to 'crop failure' and 'bankruptcy or indebtedness' in the State of Maharashtra is as under:–

Year	Crop Failure	Bankruptcy or Indebtedness
2014	350	857
2015	792	1293

(b) During the past few months, incidents of unrest among farmers have come to the notice of the Government specially in the States of Maharashtra, Madhya Pradesh and Tamil Nadu.

(c) Agrarian distress as manifest from large number of farmers living below the poverty (BPL) line and unfortunate incidents of suicides can be addressed by enabling the farmers to increase their income. Agriculture is State subject. However, the Government is targeting to double the income of the farmers by the year 2022. To achieve this, the Department of Agriculture, Cooperation and Farmers' Welfare has constituted an Inter-Ministerial Committee to examine various dimensions of farmers' income and to recommend an appropriate strategy. In the meanwhile, the Government is realigning its interventions to move from production-centric to farmers' income-centric approach. The Department has, therefore, been implementing various schemes to meet this objective *viz*. Soil Health Card (SHC) Scheme, Neem Coated Urea, Paramparagat Krishi Vikas Yojana (PKVY), Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), National Agriculture Market Scheme (e-NAM), Pradhan Mantri Fasal Bima Yojana (PMFBY), Interest Subvention Scheme etc.

Setting up of new research centres

†1633. SHRI SANJAY RAUT: Will the Minister of AGRICULTURE AND FARMERS WELFARE be pleased to state:

(a) whether Government proposes to open new research centres for facility and training of farmers;

(b) the details of action plan being formulated and targets fixed by Government to double the income of farmers;

(c) whether Government is formulating any action plan for continuous new research for all-round development and progress in agriculture sector, the details thereof;

(d) whether Government proposes to use new research and cutting edge technology for protection of farmers; and

† Original notice of the question was received in Hindi.

(e) if so, the details thereof?

THE MINISTER OF STATE IN THE MINISTRY OF AGRICULTURE AND FARMERS WELFARE (SHRI GAJENDRA SINGH SHEKHAWAT): (a) No, Sir.

(b) The Government has a 7-point strategy for doubling farmers' income by 2022, that includes (i) special focus on irrigation with sufficient budget, with the aim of "Per Drop More Crop", (ii) provision of quality seeds and nutrients based on soil health of each field, (iii) large investments in warehousing and cold chains to prevent post-harvest crop losses, (iv) promotion of value addition through food processing, creation of a National Farm Market, (v) removing distortions and e-platform across 585 stations, (vi) introduction of a Crop Insurance Scheme to mitigate risks at affordable cost, and (vii) promotion of ancillary activities like poultry, beekeeping and fisheries. The Ministry of Agriculture and Farmers Welfare has already prepared the first four volumes of the draft Reports on the "Strategy for Doubling Farmers' Income by 2022", as also available on the website *http://agricoop.nic.in/doubling-farmers for public opinion.* Salient points of the report have been given in the Statement-I (*See* below).

Meanwhile, the Indian Council of Agricultural Research under the Department of Agricultural Research and Education also constituted State Level Coordination Committees for preparing State-wise strategy documents on Doubling of Farmers' Income headed by a Vice Chancellor of Agricultural University. The reports have been developed for all the States that will be shared with the State Governments for adoption.

(c) There is no specific action plan as such. However, the Indian Council of Agricultural Research is spearheading its R&D efforts in new science including development of climate resilient varieties, genomics, nanotechnology, application of space and solar energy based research in agriculture, apart from mundane research on resource conservation technologies, integrated soil-water-nutrient management, farming system research, organic farming' and mobile apps. Details are given in the Statement-II (*See* below).

(d) and (e) The Indian Council of Agricultural Research is engaged in application of geoinformatic tools such as GIS and Remote Sensing for land use planning and soil inventorization; Information Technology (IT) in agriculture for knowledge-based agriculture, mobile-apps for different crops and commodities; digital decision support systems for forecasting and surveillance. All these contribute to the effective monitoring and management of agricultural resources in the larger interest of farmers. Details are given in the Statement-III.

Statement-I

Brief on the details of the report of the DFI Committee

As a result of deliberations in DFI committee, the following steps have been taken:

Institutional Framework Mechanism: The Government has issued guidelines to all the States for setting up inter-ministerial/departmental committees at State/District levels. The mandate of these committees is to achieve coordination and convergence among different activities relating to agriculture and also monitor welfare issues relating to farmers.

For market reforms a seven point agenda (Based on Model APMC Act, 2003) which includes; Setting up of markets in private sector, direct marketing (direct purchase of produce from farmers by processors/exporters/bulk buyers, etc. outside the market yard), Farmer-Consumer markets (direct sale by farmers to consumers) to be set up by a person other than a Market Committee, contract Farming, E-Trading, single point levy of market fee across the State and single trading license across the State.

- Apart from e-NAM Government is persuading States to adopt market reforms with a view to provide farmers with alternate markets. To achieve this, a model act called Agriculture Produce and Livestock Marketing (Promotion and Facilitation) Act, 2017 has been shared with all States and UTs.
- Contract Farming: The Government has constituted a committee for preparation of a model Contract Farming Act. It is at advanced stage of drafting.
- The restructuring of DMI has initiated.
- Road-map for Pulses Production: DAC&FW has prepared a road-map for achieving self-sufficiency in pulses by 2022.
- A dedicated micro-irrigation fund with initial corpus of ₹ 5000 crores has been set up in NABARD to achieve Per Drop More Crop.
- Computerization and integration of all 63,000 functional PACS with core banking system to be supported through NABARD.
- A dairy processing and infrastructure developing fund to be set up in NABARD with corpus of ₹ 8000 crores over three years. Fund will initially start with corpus of ₹ 2000 crores.
- Under Blue Revolution Scheme the fisheries production would be increased by 50% from 10 million tonnes in 2015-16 to 15 million tonnes by 2019-20.

- Under Rashtriya Gokul Mission, indigenous breeds would be developed in focused and scientific manner.

- The Ministry of Agriculture and Farmers Welfare with support from NITI Aayog is focusing on two other important reforms. These are:–

  - Adoption of Model Land Leasing Law by the States/UTs. A draft law has been shared by NITI Aayog.

  - Liberalise current regulatory regime for felling and transit of trees grown on non-forest as well as private land. This will promote agro-forestry and diversify farmers' income basket, besides providing income security against vagaries of monsoon.

- Indian Council of Agricultural Research (ICAR) prioritised its research activities towards improving the productivity and double the farmers' income by 2022. To achieve this ICAR is developing new high yielding, climate resilient varieties of crops, especially for pulses which can grow in rain fed areas, this would help us in fighting protein deficiency in Indian populations. Honey production during the last three was 263,930 MT tones/per year which is 20.54% more than that of earlier years. Further priority research on development of location specific, cost effective, eco-friendly, socially acceptable scientific farming practices in the areas of soil health management, integrated water management, watershed management, enhancement of nutrient and water use efficiency, resource conservation, crop diversification, integrated farming system including agroforestry, dryland farming, arid, coastal and hill agriculture, abiotic stress management, climate resilient agriculture, conservation agriculture, waste water utilization and solid waste management, keeping in view the farmers' resource availability, traditional indigenous technology know-how and grassroots farm innovations. Benefits of successful research are being popularized among the farmers throughout the country through delivering the benefits of research to the farmers, the ICAR has established a network of 681 Krishi Vigyan Kendras (KVKs) in the country. Through this network the technologies/products being evolved are demonstrated by organizing various extension programmes like farmers fair, Krishi Mahotsav, exhibitions, exposure visits, animal check-up camps and diagnostic and advisory services for soil, water and infected plant samples and also training of farmers to update their knowledge and skill.

Statement-II

Salient actions of new research for continuous and all round development and progress of agriculture sector

1. Three hundred and ten high yielding crop varieties/hybrids comprising 157 of cereals, 50 of oilseeds, 43 of pulses, 33 of fibres, 18 of forages and 9 of sugarcane were released.
2. A total of 4000 new plant germplasm and 140 microbes' germplasm added to the national repositories.
3. An extra-early maturing (52-55 days) summer mungbean variety namely IPM 205-7 (Virat), first-of-its-kind globally, with yield potential of 1-1.2 tonnes/ha. and highly resistant to MYMV and other diseases released for irrigated condition of Punjab, Haryana, Rajasthan, Gujarat, U.P., M.P., Bihar, Jharkhand, A.P., Telangana, Karnataka and Tamil Nadu.
4. Early maturing (130-135 days) pigeon pea variety PAU 881 with average grain yields of 13-14 q/ha. and suitable for cultivation in north-west plains of India including Haryana, Punjab, parts of Rajasthan and U.P. released.
5. A total of 53 plant germplasm accessions were registered.
6. A total of 1.25 lakh quintals breeder seed, 1.49 lakh quintals foundation seed, 1.19 lakh quintals certified seed, 1.28 lakh quintals truthful labelled seed and 0.37 lakh quintals planting material were produced.
7. The first high zinc rice variety namely DRR Dhan 45 with 22 ppm Zn in polished rice released for Tamil Nadu, Andhra Pradesh, Telangana and Karnataka.
8. A high protein rice variety namely CR Dhan 310 with 10.3% protein in milled rice released for Odisha, Madhya Pradesh and Uttar Pradesh.
9. Two bacterial leaf blight disease resistant rice varieties (Pusa 1592 and Punjab Basmati-3) and one blast disease resistant rice variety (Pusa 1609) developed through marker assisted selection released.
10. First Canola type Indian mustard variety namely Pusa Double Zero Mustard 31 (PDZ-1) with less than 2% erucic acid in oil and less than 30 ppm. glucosinolates in seed meal released for NCR Delhi.
11. An extra-early maturing (52-55 days) MYMV resistant summer mungbean variety namely IPM 205-7 (Virat), first-of-its-kind globally, released.
12. The genomes of 15 strains of wheat leaf rust fungus and an indigenous pathogen Karnal Bunt were sequenced.

13. Three new mobile apps namely 'Pusa Krishi' 'riceXpert' and 'Chana Mitra' launched for farmers to get instant solutions to their problems.

14. Developed and released 5 improved backyard poultry varieties namely Pratapdhan in Rajasthan, Kamrupa in Assam, Narmadanidhi in M.P., Jharsim in Chhattisgarh and Himsamridhi in H.P. These varieties have been developed as per the liking/preference of the local population. The poultry varieties have double the egg production (120-180 eggs per annum) as compared to the local/ native variety (50-70 eggs per annum) resulting in additional agricultural income of ₹ 4,000-5,000.00 per annum from 20 number of birds from sale of eggs.

Statement-III

New research and cutting edge technology for protection of farmers

1. Genomics research for biotic stress tolerance: Two varieties of rice resistant to bacterial leaf blight disease (Pusa 1592 and Punjab Basmati-3) and one variety resistant to blast disease (Pusa 1609) developed through marker assisted selection and were released for cultivation. The genomes of 15 strains (~1500 MB data) of wheat leaf rust fungus decoded. A high quality draft genome (~100Mb) sequence of Race 77 with 33X genome coverage predicted 27678 protein coding genes responsible for various functions generated.

2. Bio-fortified varieties to address problem of malnutrition: Three varieties of rice (High protein: CR Dhan 310; High Zn: DRR 45 and Chhattisgarh Zinc Rice 1), two of wheat (High Zn: WB 02 and HPBW 01), four quality protein maize (Pusa Nutri Q Makka 1, 2, 3 and 4) and two of pearl millet (High Fe and Zn: AHB 1200 and HHB 299) were released for cultivation.

3. Canola Indian mustard for quality in oil and seed meal: First Canola type Indian mustard variety namely Pusa Double Zero Mustard 31 (PDZ-1) with less than 2% erucic acid in oil and less than 30 ppm. glucosinolates in seed meal and mean yield of 2.4 tonnes/ha. along with about 41% oil content released for timely sown irrigated conditions of NCR Delhi.

4. Extra-early/early maturing varieties of pulses (Mungbean and Pigeon pea): An extra-early maturing (52-55 days) summer mungbean variety namely IPM 205-7 (Virat), first-of-its-kind globally, with yield potential of 1-1.2 tonnes/ ha. and highly resistant to MYMV and other diseases released for irrigated condition of Punjab, Haryana, Rajasthan, Gujarat, U.P., M.P., Bihar, Jharkhand, A.P., Telangana, Karnataka and Tamil Nadu. Early maturing (130-135 days) pigeon pea variety PAU 881 with average grain yields of 13-14 q/ha. and

suitable for cultivation in north-west plains of India including Haryana, Punjab, parts of Rajasthan and U.P. released.

5. Bt Cotton varieties released first time by public sector in India: Two Bt cotton varieties (ICAR-CICR Bt-6 and PAU-Bt-1) tolerant to whitefly and cotton leaf curl virus released. Farmers can use their seeds own seed for next year
6. Multi-plant virus detection technology: A molecular diagnostic platform important for quarantine of imported germplasm developed, which can simultaneously detect 1155 viruses causing serious diseases in crop plants.
7. New pest surveillance technology and also the light insect traps which are safer to beneficial insects have been developed and popularized. Integrated Pest Management technologies in rice, cotton, vegetables, fruit crops, oilseed crops, not only reduces the uses of chemical pesticides but increases the yield also.
8. ICAR has developed low cost microbial formulations for enhanced nutrient uptake growth and yield of crop plants. Those formulations are helpful in cutting the cost on chemical fertilizers/pesticides. The microbe based technologies enhances the income of farmers.
9. ICAR is also working for developed of rapid composting technologies for agri residue management.
10. Standardized grafting of tomato hybrid, Arka Rakshak, on brinjal rootstock for excess soil moisture condition.
11. Developed cultivation technology of mushroom, *Volvariellabombycina,* a new paddy straw mushroom species.
12. Developed JHULSACAST model for late blight forecasting in potato.
13. Developed micronutrient deficiency maps for mango, tomato and grapes.
14. Standardized production technology for off-season cultivation of English cucumber under naturally-ventilated polyhouse.
15. Standardized grafting of Bell pepper hybrid on chilli rootstock raised in net house for higher yield.
16. Standardized method for production of single sprouts of ginger in pro-trays.
17. Developed molecular characterization of begomo viruses infecting chilli.
18. Developed triplex lateral flow immune assay (LFIA) for simultaneous detection of viruses like PVX, PVA and PVM, duplex RT-PCR for CMV and TMV and multiplex RT-PCR for simultaneous detection of PAMV, PVS, PVM, PLRV and PVX in potato.

19. Developed two PGPR based bioinoculants, '*Kera Probio*', for raising robust coconut seedlings and '*Cocoa Probio*', effective for raising healthy cocoa seedlings.
20. Standardized Web and mobile based Decision Support System (DSS) in grapes.
21. Developed Lateral flow immunoassay kit (Dipstick) for on-site detection of banana bract mosaic virus
22. Designed and developed power operated onion grader.
23. Tractor drawn bed former cum onion seeder has been developed.
24. Standardized technology for turmeric curing with solar steam.
25. Standardized fruit coating technology for improving shelf-life of noni.
26. Standardized device for collection of fresh hygienic coconut inflorescence sap (Kalparasa).

Steps to increase productivity

†1634. SHRI MAHESH PODDAR: Will the Minister of AGRICULTURE AND FARMERS WELFARE be pleased to state:

(a) whether it is a fact that 90 per cent arable land is single crop land in Jharkhand;

(b) whether it is also a fact that cultivation of rabi crop is done on less than 20 percent of agriculture land; and

(c) if response to 'a' and `b' above is in affirmative, the steps being taken by Government to check the migration, to achieve self-sufficiency, and to increase the multi-dimensional productivity in agriculture in this poor State, if no steps are being taken, the reasons therefor?

THE MINISTER OF STATE IN THE MINISTRY OF AGRICULTURE AND FARMERS WELFARE (SHRI GAJENDRA SINGH SHEKHAWAT): (a) As per the report on Land Use Statistics for 2014-15 (latest available), 31.9% of arable land (agricultural land) is single crop land (net area sown) in Jharkhand. However, single crop land (net area sown) forms 89.1% of total cropped area.

(b) Yes, Sir. As per the report on Land Use Statistics for 2014-15 (latest available), area under rabi crops forms 5.2% of agricultural land and 14.6% of total cropped area.

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† Original notice of the question was received in Hindi.