

PEOPLE'S TECHNOLOGIES IN THE FARM SECTOR - A Scientific Approach for Sustainability

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People's technology is local wisdom that is unique to a given culture or society. It is the basis for local level decision making in agriculture, health care, food preparation, education, natural resource management and a host of other activities in rural society. Such knowledge is passed down from generation to generation, in many societies by word of mouth. India has a rich tradition of oral knowledge that goes back to the Vedic times. Much of that wisdom is being rediscovered by the modern world. This is true of Indian agriculture as well. A rich heritage of accumulated indigenous agriculture knowledge is being practiced. But unfortunately the wisdom was passed on either by word of mouth or observation and rarely documented in written form. As a result, the significance of many of the indigenous useful practices is either lost or at times, the practice itself has been distorted.

People's knowledge is an important component for many kinds of developmental activities to be successful. If people's knowledge had not been recorded, it would remain largely inaccessible to development workers. According to Jiggins (1989), Slikkerveer (1989) and Warren (1989), indigenous knowledge systems have been largely ignored in many developing countries. At the same time Vanek (1989), Hansen and Erbaugh (1987) have stated that people have started recognizing indigenous knowledge as an important national resource that can facilitate the development process in a cost effective, participatory and sustainable way. Solutions offered by a development project often fail because they do not fit in with the local knowledge. People's knowledge suggests alternatives in such circumstances. People's knowledge used effectively by one society can be used to solve problems faced by other societies in similar agro-ecosystems. Indigenous / conventional knowledge is eco-friendly and sustainable as evidenced by many of these technologies surviving for many centuries.

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The present knowledge of agricultural scientists with little exposure to the indigenous practices or their underlying wisdom has failed to give due recognition to the strengths of such indigenous technology and culture and emotional issues of such wisdom. Lack of adequate documentation is a serious constraint to scientific validation and commercialization of such knowledge.

Efforts to Document People's Technologies

The University of Agricultural Sciences, Bangalore has made a beginning to document such technologies. A core group on watershed management and a professional society "Hittala gida" (Back yard plant) are actively involved in locating, documenting, validating and popularizing indigenous agricultural technologies.

Based on a review of literature compiled by Arun Kumar *et al.* (1999) and detailed discussions with the authors and researchers some of the most popular technologies developed and practiced by farmers are presented below. Farmer's logic as well as probable scientific explanation is also given.

S. No.	Description of ITK	Farmer's Logic	Probable scientific explanation
1.1	Crop Management Cattle are allowed to graze top of ragi crop before heading	Enhances earhead size as well as grain filling and controls leaf diseases	Reduces evapotranspiration and induces heading
1.2	Well-decomposed sheep/goat manure is mixed with paddy seeds soaked overnight. The treated seeds are stored overnight in gunny bags by placing weight on them	Promotes uniform germination	Manure has growth regulatory effect

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1.3	Ragi husk is used as mulch for perennial crops	Mulch is less affected by termites	Checks evaporation and weed growth, Termites failed to get a foothold and hence their incidence is reduced
1.4	Spreading a thin layer of sand in silkworm rearing room. Broadcasting ragi/ jowar seeds and watering for the seeds to sprout	Reduces temperature	Reduces temperature and CO ₂ , and increases humidity.
1.5	Covering the roof top of the silkworm rearing house with coconut leaves/ hay/sugarcane trash and sprinkling water	Keeps the rearing house cool	Acts as a physical barrier to solar radiation (insulation)
1.6	Tying old cassette tape in sunflower fields	A device for bird scaring	Light reflected by the shining tape scares birds
1.7	Passing wooden plank at 60 days after seeding in drill sown paddy (locally called HODTHA operation)	Ensures optimum, seedling density, increase tillering and controls pests and diseases	a) Operation stimulates profuse tillering b) Makes seedling dip in the standing water thereby killing pests and also some diseases
1.8	Sunflower seeds soaked in sour butter milk before sowing	Better germination	Acts as a growth promoter



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1.9	Growing garlic in nut-grass affected fields once in three years	Minimizes nut grass incidence	Root exudation acts as weedicide
1.10	The cut ends of plant cutting are presented with cow dung ball	Better sprouting and rooting	Reduces desiccation and acts as growth promoter
1.11	Rolling an empty drum of about 10 kg weight in Onion field 10-15 days before harvest	Facilitates removal of stalk	Physical breaking of photosynthates from the bulb
1.12	Application of common salt to coconut	Reduces button shedding and rhinoceros insect incidence	Cost effective substitute for potash and also acts as insect repellent
1.13	Nailing sterile jack/papaya tree	Induces flowering and fruiting	Iron availability induces flowering
1.14	Sowing coriander seeds between jowar rows	Controls striga a root parasite of jowar	The alkaloids in coriander exudates inhibit growth of striga
2. Plant protection			
2.1	Cooked rice is spread in the fields	Cooked rice in the field attracts birds which incidentally predate on semi-looper as well	Biological insect control by attracting birds
2.2	Maize is grown around vegetable gardens	Prevents cattle and insect damage to main crop	Acts both as a physical barrier to cattle and trap crop for insects
2.3	Planting cashew in mango orchards	Reduces mango hopper incidence	Cashew acts as alternate host for the hopper

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2.4	Spraying cow dung slurry to sapota and mango plants	Cost effective control for sooty mould	Cow dung is a known disinfectant
2.5	Soap water spraying to sapota and mango plants	Cost effective control for sooty mould	Physically removes the pathogen by washing off
2.6	Calotropis (Ekka) branches are placed at the water inlet in paddy fields	Controls insect pests	The alkaloid present in latex act as an insect repellent
2.7	Placing of small sugarcane bundles at random in the field 20 day after planting	Controls insect pests	Acts as insect trap especially the stem borer moth and also serves as seed material for gap filling
2.8	Incorporating agave leaves into foundations of farm building at the time of construction	Agave leaf extract prevents termite infestation	Phenol in agave leaf extract acts as termite repellent
2.9	Cow dung slurry and groundnut cake in water is kept in earthen pots in coconut gardens @ 20-25 spots per ha	Minimizes damage by rhinoceros beetle	Fermenting mixture of cow dung and groundnut cake is known to act as an attractant of this pest
2.10	Growing coriander and linseed with Bengal gram	Controls pod borer	The crops are insect repellents
2.11	Spraying jaggery solution (0.4%) to redgram	Controls pod borer	Ants and other insects attracted by jaggery destroy pod borer eggs.



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2.12	Cultivating marigold with redgram	Controls pod borer	Acts as pod borer trap
2.13	Growing red champak in the vicinity of coconut tree	Controls coconut stem borer	Champak odour acts as a repellent
2.14	Leaves of Kasarka (<i>Strychnos nuxvomica</i>) mixed with cow dung is applied to cardamom and lemon plants	Controls grubs	Fumigation effects
2.15	Crushed and dried muthuga (<i>Buteamonosperma</i>) spread in paddy fields	Controls crab incidence in paddy fields	Acts as a repellent
3. Sericulture Production			
3.1	Keeping non-spinning worms in paddy straw or eucalyptus leaves and exposing to sunlight and covering with gunny cloth	Encourages spinning activity	Warm temperature induces spinning
3.2	Nipping apical buds a week before harvest in mulberry	Improvement in leaf quality	Checks vertical growth and ensures uniform maturity of leaves

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4. Post harvest technology			
4.1	Neem leaves are put in pulse bags for storage	Controls storage insects	Neem leaves affect hatching of storage pests eggs
4.2	Passing ragi after winnowing through used chandrika	Cleans the grain and makes it more appealing	Silk filaments remove glumes on ragi grains
4.3	Coating red earth to redgram soaked over night and drying in shade	Reduces insects damage and facilitates milling	Wetting and drying (thawing) process loosens husk from kernel and red earth acts as a physical barrier to the storage insect
4.4	Bunching local small onion and hanging to the roof	Enhances shelf life	Hanging prevents rodent damage and the higher temperature and air circulation near the roof has a curing effect
4.5	Red gram is heated with castor oil and stored in earthen vessel (Vadde)	Cost effective control method and a low cost storage structure	Oil removes glued eggs and acts as physical barrier to pests
4.6	Mixing wood ash for storing pulses	Controls storage pests	The fine powder of ash as a physical barrier and also blocks respiration system in storage pests
4.7	Bamboo grain storage structure plastered	Reduces storage insect pests of paddy and	Cow dung slurry acts as disinfectant while

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	with cow dung slurry covered with a layer of paddy straw and a layer of dried leaves of Lakke at the bottom to store paddy	prolongs storage life	Lakke acts as an insect repellent
4.8	Storing paddy seeds in Mudi (in a thick layer of paddy straw, tied together forming sacks) kept on planks suspended in the kitchen	Prevents loss of seed viability	Smoke with higher temperature prevents storage pests
4.9	Using camphor to store groundnut pods for seed purpose	Helps to overcome loss of seed viability in groundnut in hot humid weather	Acts as insect repellent induces dormancy due to less oxygen availability
4.10	Dipping pulse seeds in cattle urine and shade drying	Protects from pests incidence and enhances storage life	Toxic urine odour acts as repellent
4.11	Putting 10-15 red chillies in one quintal rice bag	Prevents storage pests	Pungent odour acts as repellent
4.12	Mixing crushed leaves of Lakke fermented in cow urine for a day, and its extract with water sprayed on crops	Controls pests and diseases	Acts as disinfectant and insect repellent
4.13	A layer of rock salt is spread at the base of a storage structure for pulses and other grains	Controls storage pests	Acts as an insect repellent

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4.14	Smearing pongamia / neem oil to Tur and Avare at 300 ml/ql before storage	Prevents damage from storage pests	Insect repellent and antifungal agent
5. Animal Health			
5.1	100 g of fresh papaya seeds are crushed and administered in 1 liter of water to calves	Cost effective deworming medicine	Acts as anti-helminth
5.2	Administering a handful of salt in 4 litres of water or a handful of salt mixed in cattle feed	Stops diarrhoea	Restores electrolyte imbalance
5.3	Application of cashew shell oil to cattle wounds	Helps fast healing of wounds	Acts as antiseptic and softens the wound site
5.4	Application of fresh cow dung to wounds of cattle	Fast healing of wounds	Acts as antiseptic and natural disinfectant
5.5	A paste prepared by grinding and boiling 100g horse gram seeds is applied for 3-4 days to yoke gal	Cost effective local curative	Horse gram contains antibacterial substances

Perusal of the above listed technologies clearly demonstrates that, they have not been developed overnight, rather they have evolved over generations. Farmers' experiences have taken shape into technological interventions and developed through trial and error method. The fact that people's technologies have withstood the test of time and are surviving over the years, is an ample evidence for their sustainability. Besides, all these technologies are no cost or low cost methods, which could be easily understood, analyzed and applied in problem solving situations even by illiterate and resource poor farmers.

Many of these technologies have all the attributions of scientific innovations in terms of their relative advantage, compatibility, complexity, trialability and observability.

Recommendations and Conclusion

Considering the benefits of people's technologies, concerted efforts are needed through the existing network of Indian Council of Agricultural Research Institutes, State Agricultural Universities, Non-Government Organisations as well as State Developmental Departments to locate people's technologies, document, validate and channelize such technologies and farmers experiences and their application in solving the recurring problems in the farm sector.

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