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# Indigenous Technical Knowledge (ITKs) and Its Role in Sustainable Agriculture

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## INTRODUCTION

The term indigenous technical knowledge (ITK) means "local knowledge'' and "Traditional knowledge". Traditional knowledge is gathered over a period of time from a specific region and it transferred from generation to generation. It is synonymous to local knowledge and is defined as "A sum total of knowledge based on acquired knowledge and experience of peoples from a specific region in dealing with problems and typical situation in different walks of life". It is the knowledge, which has been accumulated by the people over generations by observation, by experimentation and by handling on old peoples' experiences and wisdom in any particular area of human behaviour. Indigenous technical knowledge is the local knowledge that people have gained through inheritance from their ancestors. It is a people derived science and represents people's creativity, innovations and skills. This knowledge has backgrounds of hundreds and sometimes thousands of years of adoption, while bearing odds and evens of the time.

The term indigenous technical knowledge is often invisible with the belief that is associated with forthcoming happenings and the innovations made by the farmers to solve their specific problems. Some of the related terms are:

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- **Indigenous Knowledge (IK):** Indigenous knowledge is the participants' knowledge of their temporal and social space. Indigenous knowledge as such refers not only to knowledge of indigenous peoples, but to that of any other defined community.
- **Indigenous knowledge system (IKS):** delineates a cognitive structure in which theories and perceptions of nature and culture are conceptualized. Thus it includes definitions, classifications and concepts of the physical, natural, social, economic and ideational environments.
- **Indigenous Technical Knowledge (ITK):** is specifically concerned with actual application of the thinking of the local people in various farm operations of agriculture and allied areas.
- **Belief:** Naturally change in behaviour of insects-pest, animals and vegetation indicating a forthcoming event without any scientific realistic but could be true in happening.
- **Innovation**: outside the arena of ITK, but scientifically based development of practices using the locally available resources to solve specific problems.

**Diversity of Indigenous Knowledge**

Indigenous knowledge systems are:

- Adaptive skills of local people usually derived from many years of experience that have often been communicated through oral traditions and learned through family members/ old peoples over generations.
- Time-tested agricultural and natural resource management practices, which lay concrete on the way for sustainable agriculture.
- Strategies and techniques developed by peoples to deal with the changes in the socio-cultural and environmental conditions.
- Practices that are accumulated by farmers due to constant experimentation and innovation.
- Trial- and- error problem-solving approaches by groups of people with an objective to meet the challenges they face in their local environments.
- Decision-making skills of local people that draw upon the resources they have at hand.

**Characteristics of ITK**

- ✓ ITK is not static but dynamic
- ✓ Exogenous knowledge and endogenous creativity brings change to ITK
- ✓ ITK is intuitive in its mode of thinking
- ✓ ITK is mainly qualitative in nature
- ✓ ITK study needs a holistic approach
- ✓ ITK, if properly tapped, can provide valuable insights into resources, processes, possibilities and problems in particular area
- ✓ ITK is recorded and transferred through oral tradition
- ✓ ITK is learned through observation and hands-on experience
- ✓ ITK forms an information base for variety
- ✓ ITK reflects local tradition

**Roles of ITK**

- ✓ ITK can aid development efforts
- ✓ ITK can facilitate local people's participation
- ✓ ITK is a valuable source of developing appropriate technologies

**Role of ITKs in the traditional non-chemical agriculture**

Successes in agricultural front with higher production levels, especially in food grains have undeniably achieved. But more energy in the form of mineral fertilizers, chemical pesticides and farm machinery are required every year to produce the same quantity of farm products. The yield plateau of crops in Punjab, Haryana, Western Uttar Pradesh and other states strongly indicate that there is a disorder in our natural resources management and the present practices are not conducive to sustainable agriculture. Soil degradation has increase by almost 800 lakh hectares area. Soil degradation has already covered 57 per cent of

the country's area. Apart from soil erosion, in-situ degradation like water logging, salination and nutrient depletion is responsible for a loss of 26 per cent of the annual agricultural production. Depletion of natural resource base due to deforestation, over grazing, desertification, excessive agricultural intensification, and agriculture on marginal lands leads to decline in agricultural production potential leading to decrease in the sustaining capacity of agriculture. Natural resources (soil, water, nutrients) have boundaries and improved management is needed to reverse the degradation of this resource base and develop agricultural production systems that sustain our ecosystem. It is estimated that without conservation measures on the rainfed lands for soil erosion by wind or water, salination or alkalination, depletion of plant nutrients and organic matter , deterioration of soil structure and pollution total productivity loss will amount to 29%, and loss of 544 million hectares of cropland all over the world, Thus, sustainable agriculture involving sustenance of our agricultural systems should be the major emphasis for all technological innovations involving land and water use so that there is no adverse effect on the biological productivity of the resource base in the long run. Sustainable agriculture is the sustainable exploitation of renewable natural resources including annual and perennial cropping, agro-forestry and livestock as well as the conservation measures needed for long term maintenance of resources. The intensive agriculture resulted in depletion of nutritional status of soils, erosion of biodiversity, natural habitats, forests and water resources. Unsystematic use of chemical pesticides and fertilizers affected the agro ecosystems, causes soil and water pollution resulting in human and animal health hazards and contributed significantly to destabilize the traditional systems of agriculture.

**Some Famous ITKs organic products developed by progressive farmers to manage disease and pest attacks. These products have been scientifically validated by universities/ organizations**

There are so many organic products which can be useful in disease and pest management i.e. Bijamrut, Jivamrut, Sanjivak, Amritpani, Panchagavya, Anda-Arkh, Fish-Arkh, Sanjeevani, Amritjal, Gajajar ghass svaras and Amrit dhara. some of them are described below here:

**BRAHMASTRA (broad spectrum botanical pesticide)**

Crush 3 kg neem leaves in 10 L cow urine and crush 2 kg custard apple leaves, 2 kg papaya leaves, 2 kg pomegranate leaves and 2 kg guava leaves in water. Then mixed that and boil 5 times at same interval till it becomes half. Keep for 24 hours, then filter squeeze the extract. This can be stored in bottles for 6 months. Dilute 2-2.5 litre of this extract to litre to 100 litre for one acre land. This product is useful against sucking pests, pod and fruit borers.

**NEEMASTRA (broad spectrum botanical pesticide)**

Crush 5 kg neem leaves in water and add 5 litre cow urine and 2 kg cow dung then Ferment for 24 hrs with intermittent stirring after that filter squeeze the extract and dilute to 100 liter water and use as foliar spray over one acre. This product is useful against sucking pests and mealy bugs

**Source:** NCOF, Ghaziabad (2011-12)

**CONTROL OF MAHU (APHIDS)**

Take 1 litre cow urine, 2 kg fresh cow dung, 1 kg groundnut cake and 250g fermented jiggery then mix the entire ingredient in 5 litre of water and spray in crops.

**FUNGAL DISEASE CONTROL**

- A mixture of ash (2-3 kg) and 1 litre of castor oil is spread on a seed bed of a size of about 100 $m^2$. The application is repeated 2-3 times at intervals of 7-10 days. This provides protection of tobacco nurseries against soil borne diseases.
- To control powdery mildew use a mixture of 2 kg of turmeric powder and 8 kg wood ash and spray as dust over leaves.

- Ginger powder at 20 gm/lit of water and sprayed thrice at interval of 15 days can also effectively check the incidence of powdery mildew and other fungal diseases.
- Handful of slaked lime applied at the base of tomato plant can combat damping off disease.
- Urine of cattle and goat has fungicidal properties. Two cups of cattle urine with 5ml peppermint oil and 10 lit of water can be used to control fungal diseases on grapes.

 