NABARD

FICCI

LIVELIHOOD FORUM 2020

INTEGRATED FARMING SYSTEM FOR DOUBLING FARMERS INCOME

January 28, 2020 | Chandigarh



SUPPORTED BY NABARD PUNJAB

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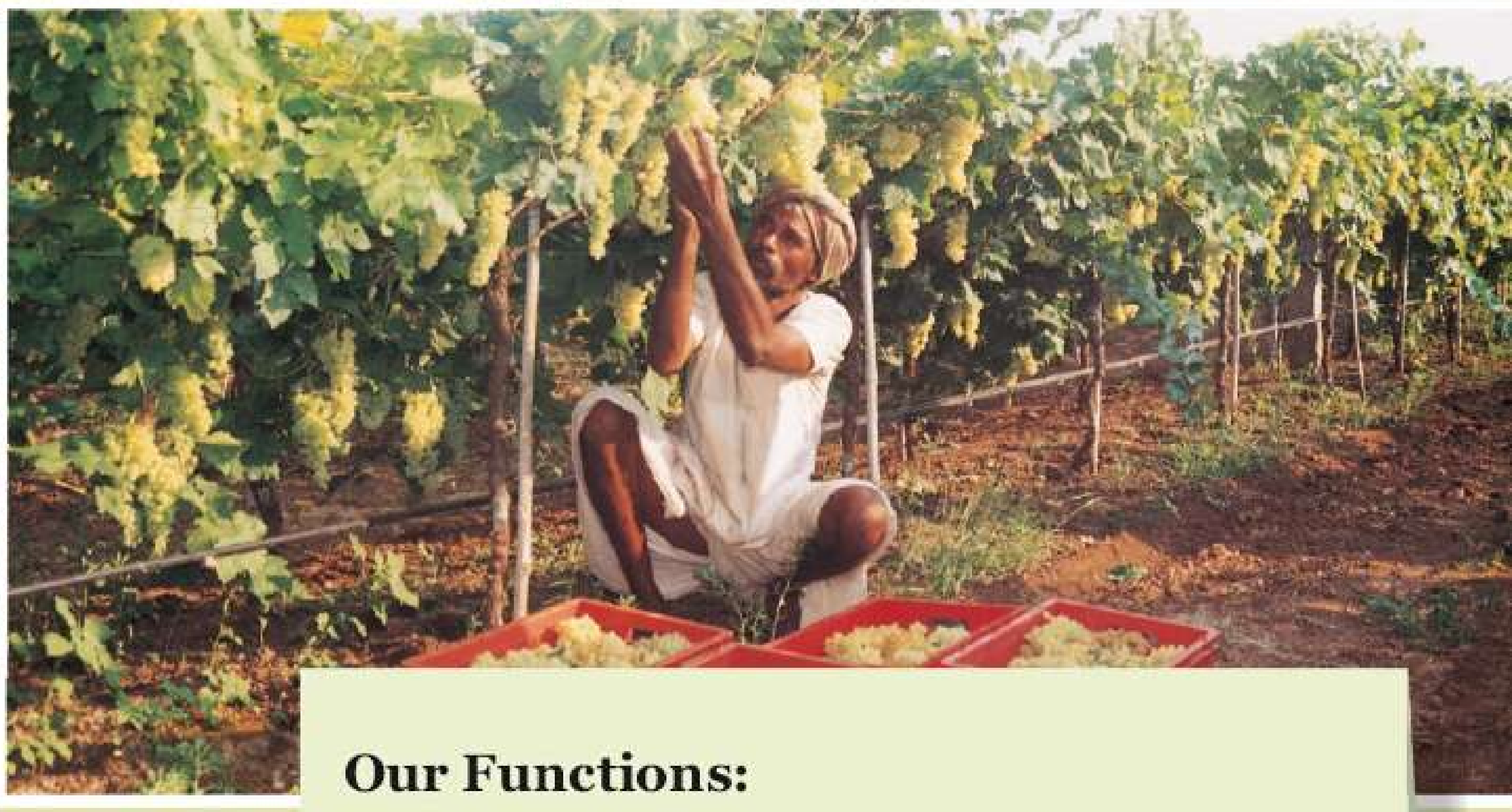
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National Bank for Agriculture and Rural Development









Our Mission: Promotion of sustainable and equitable agriculture and rural prosperity through effective credit support, related services, institution development and other innovative initiatives.

- **Research and Development on matter of importance pertaining to agriculture, agricultural operations and rural development including the provision of training and research facilities.**
- **Consultancy services related to Agriculture & Rural Development through subsidiary (NABCONS).**

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- Development functions undertaken through Farm Sector Promotion Fund (FSPF), Financial Inclusion Fund (FIF), Watershed Development Fund (WDF), Tribal Development Fund (TDF) Rural Infrastructure Development Fund,(RIDF) etc.
- Supervisory functions in respect of Cooperative Banks and Regional Rural Banks.

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Rural Development & Panchayats
Animal Husbandry, Fisheries,
Dairy Development and Higher
Education Minister, Punjab.

Dated: _____

It gives me immense pleasure to know that FICCI is organizing **Livelihood Forum 2020** with spotlight on Integrated Farming System for doubling farmer's income by 2022, on January 28, 2020 at Chandigarh.

Livelihood security among farmers is a significant factor in determining extent of agriculture and rural development in any State. It becomes even more important when we speak in regard to an agricultural economy such as Punjab. As this conference is aimed at exploring benefits of integrated farming and encouraging its adoption among Punjab's farmers, I am hopeful that with constructive discussion, it will go a long way to help the farming community ensure a continuous stream of income for themselves.

I wish my best to FICCI and hope for success of the program.

(Tript Rajinder Singh Bajwa)

मुख्य महाप्रबंधक
Chief General Manager

NABARD



Livelihood Forum 2020
Integrated Farming System for Doubling Farmers Income

Farmers with small, marginal and fragmented land holdings are most hit by the issue of livelihood vulnerability in context of agriculture. In agriculture-dominant States such as Punjab, it is an even higher concern. Given its critical nature, Central and State Government as well as State Branches of Central bodies have kept income security of farmers at the top of the agenda, and to that effect, have undertaken various measures. Through well-framed researches, it has been found that aligning an enterprise with another farm/non-farm one could offer an optimum solution to income concerns while also enhancing land productivity and ensuring sustainable farming in its wake.

I am glad that FICCI in collaboration with NABARD is organizing a conference woven around it. By bringing farming community, subject-matter experts and allied stakeholders together for constructive discussion, I am hopeful that it would draw a roadmap for taking farmers on a pathway to inclusive growth.

(J.P.S. Bindra)

राष्ट्रीय कृषि और ग्रामीण विकास बैंक
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FROM THE **CHAIRMAN'S DESK**

Punjab being an agriculture-driven economy, impact on State's farming community has been a significant consideration behind most of the Government policies, schemes and incentives. With a contribution of more than 30% to Gross State Domestic Product, agriculture and allied activities have become the major stakeholders in the overall growth and development of the State, thus rightly receiving focused attention from both Government and expert agencies alike. Speaking in this context, it is only natural that the Central Government's mandate of doubling farmers income comparatively holds more relevance and urgency for Punjab. The first step in this direction is to ensure livelihood security among farmers.

Average operational land holding in Punjab stands at 3.62 hectare, as per Government data. Against the national average of 1.08 hectare, it is the third largest in India; however, even then, insufficient for farmers to earn a continuous flow of income. Due to increasing population, urbanization, and other related factors, demand for land has outstripped supply, the impact of which in agriculture is that the small and marginal farmers have no to less land to further expand their holding; thus, they aren't able to reap economies of scale and have sustainable farming operations. To add, at the end of this cycle, most of these farmers find themselves putting more chemical fertilizers and pesticides than required, thus adversely affecting the land and groundwater quality, thus further reducing productivity and incurring higher costs in its wake.

State Government has been actively pursuing integrated farming as a solution to these concerns. In 2017, it gave nod to integrated horticulture-forestry models to boost diversification while at the same time ensuring addition income to the farmers. Awareness workshops and capacity building initiatives for integrated production, processing and marketing are also being undertaken to fill the skill/knowledge gap for alignment of one farm/non-farm enterprise with another. State branches of Central bodies like NABARD have also made strenuous efforts in this direction.

Livelihood Forum 2020 is aimed at furthering this agenda. We are delighted to have received support from Government departments and our partners for this initiative. The financial assistance as received from Research and Development Fund of NABARD towards publication of this compendium is gratefully appreciated.

Looking forward to more such collaborative efforts.

RAJINDER GUPTA
Regional Chairman, FICCI

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FARMING IN INDIA

Regional Focus: North | State Focus: Punjab

Farming in India is characterized of small, marginal and fragmented land holdings, which are though efficient for cultivating labour-intensive crop or tending livestock, these are too small to be compatible with modern techniques/methods of crop production and more often, do not generate sufficient household income for farmers. Though the situation in North India is comparatively better, the issue of livelihood security still remains. For once, the land sizes here are still not adequate and are prone to effects of increasing cost of inputs, climate-induced uncertainties in output and market inefficiencies. Then, there are concerns related to soil and water poisoning, lack of strategic marketing and extension facilities,

86%

of farmers in India are dependent upon less than two hectares of land

INTEGRATED FARMING SYSTEM

1

In this system, waste of one activity becomes an input of another enterprise; thus reducing cost.

2

It also improves soil health and productivity improves. This especially holds true in case where artificial fertilizers are replaced with livestock waste.

3

With additional source of income in form of the allied enterprise, not only is the farmer's livelihood uplifted but the overall socio-economic status too improves.

Solution to these varied but inter-related concerns lies in Integrated Farming Systems (IFS). Referring to integrating crop production with allied enterprises, such as dairy, poultry, fisheries, agro-forestry, goat-rearing, vermi-compositing etc, IFS is an effective way of managing natural resources in a manner that income security is realized.



As the first edition, Livelihood Forum 2020 adopts the case of doubling farmers' income and ensuring livelihood security in agriculture. Being organized in collaboration with NABARD Punjab, the program is expected to witness a gathering of 150+ progressive farmers, agri-allied industry (livestock, processing etc), agri-equipment and technology providers subject matter experts from academia and research institutes to understand the benefits of Integrated Farming System (IFS), map the best suited model for various districts of the State of Punjab and support the farmers in adopting it. The program will also disseminate knowledge on judicious use of inputs on farm and methods of ensuring overall farm health.

PROGRAM **AGENDA**

INAUGURAL SESSION (10:00 – 11:30 Hrs)

Integrated Farming System for Livelihood Security Among Farmers

The average size of the farm in India has reduced due to factors ranging from population rise, fragmentation, rapid urbanization, land procurement for construction of infrastructure like roads, railway tracks, dams etc. This has further reduced the ability of the small and marginal farmers to use specialized farming techniques for generating enough output to be able to offset increasing costs of inputs as well as climate-related and human-based uncertainties. Given the meek scope of horizontal farm expansion, vertical integration by combining crop production with allied enterprises such as livestock, vermi-composting etc remains the only viable option. By adopting Integrated Farming Systems, farmers become a part of a circular agri-economy wherein waste of one activity (crop production, for instance) can be recycled as input for another (livestock etc). This not only supplements their cropping-based income with that from allied enterprise, but also enables proper natural resource management; thus reducing cost and increasing productivity. The inaugural session will lay a foundation of the theme of the conference. It will touch upon the livelihood vulnerability of the farmers and will delineate how Integrated Farming Systems may be explored as a solution.

10:00 – 10:05 Hrs ***(Duration: 05 minutes)***	**Welcome Remarks by FICCI**	
10:05 – 10:15 Hrs ***(Duration: 10 minutes)***	**Expert Address**	**Dr. Dinesh Chauhan** Director, Indigram Group
10:15 – 10:25 Hrs ***(Duration: 10 minutes)***	**Address** *By Guest of Honour*	**Dr. Balwinder Singh Sidhu** Commissioner, Agriculture-Punjab
10:25 – 10:35 Hrs ***(Duration: 10 minutes)***	**Address** *By Guest of Honour*	**Mr. K.S. Pannu IAS** *Secretary, Department of Agriculture, Punjab*
10:35 – 10:45 Hrs ***(Duration: 10 minutes)***	**Address** *By Guest of Honour*	**Mr. Raj Kamal Choudhary, IAS** *Secretary, Department of Animal Husbandry, Punjab*
10:45 – 11:00 Hrs ***(Duration: 15 minutes)***	**Address** *By Guest of Honour*	**Mr. JPS Bindra** Chief General Manager (CGM), NABARD
11:00 – 11:15 Hrs ***(Duration: 15 minutes)***	**Keynote Address** *By the Chief Guest*	**Mr. Tript Rajinder Singh Bajwa** Hon'ble Minister of Rural Development & Animal Husbandry, Punjab
11:15 – 11:30 Hrs ***(Duration: 15 minutes)***	**Release of Compendium, Guest Facilitation & Closing Brief**	

NETWORKING TEA (11:30 – 11:45 Hrs)

PROGRAM **AGENDA**

SPECIAL ADDRESS (11:45 – 12:00 Hrs)

Mr. Inderjit Singh

Director, Dairy Development, Punjab

PANEL SESSION (12:00 – 13:30 Hrs)

Integrated Farming Models: Best Adoptable Practices

Integrated Farming Models do not follow a 'one-size-fit-all' approach i.e., a model as may have been successful in one district may not bear expected results in the other. A suitable IFS model is mapped on the basis of parameters including characteristics of crop under production, soil nutrient level, irrigation facilities etc. On the other hand, there may be more than one suitable IFS models for a district or a State.

This panel session will disseminate lessons from models implemented in other districts as may also be adoptable and adaptable given Punjab's agriculture dynamics. Outcomes of about five such models will be explained in focused presentations, while the following panel discussion will witness the practitioners discussing about challenges in implementation and suggesting counter-measures for farmers.

12:00 – 12:10 Hrs ***(Duration: 10 minutes)***	**Opening Remarks & Moderation**	**Mr. PPS Pangli, AFS** President, Borlaug Farmers' Association for South Asia and Member- Global Farmer Network
12:10 – 12:20 Hrs ***(Duration: 10 minutes)***	**Individual Presentation/Address** *Vermicomposting-Fisheries-Floriculture-Flower-Processing*	**Sh. Gurpreet Shergill** Progressive Farmer
12:20 – 12:30 Hrs ***(Duration: 10 minutes)***	**Individual Presentation/Address** *Agriculture-Horticulture*	**Sh. Sukhpal Bhullar** Progressive Farmer
12:30 – 12:40 Hrs ***(Duration: 10 minutes)***	**Individual Presentation/Address** *Piggery-Fisheries-Goatry*	**Sh. Harbhajan Singh** Progressive Farmer
12:40– 12:50 Hrs ***(Duration: 10 minutes)***	**Individual Presentation/Address** *Integrated Farming- Renewable Energy*	**Sh. Dilbar Singh** Progressive Farmer
12:50 – 13:20 Hrs ***(Duration: 30 minutes)***	**Panel Discussion with Q&A**	
13:20 – 13:30 Hrs ***(Duration: 10 minutes)***	**Felicitation of Panellists/Speakers** **Session Closing**	

PROGRAM **AGENDA**

TECHNICAL SESSION (14:30– 15:25 Hrs)		
14:30 – 14:45 Hrs ***(Duration: 15 minutes)***	**Presentation 1** *Organic Farming*	**Mr. Umendra Dutt** Executive Director, Kheti Virasat Mission
14:45 – 15:00 Hrs ***(Duration: 15 minutes)***	**Presentation 2** *Integrated Value-Chain: Primary Processing*	**Mr. Puneet Thind** National Director, Vegetable Grower Association of India
15:00 – 15:15 Hrs ***(Duration: 15 minutes)***	**Presentation 3** *Agricultural Marketing & Extension*	**Prof. Dr. Dhaliwal** Director, Punjab Agricultural Marketing and Extension Training Institute (PAMETI) **Prof. Dr. Harmeet Kaur** Deputy Director, Punjab Agricultural Marketing and Extension Training Institute (PAMETI)
15:15 – 15:25 Hrs ***(Duration: 10 minutes)***	**Presentation 4** *Financing in Agriculture*	**Mr. Pankaj Anand** Assistant General Manager, Oriental Bank of Commerce (OBC)
CLOSING CEREMONY (15:25 Hrs onwards)		

एकीकृत कृषि प्रणाली बढ़ा सकती है किसानों की आमदन

-- मेहरम पब्लिकेशन

देश की बढ़ती जनसंख्या का भरण-पोषण करना भविष्य के लिए एक चुनौती बनकर उभर रही है एवं आने वाले समय में खाद्यान्न, दलहन, फल, सब्जी, दूध, मांस, अंडा सभी की मांग बढ़ेगी। ओसत जोत का आकार कम हो रहा है तथा असंतुलित परम्परागत कृषि पद्धतियों के कारण किसानों की आर्थिक दशा दयनीय होती जा रही है। देश में छोटे किसानों की संख्या लगभग 83 प्रतिशत है। शुष्क क्षेत्रों में फसल+पशुपालन एवं फसल+कृषि वानिकी मुख्य एकीकृत कृषि पद्धतियां हैं। सिंचित क्षेत्रों में फसल+पशुपालन+मुर्गीपालन+मछलीपालन मुख्य एकीकृत कृषि प्रणाली है। भविष्य की मांग एवं वर्तमान कृषि परिवेश को देखते हुए उचित एकीकृत कृषि प्रणाली अपनाने की अत्यंत आवश्यकता है। एकीकृत कृषि प्रणाली के द्वारा खाद्य एवं पोषण के साथ-साथ अवशेष का पुन: चक्रण करके अधिक लाभ, वर्ष भर रोजगार एवं टिकाऊ कृषि उत्पादन किया जा सकता है।

एकीकृत कृषि प्रणाली के लाभ :

खाद्यान्न एवं पोषण सुरक्षा : एकीकृत कृषि प्रणाली मॉडल छोटे से छोटे जोतधारक को भी घर में पौष्टिक भोजन के रूप में अनाज, दलहन, फल, सब्जी, दूध, मछली, अंडा एवं जानवरों के लिए पोष्टिक चारा नियमित रूप से उपलब्ध कराता है। इस पद्धति द्वारा संतुलित आहार एवं उसके परिवार को खनिज तत्व एवं विटामिन से भरपूर भोज्य पदार्थ प्रचुर मात्रा में उपलब्ध हो एवं उसका परिवार स्वस्थ रहे। इस पद्धति द्वारा पांच से छह सदस्यों के परिवार की अधिकतम आवश्यकता पूरी करते हुए बाजार पर उसकी निर्भरता कम की जा सकती है।

संसाधनों का पुनः चक्रण : कृषि अधिक सघन होने से मृदा में जहरीलेपन तथा विभिन्न प्रकार की कमियां, कृषि उत्पादन को स्थिर रखने के लिए एक चुनौती है, जिसके कारण पैदावार का घटना शुरू हो जाता है। इस प्रणाली में एक घटक के अवशेषों को चारे के रूप में, जानवरों के अपशिष्ट को बायोगैस, वर्मी कम्पोस्ट एवं मछली तालाब में, वर्मी कम्पोस्ट एवं मछली तालाब तलछट को विभिन्न फसलों में इस्तेमाल किया जा सकता है। इस पुनरू चक्रण द्वारा विभिन्न घटकों के अवशेष पदार्थों का उचित उपयोग सुनिश्चित होता है एवं बाहरी स्त्रोतों पर निर्भरता कम होती है। इस प्रकार एक उद्यम का बेकार पदार्थ दूसरे उद्यम के लिए आगत का कार्य करता है तथा वातावरण भी दूषित नहीं होता है।

रोजगार स्त्रजन : परम्परागत खेती में वर्ष के कुछ महीनों में ही रोजगार एवं आय प्राप्त होती है तथा विभिन्न कारणों जैसे दृ कीट, रोग, मौसम एवं बाजार द्वारा फसल के नुकसान का जोखिम बना रहता है। एकीकृत कृषि प्रणाली अपनाने से किसान को वर्ष भर रोजगार एवं आय के साधन उपलब्ध रहते हैं। इस प्रणाली द्वारा परम्परागत खेती में होने वाले जोखिमों को कम किया जा सकता है।

अधिक आय एवं बचत : एकीकृत कृषि प्रणाली में परम्परागत कृषि प्रणाली की अपेक्षा अधिक लागत आती है परन्तु विभिन्न घटकों के उच्च उत्पादन, उत्कृष्ट पुनरू चक्रण एवं पौधों के संतुलित पोषण के कारण अधिक लाभ प्राप्त होता है।

टिकाऊ खेती : एकीकृत कृषि प्रणाली में विभिन्न घटकों के अवशिष्ट, पुनरू चक्रित होकर मृदा की संरचना जलधारण क्षमता एवं वायु संचार में सुधार लाते हैं, जिससें मृदा का ह्रास कम होता है, साथ ही पर्यावरण भी सुरक्षित रहता है। इस प्रणाली में दलहनी फसलों एवं जानवरों के अपशिष्ट द्वारा 36 प्रतिशत नत्रजन, फास्फोर्स व पोटाश प्राप्त होता है जो कि मृदा की उर्वरता को बढ़ाता है तथा खेती टिकाऊ खेती है।

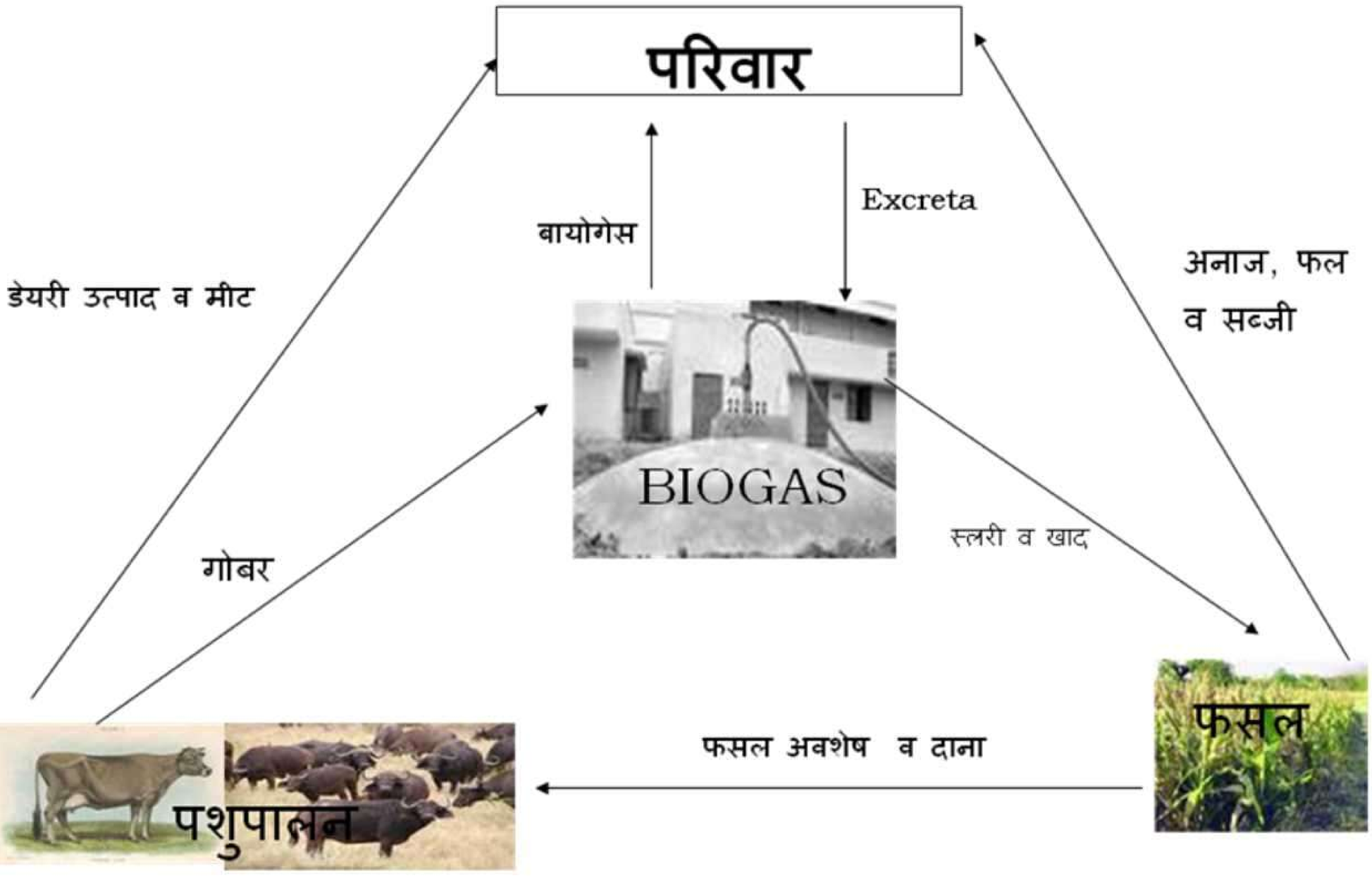
महत्वपूर्ण सुझाव

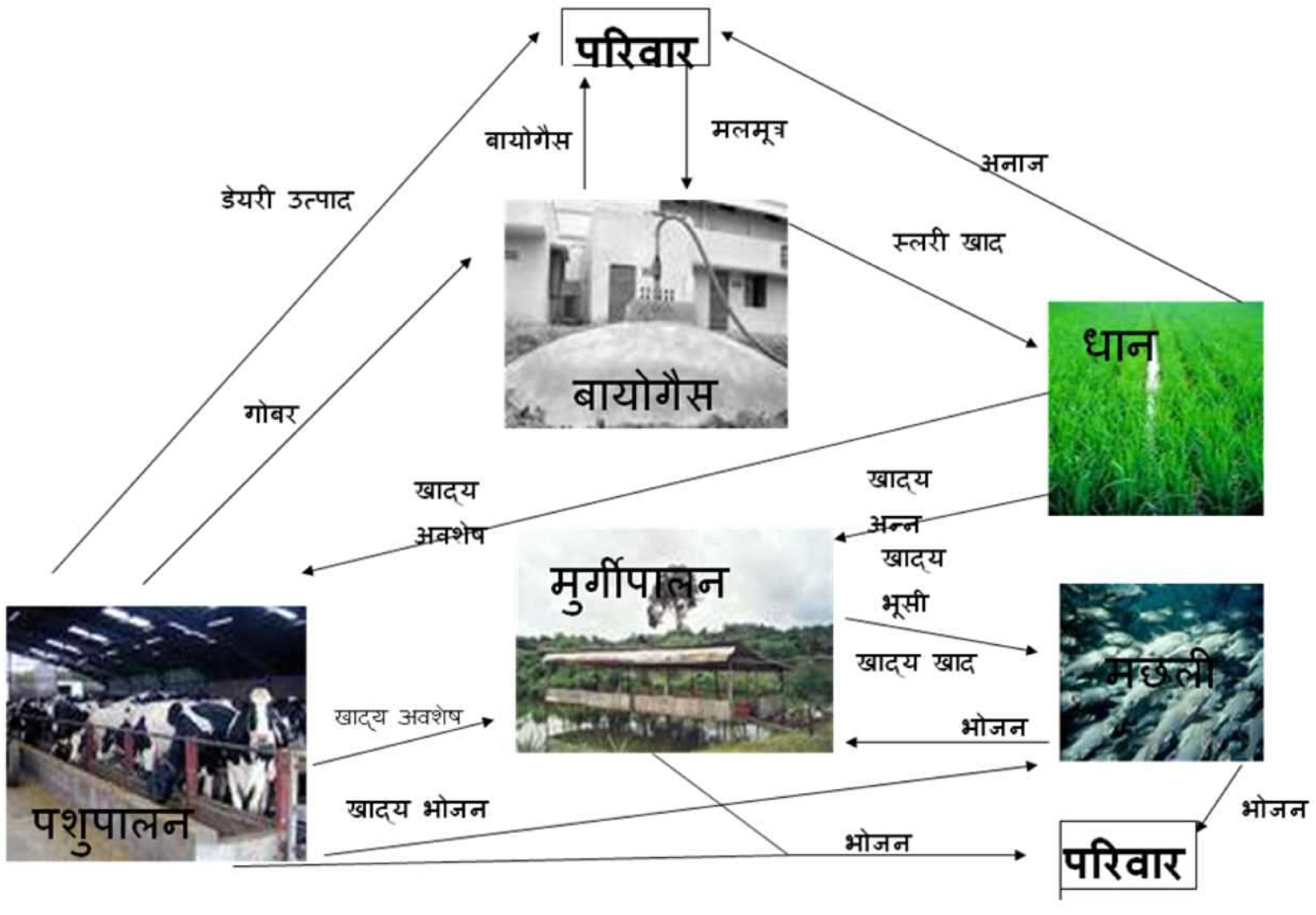
- एकीकृत कृषि प्रणाली में 3-4 उद्यम रखें। कुछ उद्यम ऐसे रखने चाहिएं जो लगातार आय सुनिश्चित कर सकें जैसे पशुपालन, फल एवं सब्जी उत्पादन एवं कुछ उद्यम ऐसे होने चाहिए जो कि एक निश्चित समय के बाद अच्छी आय प्रदान कर सकें- जैसे खेत के चारों तरफ यूकेलिप्टस और सुबबूल का रोपण करें।
- संसाधनों का बहुउद्देशीय उपयोग एवं विभिन्न घटकों के अवशिष्ट का पुनरू चक्रण सुनिश्चित करें जिससे बाहर की निर्भरता को कम किया जा सके। इसके लिए केंचुआ खाद इकाई एवं मशरूम उत्पादन आदि उद्यम लिए जा सकते हैं।
- बाजार एवं सामाजिक बातों को ध्यान में रखकर ही उद्यम का चुनाव करें।
- आय व्यय का लेखा जोखा रखें।
- इस प्रणाली द्वारा अधिक लाभ हेतु परिवार के सदस्यों का श्रमिक योगदान सुनिश्चित करें।
- पशु एवं फसल बीमा अवश्य कराएं।

इस तरह की एकीकृत खेती प्रणाली का अगर वैज्ञानिक तरीके से अनुपालन किया जाए तो वह खेती में लगे परिवारों को पूरे साल की आजीविका देने के अलावा उनकी आय वृद्धि का भी माध्यम बन सकता है। इसके अलावा इन खेती प्रणालियों में श्रम की अधिक आवश्यकता को देखते हुए संबंधित कृषक परिवार के अलावा कुछ अन्य लोगों को भी रोजगार मिल सकता है। आईआईएफएसआर के निदेशक एएस पंवार कहते हैं, 'एकीकृत खेती प्रणाली से किसान की आय दोगुनी होने के साथ ही कृषि अवशिष्टों का पुनर्चक्रण करने से पर्यावरण को भी फायदा होता है।' एकीकृत खेती प्रणाली में अगर एक अवयव नाकाम भी होता है तो दूसरे अवयवों के कारगर होने से उस परिवार की जरूरतें पूरी हो सकती हैं। हालांकि इसके लिए इन प्रणालियों को उस स्थान-विशेष के मुताबिक तैयार किया जाना बेहद जरूरी होता है।

एकीकृत खेती प्रणाली के लिए खेत का आकार अधिक

मायने नहीं रखता है। सच तो यह है कि इस तरह की प्रणाली छोटे एवं सीमांत किसानों के लिए कहीं अधिक कारगर साबित होती है। देशभर में छोटे एवं सीमांत आकार के खेतों की संख्या बढ़ने से एकीकृत कृषि प्रणाली की उपयोगिता और अधिक बढ़ रही है। इस प्रणाली को अपनाकर छोटे एवं सीमांत किसान अधिक उपज वाली फसलों के साथ ही मशरूम, फल, सब्जियां, अंडे, दूध, मांस और शहद जैसे लाभदायक उत्पाद भी पैदा कर सकते हैं। इसके अलावा वे जैव-ईंधन भी पैदा कर अपनी आय बढ़ा सकते हैं। दरअसल एकीकृत खेती का मूल यह है कि एक किसान की जमीन का अधिकतम इस्तेमाल किया जाए।■





BEST ADOPTABLE PRACTICES FOR VIABLE ALTERNATIVE INITIATIVE IN AGRICULTURE

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The challenges of meeting the food security and nutritional security of the country in a profitable way for the farmer and in an environmentally sustainable way are enormous. We have to get ready to feed 150 crore population in the next ten years, with the bottom of the pyramid requiring food at affordable prices. Science helped our country to achieve a breakthrough in crop yields and ensure food security except in oil seeds. Starting with High Yielding Varieties (HYV) of Rice and Wheat fifty years back we passed through hybridization and GenetiC Modification in some crops to achieve this success. Our food grains production quadrupled in last fifty years.

Secondary agriculture assumes prominence with the announcement of the goal of doubling farmers' incomes. The term 'secondary' has a bearing on climate change adaptation and its mitigation, small farm viability and profitability, food security, nutrition, sustainable utilisation of natural resources, and optimal usage of produce from primary agriculture and farm incomes. An agricultural system with low inputs, high returns and sustained growth while conserving environment called Conservation agriculture (CA) is the need of the hour. CA utilizes scientific knowhow and technology to improve and conserve input resources like soil health and water to achieve economically and ecologically sustainable agricultural production. Soil carbon retention by minimal tilling and cover crops, nutrient and weed management along with diversified crop rotation are critical attributes of CA with rice straw management is the present issue.

Current approaches to agricultural nitrogen policy do not take into account all the actors in the agri-food chain. A narrow focus on farmer behaviour is not only a challenge for policymakers but it also omits a much broader range of actors across the agri-food chain. By introducing the main actors common across almost all agri-food chains and the range of policy interventions that apply to them, coupled with criteria to aid policymakers in selecting where and how to intervene, this study broadens the scope of policy opportunities for countries suffering the impacts of excess nitrogen.

Even as wheat varieties like HD2967 and HD3086 developed by the Indian Agricultural Research Institute (IARI), continues to be popular among farmers due to its high yield, they now have new options of seed varieties like HD3226, WH1184 and DBW187 this rabi season and are hoping to get better returns. Agriculture experts say that though HD2967 has been a good choice due to a good yield for the past several years, it will be interesting to observe the performance of the new varieties that have been released for sowing by three institutions are PAU, WRI and HAU in North West Plain Zone.

While the PMO wants to reduce the subsidy burden, and ostensibly reduce the cost of carryover stocks, the Commission for Costs and Prices (CACP) is seeking a review of the open-ended procurement policy under which the marketable surpluses of wheat and rice farmers bring to mandis, the government is committed to buy at MSP. Seeking a restriction on procurement by setting limits for purchase, the CACP is suggesting that the private sector be allowed to directly procure from farmers.

The last time the government amended the APMC (Agricultural Produce Market Committee) Act in 2006 to allow private companies to buy directly from farmers, it ended up turning the country into the world's biggest importer of wheat. Private trade swung into action to make brisk purchases, but didn't disclose the quantity purchased and hoarded the grain. As a result, there was a shortfall in procurement at a time when there was no visible drop in production.

On the issue of curtailing open-ended procurement, what needs to be understood is that even if the MSP does not entirely cover the cost of cultivation, at least it provides an assured price.

the MSP does not entirely cover the cost of cultivation, at least it provides an assured price. For the farmers, an assured price as well as an assured procurement is what protects them from the tyranny of the markets. That is why the farmers' demand for raising the MSP and linking it with the Swaminathan Commission's recommendations has been growing steadfast. But for quite some time, the dominant economic thinking is for dismantling the APMC-regulated markets and doing away with the MSP. The World Bank has been consistently demanding this, the World Trade Organisation has been questioning the need for public stockholding, and even economic surveys as well as some mainline economists have repeatedly pointed to how administered prices are coming in the way of what it calls as price discovery.

If there is one market intervention that ensures price discovery, it is the MSP, if it is delivered properly. In a country where only six per cent farmers get the benefit of MSP, markets have failed miserably to provide a better price to 94 per cent of the remaining farmers and thereby help in price discovery. The introduction of e-NAMs (electronic national agricultural markets), too, has failed to assure a higher price to farmers. Although former Finance Minister Arun Jaitley had acknowledged that e-NAMs are the first step towards setting up spot markets, what is not being answered is why in the US agriculture continues to slide into deep crisis year after year despite having the world's largest commodity exchange at Chicago, and another at New York? According to the US Department of Agriculture, the growth in real income for American farmers has been on the decline since the 1960s.

Strengthening the procurement system is, therefore, the answer. Instead of ascribing a quota system (at the farmer or the district level) for limiting wheat and paddy procurement, an effective procurement system needs to be evolved for alternate crops. For instance, if Punjab's share in total procurement of wheat has to be reduced from the existing 37.1 per cent, an equally robust procurement system for crops like maize, millets, pulses and oilseeds have to be first ensured. This also holds true for paddy, which is blamed for the depleting groundwater. Farmers do realise the need to diversify, but in the absence of an assured price and procurement, are not willing to make the shift. Rightly so. After all, volatility of markets is what hits farmers the most. Give farmers a viable alternative, they would do the rest. But on the other hand, any move to systematically dismantle the food procurement system, based on the twin strategies of assured price and an assured market, which Dr MS Swaminathan had once referred to as the two planks of a 'famine avoidance' strategy, will have serious political ramifications.

Lessons for Indian Farming

India can draw some lessons from some of the best international practices followed by countries such as China, Kenya and the US. The heavy premium subsidy programme insured started by Government of China in 2007 led to an expansion of insured farm area from 15 million hectares in 2007 to 115 million hectares in 2016, covering 69% of total sown area. The premium subsidy payable by the govt. increased from 50% to 80% of the total premium amount. The Kenyan experience is significant due to its efficiency in settlement of claims with 2-4 days. It must be noted that there is almost zero transaction cost in either issuing the policy or in disbursement of claims. This system of claim disbursement via mobile technology is efficient because of timely payout of claims and transparency in claims assessment.

Kilimo Salama (Safe Agriculture) is a weather index based insurance product developed by SFSA in 2009. They developed an application that uses Safaricom mobile technology. M-pesa to transfer money for claim payouts. Whenever there is a deviation from normal rainfall resulting in germination failure, the claim amount automatically gets transferred into the accounts of insured farmers. In the US the insured area is 300 million acres in 2015 has increased from 52% of cropland in 1998 to 89% in 2015. the government subsidy accounts for approximately 70% of the total premium amount. Revenue insurance, which protects farmers against fluctuations in price and yield, has become the most popular insurance product accounting for 85% of total premium.

The states like Punjab and Haryana must come up with new policies in agriculture by energizing the stagnant institutions like Markfed, HAFED, Punjab Agro, Pun Grain, Pun Seed and Pun Sup to handle and process alternative crops, oil seeds and pulses. There is a big change to start onion flakes industry in Northern India to give alternative crop after harvesting of potato. ■

INTEGRATED FARMING SYSTEMS AT PAU, SINCE 2010

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Integrated Farming System (IFS) is a judicious mix of two or more enterprises having minimum competition and maximum complementarily to increase environment friendly production, farm income and family nutrition. IFS preservation of bio-diversity and maximum recycling of farm-residues by using recyclable output of one enterprise as input for other enterprises and thereby provides eco-system services. In Punjab, crop + livestock (cow, buffalo etc) based farming system is pre-dominant and 80% of farm households practice it. Integrated farming systems can comprise several modules such as cropping systems, fruit orchards, dairy, goatery, poultry, piggery, aquaculture, mushroom, apiary, bio-gas, roof-top gardening, compost yards, kitchen garden, boundary/bund plantation, and processing and value addition of marketable surplus products. These modules can be selected by the farmers based on the resource availability such as land, labour and capital for investment. The system as a whole provides opportunity to make use of the produce/waste material of one component as input for another and thus reduce cost of cultivation. In IFS, resources are allocated by giving top priority for meeting the household demand of food, fodder (round the year), feed, fuel, fibre and fertilizer, followed by allocation for commercial activities for providing regular income to the household.

At PAU, Integrated Farming System model was initiated in 2010 under “All India Coordinated Research Project on Integrated Farming Systems (ICAR)”. The study is being conducted on a 1.0 ha model (10,000 sq m area) comprising crops-horticulture- aquaculture- dairy- agroforestry components. During 2018-19, kharif crops grown in the 6400 sq m area included paddy, maize and turmeric and in the Rabi and summer season potato, berseem, wheat, gobhi sarson, onion, pearlmillet and spring maize were grown. Around 1600 sq m area was utilized for horticulture comprising guava and citrus plantation and the inter row spacing of 1500 sq m area was utilized for raising vegetable crops while 200 sq m, 1000 sq m and 300 sq m was meant for dairy, aquaculture and agro-forestry, respectively. In addition, boundary plantations with cranberry (Karounda) and Galgal was also done. The integrated farming system generated employment of 280 man days/ha. The total value of recycled farm products was Rs 84,514/ha/annum amounting to 29.6 % saving of recycled farm products of input cost. The highest returns in the study were contributed by dairy (Rs 2,82,944) followed by field crops (Rs 1,17,523), horticulture (Rs 37,137), aquaculture (Rs 20,500), boundary plantation (Rs 13,050), kitchen gardening (Rs 5,750), and agro-forestry (Rs 2,923). Hence, the 1.0 ha model developed for marginal and small farmers gave gross returns of Rs 7,74,229/ha, costs incurred were Rs 2,94,402/ha and net returns by deducting all variable costs were Rs 4,79,827/ha which were far higher than the prevailing rice- wheat cropping system.

Integrated Farming System was adopted by 36 farmers in Amritsar during last 4-years under the above project. Presently, another 36 farmers have been added in Patiala district. These farmers will serve to demonstrate this technology to others.
The shift to IFS has resulted in enhancing the income of these farmers on an average from Rs 1,40,000/- to Rs 1,90,000/- per year besides providing better nutrition to the farmers’ family. Off-farm subsidiary occupations like bee-keeping and mushroom production can add substantially to the farmers’ income and large number of farmers has been trained in these occupations making Punjab a leading producer of honey as well as mushroom. Further, home scale food processing provides another value addition and income enhancing opportunity. PAU has developed large number of technologies/ standardized recipes for agripreneurs and self help groups (SHGs). The two food industry business incubators (Ludhiana and Bathinda) provide training, handholding and pilot production facilities while the Skill Development Centre provides training in various agriculture related enterprises. Diversified agriculture value addition and entrepreneurial skill have emerged as key components of improved farmer livelihoods. ■

INTEGRATED FARMING SYSTEM IN LIVESTOCK SECTOR

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Punjab is primarily an agricultural state, where the main stay of the rural masses is agriculture and allied enterprises including livestock sector. While contribution of crop GDP is on the decrease, the percentage share of livestock GDP in agricultural GDP is continuously increasing and has reached 37.65 per cent in 2017-18 from 29.60 per cent in 2000-01.The GDP from livestock and fisheries sectors is increasing at the rate of 5.71 per cent and 6.74 per cent per annum, respectively in the present decade. Punjab has 39.99 lakh buffaloes and 25.32 lakh cattle (21.06 lakh cross bred and 4.26 lakh indigenous). Buffalo and cattle population has declined by 35.20 per cent and 4.05 per cent, respectively during the period from 1997 to 2019. Apparently, unwanted and low producers and males are moving out of the production system. The number of indigenous cattle is declining continuously and that of cross-bred is increasing and has reached 83.17 per cent in the year 2019.

Growth in milk production was mainly due to increase in livestock numbers, up to 1997. Since 1997, there has been decline in numbers but the milk production is going up. It rose from 7.77 million tonnes in 2000-01 to 12.60 million tonnes in 2018-19 at an annual growth rate of 3.45 per cent. Punjab is producing 6.71 per cent milk of India with only 2.16 per cent dairy animals and stands first in terms of per capita milk availability (1181 gm/day vs 394 gm/day) in the country. Besides dairying; goat, pig and fish farming are also remunerative subsidiary enterprises and are being adopted by the farmers. In Punjab, during the period 2003 to 2019, the goat population has increased by 25.18 per cent (from 2.78 lakh to 3.48 lakh), of pigs by 79.31 per cent (0.29 lakh to 0.52 lakh). Goat and pig farming are having enough potential for meat production providing good source of income and employment. In Punjab, around 70 per cent of total fish production is contributed by aquaculture sector and 30 per cent by capture sector. Fish production in the state was 1.22 lakh tonnes during 2017-18, which increased from 0.52 lakh tonnes during 2000-01 at an annual growth rate of 7.92 per cent. Fish farming is also a good alternative for generating income and employment in salt affected water logged areas of South-Western Punjab.

Dairying has emerged as a major allied enterprise for supplementing the income of marginal and small farmers in all the zones of Punjab. Similarly, other livestock enterprises like goat, pig and fish farming are remunerative enterprises providing good source of income and employment compared to mono-culture of wheat-paddy crop rotation. There is immense potential to further exploit the contribution of dairy, piggery, goat farming and fisheries sector in the state. In Punjab, integration of livestock with the crop production provides a viable opportunity for much needed diversification of agriculture. The adoption of multiple farm enterprises in an integrated manner can ensure a substantial income generation to sustain the livelihood of farmers over the income from self-standing enterprises. The focus of present government is on doubling farmers' income by 2022. Only livestock component would provide the facilitating inputs to enhance the income of farm families within a short period of five years in a synergistic mode. In integrated crop-livestock farming systems, the waste products of one component serve as a resource for the other. For example, manure is used to enrich the soil and enhance crop production; crop residues and by-products feed the animals, supplementing often inadequate feed supplies, thus contributing to improved animal nutrition and productivity.

The livestock enterprises are profitable allied enterprises providing good returns and can be adopted along with crops for curtailing the cost of cultivation of crop farming through usage of animal waste as manure for enriching the soil with essential nutrients. In return, fodder grown in the fields and wheat straw produced can be used for feeding the dairy animals, hence saving the cost of purchased fodder. Waste material (dung and droppings) from the animals can be used for fertilizing the fish pond resulting in saving of Rs 2500-3000 per acre and the waste/surplus water

Table 1: Net profit from various enterprises in livestock based integrated models in Punjab, 2018-19

Sr. No.	Livestock based integrated model	Per acre per annum net profit in Rs from					
		Crops	Fish farming	Dairy farming	Goat farming	Pig farming	Overall model
1	Crop-Fish farming	32,792	79,949	-	-	-	58,510
2	Crop-Dairy-Fish farming	32,328	84,725	78,882	-	-	53,030
3	Crop-Dairy farming	34,992	-	73,805	-	-	39,084
4	Crop-Dairy-Goat farming	34,540	-	66,480	1,05,500	-	50,048
5	Crop-Pig farming	34,172	-	-	-	2,07,240 (from 11 adult pigs)	87,039

Source: GADVASU, Ludhiana.

from fish pond, which is rich in nutrients, can be used for irrigating the field crops, hence cutting down the cost of fertilization of crops to the extent of Rs1000-2000 per acre.

An examination of the enterprise wise labour employment of various livestock based integrated models revealed that livestock enterprises are providing higher employment as compared to crop farming as these enterprises are labour intensive. Hence, the size of livestock enterprises should be enhanced in an integrated way to the extent possible so as to further increase their contribution in farm incomes, generating more employment and hence enhancing the overall income level of the farmers in the state.

There is need of creating awareness among the farmers regarding the importance of livestock based integrated models in improving income and employment levels and safeguarding the environment with efficient utilization of crop residues and animal waste.Labour expenditure is the important component of variable cost. For curtailing the labour expenditure, the surplus family labour should be utilized to the extent possible. All these efforts will help in cutting down cost of production and hence enhancing the profitability from integrated farming.

Feed cost is major component of the variable cost. The main constituent of feed is maize grain. Hence, the farmers should grow maize at their own farms and prepare the feed at their farm so as to reduce the feed cost and ensure the quality feed. There is need to make more efforts for effective extension so that the farmers may be able to have the latest know how regarding production practices, record keeping and other management practices for improving the productivity from crops and livestock enterprises in integrated farms. Adequate and subsidized credit facilities should be provided to start and scale up livestock enterprises along with crops. Suitable subsidies should also be provided so as to encourage the farmers to adopt more and more livestock enterprises in combination with crops. In nutshell, the livestock based integrated farming, on account of its benefits in generating more income and employment in eco-friendly way, need to be promoted through various policy initiatives. ■

MARKETING & EXTENSION IN AGRICULTURE

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Punjab is bread basket of India because with only 1.5% of India's cultivable land, it is producing 20% of India's wheat and 12% of India's rice. Farmers grow these crops because of assured market or MSP support by the Central Government. However, this has led to monoculture of rice & wheat creating many inherent problems like water depletion, increase in air pollution and chemical poisoning of soil etc. In addition to these, there is shrinkage of farm income and profits. As the cost of Inputs is increasing at a higher rate and output price is increasing at a lesser rate. This has led to increase in indebtedness and distress of the farmers.

To improve the real income of farmers, there is one option to shift towards Integrated Farming system (IFS). It helps in recycling of farm wastes as waste of one enterprise becomes input for other enterprise. This helps to reduce pollution and increase income by combining different types of farming. This decreases cost of cultivation. Intensification of crops/ enterprises maximizes income in relation to area, time and efforts. Soil remains fertile for a long time due to the correct use of bio wastes. IFS ensures influx of income throughout the year.

Diversification also seems to be a solution to tackle the problem created by monoculture. However, diversification leads to problem of finding market for alternative crops/ enterprises. Therefore, in the present time, new emerging formats of markets have to be explored by the farmers themselves. These include:

Farmer Producer Organizations (FPOs)

FPOs are farmers' groups/collectives, with membership mainly comprising small/marginal farmers (around 70 to 80%). The main advantage is that cost of production can be reduced by procuring all necessary inputs in bulk at wholesale prices and reducing marketing cost because of aggregation of produce and also the bulk transport cost reduces. Aggregation of marketable surplus of all the member farmers gives them bargaining power and they can realize higher price for their produce. This increases net income of the producer. Producing on large scale helps to achieve economies of scale also.

Contract Farming

It is a contract between farmer and the contracting agency/buyer where both of them agree on quantity, quality, price of commodity, place of transaction and timing of transaction and payment. Farmers have the benefit of farm advisory during the production and assured sale of the final produce etc.

Road Side Display (RSD)

It is a service provided to the consumer in which farmer sells fresh and processed farm products directly to consumers by displaying the same on the farm adjoining the highway. It can be a strong entrepreneurial platform in rural areas of Punjab. It can provide a solution for the marketing of alternative crops which are perishable and voluminous. The concept of RSD will help in bringing about diversification from monoculture of Rice Wheat cropping system to high value crops.

Apni Mandis/ Kisan Bazaar

These provide a venue for farmers to sell their produce directly to he consumer by eliminating the middle men. They get a better price for produce and improve their profitability. Previously it was known as Apni mandi or farmers' market now it is operating under the name of Kisan Bazaar by ATMA. Kisan Bazzar is held on specific days at specific place in open.

ATMA Huts

These are the establishment set up on Government offices or at public place where the farmers stock their produce and sell it directly to the consumers. There sales are realized through the year.

eNAM

National Agriculture Market or eNAM is an online trading platform for agricultural commodities in India to create a unified national market for agricultural commodities. eNAM helps the farmers to realize higher prices and facilitates smooth marketing of farmers' produce.

Digital/ Internet Marketing

It is marketing of agriculture produce using electronic or digital technologies like internet, computers, mobile applications, databases etc. The power of social media is also harnessed for marketing of Agriculture produce.







Market Led Extension

It is imperative to educate the farmers about the knowledge of all such above mentioned agricultural marketing systems so that farmers can become a producer cum seller not only in the domestic/smaller markets but also in wider markets. All this comes under the perview of market led extension.



FROM AMIDST THE STARS TO TINY GRAINS OF SOIL: REMOTE SENSING FOR SOIL INFORMATICS WITH EYES IN SPACE AND VISION OF FUTURE

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Ever since its inception, Remote Sensing has eased human efforts of surveying and mapping. Beyond surveying, in this era of cyber savvy necessity, Remote Sensing has proved to be an effective, reliable and robust tool which has revolutionized varied domains of study from Geography to Engineering and Technology. One such domain is the field of agriculture and soil studies. Soil study or analysis has long been conducted in-situ with the help of field equipment and many a times ex-situ with help of sample analysis in labs. Earliest uses of Remote Sensing for soil health studies were done using optical remote sensing using Panchromatic (Single band) and Multispectral Remotely sensed images from aerial and space borne platforms. These studies were however, had their main thrust on precision agriculture. Therefore for a gap of time, dedicated soil health studies found paucity of material.

Later as the technology grew, and many new forms of remote sensing such as Thermal, Hyperspectral and Microwave (SAR- Synthetic Aperture RADAR) remote sensing came up. These imaging methods used different region(s) of the Electromagnetic Spectra and proved more informative than their predecessors.

Thermal remote sensing proved highly beneficial for water logging, soil erosion and soil texture studies since all these parameters have different thermal signatures. Hyperspectral remote sensing proved highly beneficial for soil mineral content and salinity information studies. Microwave remote sensing being an active remote sensing technique wherein the sensors have their own illumination were used to further quantify soil related research. Microwave or SAR remote sensing has an all-weather, and a better temporal resolution with 24×7 data availability. Being an active sensor, it emits Electromagnetic Radiation in microwave region (wavelength 1mm-1m) which interacts with the soil particles and is received back as backscattered signal by the same sensor in bi-static mode. This gives microwave remote sensing added advantages of numerous modelling approaches since signals are highly sensitive to soil moisture, texture and salinity.

At the Geomatics lab of Department of Civil Engineering, IIT Ropar we are engaged in research to use microwave remote sensing for soil health studies. Using different soil parameters collected from field using field instruments we have been able to successfully correlate the soil health parameters as mentioned above with the SAR signals of satellite. This was developed into various regression models which gave more than 90% predictive accuracy once validated again with field data.

Later it is proposed to use these satellite bound and on-ground parameters into modelling for crop yield prediction and estimation. Since soil health affects crop health which in turn
affects crop yield, such an approach was long needed for which could be formulated into an app based platform that could give such results about soil in real-time. Not only will it give a pre alarm for deteriorating soil health to farmers but also help them plan their irrigation and soil dressing cycles.

We strongly believe that this would be able to contribute to societal and nation building and ensure food security for all, and if not at least contribute to food security for all through our research. ■

STRENGTHENING AGRICULTURE WITH BANKING SUPPORT IN INDIA

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Introduction & Market Size

Agriculture is the primary source of livelihood for about 58 per cent of India's population. Gross Value Added by agriculture, forestry and fishing is estimated at Rs 18.55 lakh crore (US$ 265.51 billion) in FY19(PE).

During 2018-19* crop year, food grain production is estimated at record 283.37 million tonnes. In 2019-20, Government of India is targeting foodgrain production of 291.1 million tonnes. Milk production was estimated at 176.3 million tonnes during FY18, while meat production was 7.4 million tonnes. As of August 2019, total area sown with kharif crops in India reached 92.6 million hectares. India is the second largest fruit producer in the world. Production of horticulture crops is estimated at record 313.9 million metric tonne (MMT) in 2018-19 as per third advance estimates. Total agricultural exports from India grew at a CAGR of 16.45 per cent over FY10-18 to reach US$ 38.21 billion in FY18. In FY19, agriculture exports were US$ 38.54 billion. India is also the largest producer, consumer and exporter of spices and spice products.

Road Ahead

India aims to achieve the ambitious goal of doubling farm income by 2022. The agriculture sector in India is expected to generate better momentum in the next few years due to increased investments in agricultural infrastructure such as irrigation facilities, warehousing and cold storage. Furthermore, the growing use of genetically modified crops will likely improve the yield for Indian farmers. India is expected to be self-sufficient in pulses in the coming few years due to concerted efforts of scientists to get early-maturing varieties of pulses and the increase in minimum support price.

While we speak of such developments, current and to-be, it is imperative to not forget the role of banking and financial institutions in India's journey to agricultural excellence. One of the basic objectives with which the commercial banks are established is to provide banking facilities to rural areas. The Rural Credit Survey Committee envisaged a dominant part for the commercial banks in rural finance. The Commercial Banks provides agricultural and rural finance in the following ways:

- Expansion of Rural Branches
- Loans and advances to co-operative banks
- Loans and advances to co-operative marketing and processing societies
- Financial assistance to Central Land Development Banks
- Small Farmers Scheme
- Farm Graduates Schemes
- Agricultural Development Branches
- Village Adoption Scheme and Service Area Approach
- Sponsoring Regional Rural Banks
- Ware Housing Finance

Support Options for Farming Community and Agriculturalists

To give special focus to agriculture lending Bank has also appointed agri specialists in various disciplines to handle projects/ guide farmers in their agri ventures. Advances are given to borrowers for very small activities covering poorest of the poor to hitech activities involving large fund outlays.

Oriental Bank of Commerce provides the KISAN Credit card – Oriental Green Card to qualified farmers for the purpose of meeting their working capital needs and crop production requirements concerning all farm activities , consumption needs ,equipment repairs etc. via the credit card. The Bank also offers term loan against the card to meet their investment needs. The Oriental Green Card is given to farmers, cultivators and artisans who are engaged in farm and non farm activities.

Other Facilities

- Advance against warehouse Receipts to Farmers
- Purchase of land for agriculture purposes
- Scheme for Financing Working Capital Requirement of Cold Storage
- Scheme for Financing Timber Merchants and saw Mills
- Financing Two /Three Wheelers to farmers
- Model Scheme for Financing Coconut Farming.

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EMPOWERING RURAL RAJASTHAN WITH INTEGRATED FARMING: PROJECT BY INDIAN SOCIETY OF AGRIBUSINESS PROFESSIONALS (ISAP)

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Indian Society of Agribusiness Professionals (ISAP) which is a non-government, non-profit organisation working since 2001 for the empowerment of rural India through sustainable farm and non-farm livelihood development initiated the Integrated Farming System project in 2014 with donor support in three districts of Rajasthan, with the objective of promoting IFS for improving soil health, resource productivity, and positively impacting the income and livelihoods of farmers in Rajasthan. The Project was initiated in Rajasthan, following the demonstrated success of a similar project in Karnataka. This project was implemented in Bidar, Gulbarga, and Raichur Districts of North Karnataka and covered 6000 farmers as direct beneficiaries. Project adopted the Integrated Farming Systems (IFS) approach as its core strategy. The IFS is an integrated approach that looks at an all-inclusive and sustainable development pattern for not only the target farmers but also within the target geographies. Project aimed to identify issues related to crop & animal husbandry, resource conservation, value addition & marketing, women empowerment, etc. and design relevant solutions for the same. The project objectives were met through the participation and the direct involvement of 9600 farmers on the ground. The project started in 2014 and is being implemented in six blocks distributed across three districts of Rajasthan. The project locations were Anta & Kishanganj in Baran district, Hindoli & Nainwa in Bundi district, and Bonli & Khandar in Sawai Madhopur district. This chapter documents the heart warming stories of transformation and growth of select project beneficiaries who have something to say about the project. It serves as a small window for showcasing the quantitative and qualitative impact created by the IFS project interventions.

EXCERPT 1: INTEGRATED WATER MANAGEMENT



“Under the IFS Project of ISAP, I got a farm pond constructed on my farm. Hitherto, this area had been a wasteland and was completely non-irrigated. But the construction of this farm pond has facilitated irrigation during both the seasons. Water scarcity is a big issue in this area and there aren’t many sources of water conservation. I dug a bore well at the farm a few years ago but the water it pumped out would turn out to be hard and harm the soil. This pond, on the other hand, harvests rainwater, which is supremely good for the crops. I don’t have to worry as much about drought anymore. The farm pond irrigates an additional 8 bighas of land now, this land was totally fallow until now and not at all productive. Since the construction of the farm pond, I have dared to venture into crops like wheat, which requires more water. In addition to that I grow saunf (fenugreek) and mustard as well. The irrigation from the farm pond has increased my total production by 56 quintals and I am able to earn an additional Rs. 2,24,000 per year."

Chhail Bihari Rawasa
Bonli (Rajasthan)



Nadan Singh Gujar
Bonli (Rajasthan)

EXCERPT 2: CROP PRODUCTION-VERMICOMPOSTING-ANIMAL HUSBANDRY

ISAP gave me new improved seed varieties, and also trained me in better seed production. Earlier I'd be able to grow about 5 quintals of mustard per bigha, which has now increased to 10 quintals. I started growing guava fruit at the company's behest. It is expected to give great profits upon harvest! Now I also grow chillies, which I never did before. Apart from it, the vermi compost manure provided under the project is excellent, as opposed to Urea and DAP, which are both expensive and harmful. Now I use only this organic manure. It has caused the production capacity to grow exceedingly. Another thing with the chemical fertilizers was that it was making the children more prone to diseases. That threat too has been assuaged now. The project encouraged me into another unexplored territory, that of goat-keeping. I received three (two females +one male) goats from them. What we do is that we keep the females and rear them, while we sell the males off. One young male goat sells for Rs. 2,000-2,500 and the grown ones for Rs. 10,000-15,000. Goat milk is extremely nutritious for the children. Earlier we used to feed buffalo milk to the children, but then the doctor told us to substitute it with goat milk instead, as it is better for their health.

I have discovered a new found confidence in myself, which has motivated me and my family to start a tea stall as well as a pan stall to augment the family income. My brothers and I take turns working the stalls and our wives work too. Among the many trainings provided under the project, I was most intrigued by bee-keeping, which I plan on starting soon. ■

LESSONS FROM KARNATAKA

Mahadevappa Nagure
Chatnalli, Bidar (Karnataka)

Mahadevappa Nagure is an educated farmer from Chatnalli, Bidar who holds a diploma in sericulture. He holds a total of 20 acres of land and uses it for all kinds of purposes. He grows crops in one part, practices horticulture in another and keeps another third part for rearing livestock. He has a jaggery making unit as well as a farm pond. From all these activities he earned a yearly income of Rs. 6-7 lakhs. One could say that he was an affluent farmer who could've been content with his share in life. But Mahadevappa still felt a dearth of knowledge in his farming practices and wanted to learn more. He felt there was something missing. "I was stuck. I feel like as a farmer, serving agriculture is our biggest duty and pursuit which I was not able to fully serve", he says ruefully.

It was in the year 2013 that Mahadevappa found himself in contact with ISAP's team co-ordinators, and it's as if a new gate had been opened for him. "Under the IFS Project, I learned of so many things I could do differently that would help augment my farming practices. The integrated farming approach taught me a beautiful cycle that facilitates a convergence of resources. That means that I could use outputs from one activity as input from another. For instance, I could use my animal and crop waste as organic fertiliser and manure", explains Mahadevappa. "There have been some unfavourable climatic changes in our region, due to which an emphasis on multitasking along with regular farming activities is laid during the IFS training." His efforts and capabilities singled him out to be a role model for other farmers of his region. His abilities were channelized to make him even more efficient and adept at his work. "The ISAP team supported me immensely, so much that they installed a biodigester and a bio-gas plant on my farm. They cost a total of Rs. 43,625. By installing a biogas plant I am able to generate light for my house, farm and cow-shade. I use the methane gas produced from the biogas plant as fuel to use as cooking gas. The residue of the biodigester is used as organic fertilizer (manure) in the farm. It has brought so much efficiency to my traditional farming practices", he rejoices.

In 2014, the ISAP team also helped him build eight vermi-compost units worth Rs. 28,000. He says, "From the vermi-compost unit I am able to produce more organic fertilizer and manure, which I'm able to sell and also use in my own farm. I am able to earn Rs. 1 lac from the vermicompost unit alone." Mahadevappa's efforts have become more fruitful as an IFS farmer. He is now a wealthy farmer engaged in multitasking, such as selling pulses and fruits from his farm, selling milk of buffaloes, cows and goats, selling poultry eggs and birds, selling matured goats, selling jaggery, etc. His annual income is Rs. 8–10 lakhs. "With the help of and ISAP's interventions, I have become a more efficient farmer", he recognises. His efforts and sincerity have made him a role model for other farmers and he is giving back to the community by guiding 200 farmers about the crops they should grow, soil and its fertility, etc. This has generated an enormous ripple effect in the region.

These days Mahadevappa is concentrating on making organic medicines and herbal supplements. All his products are ready for launch as he awaits the inauguration day with the excitement of a child. Thus, Mahadevappa has set an example of a holistic farming practice and has become an established farmer by bringing IFS into his life and that of others.

NATIONAL RECOGNITION WITH FLORICULTURE

Gurpreet Shergill
Progressive Farmer, Punjab

Gurpreet Singh Shergill is a diversified farmer, known as *Phoolon Ka Badshah* across India. Born and brought up in the Patiala district of Punjab at Village Majhal Khurd, Mr. Shergill holds a Mechanical Engineering diploma and is a farmer by profession. He is awarded a number of prestigious National Awards for his innovations and hard work in the field of horticulture by honourable Prime Minister and Government of Punjab. He has received a Chief Minister Award by Punjab Agricultural University (PAU), Ludhiana, and a Fellow Farmer Award by Indian Agricultural Research Institute (IARI), New Delhi. Gurpreet is also a member of the National Advisory Panel, IARI, and Extension Council of PAU. In 1996, he started practicing flower cultivation with Marigold in 1-acre land, and then with Rose, Gladiolus, Gulzafri, and many other flower varieties.







Gurpreet, from a very young age, had an urge to do something in agriculture and didn't want to follow the monoculture of growing Wheat and Paddy. His interest was more into exploring possibilities of diversification in agriculture. He designed and manufactured his own Gladiolus Bulb Grading Machine in Rs 50,000 only, which has a market price of Rs 40 lacks approx., and was only used by exporters. During his journey, he faced many problems like crop loss due to excessive fog in winters, lack of cold chain, inadequate marketing and transport facilities, and more. He even thought of quitting floriculture at one point in time. But then, his father, Mr. Baldev Singh Shergill, supported him, saying, "Failure is the Key to Success." In 2009, he started the processing of flowers with his first product as Rose Water, and then in 2013, he introduced a new product- Rose Sharbat, and started self-marketing at Kisan Melas with his brother, Karamjit Singh Shergill. Consumers relished his product, and sales started to surge. Thereafter, he launched many new products under his brand name- "Shergill Farm Fresh," like Aloe Vera juice, Amla Juice, Rosewater, sugar-free Rose Afza, etc. Mr. Shergill's story made headlines in many National Newspapers and T.V. channels. He has adopted diversified farming in his 36 acres of farm, which includes flower cultivation, Polyhouse for vegetables and flowers, fish farm, vermicomposting unit, and processing & packaging unit. Various agriculture experts and officials from International Forums visit his farm and consider it as a "Model Farm."

सोशल

बहादरपुर में एक किसान ने अपने पैसे से हर घर तक पहुंचाई गैस

जहां हर घर को रसोई गैस फ्री है

इन्द्रप्रीत सिंह .चंडीगढ़

चंडीगढ़ से लगभग 70 किलोमीटर की दूरी पर सतलुज नदी के किनारे गांव है बहादरपुर। जहां हर घर को रसोई गैस मुफ्त में मिलती है। ऐसा, संभव किया है गांव के दिलबीर सिंह और उनके परिवार ने। वे फार्म पर डेयरी चलाते हैं। 120 गायें हैं। इन्हीं गायों के गोबर और गोमूत्र को साइंटिफिक ढंग से एकत्रित करके, उसमें से कार्बन डाई ऑक्साइड निकाली जाती है। बची हुई मिथेन गैस को प्रोसेस करके गांव के हर घर को सप्लाई कर दी जा रही है।

गांव में 75 घर हैं। हर घर में गैस पहुंचाने के लिए दिलबीर सिंह ने अपने खर्च से पाइप लाइन डाली है। दिन में तीन बार 2-2 घंटे के लिए सभी के लिए गैस सप्लाई होती है। दिलबार सिंह के परिवार का दुबई में स्क्रैप का कारोबार है। दिलबीर कहते हैं ,'हम गोबर को बर्बाद क्यों कर रहे हैं? क्यों गैस और बिजली के लिए अरब मुल्कों के हाथ जोड़ रहे हैं। हर गांव 70 फीसदी खाद, बिजली और गैस के लिए आत्मनिर्भर हो सकता है।' दिलबार के पास अभी 120 गाए हैं, वे इसे 200 तक ले जाना चाहते हैं। पहले से ही प्लानिंग करके उन्होंने अपना फार्म उसी तरह का बनाया है। गोबर से गैस निकालने के बाद बचा अवशेष खाद में बदल जाता है, जो वह बेचते हैं। उन्होंने बताया, इसे सिलेंडरों में भरकर भी सप्लाई किया जा सकता है लेकिन उसके लिए भारत सरकार से लाइसेंस लेने की जरूरत पड़ती है। हम उस दिशा में काम कर रहे हैं।

दिलबीर पैक्ड दूध की सप्लाई करते हैं और बचे हुए दूध से मिठाइयां भी बनाते हैं। इंटरनेशनल स्टैंडर्ड की। अपनी जमीन पर फैक्टरी बना ली है जहां से दुबई आदि में ये मिठाइयां सप्लाई की जाएंगी। वे कहते हैं, डेयरी कारोबारी दूध को मुख्य बिजनेस बना रहे हैं, जबकि हमारे लिए दूध डेयरी का बायप्रोडक्ट है। डेयरी फार्मिंग से हम ऊर्जा जरूरतों को पूरा कर सकते हैं।



दिलबीर सिंह के फार्म से लोगों के घरों तक बिछाया गैस पाईप।

मान गए आईआईटी के प्रोफेसर..

आईआईटी दिल्ली का फार्मूला गोबर को पहले ही दिन प्रोसेसिंग में डालकर गैस निकालने का है। दिलबार सिंह दूसरे दिन इसे प्रोसेस करते हैं। ताकि पहले दिन आग बुझाने वाली कार्बन डाई ऑक्साइड निकल जाए। फिर इसमें रह जाती है सिर्फ मिथेन। जो ज्वलनशील है। जब इस बात का पता आईआईटी दिल्ली के प्रोफेसरों को चला तो उन्होंने दिलबीर का पूरा प्रोजेक्ट समझा और सराहा।

प्रैक्टिकल से ही आया ये आइडिया...

दिलबीर ने बताया, कार्बन डाई ऑक्साइड को निकालने का आइडिया प्रेक्टिकल से आया। अब गैस की क्षमता और बढ़ाने के लिए मिथेन का तापमान बढ़ाने पर काम कर रहा हूं। यदि इसे 45 डिग्री तक ले जाने में कामयाब हो गया तो इसी गैस प्लांट की क्षमता दोगुनी हो जाएगी।

ਭੁੱਲਰ ਦੇ ਫੁਹਾਰਿਆਂ ਨੇ 25 ਵਰ੍ਹਿਆਂ 'ਚ ਬਚਾਇਆ ਕਰੋੜਾਂ ਲੀਟਰ ਧਾਣੀ

ਅਸ਼ੋਕ ਵਰਮਾ

ਬਠਿੰਡਾ, 10 ਜੂਨ

ਪੰਜਾਬ 'ਚ ਅੱਜ ਪਾਣੀ ਦੇ ਮਾਮਲੇ 'ਚ ਖੇਤੀ ਹੁਣ ਤੱਕ ਦੇ ਸਭ ਤੋਂ ਵੱਡੇ ਸੰਕਟ ਵਿੱਚੋਂ ਗੁਜ਼ਰ ਰਹੀ ਹੈ। ਸਰਕਾਰ ਨੂੰ ਤਾਂ ਪਾਣੀ ਦੀ ਸਭ ਤੋਂ ਵੱਧ ਖਪਤ ਵਾਲੀ ਫਸਲ ਝੋਨੇ ਦੀ ਲੁਆਈ ਲਈ ਤਰੀਕਾਂ ਮਿਥਣੀਆਂ ਪਈਆਂ ਹਨ। ਹਾਲਾਂਕਿ ਦਿਨੋ-ਦਿਨ ਨੀਵੇਂ ਹੁੰਦੇ ਜਾ ਰਹੇ ਪਾਣੀ ਦੇ ਪੱਧਰ ਪ੍ਰਤੀ ਸਭ ਫਿਕਰਮੰਦ ਹਨ ਪਰ ਬੱਚਤ ਦਾ ਕੋਈ ਵੀ ਯਤਨ ਚਾਹਵਾਨ ਨਹੀਂ ਹੈ। ਅਜਿਹੇ ਹਾਲਾਤਾਂ ਦਰਮਿਆਨ ਬਠਿੰਡਾ ਜਿਲ੍ਹੇ ਦੇ ਪਿੰਡ ਘੁੰਮਣ ਕਲਾਂ ਦਾ ਕਿਸਾਨ ਸੁਖਪਾਲ ਸਿੰਘ ਭੁੱਲਰ ਹੈ ਜੋ ਆਧੁਨਿਕ ਤਕਨੀਕਾਂ ਦੀ ਸਹਾਇਤਾ ਨਾਲ ਪਾਣੀ ਦੀ ਵੱਡੇ ਪੱਧਰ 'ਤੇ ਬੱਚਤ ਕਰਕੇ ਕਿਸਾਨਾਂ ਲਈ ਰਾਹ ਦਸੇਰਾ ਬਣ ਗਿਆ ਹੈ। ਇਸ ਕਿਸਾਨ ਨੇ ਸਾਬਤ ਕਰ ਵਿਖਾਇਆ ਹੈ ਕਿ ਜੇਕਰ ਇਨਸਾਨ ਦ੍ਰਿੜ ਇਰਾਦਾ ਧਾਰ ਲਵੇ ਤਾਂ ਕੋਈ ਵੀ ਕੰਮ ਨਾ ਮੁਮਕਿਨ ਨਹੀਂ ਹੈ। ਭੁੱਲਰ ਨੇ ਇੱਕ ਸਧਾਰਨ ਕਿਸਾਨ ਦੇ ਤੌਰ 'ਤੇ ਖੇਤੀ ਦੀ ਸ਼ੁਰੂਆਤ ਕੀਤੀ ਸੀ ਪਰ ਆਪਣੀ ਹਿੰਮਤ ਅਤੇ ਜਜਬੇ ਨਾਲ ਦੋ ਫਾਰਮ ਹਾਊਸ ਬਣਾਏ ਹਨ ਜਿੰਨ੍ਹਾਂ ਦੀ ਕੌਮੀ ਤੇ ਕੌਮਾਂਤਰੀ ਪੱਧਰ 'ਤੇ ਚਰਚਾ ਹੁੰਦੀ ਹੈ। ਉਸ ਨੇ ਆਪਣੇ ਫਾਰਮ ਹਾਊਸ ਤੇ ਸਾਲ 1994 ਵਿਚ ਸਿੰਚਾਈ ਲਈ ਫੁਹਾਰਾ ਸਿਸਟਮ ਲਾਇਆ ਸੀ। ਫਾਰਮ ਹਾਊਸ 'ਚ ਅਜਿਹੇ ਫੁਹਾਰੇ ਲੱਗੇ ਹੋਏ ਹਨ ਜਿੰਨ੍ਹਾਂ ਦੀ ਸਹਾਇਤਾ ਨਾਲ ਪੌਦਿਆਂ ਜਾਂ ਹੋਰ ਖੇਤੀ ਨੂੰ ਜਰੂਰਤ ਅਨੁਸਾਰ ਪਾਣੀ ਦਿੱਤਾ ਜਾਂਦਾ ਹੈ। ਰਿਵਾਇਤੀ ਢੰਗ ਨਾਲ ਪਾਣੀ ਲਾਉਣ ਵਾਲੀ ਪ੍ਰਣਾਲੀ ਨੂੰ ਪਿੱਛੇ ਛੱਡਿਆ ਤਾਂ ਉਸ ਨੂੰ ਵਰ੍ਹੇ ਹੀ ਬੀਤ ਗਏ ਹਨ। ਭੁੱਲਰ ਦਾ ਇੱਕੋ ਨਿਸ਼ਾਨਾ ਹੈ ਕਿ 'ਜਲ ਹੈ ਤਾਂ ਜੀਵਨ' ਹੈ। ਫਾਰਮ ਹਾਊਸ 'ਤੇ ਨਹਿਰੀ ਪਾਣੀ ਨੂੰ ਸਟੋਰ ਕਰਨ ਲਈ ਇੱਕ -ਇੱਕ ਕਰੋੜ ਲਿਟਰ ਦੇ ਦੋ ਟੈਂਕ ਬਣਾਏ ਹੋਏ ਹਨ। ਜਦੋਂ ਵੀ ਪਾਣੀ ਦੀ ਵਾਰੀ ਆਉਂਦੀ ਹੈ ਤਾਂ ਇੰਨ੍ਹਾਂ ਟੈਂਕਾਂ 'ਚ ਪਾਣੀ ਸਟੋਰ ਕਰ ਲਿਆ ਜਾਂਦਾ ਹੈ। ਸੁਖਪਾਲ ਸਿੰਘ ਭੁੱਲਰ ਨੇ 'ਸੱਚ ਕਹੂੰ' ਨੂੰ ਦੱਸਿਆ ਕਿ ਇਸ ਵਿਧੀ ਨਾਲ ਲੇਬਰ ਦੀ ਬੱਚਤ ਹੁੰਦੀ ਹੈ ਅਤੇ ਖਾਦਾਂ ਘੱਟ ਪੈਂਦੀਆਂ ਹਨ ਜਿਸ ਦੀ ਬਦੌਲਤ ਲਾਗਤ ਘਟਣ ਨਾਲ ਆਮਦਨ ਵਧਦੀ ਹੈ। ਇਸ ਢੰਗ ਬਾਰੇ ਪੰਜਾਬ ਖੇਤੀਬਾੜੀ ਯੂਨੀਵਰਸਿਟੀ ਸਿਖਲਾਈ ਦਿੰਦੀ ਹੈ। ਕਿਸਾਨ ਨੂੰ ਫਿਲਟਰ ਵਗੈਰਾ ਦੀ ਸਫਾਈ ਕਰਨ ਦੀ ਜਾਂਚ ਸਿੱਖਣੀ ਜਰੂਰੀ ਹੈ ਕਿਉਂਕਿ ਗੰਦੇ ਫਿਲਟਰ ਬੂਟਿਆਂ ਤੱਕ ਚੁੱਕਵੀਂ ਮਾਤਰਾ 'ਚ ਪਾਣੀ ਨਹੀਂ ਪਹੁੰਚਾਉਂਦੇ ਹਨ। ਭੁੱਲਰ ਪਿਛਲੇ ਢਾਈ ਦਹਾਕਿਆਂ ਦੌਰਾਨ ਕਰੋੜਾਂ ਲਿਟਰ ਪਾਣੀ ਬਚਾ ਚੁੱਕਿਆ ਹੈ। ਉਸ ਵੱਲੋਂ ਆਪਣੇ ਫਾਰਮ ਹਾਊਸਜ਼ 'ਤੇ ਸਿੰਚਾਈ ਦੇ ਮਾਪਦੰਡ ਤੈਅ ਕੀਤੇ ਹੋਏ ਹੋਏ ਹਨ। ਉਨ੍ਹਾਂ ਦੱਸਿਆ ਕਿ ਬੋਲੋੜਾ ਪਾਣੀ ਲਾਉਣਾ ਖੇਤੀ ਲਈ ਖਤਰਨਾਕ ਹੈ ਕਿਉਂਕਿ ਅਕਸਰ ਕਿਸਾਨ ਮੁਫਤ ਬਿਜਲੀ ਵਾਲੇ ਟਿਊਬਵੈਲ ਰਾਹੀਂ ਧਰਤੀ ਹੇਠਲੇ ਮਾੜੇ ਪਾਣੀ ਨਾਲ ਸਿੰਚਾਈ ਕਰਦੇ ਹਨ ਜੋਕਿ ਫਸਲ ਅਤੇ ਜਮੀਨ ਦੋਵਾਂ ਦੀ ਗੁਣਵੱਤਾ ਨੂੰ ਖਰਾਬ ਕਰਦਾ ਹੈ।

ਸੁਖਪਾਲ ਸਿੰਘ ਹੋਰਨਾਂ ਕਿਸਾਨਾਂ ਲਈ ਬਣਿਆ ਰਾਹ ਦਸੇਰਾ



ਬਠਿੰਡਾ : ਆਪਣੇ ਇੱਕ ਕਰੋੜ ਲਿਟਰ ਦੇ ਟੈਂਕ ਤੇ ਸਿੰਚਾਈ ਦੀ ਫੁਹਾਰ ਪ੍ਰਣਾਲੀ ਬਾਰੇ ਦੱਸਦਾ ਹੋਇਆ ਸੁਖਪਾਲ ਸਿੰਘ ਭੁੱਲਰ। **ਤਸਵੀਰ : ਅਸ਼ੋਕ ਵਰਮਾ**

ਕਿਸਾਨਾਂ ਲਈ ਵਰਦਾਨ : ਜ਼ਿਲ੍ਹਾ ਖੇਤੀਬਾੜੀ ਅਫਸਰ

ਜ਼ਿਲ੍ਹਾ ਖੇਤੀਬਾੜੀ ਅਫਸਰ ਬਠਿੰਡਾ ਡਾ. ਗੁਰਾਂਦਿੱਤਾ ਸਿੰਘ ਦਾ ਕਹਿਣਾ ਸੀ ਕਿ ਫੁਹਾਰਾ ਸਿਸਟਮ ਕਿਸਾਨਾਂ ਲਈ ਵਰਦਾਨ ਹੈ। ਇਸ ਸਿਸਟਮ ਨੂੰ ਲਾਉਣ ਲਈ ਸਰਕਾਰ 80 ਫੀਸਦੀ ਤੱਕ ਸਬਸਿਡੀ ਦਿੰਦੀ ਹੈ। ਰੱਖ ਰਖਾਅ ਸਬੰਧੀ ਖੇਤੀਬਾੜੀ ਯੂਨੀਵਰਸਿਟੀ ਦੇ ਮਾਹਿਰ ਕਿਸਾਨਾਂ ਨੂੰ ਬਕਾਇਦਾ ਸਿਖਲਾਈ ਦਿੰਦੇ ਹਨ। ਉਨ੍ਹਾਂ ਸਫਲ ਕਿਸਾਨ ਸੁਖਪਾਲ ਸਿੰਘ ਭੁੱਲਰ ਵੱਲੋਂ ਪਾਣੀ ਬਚਾਉਣ ਲਈ ਕੀਤੇ ਯਤਨਾਂ ਦੀ ਸ਼ਲਾਘਾ ਕਰਦਿਆਂ ਹੋਰਨਾਂ ਕਿਸਾਨਾਂ ਨੂੰ ਇਸ ਰਾਹ ਤੇ ਤੁਰਨ ਦੀ ਅਪੀਲ ਕੀਤੀ ਹੈ।

ਮੁਫਤ 'ਚ ਸਲਾਹ ਲੈਣ ਕਿਸਾਨ: ਭੁੱਲਰ

ਅਜੋਕੀ ਖੇਤੀ ਬਾਰੇ ਸੁਖਪਾਲ ਸਿੰਘ ਭੁੱਲਰ ਦਾ ਪ੍ਰਤੀਕਰਮ ਹੈ ਕਿ ਪੰਜਾਬ ਜਦੋਂ ਤੱਕ ਕਿਸਾਨ ਸਮੇਂ ਦਾ ਹਾਣੀ ਨਹੀਂ ਬਣਦਾ ਉਦੋਂ ਤੱਕ ਸਫਲਤਾ ਅਸੰਭਵ ਹੈ। ਬਹੁਤੇ ਕਿਸਾਨ ਪ੍ਰੀਵਾਰਾਂ ਨੇ ਵਰਕ ਕਲਚਰ ਤਿਆਗ ਦਿੱਤਾ ਹੈ ਜੋ ਸੰਕਟ ਦਾ ਵੱਡਾ ਕਾਰਨ ਹੈ। ਉਨ੍ਹਾਂ ਕਿਸਾਨਾਂ ਨੂੰ ਅਪੀਲ ਕੀਤੀ ਕਿ ਉਹ ਅੱਜ ਤੋਂ ਪਾਣੀ ਦੀ ਬੱਚਤ ਸ਼ੁਰੂ ਕਰਨ ਨਹੀਂ ਤਾਂ ਉਹ ਦਿਨ ਦੂਰ ਨਹੀਂ ਹਰੇ ਭਰੇ ਖੇਤ ਰੇਗਿਸਤਾਨ 'ਚ ਤਬਦੀਲ ਹੋ ਜਾਣਗੇ। ਉਨ੍ਹਾਂ ਕਿਸਾਨਾਂ ਨੂੰ ਆਪਣੇ ਫਾਰਮ ਹਾਊਸ ਤੇ ਪਾਣੀ ਬਚਾਉਣ ਲਈ ਲਾਏ ਫੁਹਾਰਾ ਸਿਸਟਮ ਜਾਂ ਖੇਤੀ ਨਾਲ ਜੁੜੇ ਹੋਰ ਕਾਰਜਾਂ ਬਾਰੇ ਜਾਣਕਾਰੀ ਲੈਣ ਵਾਸਤੇ ਆਉਣ ਦਾ ਸੱਦਾ ਦਿੱਤਾ।

ਇਜ਼ਰਾਈਲ ਦੀ ਦੇਣ ਫੁਹਾਰਾ

ਸੁਖਪਾਲ ਭੁੱਲਰ ਨੇ ਦੱਸਿਆ ਕਿ ਫੁਹਾਰਾ ਸਿਸਟਮ ਇਜ਼ਰਾਇਲ ਦੀ ਦੇਣ ਹੈ। ਇੱਕ ਵਾਰ ਇਜ਼ਰਾਈਲ ਦੇ ਇੱਕ ਫਾਰਮ ਹਾਊਸ ਤੇ ਇੱਕ ਬੂਟੇ ਨੂੰ ਲੱਗੇ ਫਲਾਂ ਦੀ ਕੁਆਲਿਟੀ ਤੇ ਵਜ਼ਨ ਵੱਖਰਾ ਦਿਖਾਈ ਦਿੱਤਾ। ਫਾਰਮ ਹਾਊਸ ਦੇ ਮਾਲਕ ਨੇ ਇਜ਼ਰਾਈਲ ਦੇ ਖੇਤੀ ਮਾਹਿਰਾਂ ਨੂੰ ਜਾਣਕਾਰੀ ਦਿੱਤੀ ਤਾਂ ਉਨ੍ਹਾਂ ਮਾਹਿਰਾਂ ਨੇ ਬੂਟੇ ਦੀ ਜਾਂਚ ਕੀਤੀ ਤਾਂ ਸਭ ਆਮ ਵਰਗਾ ਜਾਪਿਆ। ਜਮੀਨ ਨੂੰ ਡੂੰਘਾਈ ਤੱਕ ਪੱਟਣ ਦੇ ਸਾਹਮਣੇ ਆਇਆ ਕਿ ਉਸ ਬੂਟੇ ਦੇ ਹੇਠਾਂ ਦੀ ਪਾਣੀ ਵਾਲੀ ਪਾਈਪ ਲੰਘਦੀ ਸੀ ਜਿਸ ਦਾ ਜੋੜ ਹਲਕਾ ਜਿਹਾ ਲੀਕ ਹੋਣ ਕਰਕੇ ਫੁਹਾਰੇ ਦੀ ਤਰ੍ਹਾਂ ਪਾਣੀ ਆ ਰਿਹਾ ਸੀ। ਮਾਹਿਰਾਂ ਨੇ ਮਹਿਸੂਸ ਕੀਤਾ ਕਿ ਇਸ ਬੂਟੇ ਦੇ ਵੱਖਰਾ ਹੋਣ ਦਾ ਕਾਰਨ ਇਹੋ ਫੁਹਾਰੇ ਰਾਹੀਂ ਮਿਲ ਰਿਹਾ ਪਾਣੀ ਹੈ। ਭੁੱਲਰ ਨੇ ਦੱਸਿਆ ਕਿ ਇਸ ਤੋਂ ਬਾਅਦ ਇਜ਼ਰਾਈਲ 'ਚ ਫੁਹਾਰਾ ਕ੍ਰਾਂਤੀ ਆਈ ਜਿਸ ਨੇ ਇਸ ਛੋਟੇ ਜਿਹੇ ਮੁਲਕ ਨੂੰ ਖੇਤੀ ਲਈ ਵਰਤੇ ਜਾਂਦੇ ਪਾਣੀ ਦੇ ਮਾਮਲੇ 'ਚ ਦੁਨੀਆਂ ਦੇ ਮੋਹਰੀ ਦੇਸ਼ਾਂ 'ਚ ਲਿਆ ਖੜ੍ਹਾ ਕੀਤਾ ਹੈ।

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