Technology Fact Sheet for Adaptation

Upscaling of locally proven IPM technologies for control of pest of economic importance[i]

Technology: Upscaling of locally proven IPM technologies for control of pest of economic importance	
Sector : Agriculture	
Subsector : Crop sector	
Technology characteristics	
Introduction	Integrated Pest Management (EPM) is an effective and environmentally sensitive approach to agricultural pest management that uses a range of practices to manage population and maintain at level below at which it can cause economic injury and affect agricultural production while providing protection against hazards to humans, animals, plants and the environment. IPM makes full use of natural, physical and cultural processes and methods, including host resistance and biological control as opposed to synthetic chemicals. IPM emphasis the growth of a healthy crop with the least possible disruption of agro-ecosystems, thereby encouraging natural pest control mechanisms. Chemical pesticides are used only where and when these natural methods fail to keep pests below damaging levels" (Frison et al, 1998; 10). This IPM technology include up-scaling of 4 locally IPM techniques to control major pest of field and greenhouse crops (mites, melon fly, fruit bats and leafminer and whitefly). They are 1.Demonstration of tree pruning and use of bird net 2.Inoculative releases of predators to control population of *Tetranychusurticae* a mite causing major damage on solaneceous crops, roses and strawberry. 3. Release of parasitoids(*Encarsiaformosa* and *Eretmoceruseremicus*) for control of White fly, serious insect pest in greenhouse production 4. Field Sanitation using field cages (augentorium) , proten bait and MAT block to attract and suppress melon fly, Bactroceracucurbitae, major pest in cucurbits The primary goal is to implement a system that results in greater yields, reduced growers' costs and eliminate human and environmental hazards.The use of sticky is to trap the adult insects and prevent multiplication and control pest population
Technology characteristics/highlights	IPM needs group action, that is neighboring fields to with common goal of ecological pest management at a locality level The upscaling of the locally proven IPM techniques will requires - Setting up of 3 greenhouse facilities for (1) production of plants required for the production of host insects that are reared for biological control programs, (2) rearing of predatory mite, *Phytoseiluspersimilis* (3)rearing of parasitoids (*Encarsiaformosa* and

	Eretmoceruseremicus)for control of whitefly (4)Demonstration of fruit tree pruning and and use of bird net (5)construction and distribution of augentoriumin or field cages, protein baits, MAT block for field sanitation - R & D to set optimum insect pest threshold - Regular monitoring of insect pest using traps - Logistic for release of predators and parasitoids - Capacity building of extension officer and farmers (scouting, IPM Principle/ strategies that include a combination of behavioural, biological, chemical, cultural and mechanical methods to reduce pest populations to acceptable levels) - Provision of IPM starter kit to farmers
Institutional and organizational requirements	The entomology division of AREU and agricultural services has the necessary expertise in IPM, rearing of predators, Yellow sticky traps and blue sticky traps tested on pilot scale have been found very efficient in mass trapping of adult flying insect pests. Farmers are grouped in association and to control actions may be taken collectively at a regional level. Implementation of IPM requires collaboration of local service providers (such as NGOs, producer organisations, technical service providers, Implementation of IPM requires collective actions between researchers, extension and farmers for monitoring and feedback. Farmers grouping can help to reduce cost of IPM and ensure high rate of success.
Operation and maintenance	Once rearing of predatory mite is developed and implemented, maintenance will have to be undertaken on sanitation to avoid contamination. Sticky traps can be made with local materials and have to be replaced at regular intervals. Maintenance of baits and traps is quite easy
Endorsement by experts	Due to over-reliance on chemical pesticides and associated problems such as development of pesticide resistance, elimination of natural enemies of pests, outbreaks of formerly suppressed pests, hazards to non-target species, threat to human health and environmental contamination, IPM has been identified as a key element in sustainable agricultural development (Frison et al, 1998; 9). During the last 15-20 years, IPM strategy has been implemented in cabbage and cauliflower plantation. Experts were present to give their support. Use of traps, baits have been found to be effectively if properly maintained.
Adequacy for current climate	The technology is appropriate for present and expected climate and is applicable islandwise
Scale/Size of beneficiaries group	Some 8,**500** farmers will benefit at first and no doubt population will be gaining from organic production
Disadvantages	- Some pest may be very difficult to control, if biological control not yet identified - Production of biological control agents have the probability to

	- High investments for rearing and research
Cost to implement adaptation technology	The cost of implementation of this technology will required -capacity building of extension and farmers in IPM - research to test efficacy of control measures locally and develop IPM package -Mass rearing of biological control agent -Monitoring of pest population and release of biological control agents - Construction and distribution of augmentaroium, sticky traps with pheromone , protein baits , MAT block on an area-wide scale - Running regular IPM field schools/ training The developed technology usage depends on growers adaptation. All depends on consignment needed for release of the natural enemies and predators. If demand by growers increases then automatically cost of production of natural enemies will increase. Vegetable growers are well grouped and this will reduce cost of production. Cost will include laboratory for rearing of predators, sticky traps , pheromone traps , baits for demonstration, training of extension officer (30)and farmers (2000), development of training programme (visual, video) **Estimated cost of implementation of the technology Rs 2,441/ beneficiary/year** **Total implementation cost Rs 28 564,000**
<u>Additional</u> cost to implement adaptation technology, compared to "business as usual"	Additional cost to implement technology Rs 20,000,000
Long term cost (i.e. 10, 30, or 50 years) without adaptation	Increasing crop damage by pest and disease, lower crop productivity and risk of farmers to abandon their production leading to reduction in supply of food
Long term cost (i.e. 10, 30, or 50 years) with adaptation	Reduce damage due to pest and disease/ farmers are better prepared to manage pest and disease in their field / reduce reliance on chemical pesticides and reduce cost of production and improve income and food safety
Development impacts, direct and indirect benefits	
Direct benefits	Reduce crop damage , increase yield and quality (less pesticide residue) andimprove income of farmers
Reduction of vulnerability to climate change, indirect **Growth & Investment**	Control insect population , thus reducing crop damage, increase crop yield and income of farmers In long run, less insecticide will be used/ minimize air and water pollution. Reduction in public & private expenditures in insecticides and fungicides cost
Social benefits, indirect	
Income **Education**	Reduce crop damage by pest and this improve yield and farm income Reduce cost of production Farmers become experts /get basic understanding of the agro-ecological system, and decision making processes for long term

Health	management of soil, crop and pests Reduction in use of insecticides leads to safer food(no pesticide residue), improve health of farmers and preserve beneficial insects better quality of air and water
Environmental benefits, indirect	Reduce use of chemical pesticides minimize risk of contamination thus conserve natural enemies
Local context	
Opportunities and Barriers	**Opportunities-** Farmers are empowered to take or organize actions collectively for better control of pest If implemented , farmers can sell their produce as organic, healthy products and can fetch higher prices **Barriers** - inability of farming community to access needed information and knowledge - can cause a slight drop in productivity Farmers prefer pesticides as they are easy to apply and provide effective control Poor linkage between research and extension Lack of policy to favour IPM over pesticides
Market potential	IPM technology is very effective with less risk, low investment with long term gain. It has market potential for commercial production of predators and parasitoids (Agri-business) Limited application at individual farm level but would be more successful if applied at group or regional level.
Status	-Expertise exists at AREU in the rearing of predators of mites. -Pilot IPM project is ongoing for monitoring and mass trapping of thrips using blue sticky traps with kairomones . -The use parasitoids (*Encarsiaformosa* and *Eretmoceruseremicus*) to control whitefly , a seious pest in greenhouses production is used in Reunion island and has also been found to give good control of the best under local conditions - The use of augentarium with protein baits and mat blocks on a pilot scale in Plaine Sophie region was found to effective in area-wide melon fly suppression by the Agricultural services AREU has already undertaken pilot projects the results have been positive. These need to be upscale and replicated in different agro-ecological sites This technology can be implemented immediately with concrete results within 1- 2 years but the majority still relying heavily on synthetic pesticides
Timeframe	Short term for traps and bio-pesticides and medium term for biological control
Acceptability to local stakeholders	The technology is already known to planters and will be easily accepted provided there is research and extension support

[i] **This fact sheet has been extracted from TNA Report – Technology Needs Assessment Reports For Climate Change Adaptation – Mauritius. You can access the complete report from the TNA project website http://tech-action.org/**