



ICAR-IIFSR



Newsletter

ICAR-Indian Institute of Farming Systems Research
Modipuram, Meerut- 250 110, Uttar Pradesh

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Director's Message

The Indian Institute of Farming Systems Research (IIFSR), Modipuram, Meerut is dedicated to develop climate resilient, profitable, multi-enterprise models of farming systems by synergizing land, water, livestock, biodiversity, solar energy and human skill for assuring food, nutrition, livelihood and environment security in all the agro-climatic regions of the country. The major challenges before us are to improve the standard of living of small and marginal households, which are expected to go beyond 90 per cent in the next 15 years. The initial result of farming system research from various locations suggests up to 70 per cent of nutrient requirement can be met within the farm itself through recycling and various integrations. However, a self-sustainable farming system should aim to meet all the input and energy requirements within the boundaries of farm, besides providing the household's food and nutritional security. Since, it involves highly location specific and dedicated multi-disciplinary team, development of self-sustainable farming system across the region may consume time and resource, but once created, it will meet the long term goal of the nation such as reducing the poverty, unemployment and malnutrition. Modelling of the farming systems under given constraints is the area, which needs attention of researchers. Capacity building for all the stakeholders such as farmers, development departments, scientists and all those who are related in farming system's domain, is also an important area to develop skilled manpower. I would like to appreciate the efforts of the editors of this volume of ICAR-IIFSR Newsletter which include sweeping informations and recent developments in farming system in pellet form with the hope, that, this newsletter will serve as a common platform for sharing the informations in the field of farming systems research and development and welfare of the discipline.



J.P. Singh

ICAR-IIFSR

The Indian Institute of Farming Systems Research (IIFSR), Modipuram, Meerut, attained the status of a full-fledged institute of ICAR w.e.f. 27th November, 2014 from its former Project Directorate for Farming Systems Research (PDFSR). The goal and mandate of the institute were revised as per new challenges and responsibilities in farming system's research. Presently the ICAR-IIFSR is running with 4 divisions i.e. Integrated Farming System Management (IFSM), Cropping System and Resource Management (CSRM), Organic Agriculture Systems (OAS) and Technology Transfer and Human Resource Development (TTHRD). AICRP on IFS and Network project on Organic Farming (NPOF) are also, the integral part of institute.

Mandate

- To undertake basic and strategic research in integrated farming system on production technologies for improving productivity and resource use efficiencies,
- To develop efficient, economically viable and environmentally sustainable integrated farming system models for different farming situations,
- To undertake on–farm testing, verification and refinement of system–based farm production technologies,
- To undertake human resource development and capacity building in integrated farming system,
- To act as a repository of information on all aspects of farming system’s research and development,
- To coordinate and monitor integrated farming system’s research in the country.

69th Independence Day celebrated

The 69th Independence Day was celebrated on 15th August, 2015 by the institute. All the employees have participated in the function. The programme was started by flying Tricolour and rendering salutes to it by the Director. It was followed by National Anthem and address of the Director. In his address, Director has highlighted the achievements of the institute during past year and appealed the officials to raise the institute to a new height and serve the nation through our new research on the arena of integrated farming systems.



Farm advisory services

The Scientists and employees of the institute have extended their farm advisory services as and when needed with the help of local newspapers, radio talks, TV talks, field days, personal visit to farmer’s field or to visiting farmers in the institute. Farmers and visitors of the region were provided appropriate technological inputs in the field of weather forecasting and planning of farming system, horticulture, integrated pest/disease and crop management, mushroom production, poultry, fishery, livestock production and management etc.

8 | दैनिक जागरण | मेट. 9 अक्टूबर 2015

प्रकृति की मदद लेकर खुद को मजबूत बनाएं किसान

मौसम की मदद लेकर खुद को मजबूत बनाएं किसान

किसानों को अपने खेतों में प्रकृति की मदद लेनी चाहिए। प्रकृति की मदद लेकर खुद को मजबूत बनाएं किसान।

मौसम की अंगड़ाई ने सर्दी बढ़ाई

मौसम की अंगड़ाई ने सर्दी बढ़ाई। मौसम की अंगड़ाई ने सर्दी बढ़ाई।

बूढ़ाबांदी के साथ बदला मौसम का भिजाज

बूढ़ाबांदी के साथ बदला मौसम का भिजाज। बूढ़ाबांदी के साथ बदला मौसम का भिजाज।

दैनिक जागरण

राजभाषा कार्यान्वयन समिति (रा.भा.का.स.) की बैठक एवं हिंदी कार्यक्रमों का आयोजन
 संस्थान में हिंदी के प्रयोग को बढ़ावा देने हेतु विभिन्न प्रकार के प्रोत्साहन कार्यक्रमों का आयोजन किया गया जिनका विवरण निम्न प्रकार है:

- (क) रा.भा.का.स. की तृतीय त्रैमासिक बैठक दिनांक 05.08.2015
- (ख) हिंदी कार्यशाला का आयोजन दिनांक 22.09.2015
- (ग) रा.भा.का.स. की चतुर्थ त्रैमासिक बैठक दिनांक 01.12.2015
- (घ) हिंदी कार्यशाला का आयोजन दिनांक 29.12.2015



हिंदी पखवाड़े का आयोजन

संस्थान के कार्यालयीन कार्यों में राजभाषा हिंदी के अधिकाधिक प्रयोग को बढ़ावा देने एवं समस्त कार्यालय कर्मियों में राजभाषा हिंदी के प्रति अभिरुचि पैदा करने के उद्देश्य से 14-28 सितम्बर 2015 तक संस्थान में हिंदी पखवाड़े का आयोजन किया गया। इस दौरान हिन्दी से संबंधित विभिन्न कार्यक्रमों/प्रतियोगिताओं का आयोजन किया

गया जिसके अर्न्तगत हिंदी सामान्य ज्ञान की लिखित प्रतियोगिता, निबंध लेखन, हिंदी भाषी एवं अन्य भाषा-भाषी के लिए पृथक-पृथक इमला एवं आशुभाषण प्रतियोगिता, प्रशासनिक संवर्ग हेतु टिप्पण एवं प्रारूप लेखन, काव्य पाठ, शुद्ध शब्द लेखन का समावेश किया गया। इसके अतिरिक्त वर्ष 2014-15 के दौरान हिंदी में अधिक से अधिक कार्य करने वाले कर्मियों को निदेशक डा० जगपाल सिंह द्वारा पुरस्कृत किया गया। अपने अभिभाषण में निदेशक डा० जगपाल सिंह ने संस्थान के वैज्ञानिकों एवं तकनीकी अधिकारियों से सरल हिंदी में किसानोपयोगी लेख लिखने की अपील की एवं शोध पत्रिकाओं में हिंदी के समावेश पर विशेष जोर दिया।



Meetings and gatherings

वार्षिक दिवस का आयोजन

भारतीय कृषि प्रणाली अनुसंधान संस्थान, मोदीपुरम, मेरठ में दिनांक 27.11.2015 को वार्षिक दिवस का आयोजन किया गया। कार्यक्रम का शुभारम्भ करते हुए संस्थान के निदेशक डा० जगपाल सिंह ने कृषि प्रणाली की संकल्पना पर विस्तृत व्याख्यान देते हुए, कृषि के विविधीकरण द्वारा छोटे एवं सीमान्त कृषकों की आय बढ़ाने व जीविकोपार्जन हेतु समुचित सुझाव दिये। कार्यक्रम के मुख्य अतिथि केन्द्रीय गोपशु अनुसंधान संस्थान के निदेशक डा० ब्रह्म प्रकाश रहे उन्होंने कार्यक्रम की भूरि-भूरि प्रशंसा करते हुए इस तरह के समन्वयन की आवश्यकता जतायी। इसी दिन 27 नवम्बर सन 2014 को इस संस्थान को परियोजना निदेशालय से पदोन्नत करके संस्थान का दर्जा दिया गया था और इसे देश भर में एकीकृत कृषि प्रणाली के अनुसंधान के समन्वयन का जिम्मा दिया गया। उद्घाटन के दौरान संस्थान से सेवानिवृत्त वैज्ञानिकों व कर्मचारियों को संस्थान के विकास में उनके सराहनीय योगदान के लिए सम्मानित किया गया। कार्यक्रम के दौरान समन्वित कृषि प्रणाली पर उद्घाटन भाषण व विभिन्न खेल-कूद प्रतियोगिताएँ जैसे: वालीवाल, रस्साकसी, अंत्याक्षरी व म्यूजिकल चेयर का आयोजन किया गया जिसमें मेरठ स्थित भारतीय कृषि अनुसंधान परिषद के अन्य संस्थानों के अधिकारियों व कर्मचारियों ने भी भाग लिया। कार्यक्रम के अंत में सभी विजयी टीमों, खिलाड़ियों व प्रतिभागियों को उचित पुरस्कार देकर सम्मानित किया गया।



29th Institute Research Committee Meeting

The 29th meeting of institute research committee (IRC) of institute was held during 06th – 08th October 2015 at ICAR-IIFSR, Modipuram, in which review of action taken report of the 27th IRC meeting, results of on-going research projects (Institute funded and Externally funded projects) as well as exploratory trials were discussed. Dr. Peyush Punia, Member Secretary, 29th IRC meeting, welcomed the Chairman and all the members of the IRC. He presented the action taken report of the 27th IRC proceeding and research highlights of on-going projects in brief. Dr J.P. Singh, Director and Chairman, IRC in his opening remarks suggested that, there should be a main programme for each division as per divisional mandate and suitable activities under the main programme should be taken up as sub-projects under the divisional programme in farming systems perspective to achieve the goals of the Institute. Small farmers and their overall components (enterprises) need to be kept in mind while designing the research programmes so as to come up with some solid outputs.



Second meeting of 7th Research Advisory Committee

The second meeting of the 7th Research Advisory Committee of ICAR-Indian Institute of Farming Systems Research, Modipuram was held on October, 28-29, 2015. Member Secretary, Dr. N. Ravisankar explained that the meeting is significant as it is the first meeting of RAC after upgradation of Project Directorate into a full-fledged ICAR Institute from November, 27th, 2014 and for the first time, Chief Agronomist/Agronomist/Principal Investigators from selected centres



of AICRP on IFS and NPOF are invited for discussion. Dr J. P. Singh, Director (Acting), ICAR-IIFSR welcomed the Chairman and Members of RAC and briefed on the activities undertaken between last RAC and the present meeting. The significant achievements highlighted were preparation of 29 region specific IFS models using on-station, on-farm and secondary data, compilation of farmer success stories (80 no's) from on-farm farming systems research, preparation of country status report and base paper on organic farming and year round capacity building activities for institute scientists/AICRP centres and farmers. In his opening remarks, Chairman pointed out that, the basic aim of farming systems research should be how a farmer thinks in managing his resources. Further, he informed that the success stories should be published in regional languages and can be disseminated through DD Kisan by respective universities. The Chairman and the members of the RAC expressed their critical views during the presentations made by the concerned scientists/team. He has presented the action taken report on the recommendations of last RAC meeting and in over all, the Committee was satisfied with the action taken report.

Xth Annual Group Meeting of Network Project on Organic Farming (NPOF) organized at MPUAT, Udaipur

The Xth Annual Group Meeting of Network Project on Organic Farming (NPOF) was organized at Maharana Pratap University of Agriculture and Technology (MPUAT), Udaipur during 19-21 August 2015. Shri Chandra Singh Kothari, Mayor of Udaipur Corporation inaugurated the group meeting as Chief Guest. Shri Kothari expressed his concern about the ill effects of indiscriminate use of chemicals especially pesticides and called for growing safe food for all on the principles of organic farming combining the tradition, modern science and farmers innovation. Professor P.K. Dashora, Vice Chancellor, MPUAT who chaired the inaugural session lauded the efforts of agricultural scientists and farmers along with policy makers for making self-sufficient India in terms of



Professor P.K. Dashora, Vice Chancellor addressing in the inaugural session

food production in the post-independence period. Dr J.P. Singh, Director, ICAR-IIFSR said that, considering the importance of organic farming in the country and to provide technological backstopping, the number of centres have been increased from 13 to 20. The geo-referenced characterization of 453 organic growers has been done to understand the dynamics of organic farming. Dignitaries also released nine publications brought out by IIFSR and cooperating centres.

In the first two days, review of on-going programmes and re-orientation/finalization of

technical programme was taken up. Besides, a special lecture on third party/GGC/PGS certification by Dr A.K. Yadav, Ex-Director, NCOF and Member, RAC of IIFSR was also organized. On 21 August 2015, interface meeting of researchers-farmers-development departments-NGOs-certification agencies was organized to take stock of research requirements of all the stake holders. Based on overall performance, Pantnagar (GBPUAT) centre of NPOF was selected as best centre and a certificate was distributed in the plenary session.



Release of Publication on organic farming by the Dignitaries



Field visit to NPOF experiments at MPUAT, Udaipur

Group Meeting of ICAR-AICRP on Integrated Farming Systems

The group meeting of ICAR-AICRP on Integrated Farming Systems was organized during 16-18 December, 2015 at Assam Agricultural University, Coimbatore in which review of on-going research programmes of on-station and on-farm centres including Tribal Sub Plan, discussion on formulation of new experiments and special lectures on identified topics were undertaken. Dr. K. M. Bujarbaruah, Vice Chancellor, AAU inaugurated the programme as chief guest. Dr. J.P. Singh, Director (Acting), ICAR-IIFSR gave brief history of ICAR-IIFSR. He appraised about the changed mandate of the institute, vision, mission and schemes, additional responsibilities and future functioning of different programmes of the institute. A brief note of the progress made by ICAR-IIFSR and AICRP on IFS during 2014-15 was also explained by him. The results of experiments conducted at on-station, on-farm and tribal sub plan were reviewed critically and following recommendations were made in the workshop. The following publications brought out by the ICAR-IIFSR and AICRP on IFS centres were also released by the Chief Guest during the function:

1. Annual Report, 2013-14 of AICRP on IFS
2. Long term Integrated Nutrient Management in cereal based cropping systems (B. Gangwar, Kamta Prasad, N. Ravisankar & JP Singh)
3. Farming Systems Research: Success Stories (Series 1) (N. Ravisankar, B. Gangwar, Kamta Prasad, Raghuveer Singh and Rajbir Singh)
4. Farmer perception on climate change and Integrated Farming System as adaptation measure towards changing climate (Mohd. Shamim, N. Ravisankar, B. Gangwar and Kamta Prasad)
5. CD on "TSP interventions in Bali Island" (AICRP on IFS centre, BCKV, Kalyani)



Institute celebrated ‘World Soil Day’ on December 05, 2015 by distributing the Soil Health Cards to the Farmers

ICAR-IIFSR, Modipuram celebrated ‘World Soil Day’ on Dec. 05, 2015 by distributing more than 260 soil health cards to the farmers of Mandora village, Sardhana block, Meerut (U.P.). The event was organized to create the awareness among the stakeholders as a part of ‘International Year of Soils 2015’ with the theme ‘Healthy Soils for a Healthy Life’. Dr. R.S. Yadav, Principal Scientist (Soils) welcomed the dignitaries and farmers and emphasized the role of soil health card for good soil health. He elaborated the detailed information enshrined in the soil health card for use by the farmers and replied the queries of the farmers. On the occasion, Dr. J.P. Singh, Director (A) while presiding over the occasion highlighted the role of good soil health for getting higher and sustained farm production. He further advised the farmers to apply the fertilizers as per the suggestion made in their soil health cards. Sh. Harendra Singh, Assitant Director (Soil Testing Laboratory), Meerut deliberated on the soil health card scheme. Chief Guest, Dr. B. Prakash, Director, ICAR-CIRC, Meerut called upon the farmers to use the information of soil health card for better management of their soil for



getting higher production and profit. Soil health cards were prepared as the guidelines of the DAC in consultation with district agriculture office, Meerut. Farmers also put their views on the day. On the occasion, more than 150 stake holder participated including farmers, scientist and contractual staff involved in the preparation of soil health cards.

One day workshop on “Developing Roadmap for Agricultural Development in Upper Gangetic Plains region”

A one day workshop was jointly organized in the institute by ICAR-IVRI, Bareilly, Zonal Project Directorate, Kanpur and ICAR-IIFSR, Meerut on 04.12.2015 to develop a

roadmap for the development of agriculture in Upper Gangetic Plain region of the country. Dr. Jeet Singh Sandhu, DDG (Crop Science), ICAR, New Delhi was the chief guest in the workshop. About 60 participants including the delegates from ICAR institutions, representatives from KVKs, Department of Seed, Department of Agriculture, progressive farmers etc., have participated in the programme. The major



problems and their probable solutions of the agro-climatic region of Upper Gangetic Plains which include parts of Uttar Pradesh and Uttarakhand, were identified during the workshop. Honourable DDG (Crop Science), ICAR assured the house to pass on these problems to PMO so that, future developmental programmes in agriculture should be formulated for this region on the basis of these identified problems.

‘जय किसान जय विज्ञान’ सप्ताह का आयोजन

भारतीय कृषि प्रणाली अनुसंधान संस्थान, मोदीपुरम मेरठ में दिनांक 23.12.2015 से 29.12.2015 तक, परिषद् के निर्देशानुसार पूर्व प्रधानमंत्री स्व. चौधरी चरण सिंह और पूर्व प्रधानमंत्री श्री अटल बिहारी वाजपेई के जन्म दिवसों के उपलक्ष पर “जय –किसान जय– विज्ञान सप्ताह” मनाया गया। सप्ताह के दौरान दिनांक 23.12.2015 को स्वर्गीय चौ० चरण सिंह जी के जन्म दिन समारोह के उपलक्ष में “चौ० चरण सिंह– एक दर्शन” पर व्याख्यानमाला आयोजित की गयी। कार्यक्रम में डा० एस० डी० धीमान, मुख्य वक्ता ने स्वर्गीय चौ० चरण सिंह जी के जीवन के संघर्ष व उपलब्धियों पर बारीकी से प्रकाश डाला और किसानों के उन्नति के लिए उन्होंने जो जीवन भर प्रयास किया इस पर चर्चा हुई। इस कार्यक्रम में कार्यालय के समस्त अधिकारियों व कर्मचारियों सहित श्री सती। चैयरमैन, प्रगतिशील किसान, करनावल, श्री नरेश ग्राम प्रधान रसूलपुर जटान ने भाग लिया। दिनांक 23.12.2015 को मुजफ्फरनगर जिले के बुढाना कस्बे में श्री सुबोध त्यागी (विख्यात किसान नेता व प्रगतिशील किसान) के बागान पर एक किसान–वैज्ञानिक परिचर्चा का आयोजन किया गया। डा० एम० पी० सिंह प्रधान

वैज्ञानिक, डा० दुष्यन्त मिश्रा, वरिष्ठ वैज्ञानिक और डा० चन्द्रभानु, वैज्ञानिक ने किसानों को आम, अमरूद, आँवला, कटहल, बेल व अन्य बागानी फसलों के उन्नत प्रबंधन तकनीक व नवीन विकसित प्रजतियों, बागानी फसलों में कीट एवं रोगों के प्रबंधन पर विस्तृत व्याख्यान दिये। व्याख्यान के बाद कृषकों को आम में टॉप ओपनिंग, बागानी फसलों में परजीवी खर-पतवारों जैसे लोरैन्थस के प्रबंधन, आम में एकीकृत रोग व कीट प्रबंधन, अमरूद, आम आँवला व अन्य फलों में कटाई-छटाई सहित विभिन्न बिन्दुओं पर प्रायोगिक प्रदर्शन कराया गया। कार्यक्रम में ग्राम प्रधान सहित क्षेत्र के लगभग 40 प्रगतिशील किसानों व पत्रकारों ने भाग लिया। दिनांक 28.



12.2015 को किसानों हेतु एक प्रशिक्षण कार्यक्रम का आयोजन किया गया। कार्यक्रम में गेंहूँ व सरसों के बीज उत्पादन तकनीकी पर विशेष जानकारी दी गयी। डा० चन्द्रभानु ने कृषकों की आवश्यकता हेतु उन्नत किस्म के बीज उत्पादन तकनीकियों पर विस्तार से व्याख्यान दिया। दिनांक 29 दिसंबर 2015 को कृषक महिला श्रमिकों के लिए एक दिवसीय प्रशिक्षण कार्यक्रम का आयोजन किया गया। इस कार्यक्रम के अंतर्गत डॉ० निशा वर्मा तथा डा० पूनम कश्यप ने कृषि में कठिन परिश्रम को कम करने तथा कार्य क्षमता बढ़ाने हेतु उपयुक्त उन्नत लघु यंत्रों का प्रदर्शन किया। दिनांक 29.12.2015 को जय किसान जय विज्ञान सप्ताह के समापन समारोह का आयोजन किया गया। निदेशक डा० जगपाल सिंह ने उपस्थित किसानों व अतिथियों का स्वागत करते हुए कृषि प्रणाली के अन्तर्गत किए जा रहे शोध कार्यो व क्षेत्र के किसानों के लिए संस्थान द्वारा संचालित परियोजनाओं की विस्तृत जानकारी दी। समारोह के दौरान क्षेत्र के नामी –गिरामी प्रगतिशील किसानों को संस्थान के निदेशक द्वारा सम्मानित किया गया। कार्यक्रम का संचालन डा० विनोद कुमार, प्रधान वैज्ञानिक ने किया। कार्यक्रम के अन्त में संस्थान के प्रधान वैज्ञानिक डा० एम० पी० एस० आर्य ने सभी को धन्यवाद देते हुए क्षेत्र के कृषकों के विकास हेतु संस्थान के दृढ़ संकल्प को याद कराया।

Observance of vigilance awareness week

The vigilance awareness week was observed in ICAR-IIFSR from 26-31 October, 2015. The week was started with pledge on 26.10.2015 by all the employees for preventing corruption and increasing transparency in the institute by adopting the package of preventive vigilance as a tool.



Trainings organized for farmers

A two day training programme was organized by the institute on 'Farming system components and their management' from 29-30.09.2015. A group of 45 farmers participated in the training. Lectures and practical demonstrations were given to farmers by the experts on farming system components and integrated farming systems for livelihood security.



Research Highlights

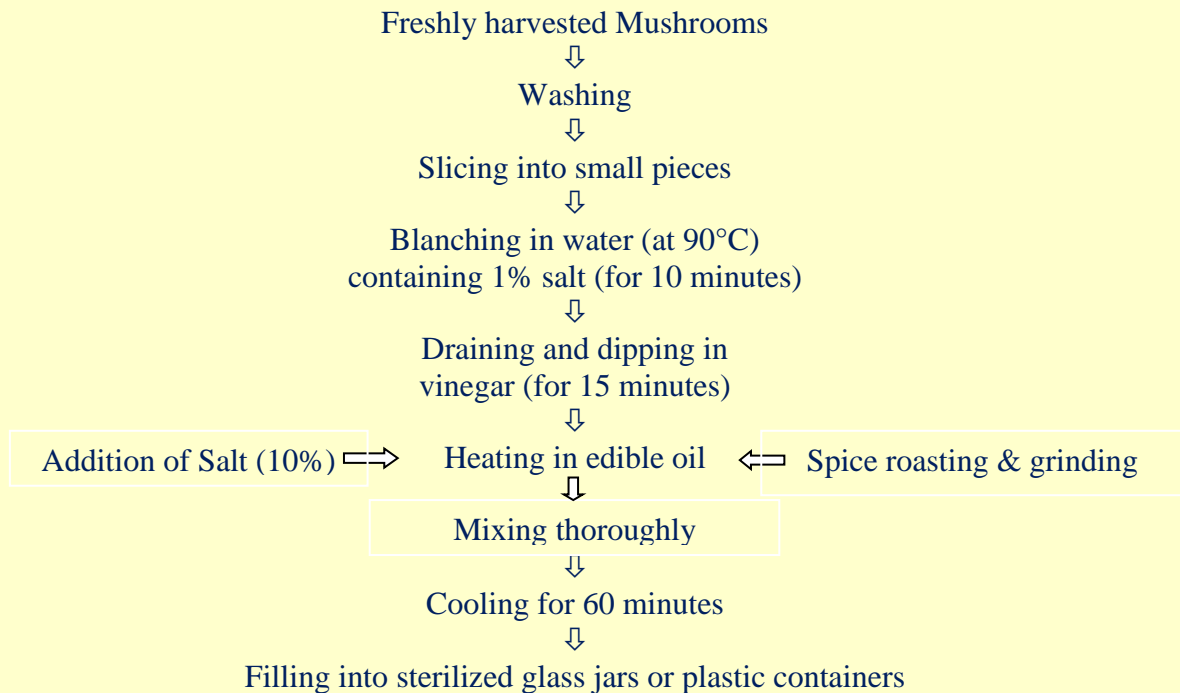
Development of Instant Mushroom Pickles

Contributed by: Amit Nath; Chandra Bhanu and J.P. Singh

Instant mushroom pickles were prepared using milky mushrooms. Freshly harvested milky mushrooms were washed with clean water for removing the dirt and sorted and cut into small pieces. This was followed by blanching in water containing 1% common salt at 90°C for 10 minutes. Drained slices were dried and kept in vinegar solution for 15 minutes. Different spices were roasted and grinded with the help of mixer grinder and heated with edible oil (10-15%). The blanched mushroom slices were mixed with heated oil containing spices and also added 10% common salt. The product was cooled for one hour at room temperature before packing in suitable containers. The final products were tested for texture, taste and flavour and it was found highly attractive in colour, flavour, texture and taste.



Flow chart for Preparation of Instant Mushroom Pickles



Evaluation of sorghum cultivars for Western Uttar Pradesh

Contributed by: Devendra Kumar, L.R. Meena, S. Ravi Kumar and L.K. Meena

Evaluation of newly developed forage sorghum cultivars developed by Indian Institute of Millets Research, Hyderabad (IIMR) i.e. CSH 14, CSH 16, CSH 13R, CSV 17, CSV 27, Phule Revati, Phule Anuradha, CSV 24SS, CSH 24MF and CSV 21F was carried out at IIFSR, Modipuram with the aim to introduce them for green fodder purpose in Western Uttar Pradesh. Out of ten cultivars evaluated, CSH 24MF, CSV 24SS, and CSV 21F were found most suitable as green fodder with fodder yield of 157.36, 145.43 and 144.46 t ha⁻¹ respectively. However, the varieties CSH 14, CSH 16 and CSH 13R were found suitable for grain purpose with grain yield of 7.96, 7.79 and 7.66 t ha⁻¹. On the other hand, varieties CSH 13R, CSV27, CSH16 and CSH 14 were found as dual purpose. Indeed, newly evaluated forage sorghum cultivars had higher green fodder production potential as well as suitability for March planting in western plain zone of U.P.



Sorghum cultivars CSH14



CSV24SS

Identification of bio-intensive complimentary cropping systems for higher productivity and efficient resource use

Contributed by: M.P.S. Arya, M. Shamim, Prem Singh and O.K. Tomar

Ten combinations of bio-intensive complimentary cropping systems were evaluated for higher productivity and efficient resource use. The effects of these systems on rice equivalent yield (REY) and radiation use efficiency (RUE) are presented in Fig. 1. The system maize for cobs +vegetable cowpea in 1:1 ratio on broad beds (BB) and *Sesbania* in furrow during *kharif* and mustard in furrow and 3 rows of lentil on broad beds in *rabi* while 3 rows of green gram on beds in summer produced highest REY of 25.59 t ha⁻¹ and was remarkably better over other systems. In the summer season, green gram yielded 1.70 t ha⁻¹ of grain and its incorporation in soil also added four tons of biomass per hectare. Bio-intensive system of raising maize +cowpea (f)- maize (cob) +black gram –wheat + menthi (6:1)- green gram (grain and residue incorporation) was second best which resulted in REY of 24.88 t ha⁻¹. This system proved to be the second best in the order of merit. The lowest productivity of 11.32 t ha⁻¹ was obtained with conventional rice-wheat system.

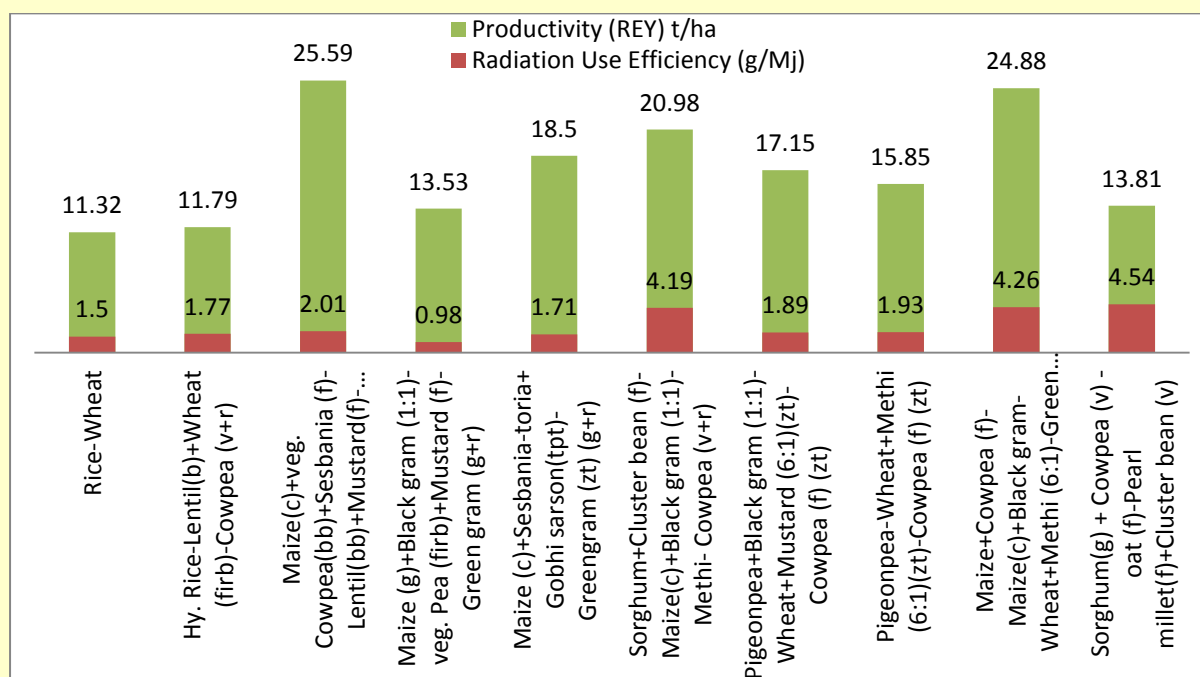


Fig. Effects of bio-intensive complimentary cropping systems on rice equivalent yield (REY) and radiation use efficiency (RUE)

Optimization of process for development of *Aloe vera* nectar and jam

Contributed by: Amit Nath; Debashis Dutta; Poonam Kashyap; Nisha Verma and J.P. Singh

Experiments were carried out to standardize the process condition for production of *Aloe vera* nectar and jam. For preparation of nectar, *Aloe vera* leaves were washed with clean water and sorted for removing the damaged parts. The cleaned and sound leaves were manually peeled with SS knife. *Aloe vera* pulp was obtained by crushing in mixer grinder and strained with the help of SS strainer/sieve for removing skins etc. To optimize the nectar, clear *Aloe vera* juice was used in different proportions viz., 20%, 30%, 40%, 50% and 60% along with sugar syrup of different TSS viz., 40%, 45%, 50%, 55% and 60% using response surface methodology (RSM) design. A fixed amount of colour, essence and preservative (sodium benzoate @ 300ppm) were added. The final products were packed in PET bottles

(500ml capacity) and sealed with automatic self-sealing caps. The final product was analysed for total soluble solid (TSS) and organoleptic score. Among different treatments, the Aloe vera nectar with 50% pulp and 55% syrup had recorded 25% TSS with high taste score (8.3) and overall acceptability score (8.2). Similarly, Aloe vera jam was also prepared using varying quantities of pulp (*viz.*, 50-70%) along with other additives. The best Aloe vera jam was obtained with 60% pulp which recorded the maximum sensory score (8.5).



Fig. Aloe vera Nectar

Protocol for production of green mango panna

Contributed by: Amit Nath; Debashis Dutta; Poonam Kashyap; Nisha Verma and J.P. Singh

Green mango panna was prepared with freshly harvested green mango fruits. The fruits were washed with clean water and peeled manually. Peeled fruits were sliced and obtained uniform fine pulp with the help of laboratory mixer-grinder. Different strengths of sugar syrup (50-70%) was prepared and mixed with different quantities of pulp (30-60%). Thereafter, different additives and spices (*viz.*, ajwain, black pepper, fennel, asafoetida, black salt etc.) were added as per desired taste. Among different blends, the mango pulp (40%) and sugar syrup (55%) had recorded 28% final TSS with high taste score (8.1) and overall acceptability score (8.0).



Productivity and economic evaluation of horticulture based farming systems

Contributed by: Poonam Kashyap

During a comparative study of three cropping systems *viz.*, CS 1- fruit crop based system (0.3 ha), CS 2- vegetable crop based system (0.22 ha) and CS 3- field crop based system (0.4 ha), CS-3 recorded the highest net returns worth Rs.263912 followed by CS-1 with net returns of Rs.224928 per hectare basis. Among the different systems of vegetables evaluated, the maximum net returns of Rs. 2,02657 ha⁻¹ was recorded for cucumber- radish- carrot-onion system followed by turmeric (Rs.1,47780 ha⁻¹) and brinjal-potato-beans system (Rs 68035 ha⁻¹) and hence showed that these systems have performed best and rendered higher returns. Based on the performance of individual vegetables in the system, highest net return was recorded for radish (Rs. 107781ha⁻¹) followed by turmeric (Rs. 87014 ha⁻¹), carrot (Rs 53375 ha⁻¹ and okra (Rs 42557 ha⁻¹). Hence radish, turmeric, carrot and okra are the most beneficial vegetables in Western Plain Zone of Uttar Pradesh. The highest economic efficiency of Rs 617.93ha⁻¹ day⁻¹ was recorded for CS-1 followed by CS-2 (565.51 ha⁻¹ day⁻¹)

which shows that diversification is more beneficial and gives higher returns as compared to the single type of system.



Fig. Intercropping of pea in mango plantation

Impact of groundwater table on cropping systems economics and energetic in Bundelkhand region of Uttar Pradesh

Contributed by: Sunil Kumar, N.D. Shukla and B.K. Sharma

A survey was conducted in Bundelkhand region using multistage stratified random sampling method for knowing the status of groundwater table on cropping systems economics and energetic in agriculture sector in this region. The analysis of the data reveals that the average groundwater table in Hamirpur district was 38.8 meters during course of survey (2009-10) while it was 34.4 meters in 2004-05 and 27.6 meters during 1999-2000 respectively. The dynamics of energy showed 2.65 lit/hr. diesel consumption during 2004-05 as against 2.10lit/hr. in 2009-10. Prior to 1999-2000, there was normal rainfall in the district and as such, the consumption was 1.59lit/hr. during that year. Due to change in water table, the total hours consumed for providing two irrigation to wheat was recorded 49.10, 56.4 and 34.3 hours per hectare during 2009-10, 2004-05 and 1999-2000 respectively. The area under cereals declined from 48.0 per cent in 1984-85 to 33.7 per cent in 2003-04 in Hamirpur. Similarly, the cropped area under oilseeds also declined from 6.7 to 3.0 per cent from 1984-85 to 2003-04. The average productivity of wheat of the sample farmers was noted 19.1q/ha which is much below to the national average productivity. These figures clearly showed the impact of groundwater table on cropped area and energy consumption. Per capita/day income of Rs.8.9 for marginal and Rs.11.2 for small farm group further underline the spread of poverty in the region which is mainly caused by scarcity of rainfall which in turn influence recharge in bore wells. These facts clearly highlight the effect of depletion of ground water table on crop economics.

Human Resource Development

National Training/ Workshop/Seminar/Symposia etc. attended

| Name of participant | Name of the training/seminar/symposia etc. attended |
|---------------------------------------|--|
| Dr. Vinod Kumar, Pr. Scientist | ➤ 14 days training on “Molecular approaches for augmenting reproductive efficiency in Cattle” organized by ICAR-Central Institute on Cattle Research, Meerut from 08.12.2015 -21.12.2015 |
| Dr. Amit Nath, Pr. Scientist | ➤ 21 days Training on “Intellectual Property Rights in Agriculture” organized by Zonal Technology Management & Business Planning and Development Unit ICAR- Indian Agricultural Research Institute, New Delhi-110012 from 12.08.2015-01.09.2015 ➤ 21 days Winter School on “Advance Soil biological approaches for enhancing carbon sequestration and mitigation climate change” organized by ICAR-IISS, Bhopal from 02.09.2015-22.09.2015 ➤ Management Programme on Leadership Development organized by ICAR-NAARM, Rajendranagar, Hyderabad from 30.11.2015-11.12.2015 |
| Dr. Suresh Malik, Pr. Scientist | ➤ 21 days Winter School on “Livestock and climate change: challenge and ways ahead for sustainable production” organized by ICAR- National Institute of Animal Nutrition and Physiology, Adugadi, Bengaluru from 01.10.2015 -21.10.2015 ➤ 14 days training course on “Molecular approaches for augmenting reproductive efficiency in Cattle” organized by ICAR-Central Institute on Cattle Research, Meerut from 08.12.2015 -21.12.2015 from 08.12.2015 - 21.12.2015 |
| Dr. Debashish Dutta, Sr. Scientist | ➤ Short course training “Smart Agro-input delivery Approaches based on hydrogels and other polymeric carriers for improved crop health and productivity” organized by ICAR- IARI, New Delhi, from 21.07.2015-30.07.2015 ➤ 21 days Winter School on “Advance Soil biological approaches for enhancing carbon sequestration and mitigation climate change” organized by ICAR-IISS, Bhopal from 02.09.2015 -22.09.2015 |
| Dr. Poonam Kashyap, Scientist | ➤ Training Programme on “Science and technology for rural societies, for women scientists & technologists” organized by ICAR- IIPR, Kanpur from 24.08.2015 -28.08.2015 |
| Dr. M. Shamim , Scientist | ➤ 21 days SERB training on “Agrometeorological Techniques for risk Assessment and Management of Extreme Events” organized by ICAR-CRIDA, Hyderabad from 01.09.2015 -21.09.2015 |
| Dr. Sanjeev Kumar, Scientist | ➤ 21 days Winter School on “Advance Soil biological approaches for enhancing carbon sequestration and mitigation climate change” organized by ICAR-IISS, Bhopal from 02.09.2015-22.09.2015 ➤ 21 days Winter School on “Climate Smart Agriculture: Lessons Learnt, Technological Advances Made and Research Priorities in SAT” organized by University of Agricultural Sciences, Raichur (Karnataka) from 16.11.2015 -06.12.2015 |
| Dr. Raghuvveer Singh, Scientist | ➤ 21 days Summer School on “Conservation Agriculture for enhancing resource use efficiency and arresting land degradation” organized by ICAR-RC for NEH Region, Umiam, Mehalaya from 19.08.2015-08.09.2015 |
| Dr. Vipin Kumar, ACTO | ➤ 21 days Summer School on “Conservation Agriculture for enhancing resource use efficiency and arresting land degradation” organized by ICAR-RC for NEH Region, Umiam, Mehalaya from 19.08.2015-08.09.2015 |
| Dr. Vinod Sharma, STO | ➤ 21 days Winter School on “ICAR-RC for NEH Region, Umiam, Mehalaya” organized by ICAR-IISS, Bhopal from 02.09.2015-22.09.2015 |

Transfers

| S. No. | Name | Designation | Date of transfer | To | Remarks |
|--------|-------------------|---------------|------------------|-------------------------|-----------|
| 1 | Dr. V. K. Singh | Pr. Scientist | 07-12-2015 | ICAR-IARI, New Delhi | Selection |
| 2 | Shri D. C. Mishra | LDC | 31-12-2015 | ICAR-IISR, Lucknow | Transfer |

Retirements

| S. No. | Name | Designation | Date of retirement |
|--------|--------------------|---------------------|--------------------|
| 1. | Dr. Kamta Prasad | Principal Scientist | 31-08-2015 |
| 2. | Shri Rjender Singh | SSS-2 | 31-01-2016 |
| 3. | Shri Chet Ram | FS (T-9) CTO | 31-0-3-2016 |

Our new colleagues

1. Shri Ravinder Singh, SAO, date of joining 02.09.2015



2. Shri Prakash Chand Ghasal, Scientist, date of joining 28.11.2015



Awards and Recognitions

- I. Dr. Amit Nath, Principal Scientist (Food Technology) was honoured with prestigious Kunwar Saxena Bahadur SRDA Award-2014 by the Society for Recent Development in Agriculture for his outstanding contribution in the field of Agriculture.
- II. Dr. Poonam Kashyap, Scientist received the Young Scientist Associate Award 2015 at IJTA 2nd International Conference on Agriculture, Horticulture and Plant Sciences held at Shimla (H.P.) from 26-27 December, 2015

Distinguished Visitors

Honourable Secretary DARE and Director General, ICAR, Dr. S. Ayyappan visited the Institute on 22.08.2015



Important Publications

Shamim, M., N. Ravisankar, B. Gangwar and Kamta Prasad (Eds). 2015. Farmer perception on climate change and Integrated Farming System as adaptation measure towards changing climate, AICRP on Integrated Farming Systems, ICAR-Indian Institute of Farming Systems Research, Modipuram, Meerut p. 127

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Dr. A.S. Panwar
Director, ICAR-Indian Institute of Farming Systems Research,
Modipuram, Meerut- 250 110, (U. P.)
Tel: 0121-2888611; Fax: 0121-2888564
E-mail: directorifsr@yahoo.com
Visit us at: <http://www.pdfsr.ernet.in>

Editors: Dr. Chandra Bhanu, Scientist,
Dr. Peyush Punia, Pr. Scientist and
Dr. Prem Singh, Pr. Scientist