GURBACHAN SINGH FOUNDATION
for
Research, Education and Development
GSFRED NEWS LETTER

Vol. 1 (2) Aug.-Dec., 2018

In this issue ...

From Chairman's Desk

One of the major objectives of Dr. Gurbachan Singh Foundation for Research, Education and Development (GSFRED) is to upscale scientific innovations and communicate agricultural science and technologies for skill and entrepreneurship development in unemployed youth, farmers and students. To achieve this objective, a Research, Education and Development Centre is established at 14 milestone, Karnal-Pehowa State Highway near Kachhwa town on 6.5 acre land purchased by the Founder Chairman using his retirement benefits. Several demonstrations and experiments have been established at this centre to create awareness amongst scientific community, farmers, students and other stakeholders about water conservation, soil health improvement, conservation of biodiversity, *in-situ* management of crop residue, climate smart agriculture, organic farming, conversion of farm waste to manure, diversification options from rice-wheat system, best management practices for doubling farmers income and retaining youth in agriculture.

An integrated farming system model blending crops, fruits, vegetables, dairy, fishery, poultry, goatery, duckery, gobar gas plant etc. has been established for multiple use of scarce resources, reduction in cultivation cost, regular high farm income, year round family employment, risk cover and *in-situ* generation of manure. A permanent long-term experiment has been initiated to popularize crop diversification options for water guzzling rice-wheat cropping system. The options being demonstrated included : soybean and green gram on bunds and rice in furrow; maize on bunds and rice in furrow during *Kharif* followed by wheat on bunds and clovers in furrow; gram and lentil on bunds and winter maize in furrow during Rabi; Similarly, a permanent field trial has been initiated to evaluate the performance of recently released rice and wheat varieties by NARS in terms of growth, productivity, resource use efficiency, pests and weeds infestation and periodic weather parameters of maximum and minimum temperature, sun-shine hours, relative humidity, cold and heat waves and economics. Mini kits of seed of new varieties of rice, wheat, mustard and other crops are distributed to the farmers. To popularize agroforestry for increasing farmer income and management of carbon at the farm level, more than 30 kinds of fruit plants and their varieties are planted along the boundary, inter-spaces being used for year round vegetable production. Paddy straw of the farm has been managed *in-situ* by placing in furrow between rows of wheat sown on bunds.

Infrastructure facilities such as chairman's office, office for research fellows, committee room, conference hall, soil and water testing lab, washrooms, farm office, seed stores and implements shed etc. have been created. The centre is being developed as an Agro-Eco-Tourism facility for this part of the country. Large number of students, farmers, scientists, trainees, civil society representatives and official from development departments including private organizations visit the centre almost daily. Dr. Trilochan Mohapatra, Secretary, DARE and DG, ICAR visited the centre alongwith 3ADG's of ICAR and appreciated GSF efforts in communicating agriculture science innovations for upscaling and skill and entrepreneurship development; Dr. N.T. Singh, FNA and Former Director CSSRI visited on 15 December, 2018; Dr. P. C. Sharma, Director, CSSRI on 28 October, 2018 and Dr. R.S. Gandhi, ADG (Animal Sciences), ICAR also visited. During the period, GSF Chairman visited Canada to meet old colleagues for probable tie-ups and Cairo, Egypt to participate and present a paper in International Water Week Conference.

The second newsletter of the Foundation covering the period August to December, 2018 is in your hand. We look forward for your suggestions, comments and feedback.

(Gurbachan Singh)

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Infrastructure Development and Extension

During the period under report infrastructure and research facilities were further upgraded. The conference hall, committee room, chairman's office and office space for research fellows were fully furnished. A soil and water testing laboratory with the state of art facilities for testing of soil, water and plants sample was made fully functional. The integrated farming system model components such as fisheries, dairy, goatery, poultry and duckry are now fully functional.

Evaluation of Rice and Wheat Varieties for Resilience to Weather/Climate Change

The long term experiment on evaluation of promising rice varieties of NARS and private sector during Kharif and recently released varieties of wheat during Rabi was continued to judge the performance in terms of growth, productivity, pest and weed scenario, response to short term variation in temperature, sunlight, relative humidity, cold and heat waves, harvest index and economics. Performance of different rice varieties grown during Kharif is reported in Table 1.

Table 1 : Performance of newly released varieties of rice during kharif 2018

S.No.	Variety	Date of transplanting	Date of harvesting	Maturity period (days)	Grain yield (t/ha)
1	BR 105	26.6.2018	17.10.2018	114	6.78
2	BR 244	26.6.2018	2.10.2018	99	4.61
3	BR 311	26.6.2018	12.10.2018	109	6.12
4	Pusa 44	26.6.2018	12.10.2018	109	4.07
5	CSR 43	26.6.2018	2.10.2018	99	7.50
6	PR 127	27.6.2018	11.10.2018	107	5.52
7	PB 1718	27.6.2018	26.10.2018	112	3.44
8	PB 1637	27.6.2018	14.10.2018	110	3.19
9	PB 1728	27.6.2018	17.10.2018	113	4.59
10	CSR 30	27.6.2018	25.10.2018	121	3.11
11	PB 1509	27.6.2018	25.09.2018	91	4.08
12	PB 1121	27.6.2018	19.10.2018	115	2.83

Note : 30 days old seedlings were transplanted, the yield represented in table is of cleaned paddy at about 13-15 percent moisture.

During rabi, the wheat varieties grown including BR 36, PBW 343, DBW 110, HD 3226, DBW 90, DBW 93, DBW 173, DBW 187, WB 2, KRL 283, HDCSW 18, HD 2967, DBW 71, VL 892, VL 829 and VL 907.

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In-situ Management of Paddy Residue/ Straw

After the harvest of rice crop from 5 acre land, not even a kg of rice residue was burned. A part of rice residue was used as mat on the floor under animals (cows, goats, poultry and ducks) during the winter. The straw blended with excreta of animals was periodically removed and dumped into pits for making compost. Major part of rice residue was used as a mulch in the furrows between wheat rows planted on ridges. This practice is likely to prove highly beneficial in terms of weed management, water saving, soil health improvement and re-generation of microbes in the soil. The preliminary studies on fast decomposition of paddy and wheat straw using cow dung, horse manure, poultry manure and urea application were continued. Visual observation revealed that poultry manure followed by horse manure seemed most effective in conversion of straw into manure

Crop Diversification Options for Rice-Wheat Cropping System

A long term experiment to evaluate the performance of several alternate crops to rice during *kharif* and wheat during *rabi* was continued. The treatments during *kharif* included : (i) rice as sole crop, (ii) soyabean as sole on raised bunds ,(iii) green gram sole on raised bunds, (iv) maize as sole on raised bunds, (v) soybean on bunds + rice in furrow, (vi) green gram on bund + rice in furrow, (vii) maize on bund + soybean in furrow, and (viii) clusterbean on bund and maize in furrow.

The treatments tried during *rabi* included : wheat on bunds and clovers in the furrow; gram and lentil on the bunds and winter maize in the furrow; kidney bean on bunds and fenugreek in furrows, bersem, winter-maize on bunds, mustard on bunds and ladies finger on bunds and cauliflower in the furrow. Performance of crops in different treatments is being evaluated in terms of overall productivity, resource use efficiency, effect on soil properties, nutritional security and economics.

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Integrated Farming System Model for Doubling Farmer Income

The studies on integrated farming system model for 1.5 acre land holding were continued. The sub components of the system such as rearing of fish in the pond, dairy component (three cows; one Sahiwal and 2 HF), goatery (7 Barbary goats), poultry (150 Desi birds), duckry (5 ducks + 5 goose) have been made fully functional. The output from these components included 40-45 kg milk per day, eggs from ducks and poultry. Regular income is being generated from the vegetable like cabbage, cauliflower, onion, spinach and fenugreek. The fruits planted on the dykes of the pond included peach, plum, pomegranate, guava, fig and citrus. The fig and guava started yielding fruits and rest of the plants will start fruiting in the coming season. This model has been established to make multiple use of resources, risk proofing for predicted climate change, doubling farmers income, in-situ energy generation for light and domestic cooking and whole family employment at the farm.

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Seed production of recently released rice and wheat varieties

During *kharif* quality seed of recently released rice varieties such as PB 1637, PB 1718, PB 1728, CSR 30, CSR 43, PR 127, PB 1509, PB 1121 and BR 105 was produced. In *rabi* season, the varieties grown for seed production included elite varieties of IIWBR, Karnal, KRL 283, HD 2967, DWR 173, WB 2, PBW 343, BR 36 etc.

Evaluation of Fruit Trees as Boundary Plantation

With the concept of increasing farmer income and year round productions of fruits and vegetables for home stead nutritional security, more than 30 fruits intercropped with different kind of vegetables are planted on the boundary of the farm. The fruit trees planted included : eight varieties of mango (Amarpali, Dasheri, Langra, Surya, Mallika, Ramkala, Alphonso and Kesar), guava, lemon, zyziphus (ber), sapota, litchi, kinnow, seedless kinnow (daisy), papaya, orange, sweet lime, grapes, emblica (aonla), psygium (jamun), peach, plum, pomegranate, pear, bagugosa, phalsa, karonda etc. More fruits such as guava varieties and sapota from PAU and grapes from NRC grapes, Pune were procured and planted during the period. To make the efficient use of the resources like land and water, interspaces between fruit trees are planted with seasonal vegetables like lady's finger, cowpea, clusterbean, cucurbitz, bean during *kharif* season and long gourd (Anokhi) bottle gourd (Punjab Pasand), cowpea (Pusa Komal), radish (chetki long and Pusa mridulo), spinach (all green), cauliflower (Poornima), black gourd (Alok), Khira (Barsati), chillies (F, Mahi), coriander, tomato (Hybrid SVTD 6922), brinjal (Hybrid NavKiran), carrot (Pusa vristi), turnip, Fenugreek (PEB and Kasuri Supreme), Pea (Pusa pragati), Onion (Pusa ridhi, Pusa red and Agrifound), Potato (Pukhraj and kufri Khyati), Garlic (G282), Knol Knol, Cabbage, Chinese cabbage during *rabi* season.

International Soils Day Celebrated with School Students

G S Foundation for Research, Education and Development celebrated International Soil Day on 5th December 2018 with students of Montfort World School, Karnal. The chairman of the foundation, Dr. Gurbachan Singh delivered a lecture on importance of soil and need for its conservation for achieving food, nutrition, livelihood and environmental security in the future. The visiting students were exposed to a soil profile so that they learn about nature and properties of the soil. A visit to various experiments and demonstrations established at G S F Research and Education Center such as

integrated farming system and agricultural diversification for doubling farmer income, conservation agriculture and *in-situ* paddy straw management for improving soil quality were shown. The students took keen interest in more than two dozen fruit trees and vegetable crops planted on the boundary of the research farm for nutrition security, doubling farmer income and conservation of natural resources.




Kindergarten Students at GSF Research and Education Centre

About 80 students of nursery class of Adarsh School enjoyed agro-eco tourism at GSF Research and Education Centre on 26 December, 2018. The visiting kids enjoyed playing with goats and their kids. They also enjoyed feeding young calves of Sahiwal and HF breeds of cows. They also took keen interest in seeing various kinds of fruits and vegetables grown at the centre. One of the most exciting ventures of the ago-eco tour was an open jeep ride to various parts of the research farm. They enjoyed their lunch and cake ceremony in the lawns adjacent to the fish pond. GSF is making efforts to link children at the nursery stage in school to create awareness about conservation of natural resources viz soil, water, climate and biodiversity for future use.






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Distinguished Visitors

Dr. Trilochan Mohaptra

Dr. Trilochan Mohaptra, Secretary, DARE and DG, ICAR visited GSFRED Research and Education Centre along with three Assistant Director Generals of ICAR (Dr. S.K. Chaudhary, Dr. S.P. Kimothi, Dr. V.P. Chahal) and Director, CSSRI, Karnal, Dr. P. C. Sharma. Chairman of GSFRED, Dr. Gurbachan Singh welcomed the DG and other dignitaries and showed various experiments and demonstrations established at the farm for linking agricultural science to society such as integrated farming system model for doubling farmers income, diversification option for rice, rice residue management for manure production, evaluation of rice and wheat varieties for resources use efficiency and resilience to weather and climate and fruit trees based agroforestry planted at the farm. Dr. Mohapatra appreciated GSF efforts in upscaling and communicating agricultural science and technologies to the farmers, unemployed youth and school students for skill and entrepreneurship development. First Newsletter of the Foundation was also released by the Secretary, DARE and DG, ICAR.

Dr. N.T. Singh, FNA, USA

Dr. Nirmal Tej Singh, Former Director, CSSRI, Karnal and Central Agricultural Research Institute, Portblair visited GSF Research and Education Centre on 15 Dec, 2018. Chairman GSF showed various experiments and demonstration established at the farm for creating awareness and linking agricultural science to society to the visiting dignitary. Dr. Singh appreciated the efforts of GSF for establishing need of the our experiments and demonstrations for reducing cost of cultivation, enhancing farmers income and conservation of natural resources. Dr. N.T.Singh currently resides in Sacramento, USA and one of the top most soil scientist in the world.

Dr. P. C. Sharma

On 28th October forenoon, Dr. P. C. Sharma, Director, CSSRI visited GSF Research Farm to see the performance of CSR 30 and CSR 43 varieties of rice developed by his institute and other experiments established at the farm. Later, in the afternoon, Chairman and others members of GSFRED met at the farm and discussed future expansion plans of GSFRED.



Religious Head Sant Kashmir Singh Ji

Baba Kashmir Singh Ji along with his disciples visited GSF Research and Education Centre on 13 December, 2018. Dr. Gurbachan Singh showed various research and education programmes and activities of the Foundation to the visiting religious personality of the area. Sant Kashmir Singh Ji took keen interest in experiments and demonstrations on organic farming; conversion of waste to wealth; integrated farming model and cultivation of traditional crops like gram, lentil, mustard, rajmah, maize etc. as substitution option for water guzzling rice-wheat cropping system.

CSSRI, Scientists

Scientists from Central Soil Salinity Research Institute, Karnal paid a visit to GSF Research and Education Centre on 14 December, 2018. The visiting scientists had detailed discussion on the present status of the soil which was reclaimed with the use of gypsum several years back. The discussion focused on layer wise characteristics of the soil in a profile dug out up to 180 cm depth. The scientists were astonished to know that only surface soil shows the characteristics of a normal soil where as sub surface layers still have very high pH and presence of calcium carbonate granules. The chairman also showed other experiments to the visiting scientists for doubling farmers income.



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Dr. R.S. Gandhi, Assistant Director General, Animal Sciences, ICAR

Dr. R. S. Gandhi, ADG, ICAR visited the centre on 6 November, 2018. He was highly appreciative of GSF efforts in establishing an integrated farming system model for food, nutrition, livelihood and environment security of small and marginal farmers.

Random Thoughts

Evergreen Revolution : Need of the Hour

The natural resources of soil, water, climate and biodiversity are showing signs of fatigue and degradation due to continuous cultivation of rice-wheat for last more than four decades. There is strong need to improve farmers income by judicious use of limited and diminishing resources. Conservation agriculture involving crop rotations, minimum tillage and retaining crop residue on the surface of the soil is the way forward for evergreen revolution. Several experiments/demonstrations are laid out at GSF Research, Education and Development Centre near Karnal to sensitize and popularize best conservation agriculture practices for doubling farmers income and conserving natural resources for future generations.

Advisory to Protect Plants from Cold Waves during Winter

Every year cold wave / freezing temperature during December 15 to January 15 effects crops, animals and fish in north west region. The most sensitive crops to adverse cold wave impact include : winter maize, mustard, potato, tomato, brinjal, marigold, chrysanthemum, dahlia, mango, litchi, papaya, amla etc. Extreme cold wave induces freezing of water in inter and intra cellular spaces effects physiological processes resulting in death of plants. Cold wave induced death of fish in ponds is also reported in the past. Some of the precautions to negate/ moderate cold wave impact on plants and animals include :

Maintaining proper moisture in the soil by applying frequent light irrigation to the crops.

Less than two years old fruit saplings / plants may be kept covered by thatching with paddy straw or any other material leaving south side open to penetrate sun light.

Provision of heat through heaters – fire or smoke between the rows and creating an air blanket of smoke particularly in extreme cold / freezing situations.

Maintain proper water level in the fish pond and practice intermittent aeration of water to alleviate respiratory stress to the fishes.

Proper shelter for livestock to stop entry of chilling wind during night hours.

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Diversification from Rice : Need of the Hour

Natural resources of water, soil, biodiversity and climate are under stress due to continuous cultivation of rice in Punjab, Haryana and western U.P. Large scale burning of rice residue every year is contributing to air pollution and resultant effect on human and animal health. Diversification from water guzzling rice crop to less water requiring and soil health building crops is need of the hour. Several experiments have been set up at the G S Foundation Research and Education Center near Karnal to identify alternate crops to rice. Soybean and maize have ample scope to replace rice provided incentives are given in terms of post harvest management and processing, marketing, pricing and trade. A sizable part of the money on the pattern of being allocated to manage rice residue *in-situ* and *ex-situ* should be used to promote and intensify diversification. The permanent solution to the whole problem lies in replacing some area from rice, an ecologically unsuitable crop in this region to other crops. Private sector needs to take lead to promote diversification.

Chairman G S Foundation in NIASM, Baramati and Goa

Dr. Gurbachan Singh was in Baramati from 28-30 November, 2018 to chair 4th QRT meeting of ICAR- National Institute for Abiotic Stress Management (NIASM). The meeting was specifically organized to have feedback and suggestions from Ex directors of NIASM and present directors of stress management institutes. Other stake holders and representatives of state govt., farmers and enterpreuners were also invited. Notable participants included Dr. P.S. Minhas and Dr. K.P.R. Vittal (former directors of NIASM), Dr. P.C. Sharma, Director, CSSRI, Karnal, Dr. O.P. Yadav Director, CAZRI, Jodhpur and Dr. N.P. Singh, Director, NIASM. QRT Chairman and Members also interacted with Chairman of Research Advisory Committee of NIASM Dr. A.K. SIKKA (Former DDG, NRM) and other members.

The QRT team also visited ICAR- Indian Institute for Coastal Agricultural Research, Goa. The QRT team had discussions with research managers, scientists, state govt. officials, progressive farmers, NGO's representatives regarding vulnerability of coastal eco-system to abiotic stresses like variations in temperature and rainfall, drought, flooding, cyclones, cold and heat waves etc. A visit to farmers participatory research and demonstrations in the field was also organized. Dr. N.P. Singh, Director, NIASM, Baramati coordinated and facilitated QRT visit to Goa.

Almora Visit

Chairman GSFRED visited Almora from 22-25 Oct, 2018 on an official visit to ICAR- Vivekananda Krishi Anusandhan Sansthan. The director of the institute Dr. Arunava Pattanayak showed institute activities including experiments on the research farm of the institute to the visiting Ex-Chairman Agricultural Scientists Recruitment Board (ASRB) and Agriculture Commissioner, Govt. of India.The Chairman also had the opportunity to meet newly recruited Agricultural Research Service (ARS) scientists, who recently joined the institute and also addressed all scientists of the institute. Long term experiments of the institute on Natural Resources Management were also discussed. Dr. R.K.Singh (ADG) Commercial Crops, ICAR was also present during the three day visit to the institute.

Participation in Cairo Water Week, Egypt

Dr. Gurbachan Singh was in Cairo (Egypt) from 13-17 Oct, 2018 to participate and present a paper in an international event on water (The Cairo Water Week). The theme of the conference was water conservation for sustainable agriculture. The chairman GSF presented a paper (Biosaline Agriculture : An Alternate to Drainage for Management of Salt Affected Soils) in this conference.

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Release of GSFRED – A Profile

On 29th October, Dr. Gurbachan Singh was in Delhi to participate in 49th Board Meeting of Trust For Advancement of Agricultural Sciences (TAAS). After the meeting a folder entitled "GSFRED – A Profile" was released by honorable Dr. R.S. Paroda, (Chairman, TAAS) , Ex Secretary, Department of Agricultural Research and Education (DARE) and DG, ICAR and Dr. Trilochan Mahapatra, Secretary, DARE and DG, ICAR. Other Board Trustees present on the occasion included : Madam Rita Sharma Ji (Ex Secretary, Govt. of India); Dr. A. K. Srivastava (Chairman, ASRB); Dr. K. L. Chadha (Ex DDG, ICAR); Dr. N.N. Singh (Ex Vice Chancellor), Dr. Bhag Mal (Ex Director NBPGR), Dr. J.L. Karihaloo and Dr. Gurbachan Singh (Vice Chairman, TAAS). The folder contains information about family background of GSF Chairman, professional career and achievements and mission, objectives and roadmap of GSFRED.

Farm Fresh Natural Food

One of the objectives of GSF is also to create awareness about quality food for healthy society. Farm fresh natural food stall with the slogan pluck and carry vegetables is installed daily along the State Highway in front of farm gate. Freshly plucked fresh vegetables are sold on reasonable rate. In addition to creating awareness, the effort is a source of revenue for daily use.

Participation in International Conference/Meeting

Singh, Gurbachan. 2018. Participated in 69th International Executive Council Meeting of ICID held at Saskatoon, Canada on 12-17 August, 2018.

Singh, Gurbachan. 2018. Biosaline Agriculture : An Alternate to Drainage for Management of Salt Affected Soils, Paper presented in an International Conference on Cairo Water Week held in Cairo (Egypt) from 13-17 October, 2018.

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