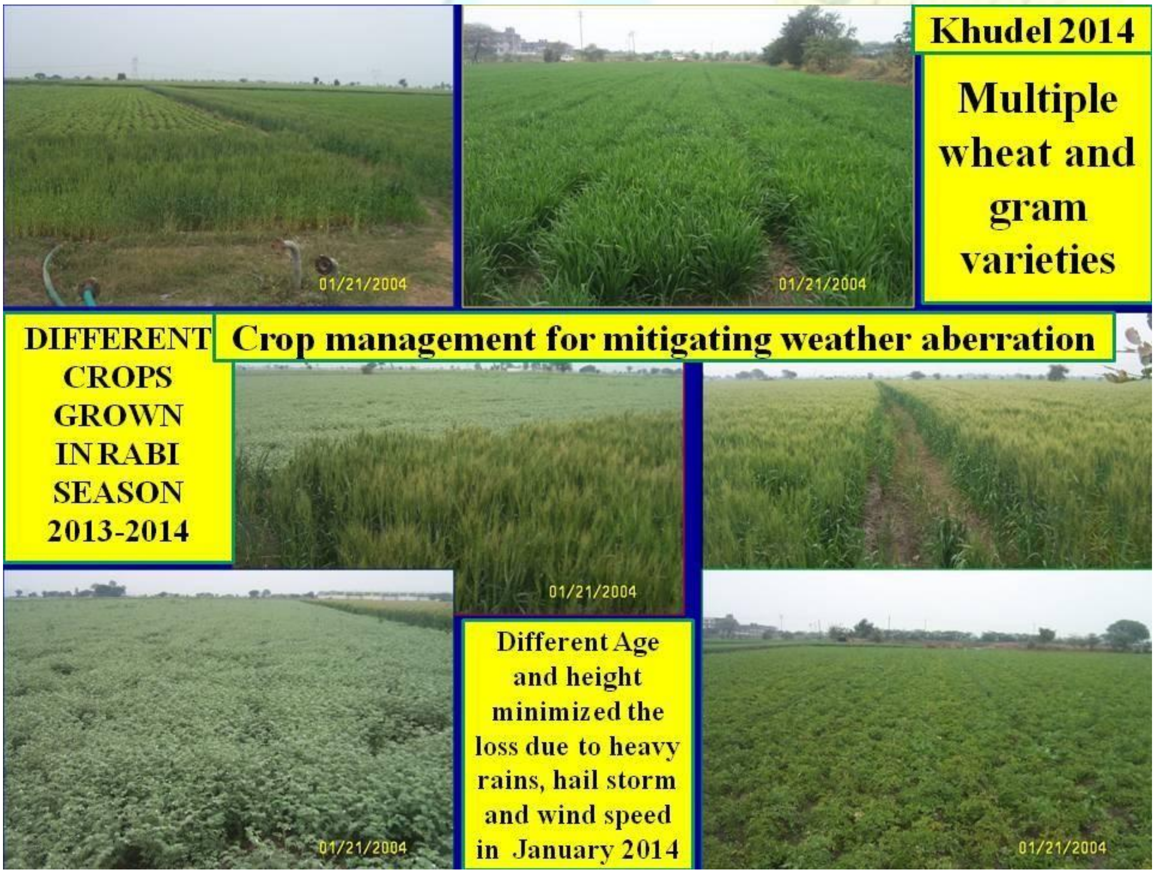

Rabi varietal trials 2012-13
GADDUKHEDI 2012


New wheat variety
Gaddukhedi 2015
22.1.2015

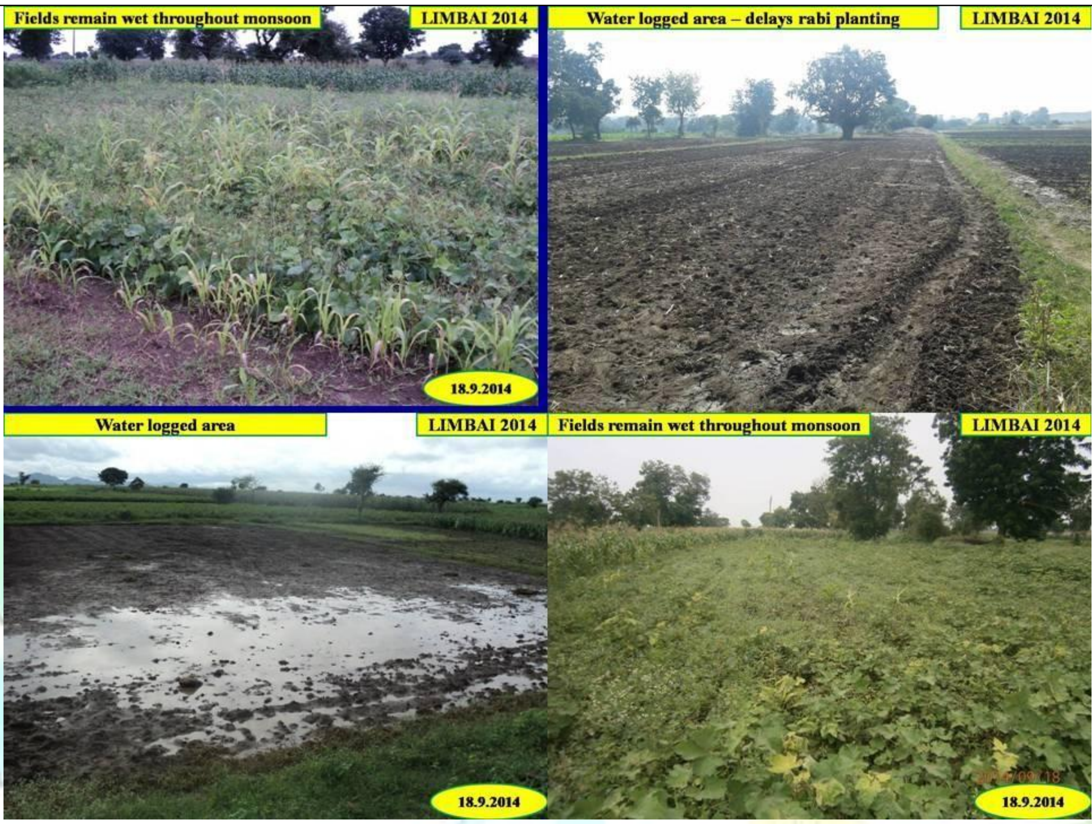

GADDUKHEDI 2013



Conversion of Wasted Land to Water Storage Tank and Its Utilization for Increasing the Crop Productivity in Malwa Region



Mitigating Adverse Climatic Conditions through Water Harvesting Tank in M*alwa* Region



land use area after water harvesting tank and installation of sub surface drainage system

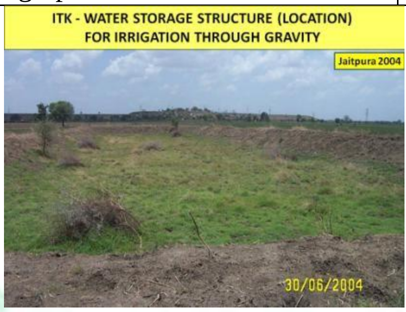
Crops and their conditions				
Kharif crops	Maize	Groundnut	Pegionpea	Green gram
Area (ha)	1.0	0.4	0.5	0.5
Weed	**Almost free from weed infestation.**			
A threefold increase in yield was recorded in *kharif* season in 2015.				
Rabi crops	Wheat	Gram	Onion	
Area (ha)	**1.5**	**0.4**	**0.5**	
No area was kept fallow due to water stagnation and limiting water.				
Timely sowing of *rabi* crops was possible and condition of the crop was very satisfactory like other normal fields in November 2015.				
No area of other farmers affected due to water stagnation problem and they are growing normal crops like cotton, green gram, onion, chilli, pegiopea, ground nut, maize, wheat and gram etc.				
Irrigation from open well – 1 or 2 during *kharif* and only oncew in *rabi*. Irrigation from tank – 2 in *kharif* and once in *rabi*				

Tackling Dual Problems of Water Logging and Irrigation Water Scarcity Through Natural Resource Management in Nimar Region

INNOVATION/ITK RELATED TO WATER STORAGE

Elevated water harvesting/storage tank for irrigating rabi crops

Name of the ORP: INDORE

1	Name of Indigenous Technical Knowledge (ITK) (with local name)	:	Elevated water harvesting/storage tank for irrigating rabi crops
2	Photograph		
			
			
3	Location from where the above ITK has been collected		Village Munjakhedi, Dist. Ujjain, Mr. Balaram Jat
4	Purpose of the Innovation/ITK		In addition to water harvesting tank or a tank for storage for the irrigation through gravity, elated masonry water storage is constructed and it is filled with pumped water from the WH tank so that an additional storage of rainwater is made for its utilization during rabi through gravity.
5	Theme area		NRM
6	Description of ITK		
	An elevated masonry tank of at least 1000 cu.m. is constructed and filled with runoff water either collected in the water harvesting tank or through tube wells. The stored water is then utilized for irrigating the crops through gravity.		
7	Advantage		• Increases additional runoff storage. • Provides irrigation to rabi crops through gravity. • Reduce the land loss for the construction of water storage tank for gravity irrigation. • Alternate to water storage structure for irrigation through gravity.
8	Constraints in adoption		• Higher cost
9	Scope for up scaling		Can be adopted in vertisol regions.
10	Researchable issue		Economical feasibility

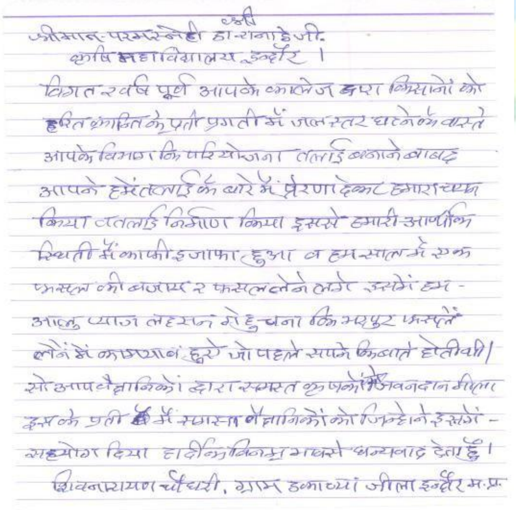
1 (B)	Actual impact of the recommendations on production, productivity, profitability, sustainability of the irrelevant farming system with verifiable indicators (2004-2010)

The overall impact of the programs of activities of the ORP on the production productivity / profitability /sustainability of the relevant rainfed production system in the center's agro-climatic zone domain (2004-2010).

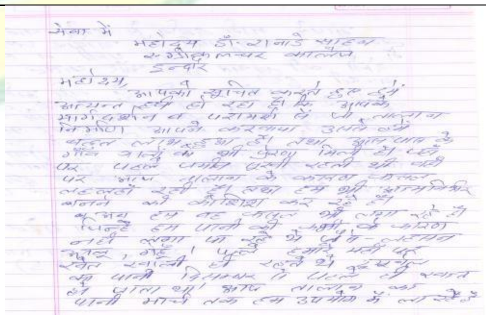
Theme/ Title of the technology	No. of farmers covered		Percent area covered in small and marginal farmers	Area covered (ha)	Details of the area
	ORP area	Non-ORP area			
RWM	10	25	20	75	Panod, Baroli, Barlai, Jaitpura, Dakachya
CS				150	
INM	25	200	60	225	
EM	10	100	50	115	Jaitpura, Barlai
CI/PVS	150	50	50	225	Panod, Baroli, Barlai, Jaitpura, Dakachya
ALU/FS	4	-	25	4	Jaitpura, Panod, Dakachya, Barlai
Livelihood activities		5	-		Barlai, Hingonia

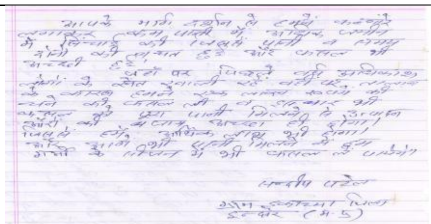
Before	**After**

Tanks constructed through technical guidance during 2006 for increasing water availability through runoff collection.



श्री
श्रीमान् परमस्नेही डा. रानाडे जी.
कृषि महाविद्यालय इन्दौर ।
विगत २ वर्ष पूर्व आपके कालेज द्वारा किसानों को
हरित क्रान्ति के प्रती प्रगती में जलस्तर घटने के वास्ते
आपके विभाग कि परियोजना तलाई बनाने बाबद
आपने हमें तलाई के बारे में प्रेरणा देकर हमारा चयन
किया तलाई निर्माण किया इससे हमारी आर्थीक
स्थिती में काफी इजाफा हुआ व हम साल में एक
फसल की बजाए २ फसल लेने लगे इसमें हम -
आलु प्याज लहसन मे हु चना कि भरपूर फसलें
लेने में कामयाब हुवे जो पहले सपने कि बाते होती थी।
सो आप वैज्ञानिको द्वारा समस्त कृषकों को जीवनदान मीला
इस के प्रती मैं समस्त वैज्ञानिकों को जिन्होने इसमें -
सहयोग दिया हार्दीक विनम्र भाव से धन्यवाद देता हुँ।
शिवनारायण चौधरी, ग्राम डकाच्या जीला इन्दौर म.प्र.





Letters from the farmers

1 (B)	**Actual impact of the recommendations on production, productivity, profitability, sustainability of the irrelevant farming system with verifiable indicators (2010-2015)**

Productivity and Profitability of Interventions (Mean): Village-Gaddukhedi (2010-2015)

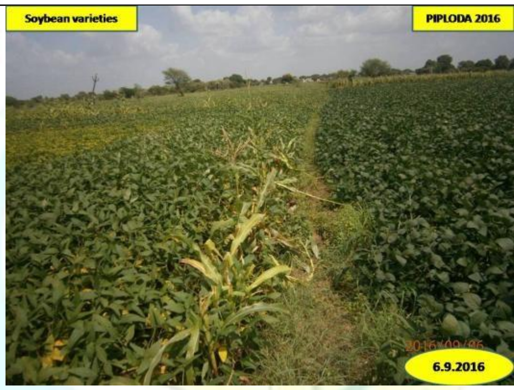
Theme	Soybean	Gram	Wheat
1.RWM			
FP	No arrangement for supplement irrigation		
Mean Yield (kg/ha)	1120	986	4800
IP	1. Enhancing water productivity in a micro watershed. 2. Natural resource management through soil and water conservation for increasing water availability for increasing crop productivity through participatory mode. 3. Up scaling and out scaling of technology and Participatory technology demonstration. Natural resource conservation programme for increasing productivity in the region.		
Area (ha) covered	50	50	50
Number of farmers	10	10	10
Mean Yield (kg/ha)	1800	1800	5800
Yield Advantage (% increase over farmers' practice)	1. The increased available water in the tank gave so much confidence in the farmer that he brought more area under wheat which requires more irrigation. 2. Increased area under rabi cultivation and enhanced productivity through additional irrigation to adjoining crops. 3. construction of water conservation measures, water harvesting tanks and surplus structures so that the farmers could construct tanks in their own field for storing the runoff water/increasing the ground water recharge/managing the excess runoff. 4. Even the deep ploughing operation carried out by the farmers helped them to in situ conservation of moisture and ensured at least dry sowing of the rabi crops.		

Before

After collected water being used for irrigation

Various crops other than traditional rabi crops are being grown after enhanced water availability.

Theme	Soybean	Gram
2. Improved Varieties		
FP	Old and mixed varieties	
Mean Yield (kg/ha)	1151	960
IP	Improved varieties	
Area (ha) covered	45	45
Number of farmers	45	45
Mean Yield (kg/ha)	1631	1964
Yield Advantage (%)	42	104
Cost of cultivation (Rs/ha) for FP	13000	11100
Net returns (Rs/ha) for FP	22850	24214
BCR for FP	2.87	2.72
Cost of cultivation (Rs/ha) for IP	14500	12100
Net returns (Rs/ha) for IP	38060	59881
BCR for IP	3.62	4.96



Soybean JS 20-29

Soybean JS 335

Theme	Soybean	Gram		
3. Energy management				
FP	No summer deep tillage			
Impact	Infestation of weeds, heavy runoff, soil erosion losses etc.			
IP	Further in 2010-11and 2011-12, farmers were provided technical guidance to use reversible MB plough for deep tillage operation atleast once in a three year.			
Area (ha) covered	10			
Number of farmers	20			
Yield Advantage (% increase over farmers' practice)	Even the deep ploughing operation carried out by the farmers helped them to in situ conservation of moisture and ensured at least dry sowing of the rabi crops.			

Summary of Impact			
S. N.	**Impact on**	**Benchmark year**	**In 2014-15**
1	Average yield of crops (kg/ha)	790	1520
2	Crop yields during drought (kg/ha)	500	1200
3	Area under fallows (ha)	11.11	9.0
4	Cropping intensity (%)	122	140
5	**% farmers adopting and % area within ORP village**		**%No/%area**
	Solving of Dual Problems of Water Logging and Water Scarcity	-	2.39/2.43
	Increasing Water Availability For Enhancing Crop Productivity Through Dovetailing Activities And Participatory Mode	-	0.96/2.43
	Conversion of Wasted Land to Water Storage Tank and Its Utilization for Increasing the Crop Productivity	-	1.44/4.85
	Construction of water conservation measures, water harvesting tanks and surplus structures	-	2.39/2.43
	Mitigating Adverse Climatic Conditions through Water Harvesting Tank in M*alwa* Region	-	0.48/4.85
	Construction of percolation tank and its seepage control	-	0.96/0.97
	Creation of sunken pond to arrest the runoff water for its efficient utilization	-	0.96/0.97
	Summer Deep ploughing of the cultivated fields and eradication of weeds	1	4.78/12.14
	Introduction of new promising varieties of important *Kharif* (soybean)	1	23.92/12.14
	Introduction of new promising varieties of important *Rabi* (Chickpea)	1	23.92/12.62
	Developing suitable integrated farming system	1	2.39/0.97
	Spreading of excavated soil from tanks and leveling of the fields, shaping, bringing new area under cultivation	-	2.39/2.43
	Treatment of degraded land and bringing it into cultivation	1	0.48/0.49
6	**% and no. of farmers adopting technology outside ORP village**	**No. of Farmers**	**Area (ha)**
	Solving of Dual Problems of Water Logging and Water Scarcity	2	5
	Increasing Water Availability For Enhancing Crop Productivity Through Dovetailing Activities And Participatory Mode	4	10
	Conversion of Wasted Land to Water Storage Tank and Its Utilization for Increasing the Crop Productivity	2	2
	Construction of water conservation measures, water harvesting tanks and surplus structures	10	10
	Mitigating Adverse Climatic Conditions through Water Harvesting Tank in M*alwa* Region	5	5
	Construction of percolation tank and its seepage control	2	2
	Creation of sunken pond to arrest the runoff water for its efficient utilization	5	5

	Summer Deep ploughing of the cultivated fields and eradication of weeds	45	45
	Introduction of new promising varieties of important *Kharif* (soybean)	75	75
	Introduction of new promising varieties of important *Rabi* (Chickpea)	75	75
	Developing suitable integrated farming system	5	5
	Spreading of excavated soil from tanks and leveling of the fields, shaping, bringing new area under cultivation	10	10
	Treatment of degraded land and bringing it into cultivation	25	25
7	Whether ORP interventions helped in reducing fodder shortage		YES
8	Whether ORP interventions helped in reducing water shortage		YES
9	Whether ORP interventions helped in reducing migration		YES
10	Whether ORP interventions helped in improving groundwater		YES

A. How the centre met its objectives

ORP Mandate	Theme (s)	Achievements
1. To understand the strengths and weaknesses in the traditional system of Dryland Agriculture	Resource characterization, ITKs	ITKs were documented and minor modifications were made to make its usefulness among the farmers.
2. To evaluate the performance of each component of dryland technology under the farmers management conditions both singly and in combination	Rainwater management, Crops and cropping system, INM.	Various trials were conducted and farmers were tried to convince to adopt these technologies through various success stories published in print media.
3. To provide feed back to the research stations for fine tuning sub-optima recommendations	Rainwater management, Crops and cropping system, INM, Energy management.	Time to time feed back is being given to main center to synthesize the recommendations. Scientists were asked to modify few technologies through feed back from the farmers and throughvarious success stories published in print media.
4. To achieve a first hand working experience in the development of area on watershed basis to serve as a model for extension agencies	Natural resource conservation	Various activities demonstrated by the center are slowly being adopted by the farmers of other villages using their own funds with the technical assistance from the project scientists.
5. To provide consultancy services to the extension agencies for transfer of dryland technology	Natural resource conservation	Provided technical guidance from time to time for low cost sunken structures. farmers were tried to convince to adopt these technologies through various success stories published in print media.
6. To identify operational and institutional constraints in the transfer of dryland technology	Crop related constraints.	Feed back to main center for refining the technologies to suit the farmer's conditions.

Operational Research Project for Dryland Agriculture, an integrated long term research project with clearly defined goals and milestones was in operation at College of Agriculture, Indore (M.P.) during 1986 to 2018. Similarly, and "National Innovations On Climate Resilient Agriculture (NICRA) project was also initiated in 2011 with a view to generate and demonstrate technologies aprticulary on natural resources management aspect with a goal to mitigate the adverse climatic conditions under climate chaning scenario. Many significant achievements have been made by the team of the scientists working at this centre particularly for the increasing farm productivity and farm income through crop improvement and agronomical technology for dryland crops. The usefulness of these techniques can be increased manifold by adopting natural resource management programmes and for sustainable agricultural productivity. The activities of particularly at Operational Research Project involve the adoption and evaluation of different soil and water conservation measures. For this, attempts have been made to conserve the natural resources like soil and water using earth moving machineries. The heavy machines have been used for the development of various water bodies viz., water harvesting tank, percolation tank, for drainage line treatment and even for the deep tillage operations to augment water requirement of different crops grown in the adopted villages. The results of these soil and water activities are found very promising and have been accepted and appreciated by one and all as it has increased the socio-economic condition of the farmers of the area. The work carried out under the project has been a source of information to farming community of Malwa and Nimar region and will surely bridge the existing gap and enhance the awareness for natural resource management through land developmental aspects and activities of Agricultural Engineering for soil and water conservation and Rainwater Management.

LIST OF AWARDS RECEIVED BY

DR. DEEPAK HARI RANADE

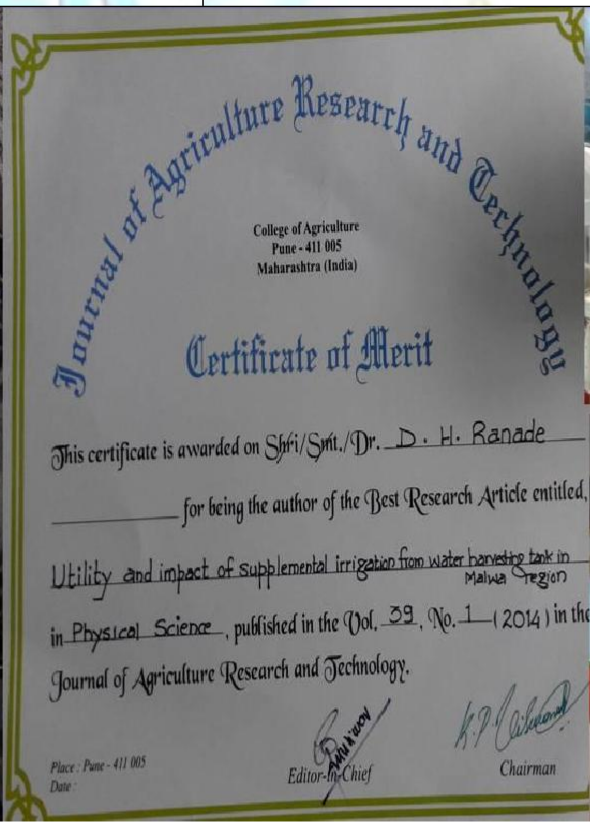
SN	Name of the award	Year	Organization	Contribution made
1	**M.P. Young Scientist's Award**	**1991**	**MAPCOST, Bhopal at Raipur**	**Research paper presentation**
2	**Dr. VASANT RAO NAIK AWARD**	**2009**	**ICAR (National)**	**Research in field of rainwater and dryaland agriculture**
3	**Best research article award in Journal of Agriculture research and technology volume 39(2014)**	**2016**	**College of Agriculture, Pune (MS) (National)**	**Research in field of rainwater and dryaland agriculture**
4	**Dr. VASANT RAO NAIK AWARD**	**2020**	**ICAR (National)**	**Research in field of rainwater and dryland agriculture**
5	**Water heroes – Jal Nayak 2021**	**2021**	**Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal Shakti, New Delhi**	**to promote value of water in general and for supporting country-wide efforts on water conservat ion and sustainable development of water resources**


इंदौर | गुरुवार • 8 जुलाई 2010

सिटी भास्कर 18

डॉ. रानडे को बसंतराव नाईक अवॉर्ड

इंदौर » भारतीय कृषि अनुसंधान परिषद नई दिल्ली द्वारा कृषि महाविद्यालय में कार्यरत वैज्ञानिक डॉ. दीपक हरि रानडे का चयन बसंतराव नाईक अवॉर्ड 2009 के लिए किया गया है। यह पुरस्कार उन्हें कृषक प्रक्षेत्र पर जल संरक्षण एवं शुष्क खेती के क्षेत्र में किए गए उल्लेखनीय अनुसंधान एवं विस्तार कार्यों के लिए प्रदान किया जाएगा। इस पुरस्कार के अंतर्गत प्रशस्ति पत्र एवं एक लाख रुपए की राशि प्रदान की जाएगी। यह पुरस्कार डॉ. रानडे को केंद्रीय मंत्री शरद पवार 16 जुलाई को नई दिल्ली में आयोजित कार्यक्रम में प्रदान करेंगे।


Journal of Agriculture Research and Technology

College of Agriculture
Pune - 411 005
Maharashtra (India)

Certificate of Merit

This certificate is awarded on Shri/Smt./Dr. D. H. Ranade ________ for being the author of the Best Research Article entitled, Utility and impact of supplemental irrigation from water harvesting tank in Malwa region in Physical Science, published in the Vol. 39, No. 1 (2014) in the Journal of Agriculture Research and Technology.

Place : Pune - 411 005
Date :

Editor-in-Chief

Chairman

MADHYA PRADESH
COUNCIL OF SCIENCE AND TECHNOLOGY, BHOPAL

YOUNG SCIENTISTS' AWARD 1991

This is to certify that Dr./Shri/Smt./Ku. D. H. Ranade of College of Agriculture, Indore presented his/her research paper at the Sixth M. P. Young Scientists' Congress organised by Ravishankar University, Raipur from March 7th to 9th, 1991. He/She was selected to be one of the young Scientist Awardees in Agriculture & Forestry

His/Her position was Third in the discipline.

DR. M. M. LALORAYA Vice Chancellor, Ravishankar University, RAIPUR	DR. D. N. MISRA Director General MP Council of Science & Technology, BHOPAL	SHRI BRIJMOHAN AGARWAL State Minister for Science and Technology MADHYA PRADESH

Indian Council of Agricultural Research

National Award for Application of Agricultural Technologies

VASANT RAO NAIK AWARD FOR RESEARCH APPLICATION IN AGRICULTURE 2020

is presented to

Dr. Deepak Hari Ranade
(Team Leader)
Ex. Chief Scientist, SWCE
Rajmata Vijayraje Scindia Agricultural University
Gwalior, Madhya Pradesh

16 July, 2021
New Delhi

(T. Mohapatra)
Secretary (DARE)
Director General (ICAR)

(Narendra Singh Tomar)
Union Minister of Agriculture & Farmers Welfare
Govt. of India

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

NATIONAL AWARD FOR APPLICATION OF AGRICULTURAL TECHNOLOGIES

VASANTRAO NAIK AWARD FOR OUTSTANDING RESEARCH APPLICATION IN DRYLAND FARMING SYSTEMS 2020

Dr. Deepak Hari Ranade
Ex. Chief Scientist, SWCE
Rajmata Vijayaraje Scindia Agricultural University, Gwalior

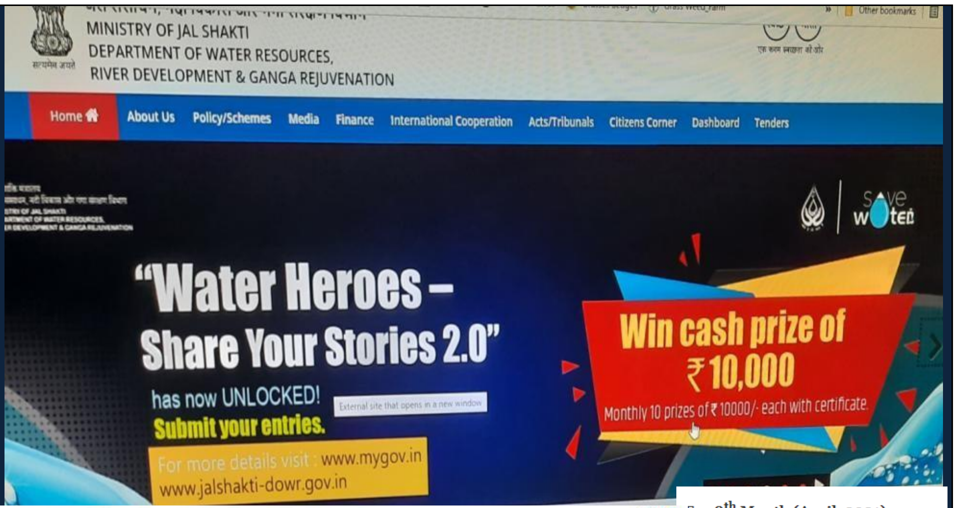
CITATION

Dr. Deepak Hari Ranade, Ex. Chief Scientist, SWCE (Team Leader) and his team which includes Dr. Indu Swarup, Principal Scientist, Plant Breeding; Dr. M. P. Jain, Ex. Chief Scientist, Agronomy; Er. M. L. Jadav, Scientist, SWE and Dr. D. V. Bhagat, Senior Scientist, Agronomy, from Rajmata Vijayaraje Scindia Agricultural University, Gwalior have been awarded Vasantrao Naik Award for Outstanding Research Application in Dry Land Farming Systems 2020. The team of Dr. D.H. Ranade made many significant achievements while working in an Operational Research Project for Dryland Agriculture and National Innovations on Climate Resilient Agriculture projects particularly for increasing farm productivity and farm income through crop improvement and agronomical technology for dryland crops. The usefulness of these techniques can be increased manifold by adopting natural resource management programmes and for sustainable agricultural productivity. The activities of Operational Research Project involve the adoption and evaluation of different soil and water conservation measures. For this, attempts have been made to conserve the natural resources like soil and water using earth moving machineries. The heavy machines have been used for the development of various water bodies viz., water harvesting tank, percolation tank, for drainage line treatment and even for the deep tillage operations to augment water requirement of different crops grown in the adopted villages. The results of these soil and water activities are found very promising and have been accepted and appreciated by one and all as it has increased the socio-economic condition of the farmers of the area. The work carried out under the project has been a source of information to farming community of Malwa and Nimar region and will surely bridge the existing gap and enhance the awareness for natural resource management through land developmental aspects and activities of Agricultural Engineering for soil and water conservation and Rainwater Management.

Dr. VASANT RAO NAIK AWARD 2020

डीएफए डॉ. रानाडे को वाटर हीरोज पुरस्कार

ग्वालियर। राजमाता विजयाराजे सिंधिया कृषि विवि के वैज्ञानिक एवं अधिष्ठाता कृषि संकाय डॉ. दीपक हरि रानाडे की प्रविष्टि को जल शक्ति मंत्रालय द्वारा वाटर हीरोज प्रतियोगिता में पुरस्कार के लिए चुना गया है। मंत्रालय द्वारा 10 हजार रुपए के नकद पुरस्कार से सम्मानित किया जाएगा। डॉ. रानाडे ने बताया कि जल संसाधन, नदी विकास और गंगा कायाकल्प जलशक्ति मंत्रालय द्वारा 1 सितंबर 2020 से 31 अगस्त 2021 के बीच यह प्रतियोगिता आयोजित की जा रही है। इस प्रतियोगिता में अब तक 5912 प्रविष्टियां जल संसाधन मंत्रालय तक पहुंची हैं। इनमें उन्होंने अपनी प्रविष्टि रिसन तालाब के उद्देश्य एवं उपयोगिता बताते हुए वीडियो फिल्म के माध्यम से भेजी थी। इस फिल्म में बताया गया था कि भूमि जलस्तर को बढ़ाने में रिसन तालाब बहुत मददगार हैं। ये तालाब में आए पानी को जमीन में सोखकर भूजल को रिचार्ज करता है साथ ही मिट्टी के कटाव के कारण निचले क्षेत्रों में होने वाले नुकसान से भी बचाता है।



For 8th Month (April, 2021)

Sl No. / Name (Sh./Smt./Ms)

1. Harshdeep Singh Zala
2. Sonali Mundhe

For 9th Month (May, 2021)

1. Vivek Raghunath
2. Dinesh Lohani
3. Tanuja Parihar
4. Sampath S
5. Deepak Ranade
6. Bhanu Chandra Murthy
7. Kuldeep Sharma
8. Anurag Srivastav

For 10th Month (June, 2021)

1. Narendra Singh Rawat
2. Bibharte

Water heroes award 2021 by Ministry of water resources,jalshakti Mantralaya

माकृअनुप ICAR

Indian Council of Agricultural Research

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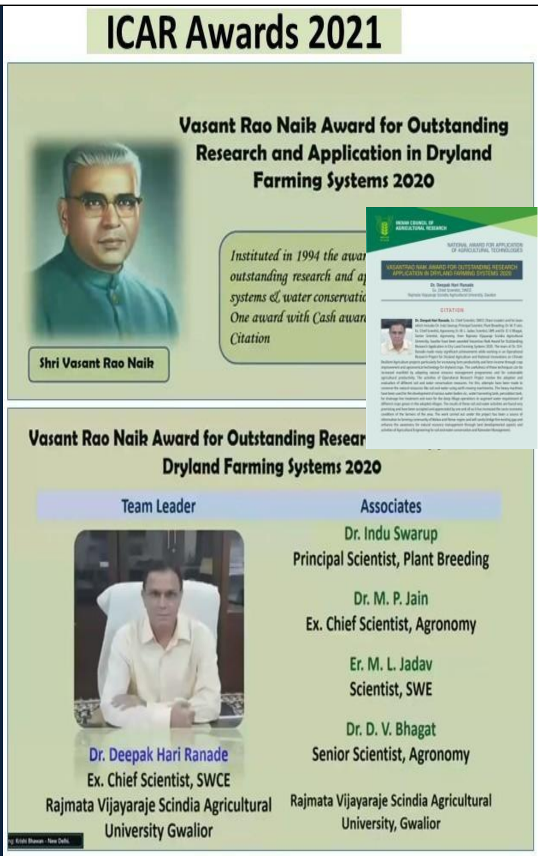

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

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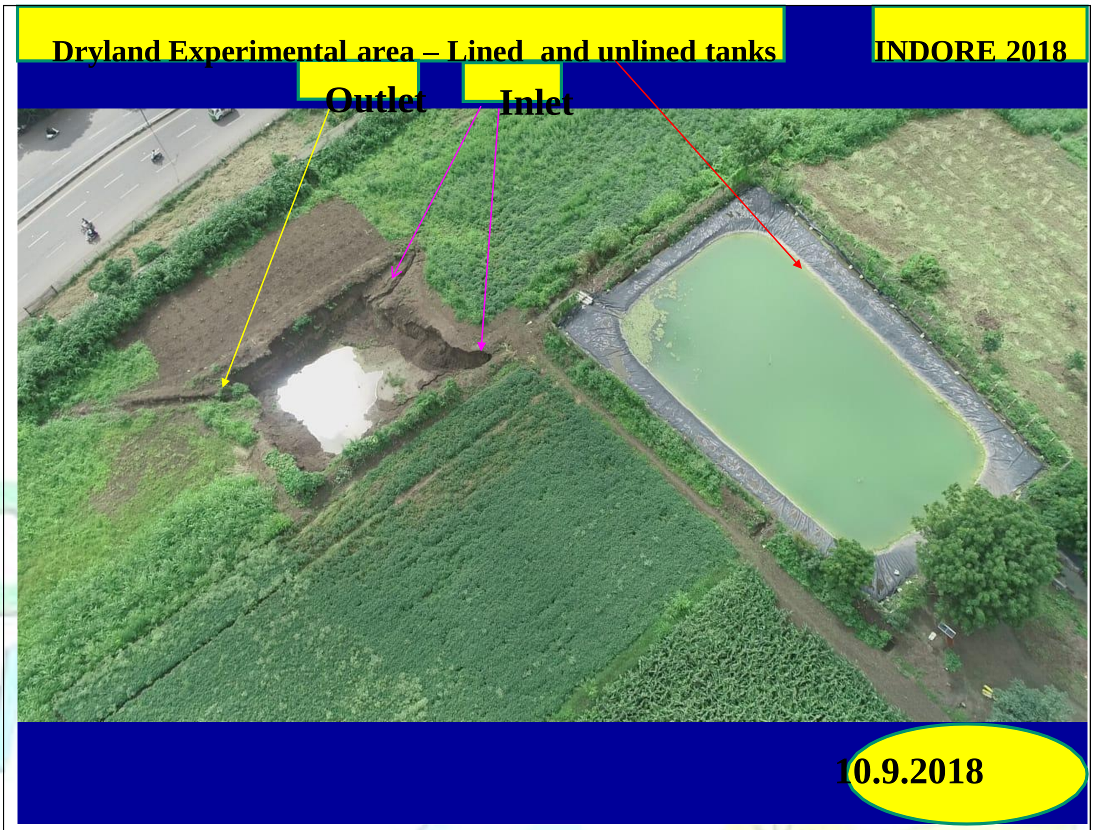
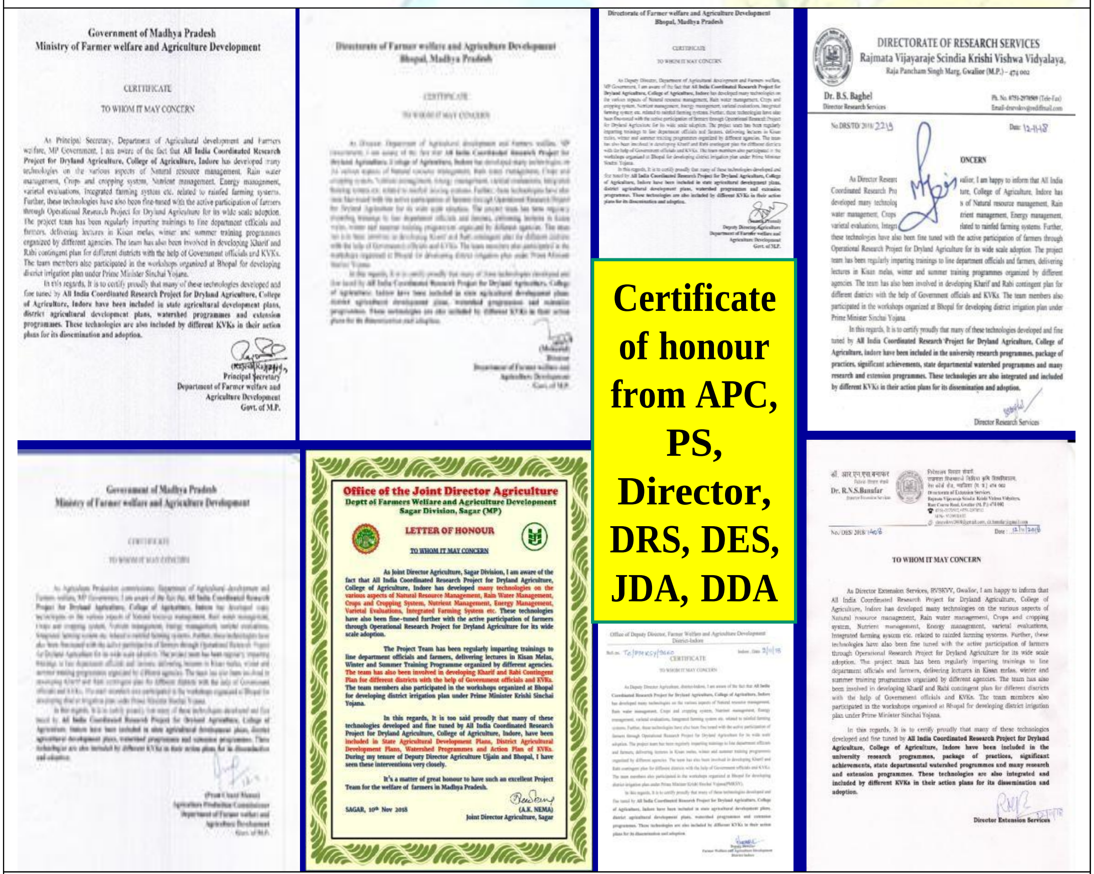
Rajmata Vijayaraje Scindia Agricultural University, Gwalior

CITATION

Dr. Deepak Hari Ranade, Ex. Chief Scientist, SWCE (Team Leader) and his team which includes Dr. Indu Swarup, Principal Scientist, Plant Breeding; Dr. M. P. Jain, Ex. Chief Scientist, Agronomy; Er. M. L. Jadav, Scientist, SWE and Dr. D. V. Bhagat, Senior Scientist, Agronomy, from Rajmata Vijayaraje Scindia Agricultural University, Gwalior have been awarded Vasantrao Naik Award for Outstanding Research Application in Dry Land Farming Systems 2020. The team of Dr. D.H. Ranade made many significant achievements while working in an Operational Research Project for Dryland Agriculture and National Innovations on Climate Resilient Agriculture projects particularly for increasing farm productivity and farm income through crop improvement and agronomical technology for dryland crops. The usefulness of these techniques can be increased manifold by adopting natural resource management programmes and for sustainable agricultural productivity. The activities of Operational Research Project involve the adoption and evaluation of different soil and water conservation measures. For this, attempts have been made to conserve the natural resources like soil and water using earth moving machineries. The heavy machines have been used for the development of various water bodies viz., water harvesting tank, percolation tank, for drainage line treatment and even for the deep tillage operations to augment water requirement of different crops grown in the adopted villages. The results of these soil and water activities are found very promising and have been accepted and appreciated by one and all as it has increased the socio-economic condition of the farmers of the area. The work carried out under the project has been a source of information to farming community of Malwa and Nimar region and will surely bridge the existing gap and enhance the awareness for natural resource management through land developmental aspects and activities of Agricultural Engineering for soil and water conservation and Rainwater Management.


DR. J. VENKATESWARLU AWARD
Dr. D.H. Ranade
2020
FOR EXCELLENCE IN DRYLAND AGRICULTURE RESEARCH
ISDA
Indian Society of Dryland Agriculture
ICAR - Central Research Institute for Dryland Agriculture
Hyderabad – 500 059, Telangana
INDIAN SOCIETY OF DRYLAND AGRICULTURE
ISDA
DR. J. VENKATESWARLU AWARD
FOR EXCELLENCE IN DRYLAND AGRICULTURE RESEARCH
2020
CITATION
Dr. Deepak Hari Ranade was born on 5th December, 1961 at Powarkheda, Dist. Narmadapuram (M.P.), completed his B.Tech. from JNKVV, Jabalpur, M.Tech. (Agril. Engg.) from IIT, Kharagpur and Ph.D. in Civil Engineering from DAVV, Indore. He started his professional career from AICRP for Salt affected soils, College of Agriculture, Indore in 1984. He has worked in AICRPDA centre, Indore and ORP of AICRPDA in different capacities during 1990-2020 and developed different rainwater management technologies. He has more than three decades of experience in teaching, research and extension of natural resource management aspects particularly in dryland agricultural systems. He is two-times recipient of ICAR - Dr. Vasantrao Naik award (2009 and 2020) for his outstanding research in the field of rainwater management and dryland agriculture. He has been awarded as 'water hero' in 2021 by Ministry of Jal Shakti, New Delhi for his efforts to promote value of water in general and for supporting country-wide efforts on water conservation and sustainable development of water resources. He is also a fellow of Indian society of water resources. He has published more than 80 research papers, 15 technical bulletins, three books on dryland technologies and 10 book chapters.
In recognition of his outstanding contribution, the Indian Society of Dryland Agriculture is pleased to award Dr.Deepak Hari Ranade with Dr. J. Venkateswarlu Award 2020 for Excellence in Dryland Agriculture Research.
Hyderabad
22nd December, 2022
(K.V. Rao)
Secretary
(V.K. Singh)
President


Dryland Experimental area – Lined and unlined tanks
INDORE 2018
Outlet
Inlet
10.9.2018


Certificate of honour from APC, PS, Director, DRS, DES, JDA, DDA

RAJMATA VIJAYARAJE SCINDIA AGRICULTURAL UNIVERSITY

RAJA PAMCHAM SINGH MARG, GWALIOR – 474002 (MP)