provides the regulatory clearance and the Central Government, part of the equity capital in the project. The enterprise could be a consortium of entrepreneurs from agri-business, cold chain, logistics, warehousing, agri-infrastructure and related background.

(c) The States of Maharashtra, Madhya Pradesh, West Bengal, Andhra Pradesh, Tamil Nadu, Uttaranchal and the Union Territory of Chandigarh have shown interest in taking up the terminal market projects.

(d) to (0 Yes, Sir. The proposal to set up Terminal Markets on *PPP* model was discussed with the State Governments and interested private enterprises at a national conference of State Ministers held on 20-02-2006 at New Delhi. All the States have in general agreed to go ahead with the implementation of the projects.

(g) In the annual budget 2006-07, under the National Horticulture Mission, an amount of Rs. 150.00 crore has been earmarked for setting up of Terminal Markets in the country.

Reducing post harvest losses

1937. SHRI K. RAMA MOHANA RAO: Will the Minister of AGRICULTURE be pleased to state:

(a) the techniques developed by ICAR to minimize the losses in agricultural produce, especially fruits and vegetables in the country;

(b) whether the Central Institute of Post Harvest Engineering and Technology is doing anything in this regard;

(c) if so, the details thereof; and

(d) the assistance given by the National Horticulture Board to the farmers to reduce post-harvesting losses?

THE MINISTER OF STATE IN THE MINISTRY OF AGRICULTURE (SHRI KANTILAL BHURIA): (a) A number of techniques and equipment have been developed by ICAR to minimize the losses in agricultural produce, especially fruits and vegetables in the country. A list of selected technologies for minimization of losses in agricultural produce is given in the Statement-I (See below).

(b) The Central Institute of Poet Harvest Engineering & Technology (CIPHET) is engaged in developing and demonstrating the post harvest technologies for loss reduction and value addition for crops, horticulture, livestock and fisheries based produce.

(c) The activities of the Central Institute of Post Harvest Engineering & Technology in detail are given in the Statement-ll (See below).

(d) The details of the assistance available from the National Horticulture Board to the farmers to reduce losses post harvest are given in the Statement-Ill.

Statement-I

Selected techniques & equipment developed by ICAR to Minimize the losses in agricultural produce

SI. No. >.	Techniques & Equipment	Developed at
1	2	3
1.	Vegetable washing machine	PAU, Ludhiana
2.	Fruit harvesting net	UAS, Bangalore
3.	Tomato Juice extractor	TNAU, Coimbatore
4.	Bottling of sugarcane juice	TNAU, Coimbatore
S.	Green chickpea shelling machine	JNKW, Jabaipur
6.	Weight based grader for fruits	GBPUA & T, Pantnagar
7.	Garlic bulb brack	RAU, Udaipur
8.	Low cost grain infestation detector	VIAE. Bhopal
9.	Temporary crop covering devices	PKV, Akola
10.	Storage technology for pulses	JNKW, Jabaipur
11.	Solar heat treatment machine for seeds	RAU, Udaipur
12.	Low cost seed storage bins from used bitument drums	CIAE. Bhopal
13.	Use of biogas for stored grains insects disinfestations	PAU, Ludhiana
14.	Use of activated clay as grain protectant	JNKW. Jabaipur
15.	Infrared stabilization of rice bran	GBPUA&T, Pantnagar
16.	Mango grader	GBPUA&T, Pantnagar

1	2	3
17.	Packaging of banana for enhanced shelf life	TNAU, Coimbatore
18.	Packaging of mango	GAU, Junagarh
19.	Lime Juice extractor	PKV, Akola
20.	Evaporatively cooled structures for oranges and potato	PKV, Akola
21.	Drying of mushrooms	GBPUA& T, Pantnagar
22.	Sun drying of chillies on different floors	CIAE, Bhopal
23.	Natural air ventilated onion storage structure	CIAE, Bhopal
24.	Dehydrated pea processing technology	JNKW, Jabalpur
25.	Insect trap bin	TNAU, Coimbatore
26.	Pomegranate seed extractor	MPKV, Rahuri
27.	Ripening chamber for banana	MPKV, Rahuri
28.	Technology for post harvest handling of litchi fruits	RAU, Pusa, Bihar
29.	Microwave for disinfestations	IIT, Kharagpur
30.	Developed the following fruit and vegetable varieties with higher keeping quality/shelf life/suitable for transport to distant markets. Fruits: Mango-Arka Anmol, Grape-Arka Neelmani, Papaya-Surya, Annona-Arka Sahan Vegetables: Tomato-Arka Shresta, Onion-Aarka Kalyan and Arka Kirtiman, Water Melong-Arka Manik, French Bean-Arka Kemal, Pumpkin-Arka Chandan	IIHR, Bangalore
31.	Standardized pre harvest practices to minimize post harvest losses in banana, mango and grapes.	IIHR, Bangalore
32.	Low temperature storage conditions for important fruits and vegetables, e.g. Grapes 2 months at 0 degree C; Mango 3 weeks at 12-13 C; Banana 5 weeks at 12-13 C, Pomegranate	IIHR, Bangalore extending shelf life of

1	2	3
	2 months at 8 C; Tomato 6 weeks at 12-13 C, Capsicum 3 weeks at 8?C; Carrot 5 ■ months at 0-2 C; Cabbage 3 months at 0 C.	
33.	The individual shrink-wrapping technology for pomegranate and capsicum to extend storage life of pomegranate to 3 months and capsicum to 6 weeks.	IIHR, Bangalore
34.	Optimized Controlled Atmosphere Storage requirements of mango and banana to extend storage life.	IIHR, Bangalore
35.	Standardized protocols to avoid chilling injury at lower temperature of 8 C by Controlled Atmospheric Storage of mango and temperature conditioning in banana for longer storage life.	IIHR, Bangalore
36.	Hot water treatment process (52C to 55C) for uniform ripening, control of fruit rot, control of fruit fly and reduction in spoilage of mango during storage.	IIHR, Bangalore
37.	Technologies for staggering of harvest to minimize market glut and thus minimize the post harvest losses. Developed varieties with different maturity periods in vegetables. Developed varieties/production technologies suitable for off season production namely Grape-Arka Ssham, Arka Neelmani, Arka Soma; Arka Jai, Arka Vijay in Dolichos Bean, Gomma Manjari in Cluster Bean etc. Poly house cultivation of tomato and capsicum.	IIHR, Bangalore

i	2	3
38.	Post Harvest Management of tomato, Kinnows & Pomegranate	CIPHET, Ludhiana
39.	Tools for safe harvesting of strawberry and capsicum.	CIPHET, Ludhiana
40	Package of practices developed for enhance-	CIPHET, Ludhiana ment of shelf life of ber
41.	Solar-cum-Electrical-cum-Agricultural waste Fired dryer	CIPHET, Ludhiana
42.	Solar Tunnel Dryer	MPUA&T, Udaipur
43.	Animal Feed Block Formation Machine	IARI, New Delhi
44.	Turmeric Boiler	TIMAU, Coimbatore
45.	Variable Speed Double Roller Gin	CIRCOT, Mumbai
46.	Banana Pseudo-stem Fibre Cleaner	CIRCOT, Mumbai
47.	Groundnut Stripper	CRIDA, Hyderabad
48.	Castor Shelter	CRIDA, Hyderabad
49.	Power Operated Coconut Husking Machine	CPCRI, Kasargod
50.	Manually Operated Coconut Husking Machine	CPCRI, Kasargod
51	Mini Palm Oil Extraction Plant	CPCRI, Kasargod
52.	Whole Tomato Crush	IARI, New Delhi
53.	Ready-to-East Dehydrated Carrot Shreds	IARI, New Delhi
54.	Snow Bail Tender Coconut	CPCRI, Kasargod
55,	Soy Milk and Soy Paneer (Tofu) (Soy Dairy Analogs)	CIAE, Bhopal
56.	Soy Biscuits (Supplemented with Full Fat Soy	CIAE, Bhopal flour)
57	Liquid groundnut and solid Jaggery	HSR, Lucknow
58.	Process for Preparation of Ready-To-Serve Banana Juice	NRCB, Trichy

1	2	3
59.	Process for Preparation of Banana Flower Pickle	NRCB, Trichy
60.	Technique for Storage of Copra and Coconut CPCRI, Kasargod Oil	
61.	Preparation of Syarup from Stalks of Sweet Sorghum	NRCS, Hyderabad
62.	Production of Cellulase Enzyme from Groundnut Shell	NRCG, Junagarh
63.	Production of Amylases from De-oiled Groundnut Cakes	NRCG Junagarh
64.	Axial Flow Sunflower Thresher	MPAU, Rahuri
65.	Phule Sunflower Thresher	MPAU, Rahuri
66.	Cleaners and Graders	CIAE, Bhopal
67.	Power Operated Potato	Grader IARI, New Delhi
68.	Pusa Vegetable-cum-Fruit Grader	IARI, New Delhi
69.	Low-Cost Power, Operated Winnower	IARI, New Delhi
70.	Rubber Roll Paddy Shelter	IARI, New Delhi
71.	Tubular Maize Shelter	CIAE, Bhopal
72.	Improved Animal Cart	CIAE, Bhopal
73.	Jute Composite Decorative Laminates (3mm)	NIRJAFT, Kolkata
74.	Particle Boards from Jute-Stick or any other Agro-Residues	NIRJAFT, Kolkata
75.	Hand-Made Paper and Board of Different Grades from Jute-Base and Agro-Residues	NIRJAFT, Kolkata
76.	Bleached Lac	ILRI, Ranchi

1	2	3
77.	**Lac** Dye from Lac Factory Effluents	ILRI, Ranchi
78.	Particle-Boards from Cotton-Stalks and Other Agro-Wastes	CIRCOT, Mumbai
79.	Kraft Paper from Cotton-Plant-Stalks	CIRCOT, Mumbai
80.	Continuous Ghee Making Machine	NDRI, Karnal
81.	Continuous *Khoa* Making Machine	NDRI, Karnal
82.	Biomass gasification	CIAE, Bhopal
83.	Post harvest management of seed cotton	CIRCOT, Mumbai

***Statement**-ll*

Efforts of Central Institute of post harvest Engineering & Technology (CIPHET) in developing technologies for minimizing losses in agricultural produces

Central Institute of Post Harvest Engineering & Technology (CIPHET) was established on August 11, 1986 and started functioning w.e.f. December 29,1989 at PAU Campus, Ludhiana. Later ICAR decided to establish one more campus of CIPHET at Abhohar, which started functioning on March 19, 1993. The Co-ordinating units of AlCRPs on PHT and APA are located at CIPHET, Ludhiana. The Institute has the following mandate.

To undertake basic, applied and adaptive engineering and technology research in postproduction sector of cereals pulses, oilseeds, fruits, vegetables, flowers, spices, plantation crops, products of forest origin, livestock and aquaculture products including agricultural structures and environmental control.

To act as National Institute for research, training and education in post harvest engineering and technology.

To act as repository of information on post harvest engineering and technology.

To transfer technology and provide advisory and consultancy services.

CIPHET has during the past 16 years carried out several R&D and HRD programmes to develop commodity and location specific technologies and demonstrate them to the stakeholders. A few of these technologies are listed below.

Salient research achievements in minimization of losses In agricultural produces

Development of on-farm storage structures of onion and garlic.

Design and development of solar fruit and vegetable dehydrator.

Design and development of groundnut pod grader.

Development of pin mill for low temperature hygienic grinding of tough agricultural products.

Design and development of lac scrapping cum grading machine.

Development of a two stage evaporative cooler for fruits and vegetables.

Management of post harvest diseases of kinnow in Abhohar region.

Use of microwave for insect disinfestations of cereal grains.

Survey of existing package of practices used for harvesting through to marketing of grapes.

Packing of minimally processed tomato, cauliflower and spinach.

Evaporatively cooled room for storage of fruits and vegetables.

Vendor's cabinet for storage of fruits and vegetables.

Design and development of pre-grinder, blender cum mixer and automatic shaker for pre-treatment of oilseeds.

Standardization of process parameters for extruded products from maize:

Post harvest management of tomato, kinnow and pomegranate.

Tools for safe harvesting of capsicum and strawberry.

Package of practices for enhancement of shelf life of ber.

Development of tomato grader

Nop destructive ripeness detector for mango.

Statement-Ill

The Assistance given by the National Horticulture Board to the farmers to reduce post-harvesting losses

SI. No.	Name of the Schemes	Details
1	2	3
1.	Development of commercial horticulture through production and post harvest management	J The schemes provide a back ended capita) investment subsidy @ not exceeding 20% of the total project cost with a maximum limit of Rs. 25 lakh per project to those projects which are found technically and financially viable. However, for the North Eastern/Tribal/ Hilly Areas, maximum limit of subsidy would be Rs. 30 lakh per project. This subsidy is provided by the Board for the activities relating to high-tech commercial production of horticultural crops, it's marketing, creating post harvest infrastructure & primary processing etc. The objective of this scheme Is to assist the farmers to take advantage of the scheme, particularly for strengthening post harvest management and cool-chain infrastructure like primary processing of

1	2	3
		horticultural products, setting up of pre-cooling units, cool store, refrigerated van at the place of production to minimize the wastage/losses of horticultural production. Secondly, the retailers/vendors of the perishables, particularly, fruits & vegetables can also take the advantage of this scheme to strengthen the post harvest infrastructure and retail infrastructure so that producer can take directly their produce to retailers and by-pass the intermediaries.
2. Capital Investment Subside for Construction/Expansion/ Modernization of Cold Storages and Storages for Horticulture Produce		The schemes provide a back ended capital investment subside to the eligible organizations for creation/modernization/ expansion of cold storage @25% of the project cost not exceeding Rs. 50,00 lakhs per project and @ 33.33% of the project cost up to a ceiling Rs. 60.00 lakh per project for NE Region.

Recommendations of National Commission on farmers

1938. SHRI R.P. GOENKA: Will the Minister of AGRICULTURE be pleased to state:

(a) whether it is a fact that the National Commission on Farmers, headed by M.S. Swaminathan, has submitted its third report recently and recommended *inter-alia* the creation of a single market for farm produce by removing all the remaining controls and barriers in inter-state movement of goods and changing the marketing laws; and

(b) if so, the details of other major recommendations/observations made by the Commission and action taken/proposed to be taken thereon?