August 30-31, 2014



Organized by Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior (M.P.), India



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Proceedings of the

National Symposium on Dryland Farming and Food Security in India August 30-31, 2014

> Edited by Prof. Anil Kumar Singh Dr. H. S. Yadava Dr. S. C. Srivastava

Organized by

Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya Gwalior (M.P.), India

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Indian Agricultural Universities Association, New Delhi Madhya Pradesh State Agriculture Marketing Board, Bhopal





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D.O. No./VC/2014-15/3029 Date: 11 February, 2015

FOREWORD

India ranks first among countries that practice rainfed agriculture in terms of both extent and value of production. Rainfed agro-ecologies cover about 60 per cent of the net sown area of 141 million ha and are widely distributed in the country. They support nearly 40% of India's population of 1.21 billion. Madhya Pradesh was bestowed the prestigious Krishi Karman Award by Government of India for last two years in a row in recognition of its outstanding performance in agriculture sector. Madhya Pradesh registered a record growth at 24.99 per cent in FY 2013-14 in the agriculture sector, including animal husbandry. This rate was 20.16 per cent in 2012-13 and 18.85 per cent in 2011-12 in the state.

The effects of climate change on dryland agriculture, however, can be disastrous and under limited water supply situations and reduced yields, may bring an additional stress on fragile ecological and socioeconomic systems. Already there is evidence that climate in the Indian sub-continent is changing rapidly.

There is ample evidence that most of the low productivity in rainfed agriculture is due to sub-optimal management of crops and livestock. This implies that productivity can be enhanced through the sustainable intensification of agricultural production systems. At the same time, there is also much work to be done in the dry areas to reduce vulnerability, increase resilience and mitigate risks from biophysical and socioeconomic shocks. This is why there is huge potential for countries to harness science, technology, knowledge and institutions to help spur a Second Green Revolution which can improve the lives and livelihoods of the millions of people who inhabit the dry areas. Green Revolution of the 60s and 70s became a reality because of a combination of high yielding varieties coupled with increased rate of fertilizer use and development of water resources in the country. However, it is also a harsh reality that the Green Revolution bypassed the rainfed areas, which today occupies 56% of the net cultivated area. Rainfed agriculture is now considered vital for the nation's food and nutritional security as it supports 40% of human and 60% livestock population of our country. It is also estimated that even when all the irrigation water resources have been developed, at least 45% of the net cultivated area in the country would remain rainfed. Global warming and associated climate changes are going to adversely impact the agricultural production and increase water scarcity. Moreover, to meet the food and nutrition security of 1.2 billion population and check the extent of land degradation, dryland agriculture management has became critically significant.

I am happy to see that the organizing committee is bringing out the proceeding of the national symposium on "Dryland Farming and Food Security in India" in collaboration with IAUA, New Delhi from Aug. 30-31, 2014 at RVSKVV, Gwalior. The discussions and deliberations of the symposium is benefit to the distinguished experts, policy makers, planners and professionals will result in new and innovative ideas which will have far-reaching impacts on dryland farming and food security in India.

(A.K. Singh)

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Proceedings of National Symposium on Dryland Farming and Food Security in India held on August 30-31, 2014 at RVSKVV, Gwalior

INAUGURAL SESSION

Chairman	0 0	Dr. Panjab Singh, Former Secretary DARE & DG, ICAR, New Delhi							
Co-chairman	0 0	Dr.A.	Dr. A. K. Srivastava, President, IAUA, New Delhi						
Chief Guest	•	Shri (łauri Sh	ankar Cl	naturbhuj Bi	isen, Minis	ster	, FWAD	, Govt. of M.P.
Guest of honour	:	Smt. Govt.	Maya of M.P.	Singh,	Minister,	Women	&	Child	Development,
	:	Shri N	Varayan	Singh K	ushwaha, M	LA, Govt.	of N	[.P.	

- : Shri Bharat Singh, Kushwaha, MLA, Govt. of M.P.
- : Smt. Samiksha Gupta, Mayor, Municipal Corporation, Gwalior

The Inaugural Session started with the lighting of the lamp by the Chief Guest, Chairman and other dignitaries followed by Saraswati Vandana, University song and floral welcome of the guests. Prof. Anil Kumar Singh, Vice Chancellor, RVSKVV, Gwalior welcomed the Chairman, Co-Chairman, Chief Guest, Guest's of honour, dignitaries and participants. He highlighted the importance of dry land areas in the national food and nutrition security of the country. He described the mandate of the symposium which is focusing on improving the crop and livestock production and productivity by efficient management of natural resources in dryland areas. He further emphasized the need for the identification of emerging challenges in dryland agriculture and sound planning to provide solution of these challenges by research interventions.

Hon'ble Shri Gauri Shankar Bisen, Minster, Farmer Welfare and Agricultural Development, Govt. of Madhya Pradesh and Chief Guest of the function informed that State has received the "Krishi Karman Award" for last two years in the recognition of the highest agricultural growth rate in the country. This was made possible by the joint efforts of the scientists, Department of Agriculture Officers, Government of Madhya Pradesh and the farmers. He emphasized the need of strategic research towards meeting the challenges and





adversities emerging due to climatic changes particularly in dryland areas of the country. He reminded all the delegates about the slogan of the Hon'ble Prime Minister, Government of India "per drop more crop".

Hon'ble Smt. Maya Singh, Minster, Department of Women and Child Development, Govt. of Madhya Pradesh and Special Guest of the function emphasized that barren and ravenous lands are major challenges. There is need to convert the barren and ravenous lands into cultivation with development of optimum technologies for ensuring the food security to growing population.

Dr A. K. Srivastava, President, Indian Agricultural University Association, New Delhi and Vice Chancellor, National Dairy Research Institute (Deemed to be University), Karnal highlighted the need and importance of the symposium in present perspectives and said that country is feeding 17% of the global population from 2.3% of global cultivable land and 4.2% of the water. He further highlighted that more than 50% of the cultivated area in the country is under rainfed farming, which supports 40% human and 60% livestock population. He emphasized the need for concentrated research and development on livestock in the country so that integrated farming system modules including agriculture, livestock, poultry, fisheries etc be feasible at the level of small holding farmers.

The Chairman of the function, Dr. Panjab Singh, Former Secretary, Department of Agricultural Research and Education, Government of India and Director General, Indian Council of Agricultural Research, New Delhi recognized the symposium organization as very important, essential and timely in view of climate change scenario. He invited the attention of scientists towards the development of efficient and effective technologies for dry farming situations so that farmers of nearly 60% dryland area can be benefited and get assured crop yield even under erratic/ un-assured monsoon conditions. He expressed that country has beenself-sufficient in food grain with the production increasing from 50 million tons to 265 million tons but there is need to sustain and enhanced the production even harsh climatic conditions.

Two publications from RVSKVV, Gwalior namely, Souvenir and Extended Summaries, National Symposium on Dryland and Food Security in India were released by the guests on this occasion. The session ended with vote of thanks to chair and dignitaries by Dr. H.S. Yadava, Director Research Services, RVSKVV, Gwalior.







INAUGURAL FUNCTION





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TECHNICAL SESSIONS

In this symposium, four technical sessions consisting of lead presentations followed by panel discussions, open house discussions and poster presentations were conducted on following themes:

- I. Natural resource management for sustainable productivity in drylands
- II. Crop productivity and production enhancement
- III. Livestock production and management systems
- IV. Policy issues and institutional support

Technical Session I: Natural resource management for sustainable productivity in drylands

Chairman	: Dr. V.S.Tomar, Vice Chancellor, JNKVV, Jabalpur
Co- chairman	: Dr. B.Venketeswarlu, Vice Chancellor, VNMKV, Parabhar
Rapporteurs	: Dr. S. K. Verma, Principal Scientist, RVSKVV, Gwalior

: Dr. D. H. Ranade, Principal Scientist, RVSKVV, Gwalior

In this session four presentations were made. Dr. B.J. Pandiyan, Director WTC, TNAU Coimbatore presented thelead lecture on 'Enhancing water and nutrient use efficiency through efficient water resource management in dryland" on behalf of Dr.K. Ramaswamy, Vice Chancellor, TNAU, Coimbatore. He emphasized to tap the potential of dryland through enhancing research activities using various soil and water management technologies. He suggested convergence all the dryland related schemes below one umbrella is essential to bring out sound results and benefits. He further suggested that proven crop production, soil and water conservation technologies suitable for dryland areas should be implemented on cluster area approach for enhancing the area and productivity.

Dr. B. Venkateswaralu, Vice Chancellor, VNMKV,Parabhani pointed out the importance of water conservation and water harvesting for its efficient utilization in dryland systems. Micro irrigation system should have more perspectives and priorities for sustainable crop production. Water conservation has therefore, to be taken up as National Mission for Dryland Farming.

Dr. V.K. Singh, National Fellow, PDFRS, Modipuram, Meerut delivered the lead lecture on "Efficient inter and sequence cropping system for optimum productivity in different agroclimatic zones". He emphasized the need for formulation and identification of appropriate cropping sequence in different agro-climatic zones for better solution of challenges for higher yield and income in dryland farming conditions.

Dr. V.S. Tomar, Vice Chancellor, JNKVV, Jabalpur, while addressing on 'Conservation Agriculture Potential in rainfed Eco-system' highlighted that rainfed agriculture offers good scope for growing food crops particularly pulses and oilseeds. He said that resource efficient agriculture can play a major role in improving the productivity on rainfed areas.Conservation



agriculture is one of the most important means of conservation of resources like minimum disturbance to soil, leaving and management of crop residues on soil surface and temporal crop sequence to derive maximum benefits from inputs and minimized environmental impacts.

Recommendations

- It is imperative to tap the potential of drylands through enhancing the resource use efficiency using various soil and water management technologies.
- Inter terrace treatments are helpful in alfisols and vertisols. Treating land before commencing rains, summer ploughing, Broad bed Furrow (BBF), Raised and Sunken bed etc. facilitates the maximum infiltration of rain water into the soil profile and thus making successful crop production possible in rainfed regions.
- Straighten the gullied portion in the farmer's field through earth moving machinery to reduce the length of gully allowing safe passage for the runoff water. It brings additional area under cultivation through reclamation process.
- Construct a percolation tank for increasing ground water recharge and enhancing ground water storage to provide extra irrigation to the crops.
- Use gabion as an inlet and outlet of water harvesting tank without any structural failure to trap silt on the upstream to increase life of water storage bodies.
- Construct water-harvesting tank to retain the excess run off from the watershed area to use stored water for irrigation purpose.
- Dovetailing of various schemes and participation by the farmer through land, labour or cost can easily help to develop a water storage body of sufficient size which not only retain huge amount of runoff but also recharge the nearby open well and tubewell.
- Silpaulin (a plastic material) of 90-120 gsm has been found to be an effective liningmaterial for farm ponds used for water harvesting purpose.









- Use vegetative barriers to strengthen the mechanical bunds at suitable vertical intervals in order to reduce run off and associated soil losses from the cultivated fields.
- Develop a sort of terracing to break the continuity of undulating slope and to reduce the chances of degrading cultivated fields into gullied one.
- Ensure drainage line treatment for providing safe disposal of excess run off and providing more opportunity time in order to reduce erosive velocity.
- Mouldboard plough, is used for deep tillage to increase the productivity of kharif crops and enhance sowing of crops through better moisture conservation and eradication of infested weeds.
- Deep tillage (ploughing up to 45 cm depth with reversible plough) has resulted in higher root length density, soil moisture content and reduced bulk density. The better soil –water and plant relationship has enhanced crop growth and overall productivity of soybean when grown in Vertisols.
- Graded bunds alone and/or along with vegetative barriers at vertical intervals of 50 cm proved most effective in controlling soil erosion and nutrient losses on soils having slope up to 2%.
- Off-season shallow tillage is important not only in controlling the weeds but also in helping entry of rainwater.
- It is found that commercially available implements can be used after little modification wherever required for the soybean based cropping system for increasing the productivity of soybean in Malwa region.
- Provide in-situ soil mulch by operating bullock drawn dora to fill up the cracks, to conserve the soil moisture and to achieve weed control. Straw mulch @ 4-5 t/ha in between the rows of crop plants to minimize evaporative losses, moisture conservation and to increase moisture efficiency in Rabi crops.
- Micro irrigation system should be adopted for better and efficient water utilization.
- Appropriate cropping system and sequence should be adopted as per the requirement of particular agro-climatic zone to achieve maximum production and profitability.
- It is possible to achieve the equal and even higher yield under conservation agriculture as compared to conventional system.
- Under rainfedalfisols at Hyderabad, CA system enables the possibility of taking second short duration horse gram crop in mono cropped region.
- Various ideas and technologies available and reported for the different agro climatic zones should be popularized for their wide scale adoption particularly for enhancing the productivity under dryland and rainfed conditions on sustainable basis.



Technical Session II : Crop productivity and production enhancement and

Technical Session III : Livestock production and management systems

Chairman : Dr. B. Venketeswarlu, Vice Chancellor, VNMKV, Parabhani

Co-chairman : Dr. G. R. Patil, Joint Director (Academic), NDRI, Karnal

Rapporteurs : Dr. M. P. Jain, Principal Scientist, RVSKVV, Gwalior

: Dr. V. S. Khandalkar, Principal Scientist, RVSKVV, Gwalior

The first presentation was made on "Climate ready crops and cropping systems to stabilize productivity' by Dr. Ashok Mishra, Chief Scientist, AICRP for Dry land Agriculture, Orissa University of Agriculture and Technology, Bhubaneswar on behalf of Dr. Manoranjan Kar, Vice Chancellor, OUAT, Bhubaneswar. He indicated that climate change will result. increased at mospheric CO2, nitrogen fixation, insect pests, and herbicide tolerance. The crop-pest interactions may shift as the timing of development stages in both hosts and pests is altered.

He mentioned that different crops, their varieties, cropping system including inter cropping, which are performing economically viable in present climatic situation should be promoted through awareness programmes for higher productivity per unit area. Regionspecific cropping sequence and intercropping should be popularized. Dr. Mishra highlighted for collection, categorization and preservation of germplasm possessing tolerance against abiotic stress such as drought, heat, salinity, and water-logging and use them in breeding programmes for developing the varieties suitable for different climatic conditions for different agro ecological zones of the country.

Second presentation was made by A.K. Srivastava, Vice Chancellor, National Dairy Research Institute (Deemed to be University), Karnal on 'Ensuring Livelihood and Nutritional Security through Livestock Production'. He elaborated livestock population scenario in dry land areas and mentioned role of livestock in Indian agriculture as they provide animalprotein, manure and fuel, draft power, day to day income, insurance against crop failure and ecological services. He put forth production and per capita availability of





milk, egg and meat inthe country from livestock sector. He highlighted different livestock management systems and need of nutritional security in human beings, which can be brought out by enhancing quality production of dairy products through scientific input interventions. He mentioned that, livelihood can be maintained through indigenous livestock management for profitable farming in water scarce areas of dry land areas. Annual grasses and fodders can be used to maintain livestock in dry land agriculture system.

Third presentation entitled, 'Fodder production and their production technologies for dry land farming system' was made by Dr. N.V. Patil, Director, National Research Centre on Camel, Bikaner. He highlighted the limitations to fulfill the fodder demand of livestock specially, low area under fodder crops, non-availability of good quality fodder and grasses seeds, low investment priority in fodder crops, lack of post-harvest technology for surplus fodder, poor management of pasture/grazing lands and inadequate research, extension and manpower support in adverse climatic conditions. He mentioned the models of fodder production systems suitable for different agro-ecological regions with recommended pasture species and varieties for different habitats and drought evading and tolerant species of fodder crops/tree. He also informed the house the importance of feed management during drought years and emphasized the use of Complete Feed Blocks in this situation. He stressed on need of Strengthening Forage Production Research (FPR) in the country. He emphasized exploiting the potential of fodder crop varieties and dry land agriculture to mitigate the basic needs of livestock production, making available the seeds of such improved varieties which have endurance in drought condition should be of prime importance.

Dr. G. R. Patil, Joint Director (Academic), National Dairy Research Institute, Karnal presented the fourth lead lecture on 'Entrepreneurship opportunities in processing and value addition of milk for livelihood security'.He indicated that contribution of livestock sector in national and agriculture GDP is about 5.59% and 31.7%, respectively. Indian dairying is predominantly run by small holders as small and marginal farmer own about 60% of milch animals and produce 70% of milk in the country. He presented milk demand, marketing and utilization scenario in the country. Large growth in working population, change in eating habits – adopting fast food culture, enhanced personal disposable incomes and life styles of today's Indian consumers have become more demanding hence, there is a great scope of entrepreneurship opportunities in processing and value addition of milk products, which can be a business opportunity in dry land farming system.

Recommendations

- Climate change is likely to affect crop yield, more particularly in dry lands. Therefore, development of multiple abiotic stress tolerant crop varieties for drought, salinity and heat/temperature need be to taken up at high priority.
- The expected increased soil erosion and land degradation in view of the increased rainfall variability and rainfall intensity calls need for appropriate land cover and land use practices.
- The variability in terms of yield reductions of major crops in different agro climatic regions has to be evaluated using crop simulation models incorporating climate change predictions.



- Improvement of soil organic carbon by enhanced use of organics in upland crops would address emissions, avoidance and carbon sequestration.
- Livestock have an important role in food security in dry land areas. Simple techniques of micro nutrient supplementation and efficient crop-livestock integration can improve livestock productivity in dry lands and contribute to nutritional security.
- There is a need of low cost livestock shelters to overcome the heat stress effect on livestock production and milk yield.
- Livestock and dairy products can contribute to nutritional security in future too. Hence, these sectors need more priority for research investment.
- Fodder tree need to be promoted in agro-forestry system to increase area under fodder crops in drylands and enhance quality of natural pastures in drought prone areas.
- Evolve policy frame work for assigning property right for community developed grazing lands.
- An Agro-eco-region based resource planning is required for improving livestock production in drylands with emphasis on strengthening of Forage Production Research(FPR) in the country.
- Promotion of ready to eat foods can create demand for dairy products and income of dairy farmers in India.
- There is need for modernization of traditional dairy product sector to add value to the raw materials and enhance profitability.
- All presenters emphasized that Government policies toward agriculture sector should be such that farmers get proper prices and market platform for their produce.
- Climate change which is primarily driven by anthropogenic activities can be reduced by equitable distribution of land mass for crop cultivation, forestry and human habitation; hence there is need for it to be reflected appropriately in the policy of the Government.
- Efforts are needed to make location specific, reliable and more advanced weather forecasting so that dry land farmers are in better position to respond to the weather and climate variability.







Technical Session IV : Policy issues and institutional support

Chairman :	Dr. Arvind Kumar, Vice Chancellor, MLBCAU, Jhansi and
	DDG (Education), ICAR, New Delhi
Co-chairman :	Dr. N. V. Patil, Director, National Research Centre on Camel, Bikaner
Rapporteurs :	Dr. M. D. Vyas, Principal Scientist, RVSKVV, Gwalior
	Dr. S. S. Kushwah, Scientist, RVSKVV, Gwalior

In his lecture on policy support and institution mechanism for up scaling dryland technologies, Dr. Arvind Kumar emphasized on location specific public investment in water infrastructure, soil enrichment and controlling land degradation. He also emphasized on strengthening the livelihood options based on fisheries, livestock agro-food processing and agro-forestry. He further specified public and private partnership to overcome the problem of dryland farming through implementation of various schemes and projects formulated for these challenging areas.

Recommendations

- Water conservation has to be taken up as a national mission.
- Convergence of all the dryland related schemes under one umbrella should be done so that the fruits of benefits of the schemes reach to poor farmers.
- Wherever possible, water conservation technologies have to be adopted for saving this precious natural resource.
- Sustained research efforts, considering climate, soil and crops will go a long way in developing local area specific practices/machines for greater adaptation of conservation agriculture.
- Various ideas and technologies available and reported for the different agro climatic zones should be popularized for their wide scale adoption particularly for enhancing the productivity indryland/rainfed conditions on sustainable basis.
- Emphasis needs to be placed on climate risk/variability awareness for small and marginal farmer groups in rainfed areas.







- Farm mechanization needs strengthening for successful implementations of various land treatments.
- Water lifting devices and use of solar energy need to be promoted.
- Drought preparedness and real time implementation of contingency measures at field level needs well structured institutional support with strong government policy and convergence among various institutions.
- Many of the resilient dryland technologies can be scaled up with MGNREGA, where drought proofing is an important component of scheduled interventions.
- Mainstreaming adaptations by considering impacts in all major development initiatives will facilitate greater adoption of scientific and economic pricing policies, especially for water, land energy and other natural resources.
- Village level based planning for agriculture, based on natural resource needs to be strengthened and priority should be given to augment the available water resources for creation of resilience at individual farm level.
- Empowering stakeholders by building capacity enabling institutions opening and formulating policies that supports dryland agriculture.
- Reducing the productivity gap between marginal and favored areas with increase in yield by 50% in rainfed areas during next ten years.
- Bridge huge gap ranging from 50-200% by overcoming fatigue, collapse of extension services and timely supply of adequate quantity of quality inputs.
- Commercially viable long term agri-business regulatory policies must be enacted at state and federal levels which should include provisions for solid incentives for corporate entities to invest in agriculture and allied sectors.
- Develop and introduce the integrated Flood Code, Drought Code and Good Weather Code for mitigating and managing weather and climatic changes.
- A significant increase is need in public investment in dry land agriculture including agricultural research and infrastructure. Development of sophisticated techniques for predicting and forecasting the monsoon in the context of climate change.
- Enable collective action and rural institutions for agriculture and rural management.
- Rehabilitate degraded lands and diversify livelihood systems for landless and vulnerable groups.
- Recharge depleted ground water aquifers and enforces strong regulations on ground water extraction.
- Clearly define and enforce water rights in watersheds communities.
- Roll out the community watershed management model.
- Price water and power to more accurately reflect their opportunity costs.
- Support water saving options such as drip irrigation and dry land crops.
- Include dry land crops in MSP scheme.



VALEDICTORY SESSION

Chairman

Dr. A. K. Srivastava, President, IAUA, New Delhi & Vice Chancellor, NDRI (DU), Karnal Dr. A. K. Singh, Vice Chancellor, RVSKVV, Gwalior Co-chairman: Dr. Arvind Kumar, Vice Chancellor, ML CAU, Jhansi Chief Guest : : Dr. B.Venketeswarlu, Vice Chancellor, VNMKV, Parabhani Special Guest Dr. U. R. Khandkar, Principal Scientist, RVSKVV, Gwalior Rapporteurs : Dr. A. N. Tikle, Senior Scientist, RVSKVV, Gwalior

The session wise recommendations were presented by respective rappoteurs. In concluding remarks, the Chief Guest, Dr. Arvind Kumar, Vice Chancellor, ML CAU, Jhansi stressed the need for development and use of innovative technologies for dryland situations. He highlighted the policies and institutional support essential for drylands.

He narrated the initiatives taken by Government of India in terms of projects and missions for the development of drylands and underlined the development take place in these problematic areas. The special guest of this session, Dr. B. Venketeswarlu, Vice Chancellor, VNMKV, Parabhani again highlighted the need for collection of rain water and their efficient utilization for improving of farming systems in dry areas. Dr. A. K. Singh, Co-Chairman and Vice Chancellor, RVSKVV, Gwalior stated the importance of rainfed agriculture in India and emphasized on the use of improved dryland technologies namely, reduced evaporation and transpiration losses, water harvesting, conservation agriculture, diversification of production system, natural resource management modules, crop production integration for resilience and livestock- fisheries farm. He also highlighted the policy issues and



institutional support for up-scaling dryland agricultural technologies. The Chairman of the valedictory function, Dr.A. K. Srivastava, President, IAUA, New Delhi stressed the importance, challenges, technological advancements and policies initiatives related to livestock surviving in dryland eco-systems. The recommendations of different sessions were approved by the house.

The prizes were distributed to the three themebased poster presentations of different sessions.



Recommendations

The following recommendations were amended after discussion:

- Extreme rainfall variability, recurrent but unpredictable drought, high temperature, low soil fertility, scarcity and degradation of natural resources, lack of infrastructure and slow dissemination of improved technologies are of great concern in dryland regions.
- Developing drought tolerant and climate change ready crops to match growing seasons and low soil moisture. Similarly, replacing vulnerable crops with more drought tolerant crops.
- Managing the natural resources to arrest land degradation and improve in-situmoisture conservation.
- Target the dryland areas for diversification livestock, horticulture, siliviculture, grass land, fodder in keeping with natural resource availability.
- Efficient livestock-crop integrated farming systems can improve livestock productivity thereby contribute to nutritional food and nutritional security.
- Increasing area in natural pastures can ensure fodder availability for livestock management in dry areas.
- Promotion of ready to eat food as per requirement of children, lactating mothers and aged persons can create demand for dairy and animal products which can ultimately increase income of livestock farmers in India.
- All the projects and schemes/ programmes for improving production and productivity in drylandsshould be brought under one umbrella and implemented intensively for better utilization of resources, increasing farm income, creation of non-farm income opportunities, area under protective irrigation, development of scientific water harvesting structure and improvement of indigenous cattle breeds.

Finally, Dr. H.S. Yadava, Director Research Services, RVSKVV, Gwalior and Organizing Secretary of the National Symposium extended vote of thanks.

ACKNOWLEDGEMENTS

The University gratefully acknowledges the financial support of Rs 4.00 lakh by IAUA, New Delhi and giving the responsibility of organizing the symposium othis university. The financial assistance provided by MPAMB, Bhopal and others private agencies are also thankfully acknowledged.





NATIONAL SYMPOSIUM ON DRYLAND FARMING AND FOOD SECURITY IN INDIA

PROGRAMME

Saturday, August 30, 2014

Venue : Auditorium, College of Agriculture, Gwalior

Registration:

09:00 to 11:00 AM

INAUGURAL CEREMONY:

11:00 AM to 12:30 PM

11:00 AM	:	Invocation

11:05AM	:	Lighting of	Lamp

11:10AM	:	Welcome address	-	Dr. A. K. Singh, Vice Chancellor, RVSKVV Gwalior,	
11:20AM		Introductory Remark	-	Dr. A. K. Srivastava, President, 1	IAU

- M : Introductory Remark Dr. A. K. Srivastava, President, IAUA, New Delhi
 - : Guest of honor address Smt Maya Singh, Minister, Women & Child Development, Govt. of M. P.

11:40AM : Lnaugural address
12:00 Noon : Chairman remarks
12:20 PM : Vote of thanks
Chief Guest -Shri Gauri Shankar Chaturbhuj Bisen, Minister, FWAD, Govt. of M.P.
Dr. Panjab Singh, Secretary DARE & DG, ICAR, New Delhi
Dr. H. S. Yadava, Organizing Secretary

High Tea

11:30AM

Lunch : 01:30 PM to 02:30 PM

TECHNICAL SESSION - I: 02:30 PM to 06:00 PM

Sub Theme: Natural resource management for sustainable productivity in dryland

Chairman	Dr. V.S. Tomar, VC, JNKVV, Jabalpur
Co-Chairman	Dr. B. Venkateswarlu, VC, VNMKV, Parbhani
Rapporteurs	1. Dr. S.K.Verma, Principal Scientist, CoA, Gwalior
	2. Dr. D. H. Ranade, Principal Scientist, CoA,

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Indore





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02:30 – 03:00 PM	Enhancing water and nutrient use efficiency through efficient resource management in drylands.	Dr. K. Ramasamy, Vice-Chancellor/ Dr. B.J. Pandian, Director, WTC, TNAU, Coimbatore
03:00 – 03:30 PM	Rain water harvesting and its efficient utilization in dryland production system.	Dr. B. Venkateswarlu, Vice-Chancellor, VNMKV Parbhani
03:30 – 04:00 PM	Efficient inter and sequence cropping systems for optimum productivity in different agro- climatic zones	Dr. V.K. Singh, National Fellow, PDFRS, Modipuram, Meerut, U.P.
Tea Break		
04:30 – 05:00 PM	Mechanization in dryland agriculture, opportunities and constrains	Dr. N.S. Rathore, Vice- Chancellor, SKNAU, Jobner
05:00 – 05:30 PM	Conservation agriculture potential in rainfed ecosystems	Dr. V.S. Tomar, Vice- Chancellor, JNKVV, Jabalpur

 $\begin{array}{c} 05:30-06:00\\ PM \end{array}$

Remarks of the Chairman

03:00 PM to 05:30 PM - Poster Session

07:00 PM to 08:30 PM - Cultural Programme Sunday August 31, 2014

09:00 AM-12:15 PM - Poster Session

09:30 AM to 11:30 AM - TECHNICAL SESSION – II & III: Sub Theme: Crop productivity enhancement and a live stock management

Chairman	Dr. B. Venkateswarlu, VC, VNMKV, Parbhani
Co-Chairman	Dr. G.R. Patil, JD (Aced.). NDRI, Karnal
Rapporteurs	1. Dr. M. P. Jain, Principal Scientist, RVSKVV, Gwalior
	2. Dr. V.S. Kandalkar, Principal Sci., RVSKVV, Gwalior



11:00 - 11:30 AM

National Symposium on Dryland Farming and Food Security in India

09:30 – 10:00 AM Climate ready crops and cropping systems to stabilize productivity.

Dr. Manoranjankar, VC/ Dr. A.K. Mishra, OUA&T,Bhubaneswar, Odisha

Dr. A.K. Srivastava, Director,

10:00 – 10:30 AM Ensuring livelihood security through livestock production system

10:30 – 11:00 AM Improved varieties for fodder crops and their production technologies for dryland farming system.

National Research Centre on Camel, Bikaner

Dr. N.V. Patil, Director,

Entrepreneurship opportunities in processing and value addition of milk for livestock

NDRI, Karnal

Remarks of the Chairman

Tea Break and visit of posters

11:30 - 12:15 PM

TECHNICAL SESSION - IV: 12:15 PM to 01:00 PM

security

Sub Theme: Policy issues and institutional support: Dryland Farming

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12:15 – 01:00 PM Policy support and institutional Dr. Arvind Kumar, DDG mechanisms for up scaling dryland technologies. Remarks of the Chairman



VALEDICTORY SESSION: 01:00 PM - 02:00 PM

Chairman	Dr. A.K. Srivastava, President, IAUA
Co-Chairman	Dr. A. K. Singh, VC, RVSKVV, Gwalior
Chief Guest	Dr. Arvind Kumar, DDG (Edu.), ICAR, New Delhi
Special Guest	Dr. B. Venkateswarlu, VC, VNMKV, Parbhani
Rapporteurs	1. Dr. U.R. Khandkar, Pr. Sci., RVSKVV, Gwalior
	2. Dr. A.N. Tikle, Sr. Sci. RVSKVV Gwalior

Presentation of Session wise recommendations

Session-I:Natural resource management for sustainable productivity in drylandSession-II & III:Crop productivity enhancement and live stock managementSession-IV:Policy issues and institutional support: Dryland FarmingPrize distributionVote of thanks



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Chief Guest			
1.	Hon'ble Shri Gauri Shankar Bisen, Minster, Farmer Welfare and Agricultural Development, Govt. of M.P.	Mantralaya, Bhopal	
	Guest of Hon	iour	
2.	Hon'ble Smt. Maya Singh, Minster, Women and Child Development, Govt. of M.P.	Mantralaya, Bhopal	
3.	Shri Narayan Singh Kushwah, MLA, Gwalior (South), Govt. of M.P.	Gwalior	
4.	Shri Bharat Singh Kushwah, MLA, Gwalior (Gramin), Govt. of M.P.	Gwalior	
5.	Smt. Samiksha Gupta, Mayer, Municipal Corporation, Gwalior	Gwalior	
	Chairma	n	
6.	DrPanjab Singh, Ex- Secretary, DARE, Govt. of India and Director General, ICAR, New Delhi	SaraswatiKunj, Naraianpur (Dafi) – Varanasi.	
-	Vice Chance	llors	
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