

**GOVERNMENT OF INDIA  
MINISTRY OF SCIENCE AND TECHNOLOGY  
DEPARTMENT OF SCIENCE AND TECHNOLOGY  
LOK SABHA  
UNSTARRED QUESTION NO.1321  
TO BE ANSWERED ON 28/6/2019**

**IMPACT OF MACHINES ON JOBS**

**1321. SHRI PARVESH SAHIBSINGH:**

Will the Minister of SCIENCE AND TECHNOLOGY विज्ञान और प्रौद्योगिकी मंत्री be pleased to state:

- (a) whether big data analytics and deep learning machines are increasingly impacting jobs in India and if so, the details thereof;
- (b) the list of new technologies developed/brought for transforming labour intensive agriculture to technology intensive agriculture in India during the last five years; and
- (c) the percentage of funds allocated out of GDP for Agriculture research and technology in India for last ten years?

**ANSWER**

**Minister of State in the Ministry of Health and Family Welfare  
Shri Ashwini Kumar Choubey**

स्वास्थ्य और परिवार कल्याण मंत्रालय में राज्य मंत्री

श्री अश्विनी कुमार चौबे

- (a) Sir, Global opinions and some studies provide conflicting conclusions on impact of big data analytics and deep learning machines on jobs. Moreover, no conclusive information, analysis or data are available for India to provide a final view in this matter.
- (b) List is attached as Annexure –I.
- (c) Percentage is provided below:

Year	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
Percentage	0.61	0.67	0.86	0.76	0.59	0.60	0.63	0.62	0.62	0.62

The list of the major technologies/equipments/machines, product and process protocol developed during last five are given below:

**Equipment/machines/gadgets:**

1. Tractor drawn planter-cum-residue mulcher for maize-wheat cropping system
2. Hand held vegetable transplanter (double lever type)
3. Tractor side mounted two-row cotton stalk up-rooter
4. Hand-held vegetable transplanter
5. Manually operated three-row multi millet seed-cum-fertilizer planter
6. Bullock drawn three-row multi millet seed-cum-fertilizer planter
7. Tractor drawn six row multi millet seed-cum-fertilizer planter
8. Tractor drawn rotary assisted broad bed former-cum-seeder
9. Seed-cum-fertilizer drill with two stage fertilizer application system
10. Pre-emergence herbicide strip applicator-cum-planter
11. Self-propelled spot fertilizer applicator for Urea top dressing
12. Spectral reflectance-based urea application system for top dressing in rice and wheat crops
13. Power weeder for mound cassava
14. Tractor mounted ginger planter
15. Motorized sugarcane single bud cutting machine
16. Tractor drawn transplanter for sugarcane
17. Mechanical inter and intra-row weeder for wide spaced field crops
18. Self-propelled high-clearance multipurpose vehicle
19. Self-propelled multipurpose hydraulic system for orchard management
20. Multi-millet thresher
21. Power operated fruit grader
22. Power-cum-manually operated fruit and vegetable grader
23. Ripening chamber for horticultural crops
24. Package for rope making from outer sheath of banana pseudo stem
25. Sugarcane sett cutting machine
26. Power weeder
27. Planters for sowing of small seeds
28. Nursery seeder
29. Pre-emergence herbicide strip applicator-cum-planter
30. GPS based variable rate fertilizer applicator (VRFA)
31. Cassava stake cutter Planter
32. Tractor drawn five row seed-cum-fertilizer drill
33. Variable rate urea application system
34. Sorghum harvester
35. Mechanization package for banana central core
36. Package of equipment to mechanize the rope making process from outer sheath of banana pseudo stem
37. Manual stalk uprooter
38. Millet planter
39. Millet harvester
40. Hand held two row vegetable transplanter
41. Tractor operated subsurface drip lateral laying machine
42. Hand held single row vegetable transplanter

43. Tractor operated small seed planter
44. Tractor operated fertilizer dibbler for ratoon sugarcane
45. Drift control shield for a hydraulic boom sprayer
46. Tractor drawn planter cum boom sprayer
47. Power operated onion de-topper cum grader
48. Tractor operated check basin former
49. Pomegranate spraying system based on ultrasonic sensors
50. Tractor operated cassava harvester
51. Tractor drawn turmeric rhizome planter
52. Power operated sugarcane sett cutter
53. Power operated garlic stem and root cutter
54. Tractor operated system for controlled level puddling
55. Self-propelled 8 row pre-germinated rice seeder
56. Tractor operated mulch laying machine
57. Seed cum fertilizer drill for sowing wheat in cotton-wheat relay cropping
58. Variable rate vertical boom type air-assisted sprayer
59. Animal drawn 3-row garlic planter
60. Animal drawn garlic digger
61. Animal lifting device
62. Pneumatic wheel steel bullock cart for payload capacity of 1.0 ton
63. Animal drawn seed drill for seed spices
64. Animal drawn seed drill for inter-cropping
65. Multipurpose tool carrier
66. Package of implements for single bullock
67. Manure spreader
68. Package of implements for groundnut
69. Bullock drawn solar powered sprayer
70. Air mist canopy sprayer
71. Zero till seed cum fertilizer drill for hilly terrain
72. Helical blade Puddler
73. Paddy puddler cum clod Breaker Bullock drawn ridge type drum seeder
74. Solar powered cold storage system
75. Hybrid hot air dryer
76. Solar PV operated knapsack sprayer
77. Reactor system for preparation of biochar from crop residues
78. Biomass fired biochar production unit
79. Millet flaking machine
80. Package of equipment to obtain juice concentrate from Garcinia combogia
81. Moringa leaf stripper
82. Modified atmosphere storage (MAS) structure
83. Carrier system for Live fish
84. Developed Multipurpose Discharge system for Silo
85. Development of RFID based quality tracing system
86. Sting (animal lifter)
87. Development of buckwheat dehuller
88. PVC Container Based Live Fish Carrier System
89. Cauliflower Stem Cutting Machine
90. Prototype of animal squeeze chute
91. Semi-automatic peeler for kinnow and sweet orange
92. Oat Dehuller
93. Nanocellulose Pilot Plant
94. Lint opener machine for lint samples for instrumental testing

## **95. Flexi Check dam for watershed management**

### **Process protocols and value added Products:**

- 1. Development of protocol for extraction of pectin from apple pomace**
- 2. Process for shrink wrap packaging of cabbage**
- 3. Process protocol for de-bittering of kinnow juice**
- 4. National Database on Post-Harvest machinery/equipment**
- 5. Development of Antioxidant rich pasta utilizing beetroot and groundnut meal**
- 6. Carrot incorporated protein rich pasta and groundnut meal**
- 7. Optimization of Process for improvement of maize dough for chapati making**
- 8. Process Protocol for making soybean flour mix wadi**
- 9. Optimization of Process for making Quality protein based gluten free muffins**
- 10. Model for detection of detergent (anionic) in milk**
- 11. Model for detection of soya oil (SO) and common sugar (CS) in milk**
- 12. Optimization of pre-treatment for enhanced oil recovery in mustard**
- 13. Oil expelling properties of dehulled deskinning groundnut**
- 14. Protein and minerals rich expanded snack food with spinach**
- 15. Development of nutritionally rich pasta with green fenugreek**
- 16. Quality protein maize based muffins**
- 17. Development of nutritious muffins utilizing sunflower meal**
- 18. Protein enriched nutritious biscuits utilizing dehulled sunflower meal**
- 19. Moth bean flour incorporated maize flour and chapaties**
- 20. Protein enriched muffins utilizing groundnut meal**
- 21. Briquettes from jute sticks**
- 22. Composite flour eggless cakes**
- 23. Multi-grain laddoos and nutritive snack for children.**
- 24. Baked multigrain tortilla chips made from a mix of corn, wheat, rice and sorghum**
- 25. Soy fortified extruded snacks**
- 26. Packaging and storage technique for probiotic soy-cheese spread and soymilk powder**
- 27. Preparation and preservation of banana central core juice.**
- 28. Gluten-free eggless cakes from multi-nutrient gluten free flour mix (finger millet, sprouted amaranth and sprouted soy)**
- 29. Chemo-mechanical process for Nanocellulose production**
- 30. Currency grade paper from cotton linters, comber noil and Banana pseudostem**
- 31. Microbial process for degossypolization and nutritive enrichment of cottonseed meal for poultry and fish feed.**
- 32. Antimicrobial textiles (bedsheets) for medical application**
- 33. Low temperature absorbent cotton production technology for application in medical textiles.**
- 34. Cotton Bamboo Viscose T-shirt for active and sports wear**

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