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Documentation of indigenous technical knowledge (ITKs) and its rationale in plantation crops in Chikkamagaluru district of Karnataka

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Abstract
The study was conducted in the Chikkamagaluru district of Karnataka state during 2019-20 to document the indigenous technical knowledge in plantation crops. 80 respondents from 2 taluks were constituted as a sample for the study. In the study, 30 Indigenous technical knowledge practices which were using in cultivating of plantation crops are documented. And also found their rationale behind practice of those documented ITKs in cultivation of plantation crops like arecanut, coffee, coconut etc. The ITKs were documented with help of pre-structured interview schedule and rationales behind practice of these ITKs were found with support of experts.

Keywords: indigenous technical knowledge (ITK), rationale, plantation crops

1. Introduction
Indigenous technical/traditional knowledge (ITK) is area bounded, local and rural in origin. It is used in land preparation, good seed germination, soil and water conservation, soil fertility management, management of pest and disease of crop plants and animals, post-harvest managements like storage etc. There are several indigenous cultivation practices of India which are still in vogue in organic agriculture in different states of India which are sustainable, eco-friendly, viable and cost effective. Indigenous Technical Knowledge (ITK) refers to the unique traditional local knowledge existing within and developed by the past experiences and experiments around the specific conditions indigenous to a particular geographic area (Roy *et al.* 2015) [5].

The Chikkamagaluru district of Karnataka state covered hilly area as well as maidan areas of agriculture. It is getting good rains so it is rich in crop diversity. The district is known for cultivation of plantation crops like arecanut, coconut, pepper, coffee, cardamom and banana etc. Farmers of study area are practicing lot of indigenous practices in cultivation of plantation crops. Today, these many ITK systems are at risk of becoming extinct because of the fast changing natural environment and rapid pacing economic, political, and cultural changes. Many practices have disappeared as they became inappropriate for new challenges. However, a number of practices vanish only because of advent of modern technologies or development (Singh and Tyagi, 2014) [7]. There is an instant need to identify and document the precious ITK practices in cultivation practices of agriculture.

2. Methodology
The current study was carried out during 2019-20 in the Chikkamagaluru district which is the leading district for coffee and pepper cultivation of Karnataka state. The Chikkamagaluru district comprises of 7 blocks out of which, Tarikere and Mudigere blocks were selected purposively for the study to cover hilly area as well as maidan areas of district. Two village viz. Tadaga, Ajjampura villages from Tarikere block and Bidarahalli, Meghalamakki villages from Mudigere block were selected randomly. Finally, 20 farmers from each village were selected randomly. Thus a total of 80 respondent farmers comprised the sample for the present study. Documentation of ITK was done by using pretested and pre-structured interview schedule. The questions and statements were asked in vernacular language i.e. in Kannada.

3. Results
There were 30 ITKs observed related to plantation crops for sustainable agriculture in the Chikkamagaluru district. Rationale of documented ITKs were found and presented with help of experts in respective disciplines. Enlist of ITK of plantation crop along with their rationale observed during the study are shown in Table 1.

Table 1: Documented ITKs and their rationale behind practice of ITKs

Sl No.	Name of ITKs	Rationale behind practice of ITKs
I	ITKs for Coconut plant	
1.	Coconut husk compost	It helps in enhancement of soil fertility.
2.	Growing poultry birds in coconut gardens	Birds will feed on termites and other insects in the garden and enrich the fertility of soil by poultry manure
3.	Salt application for coconut field	Salt solution causes ex-osmosis and desiccation on termites.

4.	Salt filling in weevil holes on coconut	It controls stem weevil in coconut plants.
5.	Application of neem cake extract on fronds of coconut plants	It controls rhinoceros beetle because neem acts as toxicant to insects
6.	Castor cake trap for coconut trees	The smell of the cake (Ricinoleic acid) attracts the rhinoceros beetles which fall into the water
7.	Tobacco trapping	Nicotine content acts as natural toxic to red palm weevil in coconut orchards.
8.	Coconut trunk wrapping with iron sheets or spine bearing vine.	This practice prevents rats climbing on coconut trees.
9.	Application of neem cake in the pits before planting coconut.	This neem cake avoids attack of ants which effect seed nuts of coconut.
10.	Salt application	It controls weeds in the field of coconut orchard.
11.	Before planting coconut seedling, some of the roots are removed.	On removing the roots helps in induces auxin synthesis, which in turn produces fresh roots on the differentiation of meristems.
12.	Salt application at root zone	This practice control flower shedding in coconut.
13.	Lime washing on trunks of arecanut and coconut trees	Lime washing controls termite attack on tree trunks. And also prevents sun scorching effect like stem splitting.
II	ITKs for coffee plants	
14.	Rubbing of coffee stem	Adult beetles prefer to lay eggs on scaly stem; rubbing makes the stem smooth which prevents egg- laying.
15.	Impregnated coffee gunny bags with neem cake extract	Neem cake is toxic to beetles and exposure to sunlight kills the beetles.
16.	Neem cake and marigold application	Neem toxic and alpha-terthienyl which acts as insect repellent for coffee plants.
17.	Lime application in coffee plantation	Because lime neutralizes the acidic soils. So it controls wilt disease in the coffee plantation.
18.	Robusta and Arabica of coffee plants are grown as intercrop	This intercropping avoids nematode attack on coffee plants
19.	Fermented cow urine spray	It is effective against mealy bugs, thrips and mites of coffee plants.
20.	Spray of Chilli or Garlic spray for mango trees	Chemical component allicin and capsaicin respectively which has repellant and anti-feedant action on insect pests.
21.	Application of buttermilk on mango trees	Application of buttermilk prevents/controls insects.
22.	Agarabatti smoke for ripening of banana and mango fruits.	The fruits are ripened in a day because of heat and smoke generated by ‘agarbatti’ and dhoopa.
23.	Growing sunflower in between mango orchard	This practice helps in attract of honeybees, which enhances pollination and fruit production in mango plants.
III	Others	
24.	Oil paper bags in guava orchard	Insects like fruits fly are trapped in paper bags.
25.	Solid jeevamrutha for banana crops	It helps in enhancement of soil fertility and microbial activity.
26.	Practice of mixed cropping in plantation crops	It avoids weeds in between crops and also conserves moisture in the soil.
27.	Straw mulching in ginger crop	It avoids weeds in the ginger field and prevents loss of moisture from the soil.
28.	Water bells in orchard	These water bells help in water conservation.
29.	Spray of Chilli or Garlic spray	Chemical component allicin and capsacin respectively which has repellant and anti-feedant action on insect pests.
30.	Sand and soil mixture for areca nut seedlings.	This practice provides enough required moisture for germination, a mixture of the sand and soil facilitates the porosity of drains off excess water.

4. Discussion

The study area was well known for cultivation of plantation crops like coffee, mango, coconut, arecanut, pepper, ginger and banana etc. Out of 30 documented ITKs 13 (43.34%) ITKs related to cultivation of coconut plants, 10 ITKs (33.33 %) were related to cultivation of coffee plants and remaining 7 (23.33 %) ITKs were related other crops of plantation and fruit crops. Farmers were using naturally and locally available inputs or materials like garlic, chilly, oil, neem, salt, cow urine and sand *etc*. to do practice of indigenous technical knowledge. The existence of the huge number of ITKs in the study location indicates the potentiality of the age old knowledge of the people. In spite of the presence of the formal technologies released from the institutions farmers are still relaying upon ITKs and treat their crops themselves. All stake holders should take active part and create provisions for documentation and preservation of this precious knowledge. The need of the day is to find the scientific rationale behind the documented ITKs so that their benefit can be harvested at a large scale.

This was supported by Makol and Gupta, 2016 [3], and Patil, 2017 [4]. And farmers were using these ITKs in cultivation aspects like seedling treatment, soil fertility and nutrient management, pest and disease management, non-insect pest and physiological disorders management, soil and water conservation and fruits ripening.

5. Conclusion

Indigenous technical knowledge is generated from trial and error, experiences and keen observation over a time period in agriculture. This is eco-friendly, cost effective and sustainable with local resources. So, there is need of documentation of these ITKs in agriculture before valuable knowledge lost forever. The same can be used by other farmers to solve same kind of problems in other places therefore, it is necessary to maintain as

documentary. Definitely it will help to farming community to do sustainable agriculture and creates channel for agricultural innovations. Indigenous technical knowledge plays an essential role in sustainable grassroots innovations. Such grassroots innovation largely differs across different sectors with respect to the characteristics, sources, stake holders involved etc. In case of traditional societies, the local indigenous individual is the major actor. In many cases, the indigenous communities are not well aware of the value of their indigenous knowledge which has been passing from generation after generation. Stake holders such as scientific institutions and NGOs could play crucial role in this regards for capacity building among the indigenous community and popularization of traditional methods and techniques.

In today's context, there is an urgent need to evaluate and popularize indigenous innovation. Government schemes and Research and Development activities should reach indigenous innovators. There are many more such examples among the ethnic groups of India. As most of the traditional knowledge and technologies are undocumented, there is also a need for more research in this field. Otherwise, this valuable knowledge will be extinct in the near future. There should be a proper collaboration between indigenous knowledge and modern knowledge. A suitable alliance between the traditional and modern knowledge and technology system has immense potential to benefit the society.

6. References

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