

Exploring the Fences Pertaining to Non Espousal of Traditional Knowledge Based Medicines at Shervaroy Hills, Eastern Ghats, India

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Abstract

This paper reports on an exploratory research work carried out aiming to identify the barriers in the usage of traditional medicines by the holders of the knowledge. The focus is on the usage of the traditional medicines by the homogenous people, Malayali tribe community at Shervaroy hills of Eastern Ghats. Semi-structured interviews were conducted among the tribe community of the area. Where the knowledge has been passed on from generations making the traditional medicinal knowledge strongly imbibed in their culture, the research findings divulged the reasons as to why in spite of having immense knowledge on traditional medicines these tribe community are opting for codified form of medicines. This report also explored the understanding of older generation in the context of holders of the traditional medicinal knowledge among the Malayali tribe community. The conclusion supports the implementation of existing policies stringently with recommendations so as to draw closer towards the three objectives enshrined in the Convention of Biodiversity and Biological Diversity Act, 2002. This paper contributes to the policy makers, pharmaceutical companies, non-governmental organizations and the holders of traditional medicinal knowledge so as to collaborate, in the process, protecting and promoting the traditional knowledge in medicinal plants.

Keywords: Malayali tribe community, Shervaroy hills, traditional medicine and policy making

1. Introduction

In today's competitive world, knowledge economy plays a vital role, hence leading to many Intellectual Property (IP) thefts. One such booming area but suffering lack of support and training from the government is Traditional Knowledge (TK), though it has acknowledged appreciation as being balancing to, corresponding with, and pertinent to scientifically knowledge (Tavana, 1997). The question that ponders now is 'whether TK will live to tell the tale to the new millennium' (Turner et al., 2000). TK though has no definitions in any statute or legislations, various understandings have been made including World Intellectual Property Organization (WIPO) as to what it is (WIPO, 2001). TK is broader in terms of comparison with Indigenous Knowledge (IK) and they are used interchangeably (Dutfield, 2003). TK can be handicrafts, folklore and medicinal knowledge. Many TK of mega bio-diverse rich countries where India is one among them have been patented by developed countries. Examples that could be cited are Kumari, Amaltas, Kala Jeera to name a few (Usha & Annadurai, 2012). Apart from the above, some other examples of patents based on traditional Indian medicine that can be cited are the anti-fungal properties of neem, turmeric for healing wounds, and a diabetes drug made from extract of jamun, which patents were fortunately revoked. The cases involving Maasai people of Kenya and Tuareg or Touareg, North African tribal inhabitants where the word 'Maasai' is used in association with a range of commodities from Land Rover cars, to running shoes, to Louis Vuitton towels, hats, scarves and bags as also in tourism and hospitality services, while Volkswagen manufactures the SUV Touareg (Mukherjee, 2013).

These 'wrong patents' on TK itself became evidence on the importance of economic aspects of TK at a global level and therefore valuing it as an Intellectual Property (IP). In this regard WIPO has taken many initiatives to control the bio-piracy issues across the globe, the Nagoya and Cartagena protocols being a knock to the developed nations. But considering the case of Kani tribe and it's so called only successful model in India for

benefit sharing, there can be included any 'person' and not just developed nations in following the code of ethics. The scientists have not done justice to the Kani tribe. The Kani tribe community was not happy with the Jeevani drug in the market as the secrets of the same have been divulged into, hence not remaining a secret any more (Bijoy, 2007). Exploring through Fact Finding Missions (FFM) became an integral part, as seeking firsthand information on the tribulations at the grass roots level associated with the communities holding the TK needed prominence. WIPO's FFM during 1998-99 (WIPO, 2001) due to its limitations, provided a broader view, hence the probability of not getting to the grass root issues of every village in all bio diverse rich countries. This FFM has given scope for any individual or organization to carry the task of congregating information that could achieve the three objectives of Convention on Biological Diversity (CBD). The urgent need to document the TK practices in India was felt as soon as issues on patenting of turmeric, neem and basmati took place, which were successfully revoked after India's Council for Scientific and Industrial Research (CSIR) successful legal battle by providing evidences of prior art and therefore not an innovation for granting patents. The rationale in such wrong patents owed to the documents' non availability on prior art on TK defeating the object in granting patents. It was reported by Mukherjee (2013), that JC Wichard, Dy. Director General of World Intellectual Property Organization (WIPO), told the Times Of India that steps have been taken by WIPO to protect TK by recognizing it as an IP like patents and copyrights and assigning Intergovernmental Committee on Intellectual Property and Genetic Resources (IGC) a task of coming to a consensus, which is a big step forward as well as adding on to recognize the rights of the holders and getting the status of documentation for future generations to follow.

Various research studies have taken place in India to document the TK of India especially associated to traditional medicinal knowledge (TMK) (Reddy et al., 2006; Udayan et al., 2006) as its economic aspects are higher than any other type of TK. These TMK include curing ailments, prevention of diseases and cosmetics made out of medicinal plants (MP). Every part of India is unique and different from geographies to cultures, hence having their own way of practicing the TMK attributing to being indigenous in nature.

Since India is a vast land of resources and cultures and India is one of the 17 mega-diversity countries rich with flora and fauna and having over 67.8 million tribal people belonging to 550 communities (Pushpagandan, 2002), a sample of one tribe community in an area is chosen in this regard. The selected area is Shervaroy Hills of Eastern Ghats, Salem district of Tamil Nadu as this area is not much explored by the social scientists.

2. Eastern Ghats

Eastern Ghats are an asymmetrical array of mountains by the side of the east coast of India situated amidst 11°30' and 22° North latitude and 76°50' and 86°30' East longitude in a northeast to southwest smack. The Ghats swathe an entirety of approximately 75,000 sq. km and comprises of a regular thickness of 220 km to the north and 100 km to the south. The Eastern Ghats stretch transversely in the states of Orissa, Andhra Pradesh and Tamil Nadu; and divisions of Mysore and Kolar districts of Karnataka also have geographical contact to these Ghats. They are separated into the northern, middle and southern Eastern Ghats. The Eastern Ghats are a craggy and sliced up hilly topography, which starts from Jawadu Hill and expands to Alagar Hill. Jawadu, Elagiri, Shervaroy, Chitteri, Kalrayan, Bodamalai, Kolli, Pachaimalai, Semmalai, Aiyalur, Karandamalai, Sirumalai, and Alagar are the most important hills, casing an area of approximately 6024 km (Jayakumar et al., 2009). One of the principal distinctiveness of Eastern Ghats lies in it being tremendously productive and fertile. The Ghat is in fact known to be the watershed for numerous rivers since the Ghat receives very high average rainfall. Due to very high rainfall, the fertile land domino effects into enhanced crops which are generally referred to as Estuaries of India. There are meager comprehensive studies performed on the flora and fauna happening in the Eastern Ghats region. Numerous wildlife sanctuaries and reserve forests to name a few like the Badrama and Hadgarh, Kalaphat, Khalasuni, Papikonda offer shelter to the diversity in the area (Mundoli, 2011). Today the Eastern Ghats are in stern ecological pressures and several of the natural wealth in that are not being dealt with on proper environmental doctrines to make sure the sustainable yields. Eastern Ghats are in stern ecological pressures and several of the natural wealth in that are not being dealt with on proper environmental doctrines to make sure the sustainable yields. The forest swathe of the Ghats is retreating more rapidly than the replenishment due to several factors like improvement activities, like hydro-electric dams, mining and irrigation schemes escorting to deforestation and dislodgment, government programs akin to forestry [Joint Forest Management (JFM), Community Forest Management (CFM)] and monocultures of coffee is unfavorably impacting the ecology, unscientific extraction of Non Timber Forest Products (NTFP) that is diminishing the wealth, forest fires caused inadvertently or deliberately annihilating forest swathe and consecutively causing soil corrosion, escalating tourism and its demands on the ecology, biodiversity being vanished as a consequence of introducing striking species like tropical pines, eucalyptus plantations and insidious species like lantana, ipomea, jatropha, etc., an increasing tribal inhabitants and more so, an increasing external populace settling down in these hill regions,

causing tension to the land and restricted resources, and the rising events of wildlife traffic and wood smuggling. All these have affected the diversity and profusion of biodiversity and in turn the lifestyles of the people, principally the tribe of the region,

Apart from added transformations that are disturbing the social and economic setting of the region. Though Eastern Ghats is extremely rich in terms of bio diversity yet when judging against with reference to the exploration of phyto-sociological scenario; it has attained very pitiable attention from the scientific community (Kumar et al., 2002). Also, Eastern Ghats is geographically more ancient than the Western Ghats (Reddy et al., 2006) thereby catering the feasibility of the possible presence and abundance of more diverse natural resources. Being able to span across three different states, Eastern Ghat is inhabited by innumerable tribal men (Rao & Pullaiah, 2007). Their knowledge regarding old traditional medicines as well as their applications undoubtedly gives the scientific community an opportunity towards developing a holistic knowledge based system and in so doing applying the incurred knowledge from the tribes to modern formulations. Ethno botanical studies in the Eastern Ghats of Tamil Nadu have been carried out for more than three decades by various researchers (Reddy et al., 2006; Ravikumar & Vijayasankar, 2003; Udayan et al., 2006; Xavier et al., 2011). In Eastern Ghats Vishakhapatnam district has been covered by Seema Mundoli (2011), as it was identified that Eastern Ghats have not been given importance either from the scientific community or from the social sciences community when compared to Western Ghats and Himalayas. Hence the researcher tried to explore Eastern Ghats. Since Shervaroy hills are considered as the King of Eastern Ghats as referred to by the local Malayali tribe and due to the richness in flora, an expectation of having more TK among the Malayali tribe was assumed. Also tribe's lives are inherently associated to the forests, lands and natural wealth and have been the foundation for their continued existence. The non-evident intricate knowledge arrangements passed over generations facilitated to build a most excellent use of wealth accessible around them in a sustainable approach. Even as on the facade, their survival appears like an undemanding existence where one ploughing the land, functioning on the commons and accumulating from the forests. With no serene life but only illiteracy, ill-health, mortality and malnutrition which have been pestering them all through their lives in the dearth of any peripheral hold establishments, yet they have coped up to live to tell the tale. In the present day, the tribes in the Eastern Ghats, as in various other divisions of the country and also throughout the globe, are being thrown open to peripheral pressures regularly outside their power or absolute understanding. Time and again these are inflicted on them devoid of their assent or even any outward appearance of discussion which is not in contour with the Samatha judgment (Samatha, 1997).

In this regard a study was conducted to recognize the extent to which Traditional Medicines (TM) are used by the tribe. Is TM practice still prevalent among the Malayali tribe community (the original and first inhabitants) at Shervaroy hills? This need was felt as TMK passed on from generations is imbibed within them and hence is expected to be a continued practice. The curiosity in knowing its extent of prevalence came as a thought considering the commercial activities like tourism, mining, coffee cultivation and real estate taking place extensively there.

3. Shervaroy Hills

Shervaroy hills are being categorized as the abode of evergreen forests which beyond hesitation endows us with the scope to look into the ecological richness (Pullaiah & Rao, 2002). It covers an area of 998 square kilometers, elevated to a height of 1450 meters/4750 feet above sea level. The average temperature during summer is 29 °C and 13 °C during winter. The humidity is 45% to 60%. The average rainfall is 1100 to 1500 mm. The information on comprehensive survey, documentation and enumeration of wild medicinal plants by indigenous people of Shevaroy hills is meager. The flora of Shevaroy hills was studied by Senthilkumar (1991) and since then there is not much information on flora of this hill.

4. Methodology

Shervaroy hills have 67 villages with various communities living and a total population of 41,869. The Malayali tribe population is 28,118 (India Census, 2011). Since the Malayali tribal men and women work for their livelihood, probability of their availability at their residences was felt feeble. Hence to collect data from the tribes, work places like the coffee estates, construction sites, pathways into the forests, bus stand and passersby were considered on convenience method for the sample. Semi-structured interviews were conducted in vernacular language (Tamil) and converted to English. Interview schedules were maintained to enter data and later into SPSS. The field study was carried out for a period of two years among 1519 Malayali tribe during the years January 2012 to December 2013 at different seasons and intervals, where each visit was between 10-15 days from eight in the morning to five in the evening. The sample covered 6.20% of the tribe population of Shervaroy hills hence avoiding the biasness in the results. Chi square and frequencies distribution was applied

with the help of SPSS 16.0 version for the data collected to analyze and interpret the results.

5. Results and Discussion

Due to modernization and lack of interest in antediluvian traditions which hardly fetch any income has led the community take up various professions either within Shervaroy hills or outside. 63.49% of the tribe's association with their traditional profession has plummeted. In this study it is observed that they are taking up any job that could help them eek a livelihood. 34.65% only are following their traditional profession. However 1.86% is not working. The reasons cited by the respondents for change from traditional profession to other professions can be attributed to income levels. The tribe is working as laborers in coffee estates and construction sites, rearing cattle, doing petty business as street hawkers, agricultural farming and some are not employed (Table 1).

Table 1. Various professions of individuals of Malayali tribe community at Shervaroy Hills

Sl. No.	Profession	No. of individuals associated with the profession	% of individuals associated with the profession
1	Cattle rearing	477	31.40%
2	Unorganized sector labour	813	53.52%
3	Cultivation*	152	10.00%
4	Others*	049	03.22%
5	Not working	028	01.86%
	Total	1519	100%

* Cultivation: farming, flower gardens, cultivating fruits and vegetables;

* Others: working in hotels, participating in tourism activities as employees, business & hawkers.

Various factors associated in non-espousal of TM were identified during the interviews with the Malayali tribe. The identified reasons are:

1) Their working conditions which have changed from their *traditional professions* like cattle rearing, farming, flower gardens, cultivating fruits and vegetables and practicing as local healers (vaidyars) to *non-traditional professions* like working in hotels, participating in tourism activities as employees and laborers which do not favor them to follow the restricted diet (patyam) posed during treatment, hence reasoning that the change of profession has led to a change in using TM. Table 2 provides the data on tribe practicing/not practicing their traditional professions and used/not used TM. Hence Chi square test was conducted for looking into the association significance between categorical variables where the independent variable is 'traditional professions' and dependent variable is 'using TM' (Table 3). The H_1 framed in this regard is 'the usage of TM is dependent on the practicing of traditional professions'. It can be inferred from the Table 3 that H_1 is proved as the P value is less than 0.05, and that there is significant association between traditional profession and using TM. It is realized that the usage of TM for common ailments is dependent on the practicing of traditional professions.

Table 2. Percentage on individuals of Malayali tribe community associated with traditional profession and using of TM

	Yes	%	No	%	Total	Total%
Traditional Profession	627	42.25%	857	57.75%	1484	100%
Traditional Medicine	447	30.12%	1037	69.88%	1484	100%

Table 3. Chi Square between 'traditional profession and 'TM'

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.442 ^a	1	.035
Continuity Correction ^b	4.204	1	.040
Likelihood Ratio	4.424	1	.035
N of Valid Cases ^b	1484		

2) Their belief is that if this restricted diet is not followed then it can even lead to death. Among the 1519 Malayali tribe, 07 claimed to have never faced any ailment. These seven are the local healers. So among the 1512 Malayali tribe 208 have used TM and the rest 1304 have used other forms of codified medication or a combination of TM with codified form of medicines (Table 4). The tribe people who have not opted for a combination but used only codified form of medication (allopathy) have agreed to quick results unlike TM (uncodified form). Table 5 provides data on this. It is observed that, all the ones who have taken TM, have also followed the restrictions completely during the treatment (Table 6) hence providing complete satisfaction and success in the TM treatment.

Table 4. Type of medicine used by individuals of Malayali tribe community

Sl. No.	Type of medicine	No. of individuals	% of individuals
1	TM	447	29.56%
2	Codified form	1013	67.00%
3	Used a combination	52	3.44%
	Total	1512	100%

Table 5. Individuals of Malayali tribe community who followed codified form of medicines and experienced quick results

	Codified form of medicines gives quick results, unlike TM	Percent
Yes	1013	100%
No	-	-
Total	1013	100%

Table 6. Individuals of Malayali tribe community who have taken only TM by following patyam and derived complete satisfaction over the treatment

	No. of individuals who have taken TM, followed restrictions and were completely satisfied	% of individuals
Yes	447	100%
No	-	-
Total	447	100%

3) Even if diet restrictions are to be followed the availability of vaidyars have become difficult, since the vaidyar is also into working as a laborer or a street hawker or a watchman and not practicing any more as a full time healer and is available only during leisure time which is again not fixed. Even if one gets in touch with a vaidyar they cannot provide treatment due to lack of time to collect plants and make available the medicines as stock. To prepare medicines, the raw material can be collected only during day time and that too on Tuesdays, Fridays and Sundays, or during the full moon as the curative properties of the plants are at their peak.

4) The tribe people stated that MPs are not freely available in the present days as it used to be earlier (15-20 years) due to mining activities, construction of buildings for tourism and coffee estates. When enquired how about growing them around their houses, it was stated that as a bad omen which they strongly believe so nobody grows the MPs around their houses but rather depend on the natural availability.

5) Apart from the above, as the government is providing free pharmaceutical medicines for common ailments like cough, cold, nausea, fever and dysentery at their door step, they have started opting for it. Their need to follow patyam (restricted diet) very often does not arise.

Table 7. Data on individuals of Malayali tribe community holding the TMK at Shervaroy Hills

Sl. No.	Total No. of individuals interviewed	No. of individuals holding TMK	% of individuals holding TMK
1.	1980	1519	76.71%

Certain other observations made regarding their discontinuation of traditional medicinal practice are dislodgment of communities due to extensive logging, mining schemes and the younger generation's interest in business activities through TMK. But commercial activities based on TMK are strictly against the cultural aspects, sentiments and beliefs of the Malayali tribe community, hence becoming a major barrier among the older generation in passing such precious knowledge to the next generation. At present 76.71% of tribe population is holding the TMK which is very high (Table 7). Among the holders i.e., 1519, 1348 (88.74%) are older generation among which 7 are practicing vaidyars. The older generation holding the TMK is not passing on to the next generation due to the younger generation's growing interest in profit making and not maintaining secrecy of the TK.

Table 8 provides data on the percentage of the older generation tribe's reason for not passing on the TMK. It is realized that among the 924 not passing the TMK, 854 i.e., 92.42% have cited the reason intention of profit making, not maintaining secrecy. Hence Chi square test was conducted for looking into the association significance between categorical variables where independent variable is 'reasoning intention of profit making, not maintaining secrecy of TMK' and dependent variable is 'passing the TMK by the older generation'. The H_2 framed in this regard is 'passing on the TMK is dependent on the reason'. It can be inferred from Table 9 that H_2 is proved as the P value is less than 0.05 and that there is significant association between reasoning intentions of profit making, not maintaining secrecy and passing on the TMK. Hence passing on the TMK is dependent on the reasoning of profit making and not maintaining secrecy. According to WIPO report (2001), a number of root causes are identified for TK erosion. These include employing of contemporary and concentrated farming practices by means of high-yield hybrid plant varieties, disarticulation of communities owing to massive logging and mining projects, transformation to modern medical system and waning interest by the younger generation among which in the present study only transformation to modern medical system is confirmed, but not waning interest among the younger generation.

Table 8. Percentage on the older generation of tribes' reason for not passing on the TMK

	Yes	%	No	%	Total	Total%
Passing on the TMK by older Generation	424	31.46	924	68.54	1348	100%
Reason being intention of profit making and not maintaining secrecy	854	63.35	494	36.65	1348	100%

Table 9. Chi Square between 'passing on TMK' and 'reason associated'

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.069E3 ^a	1	.000
Continuity Correction ^b	1.065E3	1	.000
Likelihood Ratio	1.276E3	1	.000
N of Valid Cases ^b	1348		

6. Older Generation Holders of TMK

An understanding has been made as to who is the older generation. Is it the one's holding the TMK exclusively or is it the ones who've crossed a certain age limit? Based on the interviews made with the tribe, older generation here is from the age of 41, hence providing a scope to perceive that crossing the age limit i.e., 41 years makes him belong to the older generation. It has been considered here because on an average a 41 year old has a possibility of having a child aged 15 years and above, making the elder and the younger eligible to give and take knowledge. The training starts through observation only after the age of 15 years and after a certain period which is not fixed, they professionally start teaching and training them. The reason is that by then the children are assessed on their genuineness in following the cultures strictly and their ability to be a vaidyar. In any case if anyone breaches the cultural aspects, their strong belief says that the effect of treatment by those persons will not be effective and successful and that bad spell will affect them. To professionally confirm any tribe as a vaidyar after being trained by parents/elders, any existing, well known and reputed vaidyars have to accept it by performing rituals. The training can start from parents or from any of the existing vaidyar, provided the genuineness is confirmed either by vaidyar or parents/elders and vaidyar.

7. Establishment of Market Promoting TM

Creating and maintaining a righteous innovation environment entails promoting knowledge transfer. Considering the economic status of the Malayali tribe community, their cultural identity and the Kani tribe model lessons, this research was able to confirm the parameters studied by Anderson *et al.* (2003) apart from other new ones. The government can involve and associate the NGOs in the following activities:

- 1) The prominent mind block of the tribe that money should not be made from their TMK need to be done away with. From their perspective, it is realized that basic amenities need to take care of but not get greedy for want of more price.
- 2) Organize programs to provide information on the importance and need of TM at the global market (Usha & Annadurai, 2012) and then educate the interested stakeholders.
- 3) Organize programs to employ and sustain those people who mirror the cultural diversity of the community served.
- 4) Employ interpreter or translator for interested patrons who would like to associate with TMK activities with English expertise.
- 5) Cultural know-how training for interested stakeholders.
- 6) Employ of linguistically and culturally suitable health teaching materials.
- 7) Ethnically exclusive healthcare setting.

8. Conclusion

The elevated costs of western pharmaceuticals put modern health care services impracticable for a large amount of the world's populace, which relies on traditional medicine and medicinal plants to meet their primary needs of wellbeing (Usha & Annadurai, 2010; Fitch, 2012). Indigenous people are unable to meet the expense of the modern pharmaceuticals and therefore relying on traditional remedies, thereby sustaining knowledge and interest in these practices. Other reasons cited for continuance of Complementary and Alternative Medicine (CAM) are that awareness of limitation of modern medicine, difficulties in accessing modern health care, higher income and higher education in developed countries and affordability (Bodeker & Kronenberg 2002). Based on the government source, in India for 65% of the populace TM is the solitarily obtainable resource of health care (Naggar *et al.*, 2012). But it is observed in this study the other way round, where modern pharmaceutical drugs are being provided free by the government hospital to the local tribes in Shervaroy hills for common ailments which eventually has become one of the factors in the decline of usage of TM, therefore not sustaining the knowledge and interest in these practices. This change is seen because of TM having strict restrictions towards diet and to a certain extent seclusion without movements which has now brought this shift. They also find pharmaceutical medicines quite successful without being much concerned about any restrictions at the time of treatment. *Now should this be viewed as an ethical dilemma where on one side what if the government does not support by providing free medicines, therefore indirectly laying importance to TM usage, and on the other, the same becomes an accusation and injustice of not providing adequate health care to the tribes?* These tribes find no scope and future in these TM practices and hence moving towards other sources of income. It is reported by Siva (2007) that many plants and traditional practices have an important role to play in day to day life of the ethnic and local people. It is realized that new generation of ethnic people are relying more on easy availability and less or no priced resources for their needs. This in the process is making the TMK practices to be confined with the surviving older generation. If this continues then the knowledge among these tribes will also be eroded just like the way they have lost interest in these uses and practices. In the process documentation can play a vital role so as to preserve for future generations of the community as well as others interested (Siva *et al.*, 2009). Documentation will also provide a platform to secure the TMK by not awarding wrong patents. Access and Benefit Sharing (ABS) activities can help the communities to continue living with their traditional and cultural beliefs which is an integral part of their lifestyle. Basically ABS is one of the global challenges presented due to TK erosion or bio-piracy or no proper exploitation of the same and therefore bringing a need to include local communities in forest management. Local people will only support greening an area if they can see economic benefit from conservation. There has to be some informal/formal arrangements between the local communities and the forest department. This can help in and encourage ethical market economies to help reduce the gap between the rich and poor. The possibility of integrating practitioners of TM into the mainstream, and providing appropriate exposure to training can lead to sustainable development. The success in managing research and development (R & D) and innovation activities with TK as the base and origin, strongly depends on the effectiveness through which there can be gain, creation and transfer of knowledge and resources within and

beyond/outside the boundaries. Creating and maintaining a righteous innovation environment entails promoting knowledge transfer. But on the other hand, knowledge and innovations also need to be protected against replication in order to keep the benefits from spilling over to rivals. In this research context it is suggested that in-situ or ex-situ conservation strategy can be the best way to promote the GR, TK with a sui-generis law in force (Usha, 2014).

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