

CHAPTER-2

Industrial R&D Schemes

IV Promoting Innovations in Individuals, Start-ups and MSMEs (PRISM)

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PROMOTING INNOVATIONS IN INDIVIDUALS, START-UPS AND MSMEs SCHEME (PRISM)

1.0 PREAMBLE

Department of Scientific and Industrial Research (DSIR) has launched a new programme viz. Promoting Innovations in Individuals, Start-ups and MSMEs (PRISM) during 12th five year plan. The scheme has now been extended further till 31st March 2020 i.e. co-terminus with the fourteenth finance commission period. The programme aims at to support individual innovators having original ideas to convert them into working models, prototypes etc. It also aims at supporting autonomous institutions or organizations or registered society for developing state-of-art new technology solutions aimed at helping MSME units in industrial clusters. PRISM Scheme is now a component scheme of Industrial Research and Development (IRD) scheme of DSIR. The department has supported around forty-three(43) new projects during 2018-19 (up to March 31, 2019) [Annexure-9]. The department has also successfully completed twenty-two (22) PRISM projects during the year. The details of the completed projects supported under PRISM are given in Annexure-10.

2.0 Highlights of Some of the Completed/ on-Going PRISM Projects

2.1 A Next Generation Home Appliance that automatically makes rotis and other flatbreads all by itself using wide varieties of flour

Shri Vishal Singh of Chennai(Tamil Nadu) has been scouted and mentored by TOCIC (TePP Outreach cum Cluster Innovation Centre) located at University

of Madras – Technology Business Incubator(UnoM-TBI) with financial support from DSIR under PRISM Scheme. The innovator has fabricated a fully automated, compact and portable apparatus used to produce rotis, parathas and numerous other dough based food products. The apparatus is configured to dispense ingredients, mix the ingredients, knead the mixture, press the kneaded mixture, and cook the mixture into a food product based on input obtained from internal monitoring sensors and/or inputs given by user. The apparatus is capable of producing a single product at a time, or simultaneously processing one product while other is being cooked. The apparatus does not require continuous monitoring by the user as the apparatus is configured to generate alert for the user, if intervention is required. Specifications of the machine are -Weight-14 Kg., Size-36 Litres, Power-0.8 Kwh and Time-1.5 minutes/roti.



Fig. 1

2.2 Design and development of a Tractor Operated Vegetable Transplanter for Plug-type Seedlings

Shri Abhijit Khadatkar from Udaipur (Rajasthan) was scouted and mentored by TOCIC at CTAE, Udaipur with financial support from DSIR under PRISM scheme. Shri Khadatkar has developed a 2-row tractor operated automatic vegetable transplanter with "Rotating finger with push-type mechanism for plug-type vegetable seedlings. The mechanism consists of pro-tray feed rollers, belt, "L" shaped rotating fingers, metering shaft, pro-tray guides, delivery box, micro-controller based programmable system. With the help of this invention, one labour is only required to fill the transplanter with seedling portray over the feed roller, while driving it manually / when towed behind a tractor/ or any other traction power source. Thus, it also eliminates the drudgery associated with the transplanting operation due to automation of most laborious and tedious job of placement of vegetable seedlings in the ground by avoiding bending and squatting posture.



Fig. 2

The product has following features which are summarized below :

- A two-row tractor operated automatic type vegetable transplanter for plug type seedlings with improved field efficiency
- A new metering mechanism developed i.e. Rotating finger with push-type mechanism
- Labour saving
- Saving in cost of operation
- Timeliness in operation

- Higher production and productivity
- Reduction in the drudgery as compared to traditional method of transplanting

The technology has very high industrial potential. Some of the manufacturers have been contacted for demonstration and future possible solution in the area of vegetable transplanting. The developed technology i.e. Automatic Vegetable Transplanter for plug-type seedling will be able to provide timely operation and will be more demanding due to their simple and fast perspective. The project has been successfully completed.

2.3 Development of Seed cum Manure Drill for Row Crop Cultivation

Shri Sunil Kumar Rathod from Udaipur (Rajasthan) was scouted and mentored by TOCIC at CTAE, Udaipur with financial support from DSIR under PRISM scheme. The developed machine gives the easy way of mechanisation of organic farming. With continuous use of this technology, farming will be more eco-friendly and agricultural product will be natural as it was before the introduction of chemical fertilizers. All types of organic wastes available with will be utilised properly for producing the crops naturally. The food production with this organic culture will take care of human health reducing their capital investment in medicine and health care treatments. The most important benefit of this technology is placing the bulky organic manure at the time of sowing according to recommended spacing simultaneously studying the root zone of the crops. With the use of seed cum manure drill, more area will come under organic culture with the available manure resources.

With the use of this machine, 60% manure application was sufficient to get more yield than broadcasting method in FYM (Farm Yard Manure) and 40% application was enough to achieve more yield than broadcasting method in vermi-compost application. Hence, 40% saving in FYM and 60% saving of vermi-compost is possible with this technology compared to conventional broadcasting method. Same machine can be used as cultivator as it is attached with cultivator tyres for broad furrows.

This will lead to sustainable agriculture in India. The project has successfully been completed.

2.4 Development of Heat Pipe based Window Mounted Solar Water Heater for Domestic Apartments

Shri Siddharth Y. Paralikar from Pune (Maharashtra) was scouted and mentored by TOCIC at IIT, Kanpur with financial support from DSIR under PRISM Scheme. The project – “Development of Heat Pipe based Window Mounted Solar Water Heater for Domestic Apartments” was executed by the innovator Shri Siddharth Y. Paralikar, Pune. Shri Siddharth Y. Paralikar from Pune, has been scouted and mentored by TOCIC at IIT Kanpur with financial support from DSIR under PRISM scheme.

The following two issues associated with commercially available domestic water heaters were targeted under the project:

1. Consumption of excessive roof-top space of urban residential buildings coupled to the absence of a decentralised solar water heating solution for such buildings.
2. Loss of heat due to piping in high rise towers due to large surface area and the insulation costs associated to avoid the heat loss.

In the first system, the collector is mounted outside, below the window of an apartment and the heat is transported to the storage tank placed inside, through a thermosyphon type heat pipe assembly. A thermosyphon utilizes phase change phenomenon of a working fluid to transfer heat from one end to another with minimum thermal resistance. In this design, a novel thermo siphon assembly is incorporated, consisting of a single flat plate evaporator manifold (acting as the collector) and multiple condensers. To avoid mounting of a heavy or bulky structure, a Fresnel lens is used to concentrate the solar radiation on a small size collector, thus giving higher heat flux. To make it a low-cost arrangement, a uni-axial manual tracking system with a flat plate collector is used instead of a Bi-axial continuous tracking. Flat plate collector instead of a point or a line collector, compensates for the absence of biaxial real time tracking. Automated tracking is avoided for simplicity

and cost. The location of Fresnel lens can be manually adjusted along the guide rails every few days. To improve the absorptivity of evaporator manifold, a selective absorption coating was applied. Second type window mounted solar water heater was similar to the first. The only difference between the two is that unlike the thermosyphon assembly, in which the vapour and liquid flow through same tube, a loop type heat pipe was used. In loop type heat pipe, vapour and liquid flow in two different tubes, thus reducing shear interactions between the two and improving the heat transport to the water placed inside the tank. The systems were tested for multiple days for a period of 4 hours every day. The maximum water temperatures generated in thermosyphon and loop type heat pipe system were 69°C and 74°C respectively. The project has successfully been completed.

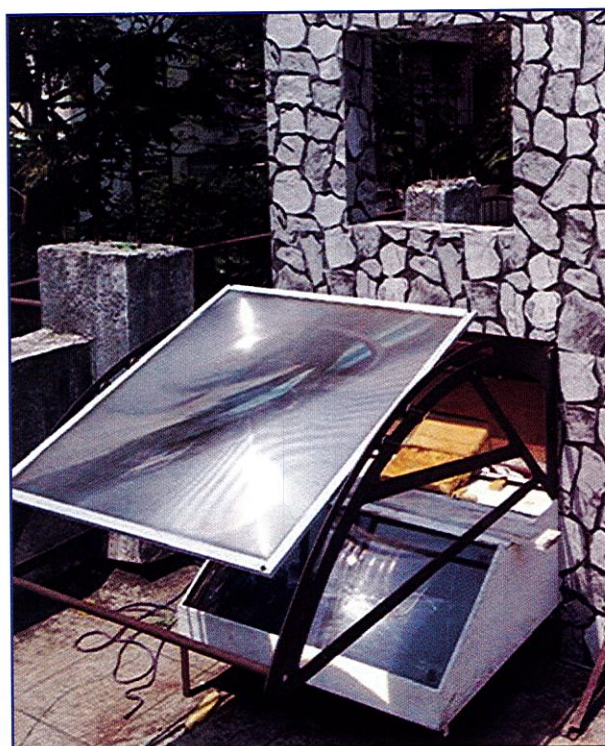


Fig. 3

2.5 Real Time 3D scanner-based psycho-physical rehabilitation

Shri Eobin Elex George from Cochin (Kerala) was scouted and mentored by TOCIC at CTAE, Udaipur with financial support from DSIR under PRISM scheme. A semi-automated system has been developed for remote healthcare centers and fitness centers. The system captures a topographic scan of the patient



as well as capture joint motion and recommend exercises for improvement of the patient's condition. This project aims to develop an innovative Real time 3D scanner based Psycho Physical Rehabilitation system.

Using real-time 3D body scan is a revolutionary approach to provide assistive rehabilitation solution to patients looking for post-trauma physical rehabilitation. It helps patients by mapping the joint motion of the patient automatically and suggesting exercises and schedules. The system uses a topical optical scanning system and Annear visual-spectrum depth measurement unit to scan the user's body to calculate his joint angles and estimate limitations in degrees of freedom by comparing it with a standard set. Once that is estimated an exercise program is recommended to the user and his performance monitored by this system intelligently when the user does the exercise in front of him. The 3D body scanner helps eliminate the need for the doctor or trainer to be physically present at the training room and provides customized training schedule for the patient/client as per his/her condition and requirement. The revolutionary use of Real-time 3D scans translates to

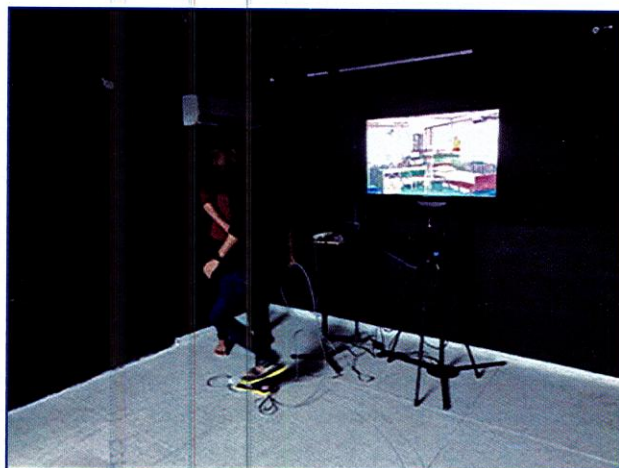


Fig. 4

higher quality of training, faster recovery and reduced costs. The project has successfully been completed.

3.0 OTHER ACTIVITIES

A number of other activities were organised/ participated by DSIR along with TOCIC during the year to sensitize academia, disseminate information on PRISM to the larger mass of the populace network partners and impact generation among common masses.