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Enriching indigenous knowledge: an alternative paradigm for empowerment

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In 1999, the World Conference on Science has emphasised the role to be played by local and indigenous knowledge (IK) in reconciling scientific, societal, and sustainable development goals. Meanwhile, some external experts believe the concept of IK has gone through a sort of development cycle, in which it was first considered useful and then subsequently seems to have been considered less useful. We should ask ourselves how we could prevent the concept of IK from going through the same cycle of critique and rejection as other concepts such as "sustainable development", "community-based conservation", and "participatory development". What can social researchers do to prevent IK from going in and out of fashion? There is no doubt that IK is essential for the eradication of poverty, as well as the localization of development. However, to be hopeful we should enrich the quality of IK with some theories and methods to empower local individuals and communities by answering three questions: (1) How can one access a knowledge society in the local communities? (2) How can one make linkages between indigenous and scientific knowledge to have a better synergy/integration? (3) How can one evaluate the customary rules and practices that govern IK to revitalise IK transmission from past to present generation and then, on to the future generations? This paper explains and provides some examples of empowering people by putting the 'Enriching IK Paradigm' (EIKP) into action in Iran.

> IK is emerging as a priority concern on the international environment and development agenda. Work in this domain has nonetheless been in progress for several decades, notably through UNESCO and the United Nations systems. (Nakashim and Morohashi 2002, p. 286)

> IK has come to occupy a privileged position in discussions about how development can best be brought so that finally, it really is in the interests of the poor and the marginalized. (Agrawal 2002, p. 287)

The above quotations are samples from the opening of papers published in the *International Social Science Journal*, in September 2002, number 173, that was focused on IK as UNESCO values it as the eradication of poverty and the development of knowledge society. There is only one paper in this number of the journal about indigenous knowledge, which says:

> No one involved in the current debates on indigenous knowledge has accorded any significance to the fact that this concept was first welcomed and then only subsequently critiqued. I will suggest that the concept of indigenous knowledge has gone through a sort of development cycle, in which it was first more useful and then subsequently less, useful. (Dove 2002 p. 350)

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Dove implies that after a while a shift of emphasis is seen from one theory to another, such as shifting from 'development' to 'sustainable development' or/and 'participatory development'; from 'government-based conservation' to 'community-based conservation'; and from 'expert-based development' to 'indigenous knowledge-based development.' It means that these theories are going in and out of fashion. But Pilcher 'has a defensive tone that hints of a backlash against local knowledge' (Campbell and Vainio-Mattila 2004, p. 427); and Davis and Wagner also believe that during the last two decades, IK 'has increased by leaps and bounds' (Davis and Wagner 2004, p. 464).

There is no doubt that eradication of poverty is ethical, and that community-based conservation is useful, and IK is essential for localization of development because IK is the local knowledge in a defined region that enables local people to survive, and to overcome their different problems (Madely 1998). For example, Unruh (1995) reports that IK systems of resources management in Africa help people to adopt biophysical problems. These systems consist of culturally related methods that enable people to adapt with new environmental conditions. Abbasi (2000, p. 21) also reports that the nature of IK is adaptability. This adaptability takes place through three types of cooperation 'with the nature,' 'together' and 'self.' These three types of cooperation lead people to a better living condition and development. IK is also important in terms of localization of development, because it is based on understanding of natural systems at the specific locale (Russell and Harshbarger 2003). Yet, as Russell and Harshbarger report, there are gaps in local people's knowledge. For example, on Makira Island, Solomon Islands, people believed that a certain species of pigeon was 'hiding somewhere' when in fact it had disappeared. Ortiz (1999) studied on a pest management project in the Peruvian Andes, he found out that people believed that the potato worms in the soil were plagues sent by God.

However, it is necessary to do research on IK to revitalise it. For this reason UNESCO initiated the project 'Local and Indigenous Knowledge Systems in a Global Society' (LINKS), as part of its medium-term strategy for the period 2002–2007. It involved all five of UNESCO's programme sectors: Social and Human Sciences, Natural Sciences, Culture, Education, Communications and Information. LINKS projects pursue strengthening local community control over processes of ecological, social and cultural change; revitalising traditional knowledge transmission within local communities; and evaluating customary rules and practices that govern knowledge access (Nakashim and Morohashi 2002). So, to be hopeful and rely on IK for the eradication of poverty and access to knowledge society, the author of this article has developed a paradigm to enrich IK.

Goals of enriching IK

Following the UNESCO's medium-term strategy initiated with LINKS projects for the period 2002–2007, three research projects were carried out in Iran: how can one access a knowledge society in the local communities? A learning theory called the Meta Cognition[1] Theory was used to increase individual's awareness, knowledge and use of the monitoring process of cognitive goals for the purpose of increasing understanding and retention of the learning material (Shahvali and Zarafshani 2002).

How can one make linkages between indigenous and scientific knowledge have a better synergy/integration? There are 'a growing number of researchers calling on government regulatory agencies to integrate local with scientific knowledge in a number of resources areas, notably agriculture' (Davis and Wagner 2003, p. 484). In order to have a better

linkage between indigenous and scientific knowledge, dualistic discourses which are based on 'etic-emic'[2] knowledge (Chambers 1996a) or 'indigenous-citizen' knowledge (Leach and Fairhead 2002), can be used.

How can one evaluate the customary rules and practices that govern indigenous knowledge to revitalise traditional knowledge transmission from past to present generation and then, on to the future generations? A hermeneutic[3] technique was used to evaluate IK carried in a written or oral shape, to revitalise it by transmission among generations (Shahvali and Forouzani 2003; Forouzani and Shahvali 2003).

Implementation of the above goals is described below.

To access a knowledge society

The metacognitive theory refers to higher order of thinking, which involves active control over the cognitive processes engaged in teaching (Livingston, 1977). According to Flavell (1979; 1987), meta cognition consists of both meta cognitive knowledge and meta cognitive experiences and regulations. The definition of meta cognition also relates to an individual's awareness, knowledge and use of the monitoring process of cognitive goals for the purpose of increasing understanding and retention of learning material. Jans (1997) also defines meta cognition as the executive controller of cognitive processes, which selects the appropriate strategy for the task in hand. Resources show that many components of thinking can be effectively taught (Whittington 1998). So, we can easily teach meta cognition strategies (Paris and Jacobs, cited in Aqazadeh and Ahadian, 1999, p. 98). To teach farmers metacognitively, Shahvali and Zarafshani (2002) used PRA techniques. According to Chambers (1996a), participatory rural appraisal (PRA) techniques enable local people to share, enhance and analyse their knowledge of life and conditions, to plan, act, monitor and evaluate it (Chambers 1996b). What makes a perfect match between meta cognition and PRA is that they both share two basic aspects. First, the learner (farmer) is aware of the nature of the learning task and the requirement for reaching this task. Second, the learner possesses knowledge pertinent to finishing the learning task. Therefore, PRA techniques can be used as met cognitive strategies in order to help farmers reach a higher level of cognition (Shahvali and Zarafshani 2002). Three PRA techniques, i.e. the mapping, matrix, and Venn diagramming, were used in Sormah-e-varmazan village located 45 kilometres northeast of Kermanshah province in Iran. The results show that the mapping technique ranked highest in developing farmers' meta cognition. Mapping as an ice-breaking exercise allowed farmers to get involved with their peers and gave them the opportunity to use their own criteria in making judgements about their real conditions. Matrix ranking gave them time to think about their thinking while prioritising the advantages of forming cooperatives in their village. As self-learners and thinkers, through a questioning insight, they were able to conceptualise new knowledge. Although not as effective as the other two techniques, Venn diagramming enabled farmers to reach a high level of thinking by synthesizing different options when they were asked to show relationships of different institutions to their village. Their visual literacy along with group interactions allowed them to compare the most influential powers in their village.

Generally, using meta cognitive theory enabled all farmers to become more strategic, self-reliant, flexible and productive in their learning. These characteristics increase local people's capacity of learning at individual level and finally shift local community to a knowledge society.

A: Mapping

B: Matrix

C: Ven diagramming

Figure 1. The PRA techniques prepared by the villagers.

Field-based applications

To make field-based practitioners familiar with enriching IK through meta cognition process, they should try to use those PRA techniques which prepare more opportunities for rural individuals to feel themselves in social contexts. These techniques help practitioners to demonstrate new knowledge construction or revitalisation of IK in social settings and show it effectively to individuals. To prepare themselves, field-based practitioners should be aware of PRA techniques applications in terms of usefulness for analysis, critics, monitoring and performance evaluations, etc., all of which are family methods to enable local people perform activities such as planning before acting. Field-based practitioners can use manual sources of PRA personally, prepared by those experienced experts such as Chambers, or participate in prepared workshops to make themselves, as outsiders, aware of behaviours and attitudes towards PRA techniques. Either for self-learning or as materials for workshops, the following sources are recommended. They are prepared by the Institute of Development Studies in the UK:

- PRA Policy Pack, June (Institute of Development Studies 1996a)
- The Institutionalisation of Participatory Approaches, PRA Topic Pack, June (Institute of Development Studies 1996b)
- Introductory PRA Methodology pack, June (Institute of Development Studies 1996c)
- PRA Behaviour and Attitudes Topic Pack, (Institute of Development Studies 1997).

Making linkages for a better synergy/integration

IK is constantly evolving and its enriching further will depend on whether or not it can be integrated with new formal information or scientific knowledge. Integration, especially for conservation purposes (e.g. pest control), is useful because 'there can be no universal meta truths about conservation that can be separated from, or implemented in isolation from, the content within which people interact with the species/ecosystem for which conservation strategies are being designed' (Campbell 2003, p. 423).

Four main types of interaction/integration between local people's knowledge and formal information can be identified (Ortiz 1999):

(1) Formative integration. This occurs when new knowledge is formed which, in some cases, replaces the previous beliefs held by the individual;

(2) Confusing integration. This occurs when there is a conflict between individual knowledge and formal information or scientific knowledge;
(3) Modifying integration. This occurs when individual knowledge is slightly adjusted by scientific knowledge so the individual is better able to understand the new concept; and
(4) Reinforcing integration. This occurs when scientific knowledge confirms the individual's own knowledge and new schema are formed.

Ortiz (1999) has developed the above classification of integrations to show the way that indigenous and scientific knowledge can be best *integrated*, in the interests of sustainable development. The knowledge integration facilitates knowledge formation by modification and reinforcement of IK by scientific knowledge. Research was carried out to control the grape moth pest in the Kohgiluouyeh and Boyer Ahmad province, in southwest Iran. Ortiz's integration model was used as a theoretical framework to classify main types of interactions between indigenous and scientific knowledge. Two villages from 12 were selected purposefully and 30 persons from each were interviewed. The interviewees were grouped into '55 and over'; '54–35', and 'under 35' years old. The main goal of this research was *to enrich* the grape gardeners' knowledge of how to deal with pest problem by participating in a grape moth pest extension program through four objectives:

(1) To identify where indigenous knowledge on pest should be reinforced
(2) To identify where indigenous knowledge on pest should be modified
(3) To identify where indigenous knowledge on pest should be formatted (Changed)
(4) To implement pest control educational programs.

The results from integration between indigenous and scientific knowledge for grape moth pest control are shown in Table 1.

It was very important to integrate knowledge just for modification and change of IK because it saved time and energy for those engaged in the research project. In general, the integration helped to cast-off *dualistic discourse* of local-expert knowledge and to link them for a better synergy.

Where the symbol $\surd$ appears in column 4 of Table 1, it shows that these items need to be either changed or modified through training. A training program was run to teach grape gardeners by poster show, brainstorming and/or films and lecture techniques according to Table 2 with appropriate time and content.

Field-based applications

To prepare an integration exercise for field-based practitioners, Ortiz's (1999) report is recommended. Field practitioners should practise the following steps:

(1) Read the report carefully.
(2) Label the potatoes pests in the Andes region mentioned in the report.
(3) Identify Andean potato growers' IK pest control.
(4) Identify experts' moth pest control knowledge.
(5) Integrate expert and indigenous knowledge and indicate outcome of the interaction. The outcomes can be interpreted as IK changes, modifications or reinforcement.

Table 1. Indigenous and scientific knowledge integration for grape moth pest control project in Kohgiluouyeh and Boyer Ahmad province, southwest Iran.

No 1	Subjects 2	Expected interaction 3	Education 4	
			yes	no
1	The diagnosis of adult insect	Reinforcing		*
2	The diagnosis of larva	Reinforcing		*
3	Places that 1st generation lay zygote	Modifying	√	
4	Time of larva appearance	Formative	√	
5	Places that 2nd generation lay zygote	Reinforcing		*
6	Existence of life cycle stages	Reinforcing		*
7	Sequence of life cycle stages	Modifying	√	
8	Identifying winter phase of pest (hibernating)	Formative	√	
9	Places of pest hibernating	Modifying	√	
10	No of generation that pest can produce 1 year	Modifying	√	
11	Causes of pest appearance	Formative	√	
12	Causes of pest spread	Modifying	√	
13	Effects of temperature and humidity on pest life	Modifying	√	
14	Effects of height on pest life	Formative	√	
15	Ways of pest transfer	Modifying	√	
16	Date of pest transfer	Formative	√	
17	Effects of pest on grape fruit	Reinforcing		*
18	Places of 2nd larva feeding	Modifying	√	
19	Identifying natural enemies of pest	Modifying	√	
20	Time of 1st spraying chemical pesticides	Reinforcing		*
21	Type of chemical pesticides	Reinforcing		*
22	Quantity of chemical pesticides	Reinforcing		*
23	Duplication of spraying chemical pesticides	Formative	√	
24	Time of 2nd spraying chemical pesticides	Reinforcing		*
25	Define methods of pest control	Modifying	√	

Source: Nooripoor 2002, p.115.

To complete Table 3, follow the procedures below:

(1) When new knowledge is formed in the interaction between the expert and indigenous knowledge, we can speak of formative interaction. It needs to be marked in the Formative Column (1). Modifying interaction occurs when farmers' knowledge is slightly adjusted by scientific information, so that farmers are better able to understand behind the things they observe. For these items, put the symbol sign in Modifying Column (2). Reinforcing interaction occurs when scientific information confirms the farmers' own knowledge. For these items, put the symbol sign √ in the Enforcing Column (3).

(2) Prepare a training program according to items in Columns 2 and 3 to change or modify Andeans' moth pest IK by preparing required contents and educational technologies.[4]

Table 2. The extension training program developed through indigenous and scientific knowledge integration to control the grape moth pest in Kohgiluouyeh and Boyer Ahmad province, southwest Iran.

NO	Items	Instructional techniques/ instruments1	Time (minutes)
1	Life cycle stages	Poster	30
2	Hibernating form of pest	Poster	
3	Hibernating places	Brain storming	
4	The places of 1st generation lay zygote	Films + lecturing	20
5	No of generations that pest can produce 1 year	Films lecturing	
6	Time of larva appearance (Embryonic period)	Films + lecturing	
7	Reasons for pest appearance	Films + lecturing	30
8	Height effect on pest living	Films + lecturing	
9	Temperature and humidity effects on pest	Films + lecturing	
10	The places of 1st generation feeding	Films + lecturing	
11	Modes of pest transfer	Films + poster	20
12	Paste spread	Films + poster	
13	Date of pest transfer	Films + poster	
14	Biological control	Films + lecturing	40
15	Chemical control duplication	Film + lecturing	
16	Pest control methods	Films + lecturing	

Source: Shahvali & Nooripoor 2002, p. 95.

Table 3. IK and expert's knowledge interactions.

Items	Andeans' potatoes pest knowledge	IK and experts' knowledge Interactions		
		Formative1	Modifying2	Reinforcing3

To revitalise indigenous knowledge

IK is localised in terms of jargons. The jargons used by indigenous people in the past are not the same as the present time. So, it may not be easy to understand the concept of IK because of differences in terminology. Media which carry IK, are not always in a written or oral form. They may be carried in myths, tales, and arts, e.g. in paintings, poems and statues (Shahvali and Amiri-Ardekani 2004). In order to revitalise traditional knowledge, to transmit it within local communities, and evaluate the customary rules and practices that govern knowledge access, first of all, we should interpret IK expressed through different jargons and different media (Shahvali and Furouzani 2003). Interpretation of a term such as IK cannot take place if we do not understand it (Davary-Ardekani 1996). To interpret a statement, we should use a method other than those used for interpretation of natural phenomena.

Mutema (2003) has found that a method like phenomenology used for understanding IK in African countries is not adequate and it should be combined with the hermeneutic method.

The third version of the International Webster Dictionary defines hermeneutics as the principles of the methodology of interpretation. Palmer (1998) defines it as a science of understanding, especially, for contents. Using this method as a research method helps to create a dialogue between content and its user for a better understanding, especially where local ecology knowledge is concerned (Davis and Wagner 2003, p. 466). In order to use the hermeneutic method to interpret content such as IK in written or oral forms, in myths, tales or arts, five steps should be considered, as below (Shahvali and Forouzani 2003):

(1) Acquiring a background about IK. It is necessary to have enough background knowledge about IK in hand in order to interpret it.
(2) Designing questions concerning IK. Asking any question on IK should be based on a background as well as expectations from IK. Meanwhile, an owner of idegenous knowledge is interested in receiving specific responses to his/her questions. So, designing the questions correctly is very important. Otherwise, it may lead to misunderstanding of the IK in hand.
(3) IK goal identification. In order to identify the IK goal, asking some sub-questions would be helpful; such as what the IK content says? What guided the author to write IK down? What had been her/his historical conditions when s/he wrote it down? How many of those conditions are true today?
(4) Identification of IK dominant meaning. What is the dominant meaning of IK in hand? An IK user must identify this.
(5) Translation of IK to the user's language. User of IK should translate IK to her/his language according to the present conditions.

The above steps lead to a dialogue between the content and its user to make it more understandable and useful for her/him. Research was carried out to interpret IK in printed media such as books. The content of IK that was considered was the protection of flour from pests during storage time. This IK content was in the book entitled *A Guidebook for Farmers*, written by Aboonaser Heravey around five centuries ago. What follows is an extract from the book.

> Indigenous people cut Cypress wood into pieces and were then put in flour during storage time. These pieces preserve flour (any kind of flour) from pests. To make it safer, they added cumin and soft salt to the flour. In this case no more pests can infect the flour. (Aboonasr, c.1500, p. 67)

In order to interpret the above indigenous knowledge precisely the researchers grouped IK along the lines of previously mentioned criteria (when IK should be integrated, modified or formatted).

IK background

Pests tend to attack grains during storage process. They (pests) also attack nuts, tobacco, animal skin, wool, etc., which are stored in storage places. The economic damage from these pests is in decreasing the nutritional value of some storage products (Sepidar 1986, pp.193–239).

The pick time of damage by pest is when it is at larva and butterfly stages. The pests are duplicated much more quickly when flour is stored for long time. So the flour would be valueless in term of nutrition when it is stored for a longer time (Baghery 1986, p. 156).

Question(s) about IK

What points about flour storage are referred to in this indigenous IK content? Flour can be stored during a long period of time by using local available materials. These materials (cypress tree, cumin and salt) save flour from pests.

Goal identification of IK

What does the IK content say? It says how we can preserve the flour for a long time. What had been the historical conditions when the author wrote this IK? There had not been any written guidebook on technical principles of seed and flour preservation, so the author decided to collect local conservation knowledge in a book. His motivation has been his religious belief, which is that agricultural activities are very important for human life. What is the use of above mentioned, local conserved knowledge today? This indigenous knowledge can be used as an organic technique to control pests.

Dominant meaning of IK

The dominant meaning of IK in this example is to naturally preserve storage products from pests for a long time.

Translation of IK to the user's language

The main purpose of cumin usage in the storage process of flour is its preservation ability against pests, because of its repellents that keep pests away. This material exists in the cypress tree. An additional benefit of cumin is that it is added to cooking to make food tastier.

The hermeneutic method helped to evaluate customary rules and practices that govern local pest control knowledge and to revitalise its transmission from past to the present generation.

Field-based Application

As expressed in the definition of hermeneutics, it can be used to interpret written or oral texts, so field practitioners can apply it in the field by a narrative approach through listening to adult key informants who carry IK with himself/herself. To assure the biggest impact, practitioners must use narrative method for communication and transformation of IK because the traditions of oral storytelling have been recognised as core to the transfer and retrieving of knowledge within society (Tuffield *et al.* 2005). For doing this job properly, it is recommended to follow the above questions with few modifications. For example, practitioners should let adult key informants tell stories about their IK by sitting down, listening and learning – relaxing and not rushing. They can ask any question about 'purposes.' 'What points are referred to in that story (IK)'? 'What are the dominant meanings of story (IK)?' In order to reach broader audience, it is possible to record the story. To make more precise interpretations it is recommended that practitioners learn more about narratology, which focuses on representing and defining one of the core modes of human communication (Tuffield *et al*. 2005).

Conclusions and field-based suggestions

As mentioned above, in order to protect IK from criticism or rejection, as happens to other concepts related to development, we should enrich IK with theories, methods and practices as a new paradigm to empower local people. This would be possible by:

- Use of learning theories such as meta cognition, which help us to have a *knowledge society*. To reach this point, it is necessary to be much more aware of these theories and their applications in development processes. For example, practitioners should try to use those PRA techniques which prepare more opportunities for rural individuals to feel themselves in social contexts to construct new knowledge as well as to revitalise their own IK. The Institute of Development Studies' packs are recommended for further reading.
- Dualistic discourses such as 'etic-emic' knowledge or 'indigenous citizen' knowledge should be avoided because they lead to community polarization and postpone development. Theories such as *integration* must be used to integrate scientific knowledge, at a global level, with IK, at a local level, in the development process. For this purpose practitioners should become familiar with Ortiz's model or similar models to do IK, and with experts' knowledge integration as well as training local people.
- Hermeneutic method should be used to assure the transmission of the indigenous knowledge from past to future generations. To do so, practitioners should be skilful in storytelling methods.

Notes

1. Meta cognition serves many diverse functions, as does language. Consider what the Austrian philosopher Ludwig Wittgenstein had to say about language: 'Think of the tools in a tool-box: There is a hammer, pliers, a saw, a screw-driver, a rule, a glue-pot, glue, nails, and screws. The functions of words are as diverse as the functions of these objects.' The toolbox is an equally apt metaphor for meta cognition. Michael E. Martinez, Department of Education at the University of California, Irvine, http://goliath.ecnext.com/coms2/gi_0199-5584368/What-is-metacognition-Teachers-intuitively.html
2. Etic-emic is a jargon in rural development dilemma used by some specialists, including Chambers, who want to show discourses between experts who are representative of outsiders (emic) and local people (etic). These discourses arise when outsiders confirm the incapacity of local people. He believes these dualistic discourses between local people (etic) and experts (emic) will be removed when outsiders' behaviours and attitudes change toward listening and learning from local people by handing over the stick, pen or chalk (adapted from Institute of Development Studies (1997)).
3. The idea of hermeneutics emerged from theology and literature referring to the process through which people interpret classic texts. Over time, the usage of hermeneutics expanded to include many forms of texts, including people as texts. www.postmodernpsychology.com/Postmodernism_Dictionary.html
4. For more details about the technical and psychological learning by individuals through Ortiz's model see *IKDM*, 1999. (7) 3; IKDM Homepage at ikdm@nuffic.nl

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