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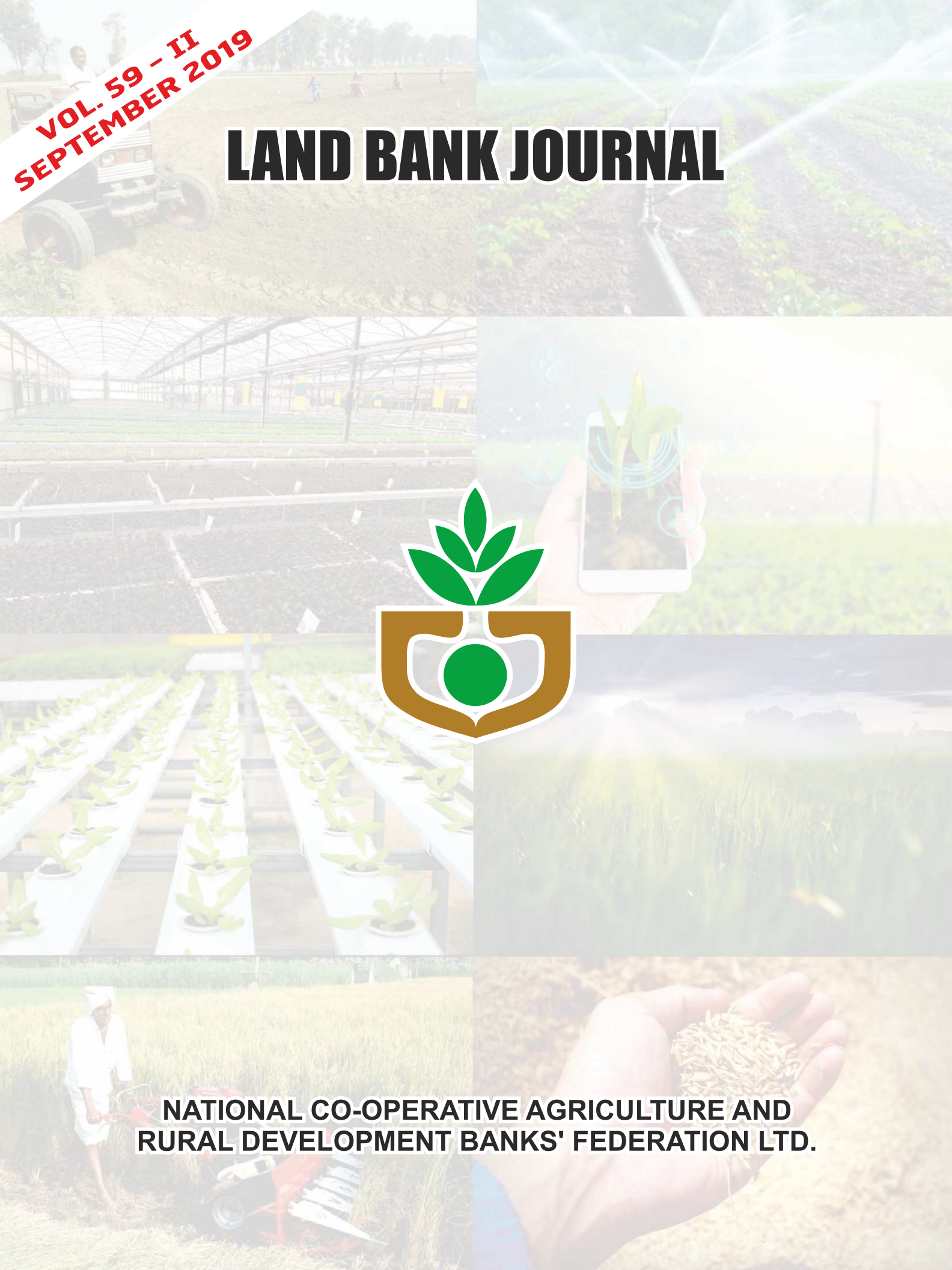

NATIONAL CO-OPERATIVE AGRICULTURE AND
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प्रबंध निदेशक

उत्तर प्रदेश सहकारी ग्राम विकास बैंक लि.

(छोटे किसानों का बड़ा बैंक)

प्रधान कार्यालय : १०, माल एवेन्यू, लखनऊ - २२६ ००१

६० वर्ष हमारा प्रयास-सतत् विकास

बैंक द्वारा उत्कृष्टतम कार्यो के लिए राष्ट्रीय स्तर पर एन.सी.आर.डी.बी. फेडरेशन मुम्बई तथा भारत सरकार द्वारा २१ बार पुरस्कृत।

उ.प्र. को उत्तम प्रदेश बनाने हेतु पूरे प्रदेश में तहसील एवं कतिपय विकास खण्ड स्तर पर कार्यरत ३२३ शाखाओं के माध्यम से समग्र ग्रामीण विकास कार्यो हेतु दीर्घकालीन ऋण सुविधा उपलब्ध कराने वाली शीर्षस्थ सहकारी संस्था।

उद्देश्यः -

१. लघु सिंचाई योजनाः- ट्यूबवेल, पम्पसेट, ड्रिप, स्प्रिंकलर आदि।
२. कृषि यंत्रीकरणः- ट्रैक्टर, हार्वेस्टर, थ्रेशर, रोटावेटर आदि।
३. विविधीकरण योजनाएः- डेयरी, पशुपालन, मुर्गी पालन, मत्स्य पालन आदि।
४. औद्यानिक विकासः- आम, अंगूर, आंवला, पान, केला, ग्लेडियोलाई, गुलाब, औषधीय पौधों की खेती एवं वनीकरण।
५. अकृषि क्षेत्रः- ग्रामीण कुटीर एवं लघु उद्योग परम्परागत उद्योग, तेलधानी. धान मिल, कोल्हू, आटा चक्की, स्कूटर, मोटर साईकिल रिपेरींग सेंटर, बैट्री चार्जिंग, टेलीविजन, रेडियो, टेपरिकार्डर एवं मोबाईल रिपेयरिंग, हेयर कटिंग सैलून, कम्प्यूटर टाईपिंग एवं साइबर कैफे, वायरमैन एवं मोटर वाइंडिंग, माडर्न लाण्ड्री, जल-पान गृह, बेकरी उद्योग, २२ हार्स पावर की क्षमता के जनरेटर सेट, आफ सेट प्रिन्टिंग प्रेस आदि।
६. भूमि क्रय।
७ लघु सडक परिवहन।

नवीन संचालित योजनायेंः-

१. ग्रामीण महिलाओं हेतु डेअरी योजना।
२. नेशनल बैकवर्ड क्लासेज फाइनेंस एण्ड डेव्हलपमेन्ट कार्पोरेशन एवं नेशनल शेड्यूल कास्टस् डेवलपमेंट कार्पोरेशन के सहयोग से दोहरी गरीबी रेखा के नीचे जीवन-यापन करने वाले पिछड़े वर्ग एवं अनुसुचित जाति के सदस्यों को रियायती ब्याज दर (४% से ६% ब्याज दर) पर रोजगार सृजन हेतु ऋण सुविधा उपलब्ध।
३. सोलर लाईटिंग सिस्टम में वित्त पोषण।
४. ई-रिक्सा योजना में वित्त पोषण।

विशेष सुविधाएँः-

१. वर्ष २०१८-१९ में ४१६४४ लघु एवं सीमांत बकायेदार कृषको को एक मुश्त समाधान योजनान्तर्गत मु.- २९०.३० करोड छूट देकर लाभान्वित किया गया।
२. बैंक द्वारा वितरित ऋण से सृजित परिसम्पत्तियों का सामान्य बीमा, जीवन बीमा एवं स्वास्थ्य बीमा क्षेत्र में भी कार्य प्रारम्भ।
३. समय पर ऋण अदायगी करने वाले किसान भाइयों को ब्याज में १ प्रतिशत की अतिरिक्त छूट।
४. पिछड़े वर्ग एवं अनुसूचित जाति की महिलाओं के आर्थिक उत्थान एवं सशक्तीकरण बनाने के उद्देश्य से विभिन्न रोजगार परक योजनाओं में न्यूनतम ब्याज दर (३% से ५% ब्याज दर) पर ऋण उपलब्ध कराना।

सावधि जमा योजनाः-

आकर्षक ब्याज दर पर मासिक आय, दोहरा लाभ व सावधि जमा योजना में ७.०० प्रतिशत तक वार्षिक ब्याज के सापेक्ष सदस्यों से स्त्रोत पर आयकर कटौती नहीं, वरिष्ठ नागरिकों को ०.२५ प्रतिशत अधिक ब्याज। उक्त योजनान्तर्गत जमाकर्ताओ को मूल जमा धनराशि पर ७५ प्रतिशत तक ऋण लेने की सुविधा। परिपक्वता पर तुरन्त भुगतान की सुविधा।





हमारा उद्देश्य - समृद्ध किसान

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Contents

MAKE A DIFFERENCE THROUGH WATER FOOTPRINT FOR CLIMATE CHANGE ADAPTATION – *Dr. Jayasree Vaidyanathan* **03**

EXTENSION APPROACHES AND STRATEGIES - MANAGEMENT OF QUALITY SEED DISTRIBUTION – *Anay Rawat & Princy Jain* **07**

शुष्क और अतिशुष्क क्षेत्रों में कृषि उत्पादों का प्रसंस्करण मूल्य संवर्धन एवं विपणन – सुनील कुमार शर्मा, कृष्ण गोपाल व्यास, चारु शर्मा **12**

16 News & Notes

28 Agricultural News

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Government of India notified the Banning of Unregulated Deposit Schemes (BUDS) Act 2019 on 31st July 2019. This Act provides a mechanism to ban unregulated deposit schemes and protect general public from fraudulent deposit schemes run by unauthorized persons/entities. The first schedule of the Act lists regulated deposit schemes and regulators in respect of each of such schemes. The list includes all deposit/investment/saving schemes being regulated by SEBI, RBI, IRDA, NHB, Govts of States or Union Territory, Pension Fund Regulatory and Development Authority, Employees Provident Fund Organisation, Central Registrar of Cooperative Societies, Ministry of Corporate Affairs or any other regulatory body designated to regulate any kind of deposit/ investment/saving schemes.

The Act designates the State Govt as the regulator for any deposit scheme offered by a cooperative society registered under the cooperative law of the State. Similarly, Central Registrar of Cooperative Societies is empowered to regulate deposit schemes of Multi State Cooperative Societies. Through this Act amendments are also carried out in the Reserve Bank of India Act 1934, the Securities and Exchange Board of India Act 1992 and the Multi State Cooperative Societies Act 2002 to make related provisions in those Acts on deposit taking to conform with the provisions of this Act. Through fresh amendments in the RBI Act 1934 and Multi State Cooperative Societies Act 2002 cooperatives are allowed to take deposits from their voting members. Enactment of BUDS Act has far reaching implications on the deposit schemes of cooperatives including Agriculture and Rural Development Banks. In the first place, the regulatory powers with regard to deposit schemes of ARDBs are now shifted from NABARD to State Govts concerned. Similarly, cooperatives can accept deposits only from members with voting rights. The general practice of credit cooperatives to enroll depositors as nominal members without voting rights has to be stopped and all depositors have to be enrolled as regular members with voting rights. Earlier, SCARDBs were allowed to accept term deposits from any individual or institution upto their net worth as per the guidelines on deposit mobilization issued by NABARD in 1997. SCARDBs, therefore, have substantial outstanding deposits received from non members/non voting members. An immediate challenge for SCARDBs is to regularize all such deposits received from non voting members and institutions. Unitary SCARDBs can regularize such deposits by enrolling the depositors as members with voting rights. However, SCARDBs in the federal structure except West Bengal and Himachal Pradesh do not have provision to admit individuals as members. These banks, therefore, have to make provisions in their byelaws for admitting individuals as voting members who may elect their representative/ representatives to the general body and to the position that may be reserved in their board for non borrowing depositors. Another option for federal SCARDBs would be to accept deposits as agent of PCARDBs from individuals/institutions who can be admitted as members of PCARDBs, based on the terms of a MoU being executed between PCARDBs and SCARDB. In spite of the practical issues involved in acceptance of deposits by SCARDBs with federal structure, this Act brings much needed clarity on the mandate of cooperatives to take deposits from members without restrictions as applicable to public deposits and also remove the confusion prevailing earlier regarding the authority to regulate the deposit schemes of ARDBs.

K. K. Ravindran
Managing Editor

Make a difference through water footprint for climate change adaptation

Dr. Jayasree Vaidyanathan *

Water is central to our daily lives but has not been the central focus in our planning. India, with a population of 133.92 crores as on 2017, nearly 50% of people are facing extreme water stress. As per NITI AAYOG (2018) estimation, 21 major cities in India are running out of the water and almost 12% of the population are living with "Day Zero" scenario. The human needs a minimum per capita water of 1700 m^3 in a year below which are water shortages. The per capita availability has been decreasing from 5117 m^3 in 1951 to 1545 m^3 in 2011 (WRD, TERI, 2017) and would reach 1300 m^3 in 2030. However, the future demand for water would be nearly 843 BCM for 2025 and 1180 BCM for 2050. The supply-demand figures indicate that demand would be double the availability and freshwater will soon strip availability of water for hundreds of millions of people, economic losses and nearly 6% reduction in country's GDP.

Water pollution, climate change and various human actions are the main drivers for water scarcity. Almost 90% of India's freshwater is used across various sectors such as agriculture, industrial, domestic and agricultural irrigation. Vagaries in climate together with unplanned water usage would worsen in coming years leading to competition for fresh water which would have profound impact on food security, natural eco-system as well as human health. The current crisis is a grave concern not just because of climate change emergency but also since water is grossly mismanaged that necessitate to work towards water security.

In the wake of climate change and other factors that impacts water availability, it is vital to explore ways through which existing resources could be efficiently and carefully utilized. Nowadays, importance of water assessment has been increased due to significant usage of water for various goods and services. The recent Government initiative "Jal Shakthi Abhiyan" intended to on ensure water reliability through various conservation measures benchmarking water usage across different sectors.

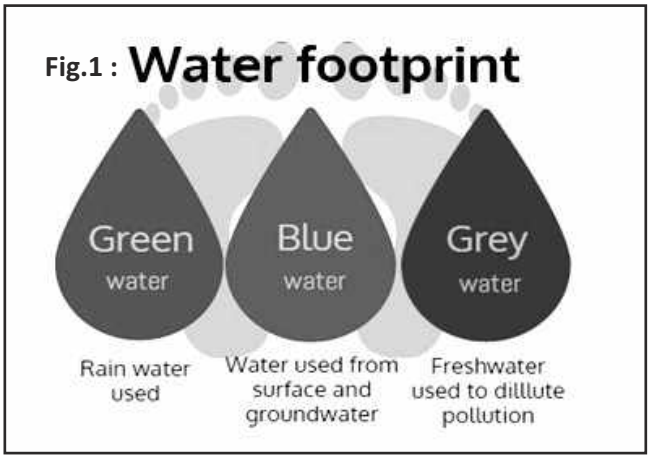
From the perspective of increasing water consumption and pollution and usage of water in various goods and services such as growing of crops, for food, mining of metals, fabric making, manufacturing of phones etc. , it is important to assess the water usage and amount of fresh water being consumed. The waterfootprint (WF), tool that measure of water usage, has become an immediate need for water sustainability that can provide decision-making support for water resource management. It has been found to be a useful indicator which quantifies freshwater consumption in terms of production factor. Evaluation of WF can uncover how resources has been used at different stages in production chain that could help to optimize and prioritize opportunities for water usage. As water is becoming increasingly scarce, such indicators would aid in strategic planning of water usage thereby contributing to the adaption of distinct impacts of climate change.

Water footprint and its components

The concept of water footprint was first introduced in 2002 by Arjen Hoekstra, as an indicator of humanity's pressure on freshwater resources measured as a metric to measure the amount of water consumed and polluted to produce goods and services along their full supply chain. Being an indicator of freshwater use, it comprises both direct and indirect water use by consumer or product expressed in terms of volume of water. The direct WF is the direct consumption and pollution of freshwater use in domestic uses for a person, operational use in factory or business and use of national water resources for a country. The indirect WF is based on the concept of virtual water and thus accounts for water physically contained in a product in addition to the amount of water used during the entire production process. WF considers the use of green, blue and grey water for a product, process, person or region (Figure 1). In this, the green water is the water available as total precipitation or soil moisture available to plants, blue water is the amount of fresh

* NIAS, Bengaluru

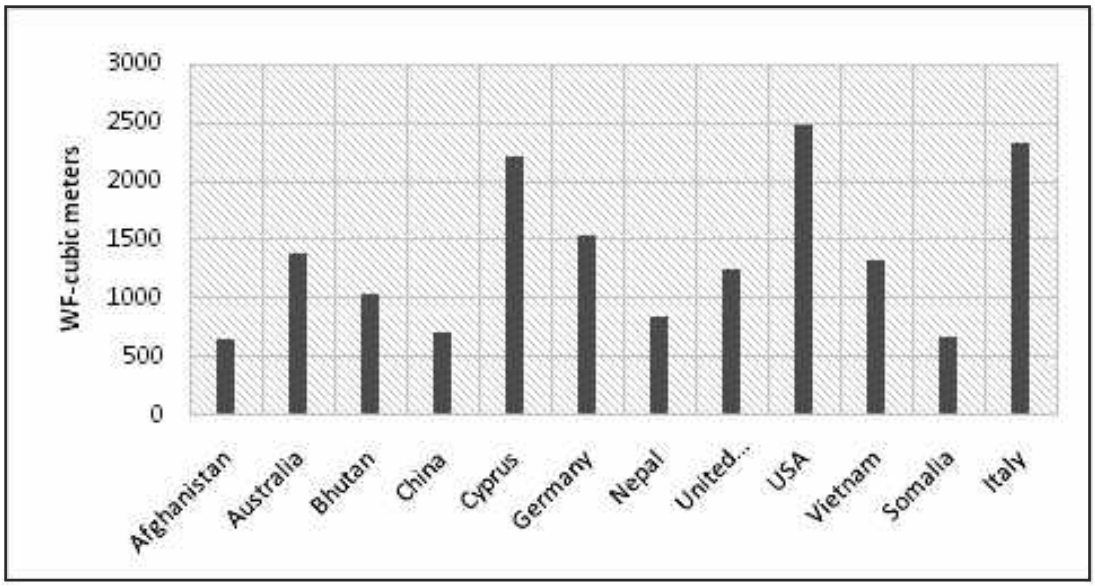
surface or groundwater consumed in producing goods or services and greywater is the measure of pollution which is expressed in terms of volume of water required to assimilate the pollutant load to meet ambient water quality standards. On an average, a person directly consumes between 100-150 litres of water per day whereas he consumes about 1500-10,000 litres per day as indirect water which make up a larger portion of our total water consumption.



Source : World Wide Web

At present, Water footprints are assessed based ISO 14001 which has been upgraded to new ISO 14046: 2014 standards which provide guideline for evaluation as well as reporting of WF that can be applied for products, processes and organizations based on the life cycle assessments. Many researchers have attempted to calculate the water footprint for various goods and services at individual, family, nation etc and sector-wise. For a nation, the WF would be the total amount of water needed for production of goods and services calculated by adding all consumption and water inherent in products imported and subtracted by water in exports. Accordingly, India has a WF of 980 m^3 per capita ranking much below global average of 1243 m^3 (Neeta, 2014). Highest WF is for USA with 2483m^3. Table 1 below show the water footprint of some of the countries.

Table 1 Water footprint for selected countries



Source :Chapgain and Hoekstra 2006

Water footprint has also been estimated for various products, goods and services consumed at various levels. Table 2 provides WF for some of the food items (Moekonnen and Hoekstra, 2011)

Table 2 Water footprint for selected food products

Product (in Kilo)	Type	% Green water	% Blue water	% Grey water	WFP-Litres
Rice	Grain	68	20	11	2497
Sugar	Food	62	19	19	920
Bread	Food	70	19	11	1608
Chocolate	Food	98	1	1	17196
Banana	Fruit	84	12	4	790
Butter	Dairy	85	8	7	5553
Beef	Meat	94	4	3	15415
Chicken	Meat	82	7	11	4325
Ground nut	Nuts	89	5	6	2782
Dates	Nuts	41	55	4	2277
Maize	Pulses	85	6	9	300
Coffee (125 ml)	Beverage	96	1	3	132
Green tea (125m)	Beverage	82	10	8	14
Apple	Fruit	68	16	15	822
Orange	Fruit	72	20	9	560
Cabbage	Vegetable	56	12	32	237
Tomato	Vegetable	50	30	20	214

From the table, it can be noted that meat and chocolates are largest consumers of water whereas fruits and vegetables have lesser WF. Coffee consumes more water than tea. Bottled drinking water has a WF of 2.02 litre, beer has 4 litre and wine has 4.74 litre. The WF for selected products as depicted in Figure 2 show that oil seeds, nuts and spices consume large amount of water.

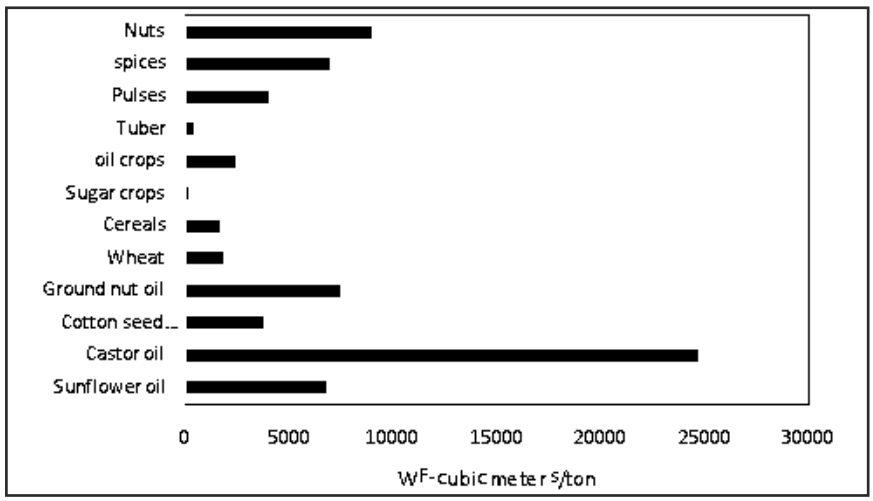


Fig.2 : Water footprint of food products (Senthil Kumar and Joshiba 2019).

In the consumer industry, leather has the highest WF of 17093 m3/kg. A pair of jeans takes 10000 litres of water (Luiken et al 2015) while a cotton shirt needs 2500 litre of water approximately (Freitas et al 2017). Similarly, one A4 sheet paper has a WF between 2-13 liters (Van Oel and Hoekstra, 2010).

In the manufacturing industry, water footprints are about 235 m3 litres for one ton of steel whereas 1kg of cement and plastic consumes 5 m^3 and 2.2 m^3 litres of water. Similarly, computer require 20000 L whereas a phone would consume 13000 m^3 litres of water to produce all parts including micro-chip, glass, plastic and metals.

Likewise based on the exact consumption of water for various day-to-day activities, different products and services etc., can be arrived at. An individual need approximately 1.7 litres of water for brushing, 36 litres for shower, 35 litres for dish washing and 50 litres for washing clothes. An estimate on average consumption of an individual consuming vegetarian food would have a WF of nearly 980m^3/year for food and about 1083 m^3/year for all daily including bathing, washing etc. A non-vegetarian diet would typically have a WF of around 2530 m3/year, with 2850 m^3 /year, an additional of 320 m^3/year for daily chores. Such comparison would help in assessing the amount of water required for various products, activities etc. for an individual, company, sector and nation.

Water footprint adaptation approach for Sustainable water management

Given the severity and far-reaching impacts of our dwindling water availability, it is important to take measures that keep water footprint level low through controlled use of both direct and indirect water.

At individual and household levels, some smart choice in water usage to lower water footprint. The direct WF reduction is possible through cautious use of water in toilets, showers, washing machine, plugging in leaks and using faucet aerators, low flush toilets etc., whereas the indirect WF reduction strategies are through making small changes in diet by consuming less meat and changing to pulses like beans, lentil, peas etc. switching from beverages and coffee to tea, eating unprocessed foods and many others. Eating whole foods rather than processed food and avoiding food wastage are also nifty ways to lighten the impacts and lower WF (Madel and Saywer, 2017).

On larger scales as in agriculture, consumer products and industries, water footprint can be lowered through reduced consumption and pollution, by water recycling, reducing evaporation losses and utilizing the used chemicals in water flows. Considering the amount of water that goes to manufacturing a product, buying a recycled product would reduce WF. Conserving energy is one of the efficient ways to lessen WF as 1KW-Hr of electricity takes nearly 95 litres of water.

In addition to the above, some changes at policy level by increasing the volume of food traded through efficient trade relationships, exporting agriculture goods from water rich to deficient regions etc., would lead to reducing WF. Capacity development activities such as effective communication, increasing awareness concerning a person's behaviour and WF, demonstration of methods to minimize WF are also necessary.

Furthermore, a commitment towards keeping low WF by consciously using water and making informed choices to purchase goods and services that have lower water footprint would be a big step towards mankind that would result in water being valued as an irreplaceable life-giving resource.

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Extension Approaches and Strategies - Management of Quality Seed distribution

Anay Rawat and Princy Jain *

Every farmer depend on availability of good quality seed to provide better establishment for their crops. At the same time, easy access to quality seed can be achieved and guaranteed only if there is a viable seed supply system to multiply and distribute seeds that have been produced as quality seed. Over 90 percent of the crops in developing countries are still planted with farmers' varieties and farm-saved seeds. Private seed companies tend to concentrate on production of hybrid seed, especially of high-value crops grown by larger farmers in more favourable areas, i.e. targeting those who are best able to pay for the seed. They tend to avoid self-pollinating crops, including many of those grown by smallholder farmers and on which they depend for their food security. Also for these crops, opportunities for commercial seed production are very limited because the biology makes it easy for farmers to save their own seeds for planting. In the beginning after independence of the country the production of food grain was nearly 50 million tonnes which has reached over 277.49 million tonnes in the recent past. Availability of foodgrains per person increased from 452 gm/capita/day to over 476 gm/capita/day, even as the country's population almost doubled, swelling from 548 million to nearly 1300 million. The projected demand by 2020 is 296 million tonnes and 300 millions tonnes by 2025. This is essential to maintain sustained self sufficiency and build up the capability to meet the export commitments also.

Ideally seed should be replaced every year for hybrids and every three to four years for non-hybrids. However, in practice seed is replaced less often especially in case of open pollinated crops. The seed plays a pivotal role in agriculture and acts as a carrier of the genetic potentialities of improved varieties. With no jeopardy to the importance of other inputs, the quality seeds of improved varieties have major role in increasing production. The average contribution in yield is around 15-36%. However, conjunctive use of quality seeds with other inputs like water, nutrients, plant protection measures etc. will tap up the genetic potentiality of high yielding varieties raising their aforesaid contribution manifold. Even the local quality graded seed would give substantial increased production over local unimproved non-quality seed. Despite a huge institutional framework for seed production both in the public and private sectors, availability of good quality seeds continues to be a problem for the farmers.

Seed is the most important determinant of agricultural production potential, on which the efficacy of other agriculture inputs is dependent. Seeds of appropriate characteristics are required to meet the demand of diverse agro-climatic conditions and intensive cropping systems. Sustained increase in agriculture production and productivity is dependent, to a large extent, on development of new and improved varieties of crops and an efficient system for timely supply of quality seed to farmers.

Seed Replacement Rate

Seed Replacement Rate is the percentage of area sown out of total area of crop planted in the season by using certified/quality seeds other than the farm saved seed. This rate is very low in all the states due to lower adoption and poor extension about the seed replacement.

There is considerable variation in seed replacement rate depending on crops and regions on an average, it is around 20% which should be increased to at least 50% in the next few years.

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Seed Replacement rate at National Level

Seed Replacement Ratio denotes how much of the total cropped area was sown with certified seeds in comparison to farm saved seeds. Seed replacement rate has a strong positive correlation with the productivity and production of crops. The Seed Replacement Rate of the different crops is given below.

Sr. No.	Crop	Seed Replacement Rate (%)	
		2016-17	2017-18
1	Paddy	40	42
2	Wheat	36	39
3	Bengal Gram	38	41.06
4	Black Gram	42	42
5	Green Gram	40	42.03
6	Pigeon Pea	35	38.97
7	Groundnut	15	16
8	Mustard	100	100
9	Maize	100	100
10	Pearl Millet	100	100
11	Castor	100	100

Status of quality Seed

It has become evident that in order to achieve the food production targets of the future, a major effort will be required to enhance the seed replacement rates of various crops. This would require a major increase in the production of quality seeds so that farmers can use certified good quality seeds in place of farm saved seeds which will enhance the Seed Replacement Rate .

Need of Seed Extension Activities:

- Wide gap exists in the average yield of crops especially pulses and oilseeds and their yields obtained under minikit/adaptive trials/FLDs on improved varieties.
- Replace the local admixture, making available seeds of improved varieties in adequate quantities to increase SRR.
- Proper choice of variety and its quality seeds.
- Zone-specific adaptability and fitness for edific, biotic and climatic variation.
- Seed production and extension agencies should ensure that seeds are available to farmers.

Reasons of low replacement of quality seeds at desired interval

Farmers would like to change seed more often than they do at present. Reasons are reported by farmers to be important which prohibits them from doing so:

- The high cost of seed.
- The unreliable quality of seeds.
- Unavailability of seed suitable for local conditions.
- Lack of sources of information of New Seed.
- Lack of Awareness of the Plant Varieties Act.
- Source of seed availability.
- Improperly organized seed distribution and marketing.
- Lack of technical knowledge of seed production and maintenance of purity of quality seeds at farmers level.

The High cost of seed

The high cost of seed was found to be particularly important in low replacement of seeds. Still farmers relied on purchased seed for a significant proportion

(more than 25 percent) of their seed requirement.

The unreliable quality of seeds

Farmers do not trust the quality of seed available in the market. This is cited as the most important reason for not purchasing new seed and relying largely on own saved seed.

Sources of Information on New seed

The farmers access to new seed also depends on information. Most respondents depend on other farmers for information on new seeds. Proper information is not available to farmers about quality seeds, new released varieties and purchase of quality seeds.

Lack of Awareness of the Plant Varieties Act

The farmers are not aware of India's legislation on the Protection of Plant Varieties and Farmers' Rights. In Madhya Pradesh only few farmers may be aware of the Legislation. Farmers can purchase seed on bill to reclaim in case of damaged or duplicate seeds.

Source of Seed

Almost all the farmers surveyed were found to use saved seed. The overwhelming importance of saved seed is also shown by the quantity of saved seed being used. In terms of volume, more than 70-80 percent of the seed used throughout the country is the farmers own seed.

Seed Distribution and Marketing

The availability of high quality seeds to farmers through an improved distribution system and efficient marketing set-up meagerly existed to facilitate greater security of seed supply.

As a result of the World Bank driven new Seed Policy of 1988, MNCs like Cargill and Monsanto entered the seed supply system in India. With their entry, India's agriculture has become destabilized. MNC seeds are costly and non-renewable. Farmers must buy them every year. High costs and non-renewability of MNC seeds have created severe distress among farmers. Farmers have become indebted.

For promoting efficient and timely distribution and marketing of seed throughout the county, a supportive environment will be required to encourage expansion of the role of the private seed sector. Efforts will be made to achieve better coordination between state government to facilitate free Inter-State movement of seed and planting material through exemption of duties and taxes.

Extension Strategies for Increasing Seed Replacement

While considering the strategy for increasing the rate of seed replacement, it has to be kept in mind that methodology of extension will differ with variety and hybrids, vegetatively propagated planting material:

- Food grain crops and oilseeds
- Vegetable and spices
- Medicinal & aromatic plants
- Vegetatively propagated plants

The methods of seed production, places and climatic stability for their multiplication will decide the strategy of extension for enhancing seed production.

1. **Community Based Programme**

   Large proportion of damaged, shrivelled, undeveloped and admixture seeds used by resource poor farmers. Experimental findings revealed 15-20% yield advantage of grading/ improving the seed quality. Community seed cleaning and grading services of farmers be established.

2. **Seed Village Concept**

   - Presently seed production by various agencies is inadequate need of seed villages in selected districts.
   - Sale of seed/farmer to farmer exchange of seed and purchase by the government.
   - Handling of seeds, seed storage, processing and subsequent distribution to the farmers in small packets also needs consideration.
   - Role of KVKs/Department of Agriculture/ private agencies/NGOs could be utilised for

different coordinated activities like technical support, training, field visits, marketing and establishing cooperative societies.

- Seed producing units need to be strengthened and added.
- Seed replacement in dryland, rainfed, tribal and hilly areas continue to be low.

3. **Sales Promoting activity**

- The sale promotional activity forms integral part of the marketing organizations. To sale the seeds there are various ways in which the farmers can be approached and apprised about the qualities of the commodity.
- Demonstrations
- Kisan Diwas
- Kisan Mela
- Advertising in press, on radio and TV
- Posters
- Individual approach by sale personnel.

4. **Prevention of Storage Losses**

- Nearty 80% of the total loss is caused by insects, rodents and micro-organisms during storage.
- Pulses are more susceptible to damage due to insects (5%) as compared with major food grains, like wheat (2.5%) rice (2%) and maize (3.5%).
- Storage losses at producers site, tarding and transit site, end user site.
- Improved storage structures developed at Agril. Universities, ICAR institutes or IGSIs needs to be popularised through demonstrations.

5. Seed Industry

The Seed industry in India started with the recommendation of a Seed Review Committee in 1968 and assistance of the World Bank.

The supply of quality seeds of cereals, pulses, oilseeds and the field and horticultural crops remained inadequate. Besides Govt agencies, the gap in need can be bridged by developing seed industries with strong corporation should have close linkage.

6. Role of private sector and voluntary agency in seed distribution:-

Production of improved seeds by private agencies needs to be encouraged to meet the demand of the farmers.

Improved seeds of maintained quality should be made available to the farmers at the doorstep at reasonable rates.

The subsidized production of bacterial cultures can be undertaken by the private sector to be provided with the seed.

The funding agencies need to support the private and voluntary agencies in the production and supply of seeds.

7. Role of public sector in certified and labelled seed distribution:

Certified/labelled seed distribution prior to 1976 was done mainly through Government Institutions and total quantum was less than 1 lac quintals.

8. **Public-Private-Partnership**

The sovereignty of India's seed supply systems rests on two sources of public seed supply 80% of which comes from farmer-bred traditional varieties, and 20% of which used to come from public sector seed breeding stations and seed farms. India's food security has been based on the diversity of seeds and on the public supply system, both at the community and state level.

For developing and providing the quality seed of improved cultivars & hybrids in adequate quantity the partnership of public and private sector on mutually agreeable appropriate terms will be a very desirable preposition.

Efforts have already been initiated in this direction. Recently Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur has also entered into a MOU

with DHANKUA, New Delhi for facilitation of production and distribution of hybrid seeds of rice.

9. **Role of Government Agencies**

   National Seed Corporation, State Seed Farm Corporation and Seed Certification Agency, SAUs are playing vital role in seed production and distribution. These need to be strengthened to play their role more confidently, transparently and trustably.

10. **Broadening the interval of change of the quality seed requirement**

    Training and strong assistance to farmers in maintenance of purity and safe storage of seeds is needed in order to increase the interval of requirement of change of seed. This will reduce the total quantity of seed required by individual farmers thus facilitating spread of quality seed over larger area.

    Production can be stabilized with the development of good improved, short duration varieties and crop management technologies available for different situations.

11. **Break-up Monopoly**

    It is essential to find some way to avoid the emergence of a single all powerful parastatal monopoly. One alternative may be to foster competing parastatals, another would be to provide for seed importation by companies, other than the seed production parastatal. The apparent confusion due to imbalance in seed supplies from different sources is a small price to pay for avoidance of the policy inertia and bureaucratic procedures which characterize dominance of an industry by a single parastatal, or other forms of central planning.

12. **Remove Barriers to Entry**

    It is important to ensure that there are no unnecessary barriers to entry of private firms into the industry, that government not impose regulations that prevent the private sector from functioning efficiently; and that the private sector has equal access to improved seeds and germplasm produced from the research system. It is not necessary to have an active pro-private policy stance; but it is essential not to have an anti-private sector stance.

13. **Subsidy**

    Under no circumstances should a subsidy be used to give differential advantage to the public sector. Any subsidy should be available to all.

14. **Extension for seed replacements**

    Now there is strong need to motivate farmers for seed replacements. After sincere efforts there was not significant increase in SRR. All the issues related with SRR may be communicated effectively by all means of extension as given below.

A. **Kisan Call Centre (KCC):** KCC may play very major role for convincing farmers for use of quality seeds. Every KCC is receiving farmer's calls frequently so they could be informed about the latest varieties released and their availability.

B. **FLD's:** Farmers do not believe without seeing so that Krishi Vigyan Kendra can conduct Field Level Demonstration (FLD) to show the yield increase due to use of quality seeds.

C. **ATIC:** Agricultural Technology Information Centre (ATIC) is the single window system for providing technology support and input to the Farmers. Farmers are visiting ATIC for purchase of seeds etc. So this may be increased by providing technical support.

D. **E-Media:** In this information era use of internet, Kiosk and SMS, voice messages will be very helpful in promotion of seed replacements. Success story of farmers who are using quality seeds and getting maximum profit may be digitized and shown to farmers. Kiosks with success stories and availability of seeds may be installed at Mandies , KVK or Rural Bank's or Cooperatives for farmers use.

(E) **Seed Hub**- Seed hub project for pulses being implemented through the KVKs of selected districts may help to increase SRR.

शुष्क और अतिशुष्क क्षेत्रों में कृषि उत्पादों का प्रसंस्करण मूल्य संवर्धन एवं विपणन

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परिचय

भारत एक कृषि प्रधान देश है, जिसमें शुष्क खेती का 60% से अधिक योगदान है। शुष्क और अतिशुष्क क्षेत्रों में कृषि पैदावार बढ़ाने के साथ-साथ किसानों की आय को 2022 तक दुगुना करने के लक्ष्य को पूरा करने के लिये न केवल सामन्वित खेती के अवयवों (जैसे फसल उत्पादन, बागवानी, पशुपालन, मुर्गीपालन, वानिकी) को अंगीकृत करना जरूरी है बल्कि कृषि एवं पशुओं से प्राप्त होने वाले उत्पादों के प्रसंस्करण द्वारा मूल्य वृद्धि करना भी आवश्यक है। चूँकि भारत निरन्तर बड़ी मात्रा में विदेशों से खाद्य प्रसंस्कृत उत्पाद आयात कर रहा है जबकि वर्तमान में देश में लगभग 370 अरब डॉलर मूल्य के खाद्य पदार्थों की खपत हो रही है जिसके वर्ष 2025 तक एक ट्रिलियन डॉलर के स्तर पर पहुँच जाने की संभावना है। आम तौर पर देखा जाता है कि, उचित मूल्य के अभाव में किसान अपनी मेहनत से तैयार कृषि एवं पशु उत्पादों को सड़क के किनारे फेंक देता है या फसलों को खेतों में ही छोड़ देता है, इस स्थिति में किसानों को आर्थिक सम्बल प्रदान करने में खाद्य प्रसंस्करण क्षेत्र महत्वपूर्ण भूमिका का निर्वाह कर सकता है। यह एक ऐसा क्षेत्र है जिसमें लघु एवं वृहद स्तर पर कारोबारी निवेश की अत्यधिक संभावनाएँ हैं। यदि इस क्षेत्र का विस्तार किया जाए, साथ ही विशेषत: ग्रामीण क्षेत्रों में छोटी खाद्य प्रसंस्करण इकाइयों की स्थापना की जाये तो किसानों, सूक्ष्म-उद्यमियों एवं महिलाओं के लिये रोज़गार की अपार संभावनाएँ हो सकती है। लेकिन एक सफलतम प्रसंस्करण इकाई की सफलता तब ही संभव है जब उद्यमी यह सुनिश्चित कर ले कि जो प्रसंस्करण इकाई वे स्थापित करने जा रहे हैं, उनके लिये एक उपयुक्त व्यापार योजना (बिजनेस प्लान) तैयार किया जाए, साथ ही जो उत्पाद वे तैयार करेंगे उन्हें बेंचने के लिये एक उत्तम बाजार मिल सके। एक सफलतम उद्यमी को स्टार्ट अप के समय इस बात का भी निर्धारण कर लेना चाहिये कि व्यापार में होने वाले जोखिम से सामना करने में सक्षम हो। दुर्भाग्यवश होने वाले जोखिम से निपटने के लिये उद्यमी को प्रसंस्करण इकाई का बीमा करवाना आवश्यक है। खाद्य प्रसंस्करण द्वारा रोजगार के अवसर उपलब्ध कराने के साथ - साथ कृषि में विविधता, पोषण स्तर, खाद्य सुरक्षा एवं निर्यात को भी बढ़ावा दिया जा सकता है।

खाद्य प्रसंस्करण का तात्पर्य ऐसी क्रियाओं एवं विधियों से है जिसमें कृषि एवं पशु उत्पादों का प्रसंस्करण कर उनका मूल्यवर्धन किया जाता है। प्रसंस्करण में सम्मिलित विभिन्न विधियों (जैसे साफ करना; किण्वन करना; काट कर धूप में सुखाना; नमक, शक्कर, तेल मिलाना; डिब्बाबंदी करना; भूनना; धुएं में पकाना; भाप में पकाना इत्यादि) द्वारा प्रसंस्कृत उत्पादों के शेल्फ़-जीवन को बढ़ाया जा सकता है।

मूल्य संवर्धन खाद्य प्रसंस्करण की विभिन्न विधियों द्वारा कृषि उत्पादों के गुण, मात्रा एवं भौतिक स्वरूप में परिवर्तन करके अनेक नये उत्पाद बनाकर उनके मूल्य में वृद्धि करके अधिक लाभ कमाना है । तथा मूल्य संवर्धित उत्पाद वे कच्चे कृषि उत्पाद/पदार्थ हैं, जिन्हें प्रसंस्करण की विधियों का उपयोग करते हुये इस प्रकार से परिवर्तित किया जाता है, ताकि उन उत्पादों को बेंचने पर बाजार मूल्य में अधिकतम इजाफ़ा किया जा सके साथ ही उन उत्पादों को

1 विषय विशेषज्ञ (कृषि प्रसार शिक्षा), 2 विषय विशेषज्ञ (शस्य विज्ञान), [3] विषय विशेषज्ञ (गृह विज्ञान)
कृषि विज्ञान केन्द्र, स्वामी केशवानन्द राजस्थान कृषि विश्वविद्यालय, पोकरण, जैसलमेर- ३४५०२१

लम्बे समय तक संरक्षित रखा जा सके।

फसल उत्पादों का मूल्य संवर्धन

ज्वार, बाजरा, मक्का, कपास, मूंगफली, जीरा, ईसबगोल, अरंडी, दालें एवं तिलहन शुष्क और अतिशुष्क क्षेत्र की प्रमुख फसलें हैं | इसलिये मूल्य संवर्धन के लिये स्थानीय स्तर पर प्राथमिक उत्पाद (कच्चा माल) सुगमता से उपलब्ध हो जाता है, जिसे प्रसंस्करण कर अनेक मूल्य संवर्धित उत्पाद तैयार किये जा सकते है। विभिन्न फसलो के दानों जैसे -गेंहू, बाजरा, मक्का, जौ आदि से आटा मील स्थापित करके आटा, मैदा, सूजी इत्यादि मूल्य वर्धित उत्पाद तैयार किये जा सकते हैं। गेहूं एवं बाजरा से बने पास्ता, नूडल्स, बिस्किट, ब्रेड, केक और अन्य बेकरी उत्पादों की तेजी से बढ़ती हुई माँग को देखते हुये बेकरी उद्योग स्थापित कर रोजगार के अवसर सृजित किये जा सकते है। दलहनी फसलों जैसे मूँग, चना, मोठ आदि से दालें तैयार की जा सकती है। चना की दाल से बेसन बनाया जा सकता है। मूँग, चँवला, सोयाबीन इत्यादि दालों से बड़ियाँ बनाकर भी मूल्य संवर्धन किया जा सकता है। मूँग, उड़द आदि से लज़ीज पापड़ तैयार किया जा सकता है। मूंगफली और चना के दानों से भूनकर तैयार किए गए स्वादिष्ट नमकीन दानो की भी बाजार मे अत्यधिक मांग है। चना और मोठ से स्वादिष्ट नमकीन बनाई जा सकती है। इस समय व्यापक स्तर पर सोयाबीन से दूध, दही, पोहा और पनीर बनाकर इसका प्रसंस्करण किया जा रहा है। कपास के बीजो से रुई अलग करके और उसका श्रेणीकरण कर बेचने से अधिक मुनाफा मिलता है। जीरा एवं सौंफ से सुगंधित तेल तैयार कर अत्यधिक आय प्राप्त की जा सकती है। शुष्क क्षेत्र की औषधीय फसल ईसबगोल से तैयार भूसी का भी औषधीय महत्व है जिसे बाज़ार मे बेचकर अत्यधिक मुनाफा कमाया जा सकता है। सरसों, मूँगफली, तिल के बीजों से तेल निकाला जाता है, जिसका उपयोग खाद्य तेल के रूप में, साबुन बनाने एवं सौन्दर्य प्रसाधन उत्पाद बनाने में किया जाता है । सरसों, मूंगफली, अरंडी, कपास आदि से तेल और पशुओं के लिए खल तैयार कर सकते है। तेल और खलियाँ दोनों ही उत्पादों का विपणन कर आय को बढ़ाया जा सकता है। गेहूँ, जौ आदि फसलों के छिलकों से पशुओं के लिए चोकर तथा मूँग, मोठ, चना आदि दलहनी फसलों के छिलकों से पशुओं के लिए चूरी बनाकर अनेक पशु खाद्य पदार्थ तैयार कर सकते है, जिनका उपयोग पशु आहार के लिए करके पशुओं के स्वास्थ्य में भी सुधार किया जा सकता है।

बागवानी क्षेत्र में मूल्य संवर्धन

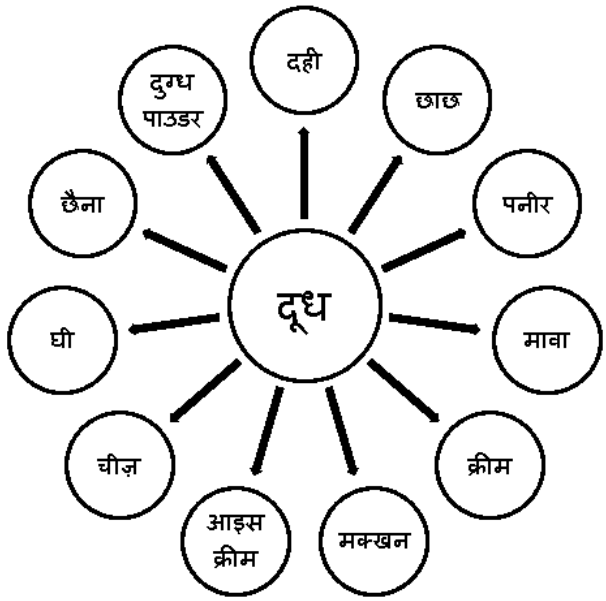
विश्व में फल एवं सब्जी उत्पादन में भारत का द्वित्तीय स्थान है और इस कुल उत्पादन का केवल 10% ही प्रसंस्करण के रूप में उपयोग हो रहा है, जबकि विकसित देशों में 40 से 80% हिस्सा मूल्य संवर्धन के लिये उपयोग किया जा रहा है, अत: इस स्तर पर पहुचकर ही कटाई एवं तुड़ाई के बाद होने वाले नुकसान से बचा जा सकता है । फल, फूल व सब्जियों की खेती से प्राप्त होने वाले उत्पादों की तुड़ाई, कटाई, छंटाई, श्रेणीकरण एवं पैकिंग से लेकर विपणन तक के अधिकतर कार्यों में मानव श्रम की आवश्यकता अधिक होती है। इसलिये इस क्षेत्र से ग्रामीणों को रोजगार मिलने की भी अधिक सम्भावना है। रोजगार मिलने के साथ-साथ फल फूलों व सब्जियों में प्रसंस्करण विधियों का उपयोग करके उत्पादों की गुणवत्ता को बढ़ाकर अधिकतम लाभ भी कमाया जा सकता है। आम, काचरी, सांगरी, केर, गुन्दा (लहसुवा), मिर्च, निम्बू, आँवला इत्यादि से स्वादिष्ट आचार तैयार किये जा सकते हैं । साथ ही आँवले से मुरब्बा, कैंडी, चूर्ण, च्यवनप्राश, चटनी इत्यादि उत्पाद तैयार किये जाते है, जिनका बाजार भाव भी अधिक मिलता है। फलों से शर्बत, जैम, जेली, ज्यूस व स्क्वैश आदि उत्पाद बनाकर अतिरिक्त आय प्राप्त की जा सकती है। आलू को छाया में सुखाकर उससे चिप्स बनायी जा सकती है। टमाटर से सॉस, केच-अप, सूप इत्यादि उत्पाद आय के अच्छे स्त्रोत है। लहसुन और अदरक से पेस्ट, चटनी इत्यादि तैयार कर अतिरिक्त मूल्य अर्जित किया जा सकता है। क्षेत्र विशिष्ट सब्जी पंचकूटा के लिए केर, सांगरी, कुमट, गुन्दा, केरी आदि का प्रसंस्करण कर अत्यधिक लाभ कमाया जा सकता है। साथ ही सूखे हुए केर, सांगरी, काचरी और ग्वार फली भी बाज़ार मे अत्यधिक मूल्य पर बेची जाती

है। खजूर के प्रसंस्करण द्वारा छुहारा, जैम, खजूर बर्फी इत्यादि उत्पाद तैयार किए जा सकते है, जिनकी बाजार में भी अत्यधिक मांग है। फलीय वृक्ष बेर से भी कैंडी बनाई जा सकती है । अनार से अनारदाना, अनार ज्यूस उत्पाद बनाये जा सकते है तथा अनार के छिलकों के पाउडर का उपयोग औषधि के रूप में किया जाता है। शुष्क क्षेत्रों में ग्वारपाठा (एलोवेरा) एवं गुग्गल की खेती व्यावसायिक उद्देश्य की दृष्टि से लाभकारी है, एलोवेरा से अनेक औषधीय, हर्बल और कॉस्टमेटिक उत्पाद तैयार किये जाते है और गुग्गल से राल (गोंद) प्राप्त कर अतिरिक्त आय प्राप्त की जा सकती है।

चित्र: केर संगरी मे मूल्य संवर्धित उत्पाद

दूध एवं पशु उत्पादों का मूल्य संवर्धन

शुष्क क्षेत्रों में निवास करने वाले किसानों/युवाओं का जीवन खेती के साथ-साथ पशुपालन पर भी निर्भर है । जलवायु की विषम परिस्थियियों के कारण फसल खराब होने की स्थिति में किसानों के जीवन यापन के लिये पशुपालन ही एकमात्र सहारा होता है। लेकिन जब किसान पशु से प्राप्त होने वाले प्राथमिक उत्पाद, दूध से मूल्य संवर्धित उत्पाद तैयार करेंगे तो निश्चित ही उनकी आय में वृद्धि होगी। दूध से अनेक महंगें उत्पाद जैसे - क्रीम, मावा, पनीर, छैना, दुग्ध पाउडर, मक्खन, घी, मावे, आइसक्रीम, बटर, चीज़ इत्यादि अधिक बाजार मूल्य वाले उत्पाद तैयार किये जा सकते है। किसान डेयरी उद्यम द्वारा आय को बढ़ा सकते है। पशुओं के गोबर और फसल अवशेषों के उपयोग द्वारा केंचुएँ की खाद (जैव उत्पाद) तैयार करके अतिरिक्त आय प्राप्त की जा सकती है। पशुओं से प्राप्त होने वाले अपशिष्ट का उपयोग गोबर गैस संयंत्र में करके ईंधन एवं स्लरी प्राप्त की जा सकती है। इसके अलावा पशुओं के बाल, उनके माँस चमड़े एवं हड्डी पर आधारित उद्योगों द्वारा रोजगार बढ़ाने की प्रबल सम्भावनाएँ हैं।



रेखा चित्र: दूध से तैयार मूल्य संवर्धित उत्पाद

विपणन

“विपणन उन समस्त आपसी प्रभावकारी व्यवसायिक क्रियाओं की सम्पूर्ण प्रणाली है जो विद्यमान एवं भावी ग्राहकों की आवश्यकताओं को संतुष्ट करने वाले उत्पादों तथा सेवाओं का नियोजन करने, मूल्य निर्धारण करने, प्रचार-प्रसार करने तथा वितरण करने के लिए की जाती है “(विलियम जे. स्टेन्टन)।

किसान एवं सूक्ष्म-उद्यमी खाद्य प्रसंस्करण या मूल्य

संवर्धन द्वारा उत्पाद/पदार्थ तो तैयार कर लेते हैं, किन्तु तैयार उत्पादों को बेंचने के लिये बाजार (मार्केट) उपलब्ध न होना उनके लिये एक बहुत बड़ी समस्या होती है । इसलिये किसानों के लिये यह जरूरी है कि वे स्टार्ट अप से पहले सुनिश्चित कर ले कि प्रसंस्कृत उत्पादों को बेचने के लिये बाजार उपलब्ध है या नही ? तथा जिन उत्पादों के लिये बाजार आसानी से मिल जाये, ऐसे उत्पाद ही तैयार करें, जिससे किसानों की आय में मुनाफा हो सके । वर्तमान में उद्यमियों को अपने उत्पादों को बेंचने के लिये अनेक बाजार उपलब्ध होते है जैसे- स्थानीय बाजार, खुदरा बाजार, ई कॉमर्स वेबसाइट, ऑनलाइन बाजार इत्यादि । लेकिन समस्या यह है कि जानकारी के अभाव में किसान/उद्यमी केवल स्थानीय बाजार तक ही सीमित रहता है, इस कारण से उसे अपने द्वारा तैयार उत्पाद का उचित मूल्य नही मिल पाता है। अत: अत्यधिक मुनाफ़ा कमाने के लिये उद्यमी को बाजार मांग को देखते हुये ई कॉमर्स वेबसाइट एवं ऑनलाइन बाजार कि तरफ रुख कर लेना चाहिये, जिससे उद्यमी को उसके द्वारा तैयार किये गये उत्पाद का अधिकतम मूल्य मिल सके।

सूचना एवं संचार तकनीक का मूल्य संवर्धन मे महत्व

खाद्य प्रसंस्करण या मूल्य संवर्धन को सफल बनाने के लिए यह अति आवश्यक है कि किसान/उद्यमी जिस प्रसंस्करण इकाई की स्थापना कर रहे है, तथा जिन प्राथमिक उत्पादों का मूल्य संवर्धन कर रहे है, उनके बारे मे सम्पूर्ण जानकारी एवं ज्ञान होना आवश्यक है। मूल्य संवर्धन द्वारा अधिकतम लाभ कमाने के लिए सूचना एवं संचार प्रौद्योगिकी (आई.सी.टी.) का महत्वपूर्ण योगदान है। आज के इस आधुनिक युग मे ज्ञान प्राप्ति के लिये सूचना एवं संचार प्रौद्योगिकी के विभिन्न अवयवों जैसे टेलीविज़न, रेडियो, कम्प्यूटर, मोबाइल फोन, इन्टरनेट, गूगल, व्हाट्सएप, कृषि संबन्धित मोबाइल एप, यू ट्यूब इत्यादि का इस्तेमाल बहुतायत से बढ़ रहा है, जिनमें स्मार्ट (एंडरोइड) फोन के उपयोग ने सूचना एवं संचार के क्षेत्र में क्रांति ला दी है। आज किसान/ उद्यमी कहीं भी खाद्य प्रसंस्करण या मूल्य संवर्धन की तकनीकों, नवीनतम विधियों, विपणन, मूल्यों इत्यादि के बारे मे शीघ्रता से जानकारियाँ प्राप्त कर सकते हैं और सूचना के अभाव में होने वाली क्षति से बच सकते हैं ।

निष्कर्ष

खेती को लाभदायक बनाने के लिये यह आवश्यक है कि किसान कटाई के बाद कृषि एवं पशु उत्पादों को सीधे रूप से बेचने की बजाय मूल्य संवर्धन करके बाजार मे बेचेंगे तो उन उत्पादों का अधिक मूल्य मिलेगा। अत: किसानों, युवाओं एवं महिलाओं के लिये यह आवश्यक हो जाता है कि वे व्यक्तिगत रूप से कार्य करने के बजाय समूह बनाकर कार्य करें। जिससे समूह के सदस्य स्थानीय स्तर पर लघु और कुटीर उद्योग इकाइयों की स्थापना करके आत्मनिर्भर बन सकें। वर्तमान में किसानों के प्रोत्साहन के लिये विभिन्न प्रसंस्करण इकाइयां स्थापित करने हेतु सरकार द्वारा विभिन्न योजनाओं के तहत अनुदान भी प्रदान किए जाते है। जिससे किसानों को उद्योग इकाइयों के स्टार्ट अप के लिये आर्थिक सहायता मिल जाती है। स्पष्ट रूप से यदि किसान सभी समस्याओं का निवारण करते हुए आगे की राह प्रशस्त करें तो भारत में भी खाद्य प्रसंस्करण उद्योग को एक रोज़गार उत्पन्न करने वाले, किसानों की आय में वृद्धि करने वाले, उपभोक्ताओं को ज़रूरत के उत्पाद समय पर उपलब्ध कराने वाले तथा देश की खाद्यान संबंधी आवश्यकताओं को पूरा करने वाले महत्त्वपूर्ण घटक के रूप में सूचीबद्ध किया जाने लगेगा। अत्यंत संभावनाशील उद्योग के रूप में यह क्षेत्र न केवल कृषि क्षेत्र के विकास में सहायक होगा बल्कि, पोषण की दृष्टि से भी अत्यधिक लाभकारी साबित होगा। प्रसंस्करण क्षेत्र मे सबसे बड़ा लाभ किसान/उद्यमी के जीवन स्तर एवं उनकी कार्य कुशलता मे सुधार और उनके आर्थिक लाभ मे वृद्धि से होगा। इससे किसानों की आजीविका मे एक बड़ा बदलाव होगा और किसान वर्ग अपने आप को वैश्विक बाज़ार मे अधिक मजबूत महसूस करेगा।

Cusat gets patent for banana plant protection device

Cochin University of Science and Technology (Cusat) has received Indian patent for 20 years for its Portable Agriculture Network System (PANS) intended to protect flexi-stem trees such as banana plants. The device is a boon to banana farmers haunted by killer storms frequently.

MB Santosh Kumar, Associate Professor in the IT division, is the inventor and B Kannan, Professor & former HoD of Computer Applications, and Sunil Kumar N, Principal of Cusat Kuttanad campus are co-inventors. Banana plants fall under the flexi plants perennial herb category usually having pseudo stems. Many such plants in the age group of two to eight months are prone to damage from heavy winds, leading to great loss to farmers. The team led by Santosh Kumar designed PANS, a system which is cost-effective, environment-friendly, portable and durable. In designing this system, the team considered the strength and durability of various banana fibres as well as other materials.

The cost is very low as it is designed from waste materials, including banana fibre, used conveyer belt etc.

Centre to invest ₹25,000 cr in fisheries in 3-5 years

As part of the ambitious Blue Revolution project, the Union government has lined up ₹25,000 crore to invest in different segments of the fisheries sector in the next three to five years."We are looking at three types of support by way of infrastructure development in harbours; extending subsidies to joint venture projects to set up hatcheries/nurseries/quarantine facilities as well as viability gap funding to establish processing plants, and cold chain facilities at harvest or landing sites, said Rajni Sikhri Sibal, Secretary, Department of Fisheries.

The government has already started a fishery infrastructure development fund with ₹7,300 crore, which is an interest subvention scheme, she said. As inland fisheries contribute only 50% of the total fish production, the government intends to augment its potential by covering reservoirs, wetlands, rivers and streams in different parts of the country. "We are planning to promote cold water fisheries in the entire Himalayan region to rear high-value fish varieties. Considering the low contribution of inland water fisheries, the government is looking to double its production to six million tonnes from the current three million tonnes in the next three to four years. To achieve the target, she said, quality seeds and feeds, aquatic animal health laboratories, and quarantine facilities are required.

Since maintaining the quality of Indian seafood is a major issue, she said the focus would be on ensuring quality, disease control and traceability of marine food products from "farm to fork" or from "catch to consumer." The government will soon come up with a set of protocols for preparation of feed and certification of seed, she said, adding that all these efforts would help double Indian seafood exports from over ₹47,000 crore in five years.

Under NREGA, workers to get ₹ 250 daily allowance for skill training

Taking the scope of Mahatma Gandhi National Rural Employment Guarantee (MGNREGA) scheme a notch higher, the government is set to pay a daily allowance of up to ₹250 to a casual labourer undergoing skill training for specialised work.

Starting October, the Ministry of Rural Development would train labourers enrolled in MGNREGA to upgrade their skill sets and equip them with better employment opportunities. To ensure that these MGNREGA workers attend the skill training programmes, the ministry would

make good the loss of daily livelihood of the family — to the tune of ₹200-250 daily — as the MGNREGA worker undergoes training. The ministry has tied up with Krishi Vigyan Kendras to train the MGNREGA workers in preparation of organic manure and basic storage of crop produce. The government has prepared 40-day on-site module for mason training and plumbing work also under NREGA.

Govt to launch programme to 'generate 10 lakh jobs in 5 years'

Ahead of the Assembly elections, the Maharashtra Government will launch the Chief Minister Employment Generation Programme(CMEGP) with an aim of generating 10 lakh jobs over the next five years. The programme is being launched to make the youth "self-reliant" and to "encourage them for self-employment". Harshdeep Kamble, secretary of department said the government will provide subsidy up to 35% for capital investment up to ₹ 50 lakh for a unit. "The entrepreneur has to raise 5 to 10% investment of the total cost and the remaining capital can be raised through loans," he said.

App by Pune Institute IMD to help farmers get info in local tongues

The India Meteorological Department and Indian Institute of Tropical Meteorology (IITM), Pune, have launched a mobile application that will provide location, crop and livestock-specific weather-based agro advisories to farmers in local languages. The application, called 'Meghdoot', has been developed following directions of the Ministry of Earth Sciences. Kripan Ghosh, head of the agriculture meteorology division, Climate Research and Service (CRS) Centre, IMD, Pune, told that the app was launched on the foundation day of the ministry of earth sciences.

"The users can get district-specific weather information, forecasts and crop advisories. The benefit of the app is instant access to district-specific agricultural information. For instance, crop advisories are currently circulated among farmers and put up on the IMD website in PDF format. This includes advisories for all districts. Through the app, the users can get information relevant to their respective districts," Ghosh said. The IMD's agriculture meteorology division will also start block-level weather-based agro advisories for farmers from this year.

Tea industry gasping for survival

India's 170-year-old tea industry is gasping for survival and needs the government's help to reverse the downtrend, members of the Consultative Committee of Planters' Associations said. Climate change, the CCPA said, has added to tea price stagnation, increasing labour and other input costs, mismatch between demand and supply leading to oversupply, high transaction costs and fair price discovery challenges at the auctions. The CCPA has asked the government to bail the industry out by taking over schools and hospitals in tea gardens, allowing the estates to use up to 20% of the "tea grant area" for agricultural and commercial diversification to augment income, and backing campaigns for boosting per capita domestic consumption from 786 gm, a low compared to that of other tea-consuming countries.

Second largest producer

"India is the second largest tea producer and the world's fourth largest exporter. The industry offers direct employment to 1.2 million people and supports more than 3 million dependents of tea garden workers, with women accounting for 50% of the employment. Data provided by the CCPA shows that tea production in India has increased from 1,207 million kg in 2014 to 1,339 million kg in 2018. But the average tea auction prices have remained stagnant or dipped. The price per kg was ₹130.91 in 2014, ₹128.60

the following year before increasing marginally to touch ₹138.83 in 2018.

Total cost

Each worker is paid about ₹170 per working day. Planters say the total cost with other benefits works out to more than ₹350 per day, much higher than in other countries. The resultant cost pressure is increasingly making Indian tea falling to competition from low-priced teas exported by countries such as Kenya and Sri Lanka.

Nafed, FCI procure nearly 38 lakh tonnes oilseeds and pulses under PM-Aasha

Nafed and FCI have procured nearly 38 lakh tonnes of oilseeds and pulses under the flagship PM-Aasha scheme during both kharif and rabi seasons of 2018-19 crop year (July-June), as more and more farmers prefer to sell their crops to government agencies for getting the MSP benefit. According to official data, as high as 19.7 lakh tonne have been purchased during rabi crops of 2018-19 and 18 lakh tonne during kharif. But, the overall procurement by these agencies is about 45% of the quantity approved by the government. Main rabi pulses and oilseeds include gram, mustard and masoor. Moong and urad, mainly kharif crops, are also grown in rabi season in some states. Odisha was the last state where the rabi season procurement ended on July 27 while in many other states it concluded in April.

Haryana, Rajasthan and Madhya Pradesh are the only states where procurement of rabi pulses and oilseeds is over 50% of the quantity approved by the Centre. The procurement was 96% in Haryana. But in states like Maharashtra, Karnataka and Uttar Pradesh, it is abysmally low. In Maharashtra, the procurement was just 9% of the 2.5 lakh tonne approved while Uttar Pradesh saw 0.5% of 5.2 lakh tonne sanctioned. Karnataka was a non-starter with just 33 tonne purchased under MSP out of 1.3 lakh tonne approved.

NEFT payment route to be available 24x7 from December

From December, one will not have to wait for working hours to transfer money via National Electronic Fund Transfer (NEFT). As part of its push towards digital transactions, the RBI announced that the platform will be available on a 24X7 basis, helping transfer of funds even during weekends.

Unlike the National Payments Corporation of India-(NPCI-) operated Immediate Payment Service (IMPS), NEFT transfers are processed periodically and, during working hours. Making them available round the clock will provide the fund transfer service on a real-time basis. NEFT is largely used by businesses to transfer funds with messages providing details of the transfer.

The move is in line with the RBI's vision of promoting NEFT and Real Time Gross Settlement (RTGS), which is for transactions above ₹2 lakhs. A large number of banks keep the NEFT window open between 8am and 6.30/7pm. RBI data showed that NEFT is one of the most popular tools for money transfer between two bank accounts.

The central bank announced other steps too for driving digitization in banking. It has allowed the NPCI-operated Bharat Bill Payment Services (BBPS) hub to enable payments for all recurrent billers. At present, it is available only for DTH services, electricity, gas, telecom and water bills. Allowing all billers to plug into BBPS would mean that all payment providers will be able to offer customers anytime, anywhere payment services for every biller from their own sites or locations.

Desi cattle numbers

LIVESTOCK CENSUS NUMBERS (IN MILLIONS)

	2007	2012	2019
1. Total Cattle	199.08	190.9	191.29
(a) Indigenous*	166.02	151.17	139.82
(b) Exotic/Crossbred	33.06	39.73	51.47
(a) Female Cattle	115.45	122.98	144.68
(b) Male-Cattle	83.62	67.92	46.61
2. Total Buffalo	105.34	108.07	110.17
3. Milch Animals**	111.09	118.59	125.15
4. Goats	140.54	135.17	147.77
5. Sheep	71.56	65.07	65.06
6. Pigs	11.13	10.29	8.26
Total Livestock* **	**529.07**	**512.06**	**533.02**

** includes Nondescript Cattle: "Adult cows & female buffaloes in - milk and dry. *** inludes horses, donkeys, mules, yaks and camels.*

Govt may waive off loans taken from private lenders

Ahead of the assembly elections, the Maharashtra state government is planning another incentive for farmers - proposal to waive off loans of those farmers who have borrowed from licenced private money lenders but do not live in their area of operations.

Under the loan waiver scheme, nearly 2.33 lakh farmers who had taken loans worth ₹171 crore from licenced money lenders was waived off by the state government. The state government also waived off bank loans of nearly 58 lakh farmers worth ₹23,000 crore under the scheme.

Government revises solar pumps costs before installing 17.5 lakh units

The Ministry of New and Renewable Energy (MNRE) has revised the benchmark costs of solar pumps for FY20. When the government is preparing to install 17.5 lakh stand-alone solar pumps and connect 10 lakh existing agriculture pumps with solar power through the recently approved Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan (PM–KUSUM) scheme.

Since all component purchased through the scheme will have to be manufactured domestically, it opens up a potential market of over 8,000 MW for domestic solar panels makers who are currently struggling to sustain themselves against cheaper imported products flooding the market. The MNRE has sub-divided the costs of the solar pumps into seven categories according to load bearing capacities ranging from 0.5 horse power (HP) to 10 HP. Each load category is further split into the different varieties of solar pumps, specifying separate costs for surface and submersible types. The solar pump price list for FY19 notified by MNRE had only four broad segments.

The solarisation cost of existing agricultural pumps has been set at ₹ 54 per watt for systems upto 10 kilo-watt capacity. The PM KUSUM scheme —which also wants to set up 10,000 MW of grid connected solar power plants in barren lands owned by farmers —which would receive central financial support of ₹34,422 crore. Farmers would receive 30% subsidy from the central government and 30% by the state for buying stand-alone solar pumps and solarising the existing ones. The remaining 40% capital would have to be arranged by the farmer.

Renewable energy cost in India lowest in Asia Pacific

India has emerged as the market leader with the lowest renewable energy cost in Asia Pacific, according to a report by research and consultancy firm Wood Mackenzie. According to the report, India's levelised cost of electricity (LCOE) using solar photovoltaic has fallen to USD 38 per megawatt hour (MWh) this year, 14 per cent cheaper than coal-fired power.

LCOE represents the average revenue per unit of electricity generated that would be required to recover the costs of building and operating a generating plant during an assumed financial life and duty cycle. Wood Mackenzie research director Alex Whitworth said India is the second-largest power market in Asia Pacific with installed power capacity of 421 gigawatts (GW) and solar capacity in the country is expected to reach 38 GW this year.

How to save water the old way

Uttarakhand: Stone-lined tanks

People in the hills of Uttarakhand worship naulas — fondly called water temples —which were built by the Katyuri and Chand dynasties in the 7th century. These small stone structures are meant to store water that sees rapid run-off in the hills. Trees such as madeera, banj, kharsu are planted nearby to boost water accumulation. Over 64,000 of these water retaining structures exist in the hill state out of which 60,000 have now dried up. But three years ago, one man in a remote village in Ranikhet realised the need to revive these traditional water storage systems. Bishan Singh, 42, was reeling under the sudden demise of his mother when he was told that there was no water for her funeral rites. The village in Gagas valley was experiencing a dry spell and all the naulas there were empty. “I walked several kilometres to fetch water and then vowed to revive the naulas.” He started a 'Naula Foundation' and today there are about 500 'naula warriors', working tirelessly to get them flowing again. In Almora district, they were joined by women groups and have successfully revived over 20 naulas. The women start by building a 'chaal-khaal' which is a wetland with grass and vegetation that retains groundwater. No grazing is allowed and eventually the land evolves into a wetland area helping naulas store more water. Naulas vary in size from 1 metre long to 10 metres.

To ensure naulas are not defiled, they are dedicated to Lord Vishnu and a stone idol is placed inside to protect the water.

Rajasthan: Water pits in houses

While many parts of Rajasthan remain parched every summer, Guda Bishoniyan village in Jodhpur has enough water to drink and then some. The reason: Every house here has a tanka to collect rainwater. Tankas are underground structures that store rainwater which flows into it through filtered inlets on the external wall of the structure. Depending upon the capacity of the tanka, it can store enough water to feed a family for up to seven months. But apart from tankas, the village also has man-made talaabs and beris. Bhawar Lal, a priest at a temple near a 500-year-old talaab (pond) in the village, said that every household has a tanka which has enough water to fulfill daily needs but even during a long dry spell there is enough water in beris. “We have numerous beris which are maintained and cleaned regularly.” Beris are basically wells dug up in places where percolated rainwater can get channelised towards it. While building a beri, one can stop digging after they hit clay or gypsum which prevent further percolation of the stored rainwater. The mouth of the beri is narrow to prevent loss through evaporation.

In other parts of Jodhpur, nadis or johads (small ponds) have kept water crisis at bay. Nadis collect water from

an adjoining natural catchment during the rainy season and it can last for several months. In Bhagtasni village near Jodhpur, nadis have served as a lifeline for several years.

Kerala: Horizontal wells, palm tanks

No temples are as revered in Wayanad as the unassuming kenis — centuries old mini wells — that have ensured water for the MulluKuruma tribe even during the harshest of summers. Kenis are cylindrical structures dug a metre-deep that are ringed with a wooden wall made of toddy palm (caryotaurens). Most of the kenis are centuries old and located in wetlands where the water table is near or above the ground level and water emerges as a spring. A study by the Centre for Water Resources Development and Management (CWRDM), Kozhikode, had shown that some kenis still yield more than 1,000 litres a day throughout the year. Girish Gopinath, an associate professor at Kerala University of Fisheries and Ocean Studies (KUFOS), who was involved in the CWRDM study as a senior scientist, said that water drawn from kenis meets drinking standards. The significance of kenis is deeply rooted in the MulluKuruma culture and tradition.

Some 200km away, in Kasaragod, horizontal wells or 'surangas' have fed water to a large population for centuries. C Kunjambu, the 'waterman' of Kasaragod, is credited with reviving this traditional method of harvesting in these parts as well as neighbouring Karnataka. In Kasaragod alone, over 1,000 surangas have been built by Kunjambu over the past 50 years.

Centre launches fertiliser DBT 2.0 initiatives

The government has rolled out new point of sales (PoS) software and desktop version of the PoS machine with added features like Soil Health Card (SHC) data as part of what it termed as DBT 2.0 in fertiliser subsidy with the long-term objective of transferring the sop directly into the bank accounts of farmers.

In October 2017, the government had rolled out DBT for fertiliser. But unlike other schemes, the subsidy is being transferred to fertiliser companies on the basis of actual sales taking place at retail outlets which are captured through the PoS machines. The government has also made Aadhaar Card mandatory for sales of subsidised fertiliser to check duplication and diversion.

The DBT 2.0 initiatives — a dashboard with details of fertiliser supply, availability and requirement at national, state and district level — are advanced version of PoS software and a desktop PoS version. The government has been able to curb leakage and black marketing of fertilisers because of DBT. The PoS machines have been installed in 2.24 lakh retail fertiliser shops in the country. Now, the desktop PoS version will work as an alternative in case there is a technical glitch in the PoS device.

Sahyadri Farmer Producer company claims to be largest grape exporter in 2018-19 season

Sahyadri Farmer Producer Company Ltd (SFPCL) said that it had exported 22,000 tonne (1,459 containers) of grapes to various overseas markets during the season of 2018-19. This makes it the largest grape exporter in India. Sahyadri Farms contributes 15% to the country's grapes export. SFPC is among the major farmers' producer companies in India with more than 8,000 marginal fruit and vegetable farmers. As much as 63% of the total farmer population in India is made up of growers with less than 1 hectare of land and Sahyadri provides the infrastructure to allow even the smallest farmers to be part of a global supply chain, chairman & managing director Vilas Shinde said.

The company has facilities in Mohadi, Nashik, with 6,000 tonne of cold storage facilities and has the capability to pack 250 tonne per day in a pack house

THE KARNATAKA STATE CO-OPERATIVE AGRICULTURE AND RURAL DEVELOPMENT BANK LTD.

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Advances (From inception to 30-09-2019)	Over ₹6011.68 crores
No. of loan cases sanctioned as on 30-09-2019	18.54 lakhs
Share of Small & Marginal Farmers in Bank's financial assistance.	68.66%
Fixed Deposits outstanding as on 30-09-2019	**Rs.319.08Crores**

Strikingly Innovative Programmes Introduced By The Bank

- Non-Farming Rural Enterprises, Rural Housing, S.R.T.O.
- Sericulture, Integrated Horticulture/ Floriculture, Medicinal Plants, Individual Dairy Development and Sheep / Goat rearing / Poultry / Piggery / Rabbit Rearing / Fisheries and Fishing Boat
- Big and Small Lift Irrigation Schemes
- Rural Godowns / Agri Clinic & Agri Business Centres
- Purchase of Agriculture Lands
- Solar Lights / Solar Pumps
- Purchase of Two Wheelers
- Rain Water Harvesting Structures
- Vermi Compost Units
- Bio-digester
- Farm Mechanisation
- Combined Harvester
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2. Two years and above 9.50%
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K. Shadakshari, Ex-MLA President	**Ingulambika V. Sarode,** K.C.S. Secretary I/C	**A. C. Diwakara,** K.C.S. Managing Director

system employing 2,000 labour on a daily basis. SFPC is among the country's largest Global GAP certified groups. The group's retail chain extension — Sahyadri Farms — has set up company-owned retail stores for fresh and quality fruits and vegetable. There are 10 stores in function at New Mumbai and Nashik. In the next two years, Sahyadri intends to set up 200 retail outlets.

Sahyadri Farms, the country's largest FPC, had signed an agreement with Jupiter and started a new era in the agricultural sector of the country. As the first table grape breeding programme to enter India, Grapa Varieties, which commercialise the ARRA varieties on behalf of Agriculture Research & Development, is also part of this venture. After experimenting with ARRA varieties in the region of Nashik on test blocks, the company plans to cultivate ARRA plants by the end of 2019 and to scale it up by an additional 2,000 hectare by the end of 2023. Volume harvest is expected as early as 2020 for export to global markets. This includes many varieties of green, black and red grapes.

Budget 2019-20 The road to agriculture and rural prosperity

A truly agriculture and rural development-focused Budget, it has adequately met the twin objectives of growth and inclusiveness. The crux of the Budget is 'sustainability' in every aspect, be it agriculture practices or economic viability.

An announcement of formation of 10,000 new FPOs over the next five years is a step towards the same. With this, the economies of scale can be harnessed to achieve the goal of doubling farmer's income by reduction in input costs and assuring better price realisations by the farmers for their output.

The incentives proposed for women SHGs besides leading to livelihood generation and women empowerment, will also nurture first-generation entrepreneurs through the MUDRA loans of ₹1 lakh. The government's impetus is to promote non-farm activities to boost economic viability of farmers. Owing to climate change challenges, it has become imperative to explore viable and sustainable non-farm means of income generation. A new scheme — Pradhan Mantri Matsya Sampada Yojana — will give enough confidence to those who are in fisheries sector, to enhance their income with better fisheries management, infrastructure creation, increasing production and productivity, improved post-harvest management bringing economic viability of the sector.

As the government wants to extend the parameters of ease-of-doing business and ease-of-living to the rural areas too, the emphasis of 'Gaon, Garib and Kisan' will see the uplift of rural lives of farmers and the poor, equally. Another new scheme — SFURTI — is an attempt in this direction.

Rural artisans have received a holding hand from the government in a cluster-based development approach that will upgrade regional and traditional industries, benefiting about 50,000 artisans. Now, under Pradhan Mantri Gram Sadak Yojana, a road network of 1.25 lakh km will bring more villages to rural markets. Enhancing the prospects of agripreneurs, the ASPIRE scheme will create 50,000 skilled rural entrepreneurs, especially in the rural agriculture sector.

Power generation

To expand the income sources of farmers, there is a proposal to enable them to take up power generation activities on their field to transform the Annadata to an Urjadata. In the dairy sector, cooperatives will be encouraged to create infrastructure for cattle field management, milk production, processing and marketing.

For relieving farmers from uncertain prospects, the States will be forced to implement e-NAM mechanism for better operations under the APMC Act.

The concept of zero-budget farming, will boost the confidence of farmers. With conventional means, the farmers will be able to enhance their income levels by keeping the input costs under control. The goal of "HarGhar Jal" by 2024 shows the sensitivity to the issue of water availability and its scarcity, equally. Striking a balance between the demand and supply of clean water, we can see a robust infrastructure being created for tackling ground-water recharge, rain water harvesting, etc., a regulatory framework will be needed to implement this resolve. Integration of funds from various Ministries to fund the Jal Shakti Abhiyan may see critical water blocks being regained. In a nutshell, 'sustainability' has largely remained at the centre of this Budget.

Using genes to understand rice blast disease resistance in Indian rice varieties

Rice blast, caused by a fungus Magnaportheoryzae, is one of the major diseases of the rice crop. Now, researchers from ICAR-National Rice Research Institute (NRRI), Odisha have mapped out the diverse genes in rice that help in disease resistance.

By characterising over 150 rice varieties from nine States across the country they also identified new markers associated with blast resistance.

The seeds of landraces grown over nine states were collected from the National Gene Bank, ICAR-NRRI, Cuttack. Leaves' resistance to blast disease was checked by growing the seeds in uniform blast nursery for two wet seasons (2015 and 2016) at the experimental farm of the institute. This farm is considered as the hot spot for leaf blast disease and the disease was recorded 25 days after sowing.

The present study showed that the rice landraces collected from north-eastern states of India had the highest resistance. Dr. Yadav explains that this may be due to co-evolution of resistance genes along with the fungal pathogen over several centuries.

The study also pointed out that rice varieties in the same ecological conditions can have different resistant/susceptible behaviors. The combination of screening and molecular characterization will help in the identification of potential donors for leaf blast.

80% rural India waits for piped water

Government had launched NRDWP in April 2009. In 2013, guidelines were updated to focus on piped water supply. A CAG report on NRDWP pointed out the scheme that was supposed to provide piped water connection to 35% of rural households by 2017, had actually been able to provide piped water connections to barely 18.3% of rural households by end of 2018-19. Data shows the slow progress under this scheme. In 2014-15, just 13.3% of India's 17.8 crore rural households had piped water connection. In the past five years this improved by just over 5 percentage points.

Worse, the number of new connections each year has declined. In 2014-15, over 17 lakh new connections were provided. This slid to just 6.3 lakh new connections in 2017-18 before an uptick in 2018-19 to 9.7 lakh. The CAG report pointed out that between 2012 and 2017, ₹81,168 crore was spent on this programme and yet it could barely achieve half the target.

Only 5 states and one UT manage to provide piped water to at least half their rural population. Among large states, Odisha, Assam, Bihar, and UP, piped water connection is available to less than 5% of the rural population.

This sobering data provides the context in which to view Centre's declaration it will make piped water the next big focus.

HOW INDIA STAYS THIRSTY

Only 18% of India's 17.9m rural homes have tap water

Rural Households		With Piped Water Supply
17.8	2014-15	13.3%
17.7	2015-16	13.6%
17.6	2016-17	15.6%
17.9	2017-18	17.0%
17.9	2018-19	18.3%

Average size of land holdings of farmers in state — 1.34 hectare

The average size of land holdings among Maharashtra's farmers has reduced from 4.28 hectare in the 1970s to 1.34 hectare in recent years, rendering crop losses owing to drought or other causes much more critical for farmers. While in 1970-71, the number of farmers with holdings below 0.5 hectare was 6,83,400, the number of farmers with extremely small land parcels rose in 2015-16 to 43,72,200. In addition, total area of operational holdings has also reduced from 2.12 crore hectare in 1970-71 to 2.05 crore hectare.

Small and marginal holdings, or farms up to 2 hectare, account for 45% of the state's farm area and 79.5% of all operational holdings. That means nearly eight out of every 10 farmers own less than 2 hectare of farm land. As per the Agriculture Census of 2015-16, number of operational holdings and area of operational holdings was 1.53 crore and 2.05 crore hectare. In comparison, the first Agriculture Census pegged the number of holdings and area of holdings at 0.5 crore and 2.12 crore hectare. The share of women-owned operational holdings has, however, increased to 14.07%, marginally better than the all-India average of 13.87%. The average size of their land holdings is 1.22 hectare.

Biovet to invest ₹200 cr. in animal vaccines

Dairy farmers in India incur an average annual loss of ₹21,000 to ₹25,000 a year per head of cattle affected by the highly contagious foot and mouth disease (FMD). FMD brings the milk production in cattle, buffaloes and sheep down by 80% and the animal's life deteriorates, making it a burden on the farmer.

With India having the largest cattle population in the world, it requires over a 1,000 million doses of FMD vaccine but only half of it is currently made available. Malur (Karnataka)-based veterinary vaccine research and development firm Biovet currently supplies over 200 million doses while its target is to raise the vaccine production by another 300 million doses. The production facility would also churn out 100 million doses of Brucella vaccine per year.

As per Dr. Ella, founder-promoter of Biovet, dairy farmers in the country incur an annual economic loss to the tune of ₹25,000 crore because of FMD and related restriction on the export of milk, dairy and other animal products. The estimated losses per infected animal because of FMD is ₹2,023 for sheep, ₹3,046 for the goat and ₹2,830 for the pig.

According to estimates, India's Foot and Mouth Disease control programme requires 1,000 million doses of vaccine each year, whereas the current production capacity in the country is about 500 million doses. There is an unmet need for 500 million doses, and Biovet aims to fill fulfil this gap through the planned expansion.

A sum of ₹13,343 crore has been earmarked for control and eradication of diseases with a special focus on FMD and Brucellosis,'' added Dr. Ella.

GM cotton: what is allowed, what farmers sowed

What is allowed?

Bt cotton remains the only GM crop allowed to be cultivated in the country. Developed by US giant Bayer-Monsanto, it involves insertion of two genes viz 'Cry1Ab' and 'Cry2Bc' from the soil bacterium Bacillus thuringiensis into cotton seeds. This modification codes the plant to produce protein toxic to Heliothisbollworm (pink bollworm) thus making it resistant to their attack. The commercial release of this hybrid was sanctioned by the government in 2002.

In India, it is the responsibility of the Genetic Engineering Appraisal Committee (GEAC) under the Environment Ministry to assess the safety of a genetically modified plant, and decide whether it is fit for cultivation. The GEAC comprises experts and government representatives, and a decision it takes has to be approved by the Environment Minister before any crop is allowed for cultivation.

Besides Bt cotton, the GEAC has cleared two other genetically modified crops — brinjal and mustard — but these have not received the consent of the Environment Minister.

The variety now sown

The farmers in Akola planted a herbicide-tolerant variety of Bt cotton. This variety (HtBt) involves the addition of another gene, 'Cp4-Epsps' from another soil bacterium, Agrobacterium tumefaciens. It is not cleared by GEAC. The farmers claim that the HtBt variety can withstand the spray of glyphosate, a herbicide that is used to remove weeds, and thus it substantially saves them de-weeding costs. Farmers spend around ₹ 3,000-5,000 per acre for de-weeding. Along with the uncertainty in finding labour, de-weeding threatens economic viability of their crops, they say.

Climate change is severely impacting the land

IMPACTS OF CLIMATE CHANGE ON LAND

- Lands are degrading from multiple stressors.
- Heatwaves are intensifying and becoming more frequent.
- Rainfall patterns are shifting.
- Water scarcity in dry regions will become an increasingly urgent challenge beyond a global temperature increase of 1.5^{0}C.
- Climate change is already undermining food security.
- It is affecting crop yields.
- It is driving lower livestock productivity.
- It is increasing the risk of agricultural pests and diseases in some regions.

WHAT DRIVES CLIMATE CHANGE

- Agriculture, deforestation and other land use are significant drivers of climate change.
- Together they produce about 23% of human-caused emissions.
- Deforestation and food production are often tied together as forests are cleared for agriculture.
- The global food system contributes up to 37% of global greenhouse gas emissions, primarily through raising cattle and other ruminants, cultivating rice and applying fertilizer to pastures and rangelands.

POSSIBLE SOLUTIONS

- Adopting farming practices that work with nature.
- Eliminating food waste.
- Eating a balanced diet.
- Switching to balanced and diversified diets rich in plantbased food and sustainably produced animal sourced food.
- Halting deforestation and restoring damaged ecosystems.

(Source: Climate Change and Land, A Special Report by the Intergovernmental Panel on Climate Change (IPCC)

Climate change may hit banana cultivation in India

Climate change may lead to a significant decline in banana production in India, the world's largest cultivator and consumer of the crop, according to a study. Bananas are the most important fruit crop, providing food, nutrition and income for millions in both rural and urban areas across the globe.

Fewer studies

While many reports have looked at the impact of climate change on agricultural production, the effect of rising temperatures and changing rainfall pattern on crucial tropical crops such as the banana is less well-understood. Researchers, led by Dan Bebber from the University of Exeter in the UK, studied both the recent and future impact of climate change on the world's leading banana producers and exporters.

Favorable change

The study shows that 27 countries – accounting for 86% of the world's dessert banana production – have on average increased crop yield since 1961 due to changing climate, resulting in more favorable growing conditions. However, the study, published in the journal Nature Climate Change, suggests that these gains could be significantly reduced, or disappear completely, by 2050 if climate change continues at its expected rate. It suggests that 10 countries – including India and the fourth largest producer, Brazil – are to see a significant decline in crop yields.

Global trade

It showed that by 2050, any positive effects of climate change on average global banana yields. Ten countries include some of the largest producers such as India and Brazil, as also Colombia, Costa Rica, Guatemala, Panama and the Philippines, which are major exporters are predicted to show at least a negative trend, if not strong declines in yields.

Rivulis app-based solution for drip irrigation

Rivulis Irrigation India, part of the global micro irrigation company Rivulis Israel, has launched its customised app Manna, a satellite-based software solution for irrigation in India. Manna Irrigation Intelligence provides site-specific irrigation recommendations at the touch of a button. Based on proprietary satellite models and sensor-free approach, Manna provides farmers with a high-resolution, integrated view of the entire field rather than reading from isolated locations.

In last three years, Rivulis has brought drip irrigation technology in the fields of over 50,000 farmers. Before downloading the app, farmers have to provide GPS location of the field, soil condition, details on crop to be grown and date of sowing.

Based on these data and weather forecast of the India Meteorological Department, the app suggest the quantum of water to be released in the field every week after taking into account the moisture and expected rainfall in the area. It also provides real-time crop monitoring maps indicating vegetation level, vegetation and wetness variability map.

Farmers have to shell out ₹600 per annum to use the app while their cost saving involve less use of water, besides lower electricity and diesel expenses. While the app is currently available in Hindi and Marathi, it will be launched in Gujarati and other languages soon. Rivulis is targeting farmers in Maharashtra, Karnataka, Gujarat, Uttar Pradesh and parts of Tamil Nadu focussing on crops such as cotton, sugarcane, pomegranate, grapes and tomatoes.

Currently, drip irrigation is used on about 11 million hectares while the government has set a target to bring another 10 million hectares under drip irrigation in next five years. The country has the potential to bring about 70 million hectares under drip irrigation.

Kharif food production will fall, say 2 out of 3 projections

There is no consensus in the projections for kharif foodgrain production in 2019, with three major players in the agricultural space reading the impact of erratic rainfall in the current season differently.

Production estimates for major kharif crops

(in million tonnes)

Crop	2018-19 4th Advance Estimate (Agri Ministry)	NCML projections for 2019-20	Skymet projections for 2019-20
Rice	102.13	101.39	88.66
Cotton*	28.71	35.77	34.21
Pulses	8.60	8.66	8.53
Soyabean	13.79	13.84	11.99

*in million bales of 170 kg each

Bumper cotton crop

Skymet anticipated a bumper cotton crop of 34.21 million bales, an increase of 14% over the previous year, while the yield of rice and soyabean may fall by 13 and 12.5%, respectively. Pulses production may dip marginally by 0.5%, according to Skymet. Floods in rice-growing States such as Assam and Bihar and a rain deficit in West Bengal and other Eastern States may adversely hit rice output. Similarly, excess rains in a few districts in Madhya Pradesh and Maharashtra are expected to impact soyabean yields adversely, it said.

NCML, agreed that cotton farmers will have a bountiful harvest this season with output going up by nearly 25% as compared to the 4th advance estimates for 2018-19.

It projected the food grain production in the current kharif season at 142.4 million tonnes, marginally higher than the 141.7 million tonnes in 2018-19. According to Crisil's projections, northern States viz., Punjab and Haryana will reap the highest profit per hectare, while there would be a healthy rise in profits in Madhya Pradesh and Gujarat.

Kerala Agricultural University develops a new Vetiver variety for soil conservation

Kerala Agricultural University (KAU) has developed a new variety of Vetiver, which would be ideal for both oil yield and soil conservation. Vetiver or Ramacham, in local parlance, is an aromatic medicinal plant and is being cultivated in Kerala for oil yield along the coastal regions of around 600 acres in Chavakkad and Ponnani areas in Thrissur. The University has identified a new south Indian type Vetiver accession with profuse root growth for soil binding in sloppy lands and coastal areas. According to experts, South Indian Vetiver variety is considered to be the best quality for oil production as it help produce around 20-25 kg oil from more than five tonnes of root.

The Aromatic Medicinal Plant Research Station under KAU has found a new Vetiver type which is suited for hedge planting in soil conservation because of its non-flowering nature, good growth performance, high root penetration and drought tolerance, R Chandrababu, Vice Chancellor, KAU said.

Properties of the new Vetiver

The new variety (ODV-7) -- which is proposed to be named as Bhoomika due to its special soil binding properties -- exhibits enhanced growth, tillering, root yield, root spread and oil content than the already released variety ODV-3.

The low canopy height, drooping leaves covering soil surface and extensive fibrous roots makes it ideal for soil and water conservation. Hence it can be planted along contour lines in hills, along sides of sloppy areas, drainage channels, ponds, as protective partitions in terraced fields and as border plant for roads and gardens. It can also be cultivated as an aromatic crop for root and oil production in open areas with good sunshine.

Firm incubated at IIT-Kanpur harnesses tech for irrigation management

Come November, farmers who get canal water for irrigating their fields in a Telangana district – most likely in Karimnagar district – may have a chance to try out something new to improve productivity of the winter rice crop. The irrigation department of the Telangana government has roped in Kritsnam Technologies, a firm incubated at the IIT Kanpur, to carry out a pilot project aimed at improving canal irrigation efficiency in the State.

Pilot project

Called Irrigation Scheduling using real-time data on Water Availability and Requirement, or ISHWAR for short, could be a powerful tool that could improve the efficiency of India's notoriously poor canal water irrigation system management. Developed by a team of technopreneurs who graduated from or are studying at the IIT Kanpur, ISHWAR has already caught the attention of three major agriculture-dependent States – Telangana, Haryana and Uttar Pradesh. While Telangana, which has come forward to fund the experiment will be the first to go on stream, the other two will follow suit soon.

In India, more than 22 million hectares of farmland is irrigated, much of it through canal water.

Controlled water release

The idea is to link water suppliers and water users in a manner that enables the release of the right quantity of water at the right time. What ISHWAR would do is to calculate water requirement of each farm on a broad scale using weather and agronomic data collected in real time through satellites and ground-based measurement. The irrigation efficiency in India is said to be about 38%. The Telangana experiment, which is partly funded by the Department of Biotechnology's commercializing arm, Birac, is all set to change this.

Another Kritsnam project is called PANI or Provision of Advisory for Necessary Irrigation, which is being implemented on an experimental basis in many villages in Kanpur Rural district. The pilot PANI project is funded through$22,000 provided by the World Bank and is implemented with the help of IIT Kanpur, the University of Washington and GeoKno, another firm incubated at IIT Kanpur. Around 150 farmers are involved in the PANI project, growing mostly wheat and some potato – were given timely advisories on soil moisture levels and rainfall forecast which they used to tweak their irrigation schedules. This kharif season, the Kanpur farmers and the firm are already on to rice crop.

Banks launch steps to boost KCC loans

Banks have kickstarted a Kisan Credit Card (KCC) saturation campaign under the auspices of the respective State-Level Bankers' Committees (SLBCs) and District-Level Bankers' Committees (DLBCs) for giving Kisan Credit Card (KCC) loans to farmers who have not been given such loans. The KCC scheme enables farmers purchase agricultural inputs such as seeds, fertilisers, pesticides, and draw cash for their agricultural and consumption needs.

The scheme comes with an ATM-enabled RuPay debit card with facilities for one-time documentation, built-in cost escalation in the limit, and any number of drawals within the limit, among others.

Besides ensuring saturation, banks will also be taking steps to link Aadhaar immediately as no interest subvention will be given if the Aadhaar numbers are not seeded to KCC accounts. According to the Ministry of Agriculture and Farmers' Welfare, currently there are 6.92 crore live KCCs, against 14.5 crore operational landholdings.

Interest subvention

In order to provide short-term crop loans up to ₹3 lakh

to farmers at an interest rate of 7% per annum, lending institutions – PSBs and private sector commercial banks (in respect of loans given by their rural and semi-urban branches only) – are offered interest subvention of 2% by the government. Further, an additional interest subvention of 3% per annum is provided to those farmers who repay in time. This also implies that farmers repaying promptly get short-term crop loans at 4% per annum.

PM Modi calls upon farmers to cut usage of chemical fertilisers, pesticides

Prime Minister Narendra Modi made an appeal to farmers to reduce use of chemical fertilisers and pesticides by 10-25% to save the soil. He asked farmers to get blessings in saving 'Mother Earth' by reducing the chemicals used in agriculture.Pointing out that no one has the right to damage soil health, Modi said: The way we are using chemical fertilisers and pesticides, we are destroying the earth.

According to a FICCI study, the current use of pesticides and other agrochemicals in India is 0.27 kg per hectare. The Indian pesticides industry terms this usage as very low compared to 4.58 kg/hectare in the US. Out of about 9 lakh tonnes of agrochemicals produced in India annually, the bio-pesticides segment has only 3% share, which indicates huge potential for it as the government shifts focus towards natural farming. Over 50% of the agrochemicals produced in the country are exported every year.

Paddy (26%-28%) and cotton (18%-20%) are the two major crops where these chemical pesticides are used.

Andhra Pradesh is the top consumer of agrochemicals with a share of 24% while eight states — Andhra Pradesh, Maharashtra, Punjab, Madhya Pradesh, Chhattisgarh, Gujarat, Tamil Nadu and Haryana — account for more than 70% usage of agrochemicals in India, the FICCI study shows.

Indian farmers use about 55 million tonne urea, DAP (phosphatic), MoP (potash) and complex fertilisers annually every year to increase the productivity. The per capita consumption of fertiliser is 1.65 quintal/hectare. Any reduction in fertiliser use will also help the government to reduce the subsidy, which is estimated at ₹79,996 crores (₹53,629 crores for urea and ₹26,367 crore for nutrient-based subsidy) for FY20.

Under Zero Budget Farming, no chemical fertilizer or pesticide is used, while bio-fertilizers and bio-pesticides made from cow dung, cow urine, neem leaves etc. by the farmer himself are used.

IFFCO cuts complex fertilizers rate by ₹50 per bag

Fertilizer major IFFCO reduced the price of its complex fertilizers, including DAP, by ₹50 per bag as part of efforts to bring down farmers' input cost, reports PTI. The rate cut will be applicable from August 15. Maharashtra pitches to bring 50% agriculture land under micro-irrigation over 5 years. The State government has urged the Centre to allocate more funds under the Pradhan Mantri Krishi Sinchai Yojana (PMKSY) to bring at least 50% of agriculture land under micro-irrigation over the next five years. It has also urged the Centre to promote micro-irrigation to crops beyond high, water-intensive sugarcane and bananas under the 'More Crop Per Drop' scheme. The total land brought under micro-irrigation in Maharashtra between 1986 and 2019 is 23.86 lakh hectares, of which 17.09 lakh hectares land is under drip irrigation and 6.77 lakh hectares under sprinklers.

The financial burden under micro-irrigation is shared by the Centre and state in a ratio of 60:40 — for 2019-20, the proposed expenditure for micro-irrigation in

Maharashtra is ₹653.33 crore, of which the Centre's share is ₹400 crore and state's ₹253.33 crore. While farmers are provided subsidies for installation of drip irrigation sets and sprinklers in their fields, their response to the scheme so far has been moderate.

According to official data, under the micro-irrigation scheme, 69,979 sprinkler sets, covering 63,617 hectares, are distributed among farmers and 1,21,689 drip irrigation sets, covering 1,10,623 hectares of land, are distributed.

As per the Centre's operational guidelines, subsidy for small and marginal farmers is 55% of the total cost of drip and sprinkler sets, while for other farmers it is 45%. Micro-irrigation subsidies is given to farmers owning up to five hectares of land. The state government, which accepted the applications from farmers through an especially designed software, e-thibak (e-drip), received 3.46 lakh applications between 2018 and 2019. Till date, 2.24 lakh applications have been sanctioned and processed. Last year, the allocations was lower at ₹255.83 crore. Total number of sprinklers and drip sets distributed among farmers was 45,045 and 64,268, respectively, while land brought under micro-irrigation through sprinklers was 28,074 hectares and drip 49,774 hectares. In 2017-18, the total expenditure for the micro-irrigation scheme was ₹687.67 crore, where 1,10,600 sprinkler sets helped introduce micro-irrigation in 7,28,087 hectares of land, whereas through drip irrigation sets, 1,53,563 farmers brought 1,36,158 hectares of land under micro-irrigation.

Uber for tractors': Government to launch app to aid farmers

A laser-guided land leveller harnesses technology to accurately flatten a field in a fraction of the time used by a traditional oxen-powered scraper. The result? Farmers save precious groundwater and increase productivity by 10 to 15%. Such hi-tech levellers cost at least ₹3 lakh, way beyond the reach of the average small farmer.

But a new app that's being described as “Uber for tractors” offers a solution. “We want farmers to have affordable access to cutting-edge technology at their doorsteps,” says a senior Agriculture Ministry official. “There are now more than 38,000 custom hiring centres (CHCs) across the country, which rent out 2.5 lakh pieces of farm equipment every year. By the end of the month, we plan to launch a new mobile app to efficiently connect farmers with these CHCs, just like Uber connects you to cabs.” The CHC app is already open for registrations by the farmers, societies and entrepreneurs who run these centres. So far, almost 26,800 CHCs have registered to offer more than one lakh pieces of equipment for hire.

Rating system

Feedback from both the CHC and the farmers contributes to a rating system, allowing customers to make informed decisions. The Ministry's app will also create an invaluable database for policy-makers, who can track the use and cost of equipment. The system would also help to track the usage of new technology that the government wants to promote, such as the Happy Seeder that aims to prevent stubble burning that causes air pollution, or solar dryers that can help farmers process and preserve their produce. Very successful demo runs in Chhattisgarh, Madhya Pradesh, Rajasthan and Punjab.”

Certification of seeds to be made mandatory to step up farm output

More than half of all seeds sold in India are not certified by any proper testing agency, and are often of poor quality. The Centre now hopes to mandate uniform certification by pushing through a replacement to the Seeds Act, 1966 and also by barcoding all seeds to ensure their traceability. This could increase overall agricultural productivity by up to 25%, Agriculture Ministry officials say.

Definition changed

The main aim of the new legislation, is to bring uniformity to the process of quality regulation. The 1966 Act starts with these words: "An Act to provide for regulating the quality of certain seeds for sale..." The new Bill removes the word "certain", and aims to regulate the quality of all seeds sold in the country, as well as exported and imported seeds.

"Currently, about 30% of seeds are what the farmer himself saves from his crop. He may re-plant that or sell it locally". Of the remaining seeds which are bought and sold commercially, 45% come through the ICAR system and have gone through the mandated certification process."The other 55% are sold by private companies, most of which are not certified, but rather what we call 'truthful label seeds'. The new Bill will also raise the stakes by increasing penalties for non-compliance. "Currently, the fine ranges from ₹500 to ₹5,000, intend to raise that to [a maximum of] ₹5 lakh".

The Centre also hopes to roll out a software to barcode seeds in order to ensure transparency and traceability. The software system will be able to track seeds through the testing, certification and manufacturing process. By connecting to a dealer licensing system, seeds will be tracked through the distribution process as well.

Farmers' income grew seven times in 13 years in Odisha

Odisha farmers' incomes grew more than seven times over a span of 13 years, the Naveen Patnaik government has claimed. The government, in its recently released draft Agriculture Policy 2019, says an average Odisha farmer earned around ₹7,731 per month, or around ₹92,772 per year.

Draft policy

"In 2002-03, his average monthly income was ₹1,062, which means that in the 13 years between 2002-03 and 2015-16, Odisha farmers' incomes grew more than seven times or at a CAGR (compound annual growth rate) of 16.5% in nominal terms and 8.4% in real terms," it states. The draft policy states that comparing the CAGR with other Indian States, Odisha's growth rate emerges as the highest in the country during that period. "During the same period, average Indian farmer's income grew from ₹2,115 to ₹8,931 which is at a CAGR of 11.7% in nominal and 3.7% in real terms. Odisha is fast catching up with other Indian States. Odisha's farmer incomes grew much faster than even the rate at which its own agricultural GDP grew," it says. According to the draft policy, between 2002-03 and 2015-16, Odisha's agricultural GDP grew at a CAGR of 3.7% and its farmer incomes grew at more than double that rate at 8.4%.

Odisha is largely a rural-agrarian economy accounts for 3% of India's agricultural GDP. Close to 83% of its people live in rural areas and about 61.8% of its 17.5 million work-force is employed in agriculture. Since the beginning of this century (2000-01 to 2016-17), Odisha's agricultural GDP nearly doubled in real terms, clocking an average annual growth rate of about 4.5%, higher than the India average of 3.1%.

Direct sowing technologies can increase Indian farmers' profits, cut pollution: Study

Alternative farming practices such as direct sowing technologies could reduce the greenhouse gas emissions from on-farm activities in Northern India by nearly 80% and help lower air pollution in cities like New Delhi, according to a study.

The direct seeding of wheat into unploughed soil and shredded rice residues was the best option -- it raises farmers' profits through higher yields and savings in labour, fuel, and machinery costs. To quickly and cheaply clear their fields to sow wheat each year, farmers in northern India burn an estimated 23 million tonnes of straw from their rice harvests, according to researchers, including those from the ICAR. To sow wheat directly without plowing or burning rice straw, farmers need to purchase or rent a tractor-mounted implement known as the "Happy Seeder," as well as attach straw shedders to their rice harvesters.

Leaving straw on the soil as a mulch helps capture and retain moisture and also improves soil quality, according to ML Jat, CIMMYT Principal Scientist, a co-author of the study. The study shows that Happy Seeder-based systems are on average 10-20 per cent more profitable than straw burning options.

Contract farming produce exempted from restrictions

Persons and firms engaged in contract farming agreements with farmers are exempted from the existing licensing and restrictions on stock limit and movement of foodstuff under the Essential Commodities Act, 1955, a gazette notification has said. The notification issued said the Removal of Licensing Requirements, Stock Limits and Movement Restrictions on Specified Food stuffs Order, 2016 of the Essential Commodities Act is amended in favour of contract farming purchasers. It may be recalled that the Model Contract Farming Act passed in 2018 had promised to remove the restrictions on licensing, stock limits and movement of specific food products for those engaged in contract farming.

Linking farmers with futures market can benefit both'

Stating that linking farmers to futures markets can be mutually beneficial to both, a study by Icrier has suggested initial focus should be on commodities markets in which there is few government intervention. An early action by NCDEX, the premier agri futures exchange, in collaboration with NABARD, which is the main body promoting farmer producer organisations (FPOs), can bring rich dividends to farming community as well as the exchange, the study said.

According to the study, co-authored by Tirtha Chatterjee, Raghav Raghunathan and Ashok Gulati, the exchange should identify production centres for those crops, which are not protected by heavy government intervention, build delivery centres around them and encourage futures trading in these areas through FPOs. It also said that FPOs can procure and aggregate the produce and ensure that both size and quality standards are met as per requirements for participation in futures markets.

From the first FPO — Ram Rahim Pragati Producer Company of Dewas, Madhya Pradesh — transacting on NCDEX in 2014, the number of FPOs increased to 69 as of May 2018. However, 55 (or 80%) of these FPOs had traded only once on the futures platform after their enrollment with the exchange. Even though formal efforts by NCDEX to engage directly with FPOs started in 2016, their share in overall agri-futures trade was just 0.004% between April 2016 and May 2018.

Kerala farm varsity offers tree-turmeric seedlings

Kerala Agricultural University has developed a germination technology to produce seedlings of maramanjal (tree turmeric), a medicinal plant. A large number of a year-old polybag seedlings of the plant have been made ready for cultivation. Called daruharidra in Sanskrit and daruhadi in Hindi, the root and stem of tree turmeric have excellent antibiotic and antiseptic properties.

Tree turmeric, which belongs to Menispermaceae family and botanically known as Cosciniumfenestratum, is native to the natural evergreen forests of South India. Highlands with relatively high humidity and shade are ideal for its growth. Its root and stem are widely used in various Ayurvedic, Unani, Sidha as well as traditional medicinal preparations for the treatment of diabetes, skin diseases, jaundice, wounds and ulcers. Its stem is used to treat snake bites. Berberin contained in the plant is the active ingredient that gives it the medicinal properties.

Rated as one of the largest trading medicinal plants from the tropical forests, almost 80 per cent of tree turmeric plants in South India have been lost. Realising the medicinal and commercial potential of this endangered species, KAU has taken up conservation-oriented research work on the flowering, fruit setting, seed viability and dormancy of tree turmeric.

Assam tea fetches 'record' ₹70,501 per kg

A specialty orthodox tea variety from Dibrugarh's Maijan Tea Estate set a new record on July 31, as it was auctioned for ₹70,501 per kg at the Guwahati Tea Auction Centre (GTAC), an official said. Two kg of the hand-made 'Maijan Golden Tips' of the Assam Company India Ltd was purchased by city-based Mundhra Tea Company for a European buyer, Guwahati Tea Auction Buyers Association (GTABA) Secretary Dinesh Bihani told."A single line of Maijan Golden Tips was sold at Rs 70,501 per kg at the GTAC, creating a world record for any public auction in the history of Assam tea... The entire lot of 2 kg was bought... for a buyer from Belgium," Bihani said. On July 30, Manohari Gold, another specialty orthodox tea variety from Manohari Tea Estate, was sold at Rs 50,000 a kg under the public auction system.

Punjab, Haryana farmers diversify a tad from rice

Better prices commanded by crops like cotton and maize last year and crop diversification strategies adopted by Punjab and Haryana governments have prompted farmers in the two States to plant less rice this season as compared to previous kharif season. While the area under rice in Haryana was a little over 10 lakh hectares (lh), nearly 15% lower than 11.87 lh planted in kharif 2018-19. In Punjab too, nearly a little over 1 lh normally used for growing rice has been diverted to plant cotton and maize. With rice sowing being almost at the fag end as far as the season is concerned, not much change is expected in the cropping pattern now.

Haryana State agriculture authorities attribute the reduction in rice cultivation to the sustained campaign they ran. “Farmers with at least 50,000 hectares have enrolled as part of the campaign to grow maize or pulses. We have given them a cash benefit of ₹ 4,500 per hectare, free seeds and free crop insurance cover under the Pradhan Mantri Fasal Bima Yojana (PMFBY), said Suresh Gahlawat, Assistant Director (Extension) at Haryana Agriculture Department.

Apart from maize, cotton sowing is also marginally up in Haryana to 6.76 lh as against 6.65 lh same period last

year. According to Sutanta Kumar Airi, Director of Agriculture in Punjab, the State to ran a campaign to lure farmers away from planting rice and this had some success. Punjab farmers planted rice only on 28.53 lh as compared to 29.57 lh in the corresponding week last year. On other hand, the area under maize cultivation has gone up to 1.6 lh as against a little over 1 lh same period last year. The area under cotton planted has crossed 4 lh last week as against 2.84 lh in same week in 2018-19.

Among the States that have reported less area under rice as compared to last season are Andhra Pradesh, Chhattisgarh, Madhya Pradesh, Telangana, and West Bengal. The reduction mainly on account of monsoon rainfall deficit and most of them have sufficient time to make up for the lost time with the transplanting has covered less than half the area normally covered.

What is zero budget natural farming?

Finance Minister thrust on zero budget farming into the spotlight in the first Budget speech of the 17th Lok Sabha, calling for a "back to the basics" approach. Several States, including Andhra Pradesh and Himachal Pradesh, have been aggressively driving a shift towards this model.

What is it and how did it come about?

Zero budget natural farming (ZBNF) is a method of chemical-free agriculture drawing from traditional Indian practices. It was originally promoted by Maharashtrian agriculturist and Padma Shri recipient Subhash Palekar, who developed it in the mid-1990s as an alternative to the Green Revolution's methods driven by chemical fertilizers and pesticides and intensive irrigation. He argued that the rising cost of these external inputs was a leading cause of indebtedness and suicide among farmers, while the impact of chemicals on the environment and on long-term fertility was devastating. Without the need to spend money on these inputs — or take loans to buy them — the cost of production could be reduced and farming made into a "zero budget" exercise, breaking the debt cycle for many small farmers.

The ZBNF promotes the application of jeevamrutha — a mixture of fresh desi cow dung and aged desi cow urine, jaggery, pulse flour, water and soil — on farmland. This is a fermented microbial culture that adds nutrients to the soil, and acts as a catalytic agent to promote the activity of microorganisms and earthworms in the soil. About 200 litres of jeevamrutha should be sprayed twice a month per acre of land; after three years, the system is supposed to become self-sustaining. Only one cow is needed for 30 acres of land, according to Mr. Palekar, with the caveat that it must be a local Indian breed — not an imported Jersey or Holstein.

A similar mixture, called bijamrita, is used to treat seeds, while concoctions using neem leaves and pulp, tobacco and green chillis are prepared for insect and pest management.

The ZBNF method also promotes soil aeration, minimal watering, intercropping, bunds and topsoil mulching and discourages intensive irrigation and deep ploughing. Mr. Palekar is against vermicomposting, which is the mainstay of typical organic farming, as it introduces the the most common composting worm, the European red wiggler (Eiseniafetida) to Indian soils. He claims these worms absorb toxic metals and poison groundwater and soil.

Which are the States with big plans?

According to the Economic Survey, more than 1.6 lakh farmers are practising the ZBNF in almost 1,000

villages using some form of state support, although the method's advocates claim more than 30 lakh practitioners overall. The original pioneer was Karnataka, where the ZBNF was adopted as a movement by a State farmers' association, the Karnataka Rajya Raitha Sangha.

In June 2018, Andhra Pradesh rolled out an ambitious plan to become India's first State to practise 100% natural farming by 2024. It aims to phase out chemical farming over 80 lakh hectares of land, converting the State's 60 lakh farmers to ZBNF methods. Himachal Pradesh, Chhattisgarh, Kerala, Karnataka and Uttarakhand have also invited Mr. Palekar to train their farmers.

Last year, the Centre revised the norms for the Rashtriya Krishi Vikas Yojana- Remunerative Approaches for Agriculture and Allied sector Rejuvenation (RKVY-RAFTAAR), a flagship Green Revolution scheme with an allocation of ₹3,745 crore this year, and the Paramparagat Krishi Vikas Yojana, which has an allocation of ₹325 crore and is meant to promote organic farming and soil health. Under the revised guidelines, both Centrally-sponsored schemes now allow States to use their funds to promote the ZBNF, vedic farming, natural farming, cow farming and a host of other traditional methods.

Waterfield Advisors to launch $15-million development bond soon for farm sector

Mumbai-based wealth advisory firm Waterfield Advisors will soon launch a $15-million Development Impact Bond (DIB) for the farm sector. It has roped in Tata Trusts' CInI as the implementation partner for the same. The company has launched the first tranche of $3 million, and it will raise the remaining part depending of the success of the first issue. The company is financing the bond — LakhpatiKisan — through domestic capital from ultra high neworth individuals (UHNI) and family foundations.

“The initiative is to transform the livelihood of 6,500 small and marginal households, which, in turn, will help in creating 'lakhpatis' in Jharkhand, Gujarat and Odisha. The DIB will help in economically liberating, crisis-hit farm sector and bring them greater financial stability,” Waterfield Advisors' founder and CEO Soumya Rajan told.

This move is a part of Waterfield Advisors' Philanthropic Advisory Services, wherein it directs philanthropic capital towards a social cause.

The bond will provide capital to a Tata Trusts' initiative that is being implemented on the ground by Collective for Integrated Livelihood Initiatives (CInI) since 2015. CInI is an organisation that functions as the nodal agency for Sir Ratan Tata Trust and Navajbai Ratan Tata Trust's Central India Initiative.

Lakhpati Kisan bond

The CInI project aims to improve the livelihood of small and marginal farmers by providing interventions to increase their income three-fold over a three-year period from ₹40,000 per annum to ₹1.2 lakh. (CInI) has created over 25,000 lakhpati families and nurtured 250 rural tribal entrepreneurs. Through Lakhpati Kisan bond, farmers will get interventions in the areas of capacity building, land and water management, high value agriculture development, poly-house nurseries for yield enhancement and livelihood layering.

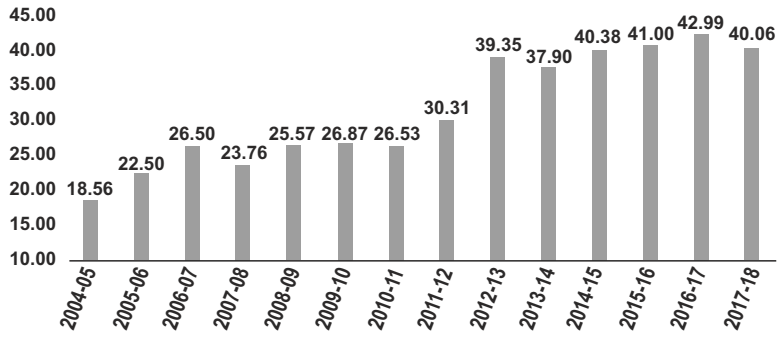
GM Crops in India

- 2002 – Bt cotton introduced in India.
- 2006 – Second generation variety of Bt cotton introduced. (Roughly 93% of India's cotton area is now covered by Bt hybrids).
- 2009 – Mahyco's BT brinjal cleared for commercial cultivation by the GEAC.
- 2010 – Environment Minister Jairam Ramesh declares a unilateral moratorium on Bt Brinjal despite the GEAC recommending its commercial cultivation.
- 2013 – Environment Minister Jayanthi Natarajan puts on hold field trials of a few GM crops approved by the GEAC.
- 2014 – Environment Minister VeerappaMoily approves 'confined field trials' of GM crops, says no embargo from SC: later the new NDA govt approves 21 new varieties of GM crops (maize, rice, wheat, and cotton) for field trials.
- 2017-18: GEAC give the goahead for commercial release of GM Mustard with a number of conditions, but puts its decision on hold a year later; allegations of the crop causing 30-40% reduction in production of nectar in flowers, thereby attracting fewer beed to collect and make honey from it, emerge.
- 2018 : GEAC approves field studies of GM mustard on bees.

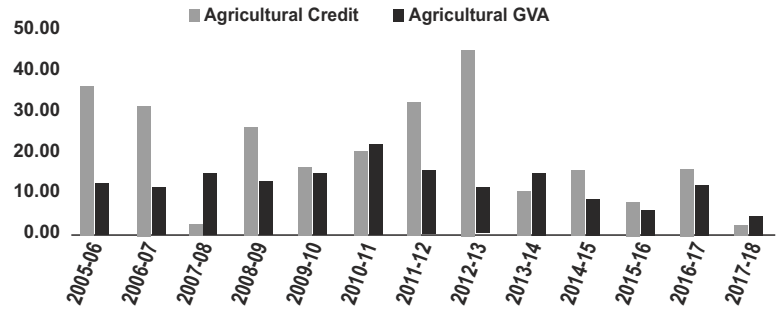
Does credit induce agricultural growth?

Credit Impact

Total agricultural credit as percentage of agricultural GVA — Chart 1



Year-on-year growth of agricultural credit and GVA (nominal terms) — Chart 2



Source: Handbook of Statistics Indian Economy, RBI, Sept 2018; Assed Report 2017-18, NABARD; 2nd Central Statics Office

Maharashtra farms out Rs 10,600 crore for agriculture, 19% more than last year

BUDGET NOTES STRAIN THE EXCHEQUER

State budget 2019-20 compared with the previous financial yera (in ₹ Cr)

	2018-19 (revised estimate)	2019-20 (Budget estimate)	Difference
Revenue receipts	2,86,499	3,14,640	9.8%
Revenue expenditure	3,01,459	3,34,933	11%
Revenue deficit	14,960	20,292	35.6%
Fiscal deficit	56,053	61,669	10%
Debt	4,14,411	4,71,642	13.8%
Interest payments	33,929	35,207	3.7%
Capital expenditure	43,339	43,666	0.7%
In 2009-10, debt was ₹1.81 cr; by 2019-20 it rose in ₹4.71 cr.			

Budget announcements

Social welfare and employment

22 schemes for Dhanger or shaphered community totalling ₹1,000cr.

₹2000cr for OBC girls, corporations, scholarship scheme for OBC girls, construction of 36 hostels for OBC students, awards for meritorios OBC students in Class X and XII

Recruitment for 4.649 posts of police constables 50% hike in honorarium for kotwals.

₹200cr for a self-employment scheme for widows, abandoned and divorced women.

₹100cr for the employment of women and youth from the minority community.

Chief Minister Employment Generation Programme to be launched.

Other schemes ₹50cr for devpt. of pilgrimage sports; ₹100cr for moderanization of buses at pilgrimage centres.

₹150cr for birth anniversary of Mahatma Gandhi; ₹100cr for birth anniversary of dalit social reformer Annabhau Sathe.

Agri and irrigation
₹350cr for micro irrigation
₹125cr for farm ponds
₹200cr for the year for agricultural universities

Climate warriors' being trained to help rural farmers adapt

The National Institute of Rural Development and Panchayati Raj (NIRDPR) has come out with a training manual for a certificate course on Sustainable Livelihoods and Adaptation to Climate Change (SLACC). The SLACC targets to create a cadre of over 200 certified 'climate-smart' community resource persons in villages, who will help the rural population cope with the the impact of climate change. The project is jointly initiated by the Union Ministry of Rural Development and the World Bank.

"The programme will strengthen the skill sets of resource persons at national and grassroots levels. It is being implemented in 638 villages in Mandal and Sheopur districts of Madhya Pradesh, and Gaya and Madhubani districts of Bihar under National Rural Livelihoods Mission," he said.

Components

The course throws light on climate change, variability, interventions that can help in improving the crop productivity, information on the weather advisory services and alternate livelihood activities for climate resilience.

These seed bankers are saving India's native crops

It was in 2001 that Sangita Sharma set up Annadana, a seed bank with 20 varieties of indigenous seeds on her five-acre farm in Bengaluru. Eighteen years later, her bank is richer by 800 varieties of desi seeds that are cheaper and more nutritious than hybrid varieties.

Dr. Debal Deb, a plant scientist and rice conservationist in Odisha, says that India was home to 1,10,000 varieties of rice till 1970. Of these only 6,000 survive today.

At Dr. Prabhakar Rao's farm near Bengaluru, visitors can see a number of desi vegetables in bloom. Red bhindi, red corn, violet peppers and tomatoes in at least four different colours including blue and yellow."India has lost 99% of biodiversity in vegetables," says Dr Rao, an agricultural scientist who started collecting native seeds seven years ago, and today has 540 in his bank called Hariyalee. To reintroduce these varieties to people, Rao holds farming workshops that attract urban farmers, terrace gardeners, students and scientists.

A software engineer by profession, Babita Bhatt left a corporate career in Gurugram three years ago, and moved to Dehradun along with her husband Alok to preserve heirloom seeds. She also set up an e-store, Himalaya2home, to sell these seeds and other products like native dals, oils and flours. She introduced a desi variety of black rice, indigenous to Imphal valley, to some local farmers.

On her e-store, she sells 15 varieties of rajma sourced from valleys across the state, like Henval, Bhagirathi, Johar, Alaknanda and Doon. One of her suppliers is Vijay Jardhari from Jardhar village in Henval valley, Tehri-Garhwal. Jardhari, 67, runs Beej Bachao Andolan, a social initiative to preserve seeds native to Uttarakhand. A key figure in the Chipko movement, Jardhari started collecting native seeds in 1985-86, and today has around 150 varieties of rice and 200 varieties of rajma, in addition to desi vegetables. Of the rice varieties, some like tapachini and jhamcha, yield 70 quintals/hectare. In comparison, Pusa RH 10, a hybrid basmati, yields 65 quintals/hectare. "Native varieties act like vaccines," says Jardhari.

Energy demand growth fastest in the world

Big Fish of Agri Exports

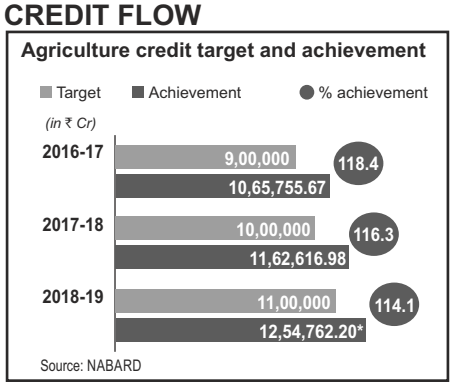
Fish and related products have grown rapidly in recent years and emerged as the largest components in agricultural exports. Growth accelerated from 4.9% in 2012-13 to 11.9% in 2018-19, helping exports rise to ₹ 47,620 crore in the previous financial year. The sector provides income and employment to 14.5 million people in India, the world's second-largest fish producer.

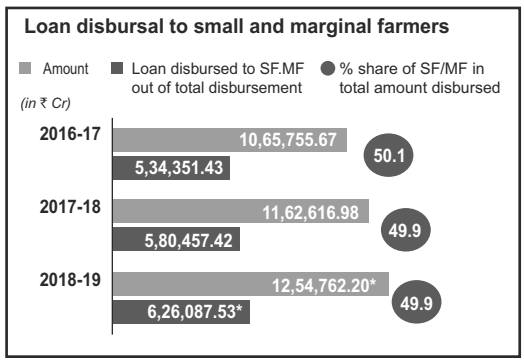
Farmers With Sheep & Goats Withstand Drought

India's poorest farmers can count on sheep and goats even if they are facing a drought and severe water shortage, said the Economic Survey. India has more than 16% of the world's goats and 7% of sheep. These animals, 200 million of them in India, can survive harsh environments where no crop or any other animal can, said the survey. Short reproductive cycles and multiple births of these animals provide another regular source of income.

Farm sector, rural economy hope for a big push

CREDIT FLOW





Assistance under NDRF for drought in 2018-19 *(in ₹ Cr)*

State	Assistance sought	Central assistance approved
Andhra Pradesh	1,466.91	900.40
Karnataka	2,434.00	949.49
Maharashtra	7,902.77	4,714.28
Rajasthan	2,819.58	1,206.62
Gujarat	4,547.85	127.60
Jharkhand	1,535.29	272.42
Karnataka**	2.064.30	-
Total	22.770.7	8,170.81

*Provisional ** For Rubi season

Corteva Agriscience introduces solution for Fall Armyworm

CortevaAgriscience, a New York Stock Exchange-listed company, has launched a new insect-control solution to tackle the Fall Armyworm infestation in India.

The company, which has a multicrop research centre here, said the insecticide Delegate contains Spinetoram 11.7% SC, which has been approved by the Union Ministry of Agriculture and Farmers' Welfare to help corn farmers address the new infestation that is spreading fast.

First reported in Karnataka last year, Fall Armyworm quickly spread to 14 States, including Maharashtra, Telangana, Andhra Padesh and Bihar.

The Fall Armyworm or Spodopterafrugiperda is an insect native to tropical and subtropical regions of the Americas. Left unattended to, it can cause significant damage to crops.

The country grows corn (maize) on about 9 million hectares. The company claims that Delegate is a broad-spectrum insecticide used to control crop-damaging insects.

How selling cereals is actually exporting water

Excessive focus on cereal production and the resulting pressure on groundwater in some States is no news. A study by a group of researchers from academic and research institutes from the UK, Germany and India has suggested a shift to maize, millet and sorghum will help the country reduce its scarce groundwater consumption. They gathered data of production and water-use for five cereal crops (rice, wheat, maize, millet and sorghum), from publicly available sources from 2005 to 2014, to understand the phenomenon.

“The States that are producing and exporting (to other parts of the country) dominant cereals such as paddy and wheat are, in fact, technically 'exporting' their scarce groundwater to other States,” Francesca Harris, a researcher with Epidemiology and Population Health of London School of Hygiene and Tropical Medicine, told. She said Punjab and Haryana are among the top States that overexploited groundwater to produce cereals. The group published a report 'More crop per drop - Exploring India's cereal water use since 2005'. India's cereal production went up by 26.4% to 238 million tonnes from 188 mt during the period without additional water or land use, thanks to higher yields for most crops.

Wheat and rice consumed a lion's share, 80.6% of total water used. While Uttar Pradesh accounted for 20% of the country's total water consumption, Punjab and Rajasthan consumed 8.4% each.

Suggestions

The study observed that increased focus on maize, sorghum and millets would help ease pressure on ground water. “Increase in maize production will help to sustain cereal production, while minimising water use,”.“On the other hand, sorghum and millets can help reduce the dependency on freshwater. However, it calls for investments to improve yields to maintain production levels,” it said.

Getting the best out of the land

AHIMSA (All Human Integrated Meritorious Social Awareness), established in 1981, is a Chennai-based not for-profit organisation which provides services towards alleviating poverty and agricultural and industrial development in rural areas. Since 1996, the organisation has been working closely with farmers across States, especially in drought-affected regions, helping them improve crop yields and earn better returns.

The organisation initially started its operations in a small scale in Maharashtra by forming 20-member farmer

clubs in villages and providing them with required inputs, including fertilisers and crop management solutions through soil testing. Today, AHIMSA supports seven farmer-producer organisations (FPOs) with 1,000 members each across Tamil Nadu, Karnataka, Andhra Pradesh and Uttarakhand; over 7.45 lakh farmers have so far benefited from the NGO, it claims.

The society is funded by contributions from its 70 members who come from different walks of life. Before extending its services, AHIMSA, through its volunteers, initially identifies regions that face farming issues such as droughts, access to market and lack of credit.

Then, based on the degree of assistance required, a team is sent to help the farmers. The expert team mandatorily conducts soil tests on the farm lands. Based on the test results, crops and cropping patterns are recommended.

The NGO claims that farmers have witnessed substantial jumps in their yields after implementing these suggestions. For instance, after the recommendations of the AHIMSA team, banana farmers from Nanguneri in Tirunelveli district, Tamil Nadu, were able to improve their annual yield from 10 tonnes per acre in 2015 to 40 tonnes per acre in 2018. Similarly, brinjal farmers in Tiruvallur district, Tamil Nadu, were able to improve their yield to 16 tonnes per acre in 2018 from 5 tonnes in 2015.

Though farmers run the FPOs independently, AHIMSA offers them support in the form of soil testing, crop suggestions, farming techniques, water management methods and non-farming activities.

AHIMSA also provide mobile water sprinklers when the crops near harvest. For instance, vegetable farmers in Thanjavur were given mobile sprinklers in 2018, given the lack of sufficient rainfall last year, particularly during the harvest period. This helped farmers revive the crops and harvest them on time. The organisation also identifies farmers who would benefit from alternative sources of income, and train them in activities such as animal husbandry and fisheries.

FPO working model

AHIMSA combines 50 farmer clubs of 20 members each in nearby areas to form an FPO; it currently helps run seven such FPOs. A farmer has to pay a one time fee of ₹100 to join a farmer club, and a capital contribution of ₹1,000 if and when the club becomes a part of an FPO. Each of these FPOs has a 10 member team from AHIMSA, who provide technical support required for crop and water management. Moreover, a CEO and staff are also recruited from outside to help manage the FPO. Currently, the NGO helps run 14,221 farmers groups consisting of 2,82,243 farmer-members. It also supports 17,914 women self-help groups with 3,58,280 women members, and around 5,930 youth groups, comprising 1,06,758 youth members. These members play a vital role in distributing the agriculture produce in the market.

Tap drip irrigation to save water

Data on water use efficiency indicates that India uses 2-3 times more water than major agricultural countries like China, Brazil and the US to produce one unit of food crop.

Benefits of drip irrigation

Drip method of irrigation (DMI) has been found to increase water-use efficiency by saving a substantial amount of water. What is DMI? Unlike FMI, the drip method supplies water directly to the root zone of a crop through a network of pipes and emitters. Since it supplies water directly to the crop, rather than the land around, water losses occurring through evaporation and distribution are significantly reduced. The on-farm efficiency of the drip irrigation system is estimated to be

over 90 %; it is only 35-40 % for FMI.

DMI was introduced in India during the mid-1980s primarily to save water. But it generates a lot of other benefits as well. That there is water saving of 30-70 % for different crops under DMI when compared to FMI has been well established. While reducing the cost of cultivation substantially, especially in irrigation, weeding and inter-culture, DMI also helps increase the productivity of different crops by 30-90%.

Reduced water consumption also curtails the use of electricity for operating pumpsets. With better productivity and quality of crops cultivated under DMI, farmers are able to realise substantially higher income. A nationwide study conducted to find out the impact of National Mission on Micro Irrigation (NMMI) during 2014 covering 13 States reveals that DMI has benefited farmers significantly. While increasing productivity by 42-53% in fruit and vegetable crops, DMI helps reduce irrigation cost by 20-50%, electricity consumption by around 30% and fertiliser consumption by about 28%.

The cost-benefit analyses done using field survey data reveal that DMI is economically viable even for small and marginal farmers cultivating different crops. Realising the significance of DMI, various promotional programmes have been introduced to increase its adoption by the Central and State governments since the early 1990s. Maharashtra is probably the first State to have taken a number of initiatives — subsidy programme being one such — to popularise DMI even during the mid-1980s.

To achieve the objective of 'per drop more crop', the Central government is taking a series of efforts to increase its adoption. While Centrally-sponsored schemes have been in vogue since the early 1990s, the National Mission on Micro-Irrigation (NMMI) introduced during 2010-11 and the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) launched in 2015 have significantly increased DMI adoption. As a result, the area under DMI has risen from a mere 1,500 ha in 1985-86 and 70,859 ha in 1991-92 to 4.24 million hectares as on March 2017.

The agenda ahead

The Task Force on Micro-Irrigation in India (2004) estimated India's total drip irrigation potential at 27 million hectares. The area under drip-irrigation accounts for a mere 4 % of gross irrigated area and about 15 % of its total potential as of 2016-17. The adoption of DMI is also concentrated only in a few States. With the current pace of adoption, it may take a long time to achieve full potential. Given the looming water scarcity and variations in rainfall pattern due to climate change, more efforts are needed to increase the pace of DMI coverage.

First of all, the capital cost required for DMI should be brought down substantially. A special subsidy programme may be introduced for water-intensive crops like sugarcane, banana and vegetables. A differential subsidy scheme for water-scarce and water-abundant areas should be introduced. Subsidy is provided to a maximum of five hectares per beneficiary under NMMI, which should be done away with.

All the areas of sugarcane cultivated using groundwater should be brought under DMI within the next 10-15 years. For encouraging the adoption of drip irrigation, a special scheme may be introduced linking bank loan facility for digging wells with electricity connection for pumpsets to those farmers who are ready to adopt drip irrigation.

Currently, water from surface sources (dams, reservoirs, etc) is not used for DMI. At least 10% of water from each irrigation project should be allocated only for DMI. Appropriate pricing of canal water and electricity will also help in increasing the area under DMI.

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FINANCIAL HIGHLIGHTS

	(₹ in Lakhs) As on 31.03.2017	(₹ in Lakhs) As on 31.03.2018
• Paid up Share Capital & Reserves :	₹ 12417.30	₹ 13059.65
• Deposits :	₹ 225999.66	₹ 245979.01
• Loans & Advances :	₹ 106792.85	₹ 117302.21
• Investments :	₹ 74979.89	₹ 82195.54
• Money at Call & Short Notice :	₹ 58873.13	₹ 63298.24
• Net Profit :	₹ 807.25	₹ 944.95
• Working Capital :	₹ 270157.95	₹ 295116.68

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- *Fixed Deposits*
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- *Double Benefit Scheme*
- *Cash Certificates*
- *Fixed Deposit linked with RDs*
- *Housing Loan Linked Deposits*
- *Children Education Deposits*
- *Crop Loans for Agriculture through KCC / SHG / JLG Cooperatives*
- *Term Loans for Agril. & Allied Agriculture*
- *Aquaculture Development One Thousand Ponds Scheme / Meghalaya State Aquaculture Mission*
- *Loans for Housing*
- *Loans for SRTO*
- *Consumer Durables Loans*
- *Loans to Technocrats & Professionals*
- *Loans to Educated Unemployed Youths*
- *Cash Credit & Overdraft Facilities*
- *Loans for Children Education*
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- *Term Loan for Tourism Development*
- *Personal Loan to Salary Earners*
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