

A Review of Global Experiences on using of Indigenous Knowledge in Rangelands Management and Utilization Projects

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Abstract— *With the further advancement of rangeland science in recent decades, the importance of utilizing the indigenous knowledge is further highlighted. However, in many cases, there are some disagreements between executive managers and specialists of rangelands on the one hand, and local communities on the other hand, which is usually due to the importance of each side to certain aspects of effective parameters in pastures. In any case, more attention to local communities and indigenous knowledge in this matter is indisputable and should be used to integrate these two factors. In this paper, the role of utilizing the indigenous knowledge in the utilization of the rangelands and their management and its experiences in Iran and several parts of the world that are located on different continents has been studied, then the results as well as the effectiveness have been discussed for pasture in Iran, and in the end, some suggestions have been made for this purpose in Iran.*

Keywords— *Indigenous knowledge, Rangeland management and utilization projects.*

I. INTRODUCTION

The use of indigenous knowledge, has long exerted a reputation for rangeland exploitation. Although, less attention was paid to the application of rangeland science and rangeland management, but with further advancement of this science at the end of 20th century and at the beginning of 21st century, the aspects of the application of indigenous knowledge in rangeland management became more evident and in recent years many studies have been conducted on the beneficial effects of these approaches on pasture issues (Shiferaw *et al.*, 2017, Kiringe 2005, Molnar

2014, Mussa *et al.*, 2017, Feysa *et al.*, 2017, Behmanesh *et al.*, 2015, Fernandez- Gimenez 2000, Bjorkan and Qvenild 2010).

In most of papers, it should be noted that most of them eventually conclude on the benefit of local community participation and indigenous knowledge in rangelands (Shiferaw *et al.*, 2017, Kiringe 2005, Molnar 2014, Feysa *et al.*, 2017, Yacoub 2018, Ghorbani *et al.*, 2013, Ens *et al.*, 2015).

But the problem encountered in this paper in other parts of the world is that in most cases, there is a contradiction in using the participation of local communities and their indigenous knowledge in the management and exploitation of pastures which most of them are due to differences in their attitude to pasture, as well as differences in profitability criteria and the actual affiliation of local communities to the immediate profitability of pastures (Mussa *et al.*, 2017, Ens *et al.*, 2015).

But what we get into papers in other parts of the world is that most of these studies acknowledge the importance of utilizing the participation of local communities, as well as the use of indigenous knowledge for pasture and the exploitation of rangelands; which requires the use of local people and their knowledge that handed to them by their generations and predecessors over time. In doing so, the use of ways to integrate modern science and indigenous knowledge will be needed (Ens *et al.*, 2015, Ghorbani *et al.*, 2013).

What is highlighted in this paper is that the majority of studies in this area has been carried out in some regions and countries of the world, which can be due to the existence of coherent and significant local communities in these areas, in

which the use of knowledge their native has been considered for participation in management and operation of rangelands. These societies are located in countries where traditional texture is more important than other parts of the world and the influence of modern technologies and culture, as well as the subsequent modern sciences has been partial.

This paper also benefits the related studies and their experiences in the mentioned countries in the field of application of indigenous knowledge in rangeland management and exploitation projects. These regions and countries include: Ethiopia, Egypt and Kenya (Africa), Mongolia and Iran (Asia), Hungary (Europe), Mexico and the USA (North America) and Australia (Oceania). The research has been conducted in terms of local community participation as well as the use of indigenous knowledge in managing and operating resources. It should be noted that Ethiopia (Africa) account for the most studies done in this area which is not surprising due to existence of genuine traditional societies, as well as the lesser penetration of modern technologies and commitment of local communities to traditional and cultural factors.

II. RESULTS

Below, a few examples of using of indigenous knowledge in the management and exploitation of pastures in the African context are addressed:

A study about the Ganta local community in the Gamo Gofa region of Ethiopia to investigate the effects of indigenous knowledge on conservation of natural resources states that the traditional practices of the local community are fully utilized in other natural resource management approaches. And the continuity and using of indigenous knowledge with the relevant government agencies are seen in the management of natural resources, so that locals, based on their indigenous knowledge, fully understand the problems of soil degradation and protect resources in the region. In this area, those local people who have local knowledge in this field will share their views with other people in the region during the meetings. Finally, it has been argued that local knowledge in the field of ecology, if involved with the relevant government bodies, plays a fundamental role in the management of natural resources and climate change (Shiferaw *et al.*, 2017).

A study in Ethiopia examines crisis management by indigenous knowledge of rangelands, which has shown that the presence of destructive conflicts in the rangeland imply a particularly negative impact on local communities and in general on the country as a whole. These conflicts can occur

within tribes, between tribes with different ethnic groups, between farmers and pastoralists, between pastoralists and investors, or between pastoralists and provincial officials. Each of these groups has indigenous traditions, and the elders are responsible for dealing with peaceful affairs and stability in the community. It is also argued that in rangeland management, customary rules are often more important than government laws, which ignoring these principles can have many negative consequences. Therefore, using a combination system consist of customary rules and state laws will improve the conditions for rangeland management and should not force local communities to enforce government laws regardless their traditional customs (Mussa *et al.*, 2017).

Another study on the management and use of edible plants in pastures in eastern Shewa, Ethiopia, states that the use of edible plants in rangelands requires a social and governmental marketing network and the use of relevant scientific education. Achievement to sustainable use of edible plants in rangelands requires practical policies, which is feasible with the use of modern management and new services (Feyssa *et al.*, 2017).

In another study on ecological and anthropological behaviors in the utilization of medicinal plants in the rangelands of Amboseli, by the Maasai Tribes is conducted in Kenya, it has been determined that most of the tribes, regardless of their gender, age, education, and occupation, benefit information about the use of medicinal plants and often prefer to use treatments that are related to these plants rather than refer to the medical centers (Kiringe 2005).

In the Egypt, another study has been done on the flexibility of local communities and indigenous knowledge in improving rangelands, which are located in Wadi Allaqi biosphere storage in the southeastern desert. In this study, most ecosystems are commonly referred to as Social-Ecological System (SES), which include the interaction of nature and community, in which flexibility is considered as an important factor in the system. The study, investigate the experiences of the local communities of Bedouin in response to the turmoil in the formation of Nasser Lake in mid-1960's. Prior to this disturbance, the traditional ranching method of these communities was based on the flock rotation system, but later on, indigenous peoples settled permanently along the coast to use water resources, which led to an increase in the severity of grazing along the shores of the lake. These local communities then learned how to use Najas species – a type of aquatic species- in the lake and thus provide an opportunity for rangelands to improve the area. In this research, ecological regeneration

has been emphasized with a focus on social criteria (Yacoub 2018).

Let us to investigate several studies on the involvement of indigenous knowledge in the management and exploitation of rangelands in Asia:

In a study that examined the indigenous knowledge of environmental components classification in order to optimize management of Dilegan tribal rangelands in Iran, it was stated that nomads have a clever and accurate observation about classification systems that fully conform to local conditions. As they had separate classifications for each of the components of nature around them. Accordingly, they divide the rangeland according to the topography, temperature, vegetation, soil, water resources, land use and access routes, and each has a distinct name and definition (Forouzeh *et al.*, 2017).

An investigation has also examined the indigenous knowledge of women in the sustainable development process in rangelands of Soleimani tribe in Iran, which states that the nomadic women of Soleimani tribe have an admirable knowledge of veterinary and the treatment of livestock diseases, milk processing and dairy products and handicrafts such as carpet, Black tent, mattress and handmade grinder which, inspired by it, can be used to steady development of rangelands (Saeedi Garaghani *et al.*, 2016).

In a survey conducted in Iran about the Boyer Ahmed tribe on the recognition of temporal and spatial patterns of rangelands from the standpoint of indigenous knowledge, it has been found that natives of the region have in their indigenous knowledge, a daily and annual calendars that they set actions up with it. Their daily calendar consists of twelve sections, which are named different times of a day base on it. Also, in the annual calendar, different years of the year are classified in thirteen different time periods, which are the annual activities of the tribes (such as migrating, harvesting, harvesting of herbs and medicinal products, etc.) according to this native calendar. Accepted According to the above, it is recommended that the issue of identifying patterns of classification and naming of time and place in native systems should be further investigated in order to provide more practical solutions for the advancement of objectives (Forouzeh *et al.*, 2016).

Studies have also been conducted in Iran to investigate the local knowledge of livestock management in rangelands of Ghasre Yaghoub, Fars province. In rural areas, rural women, based on their local traditions and in order to manage of milk of livestock, social institutions have been

shaped base on the local customs. These institutions originate from indigenous knowledge of the region and are a kind of social capital for the exploiters and play an important role in maintaining and strengthening the social cohesion and economic sustainability of the inhabitants of the region (Rasekhi *et al.*, 2014).

Another paper studies the assessment of rangeland degradation based on indigenous knowledge of rangeland operators in Iran and concludes that the control of destruction in the affected land is ineffective in lack of people who play a significant role in the area because the pastoralists have a broad knowledge base on rangelands vegetation and animal habits and also land characteristics. So matching the scientific land degradation indicators with the ones pastoralists are believed in and understand, can lead to the successfully control of land degradation (Behmanesh *et al.*, 2015).

A number of studies carried out on the role of native ecological knowledge in the sustainable management of rangelands in northern Iran, which has resulted in the use of indigenous knowledge in rangeland management, livestock diseases treatment and assessment of rangeland forage (Ghorbani *et al.*, 2013).

In a study in Iran it has been stated that shepherds, in their calculations of their economic cost, according to their indigenous knowledge, always take into account all the details, while in many scientific papers, part of these costs or earnings in calculations It is not expected to enter or that herd revenues on the up lands are considered to be unconnected with the herd in the down lands, which has been solved for herders according to their indigenous knowledge (Barani *et al.*, 2004).

In another study in Iran, it has been stated that shepherds, according to their indigenous knowledge, have adjusted the time and place of grazing of the livestock in pasture, having regard to environmental and human factors, and has developed techniques for protecting livestock and forage, directing the herd, combining and production of herd (Barani 2003).

A paper also investigates the effects of ecological indigenous knowledge of pastoralists in Mongolia on utilization of rangelands. According to this study, it has been shown that native knowledge of pastoralists and their conceptions, have opposite effects on current rangeland management. However, they are effective in grazing approaches and land us. The research suggests that indigenous knowledge about the use of rangelands has led to a flexible and variable system for the use of land that has undergone dramatically change over the centuries. Despite

the inevitable differences in the kind, quantity and quality of indigenous ecological knowledge that exists among various users, the majority of exploiters use empirically derived rules (Fernandez-Gimenez 2000).

An example of the research in Europe context examines the perception and management of seasonal heterogeneities of steppe pastures by pastoralists in the Hortobagy (Hungary) and stated that herdsmen, mainly using their own indigenous knowledge to solve the issues. Their main method of use includes grazing along with fertilization, burning and removing spiny weeds. It has also been stated that the herders evaluated the habitats in the rangelands and accordingly exploiting the resource using soil fertility, salinity and moisture content, dominant herbaceous species, soil color, geomorphology, land use and litter (Molnar 2014).

As an example of the research conducted in this regard in the American continent, one can point out the classification of indigenous peoples with regard to the biomedical landscape in Mexico, which states that indigenous knowledge is often considered as a "dwelling place"; while on the contrary, it has a dynamic state that has been shaped by adaptation to environmental changes, as well as the experience of indigenous people over time (Bjorkan and Qvenild 2010).

Another related study in this continent in the USA refer which monitoring, and assessment and/or simultaneously fail to draw on local ecological knowledge. Many community-based forestry organizations in the United States attempt to address these knowledge gaps with an integrated ecological stewardship approach that balances ecological, social, and economic goals. This study illustrated the potential for community-based forestry groups to play a key role in connecting scientists and local people for natural resource management, enhancing local people's understanding and use of conventional science, and increasing the role of local knowledge in monitoring and research. However, we do not claim that all community-based forestry groups do this (Ballard *et al.*, 2018).

Another research in the USA, acknowledge that Lack of long-term ecological monitoring presents a challenge for sustainable rangeland management in many areas of the western United States. Ranchers and other land managers have local knowledge gained from ongoing experience in specific places that could be useful for understanding ecological change and best management practices. Local knowledge is defined as knowledge gained by daily contact with the natural world and ecological processes.

Unfortunately, little is known about ranchers' local knowledge, and few studies have systematically examined the types, depth, and validity of this knowledge. (Knapp and Fernandez-Gimenez 2008).

In Oceania, for example, Australian research on native biocultural knowledge in the ecosystem and management reveals that the Global Environmental Conservation Guidelines requires integrating indigenous peoples and their knowledge in the management of global ecosystems. Migrant countries such as the Americas, New Zealand and Australia have responded to a growing number of local partnerships with an array of policies and programs, but the balance of indigenous and non-native preferences and their management practices is an important challenge. However, inclusion local public opinion leaders in the national environmental protection organizations will promote the context of SES (Ens *et al.*, 2015).

III. DISCUSSIONS AND SUGGESTIONS

According to the surveys, it was found that the most research done in the field of the using of indigenous knowledge in the management and exploitation of natural resources and pastures has been carried out in Africa, and particularly in Ethiopia; the reason is certainly the existence of coherent of significant local communities. Although local communities exist in other countries of the world, in the African context, there are more indigenous communities than other regions, and the influence of modern culture and new technologies is partial. On the other hand, their culture is in such a way that adherence to the traditional principles has been institutionalized in which the total of these factors has led to the existence of a genuine and purely traditional context, and this case is more attractive to domestic and international researchers.

In the aforementioned papers, as well as other similar studies, the importance of using local communities and their indigenous knowledge in management and exploitation of rangelands and in general natural resources has often been pointed out, and in particular, they consider the role of these communities very effective. They acknowledge that these communities are closely intertwined with pastures and other natural resources, and that the changes made in these areas are directly relevant to their lives and their livelihoods. Therefore, their indigenous knowledge which has evolved through the experience and over a long period of time, in keeping with the climate and regional changes, is very valuable and should be used in jointly with modern knowledge.

Research has also explored the problems involved in combining indigenous knowledge and modern knowledge for exploiting and managing rangelands and natural resources. Also, the differences in the views and preferences of indigenous people and governmental organizations are mentioned, but in any case, due to the importance of integrating the above factors, the solution to this problem has been considered.

Some studies also show that indigenous knowledge is dynamic and along the time, due to the disturbances encountered by local communities and based on the experience gained from encountering those disturbances, their indigenous knowledge is changing in the same direction and evolving. Therefore, dynamism is not solely for modern science.

Now, according to the information obtained from this research, suggestions for the application of indigenous knowledge in the management and exploitation of rangelands in Iran are presented below:

1. There are many local communities in various parts of Iran which each has its own indigenous knowledge. The most prominent are Bakhtiyari, Qashqa'i and Eelsavan tribes. Given the fact that they are nomadic and nomadic in the country, these tribes are entirely dependent on pastures, and any changes in pastures directly affect their lives and their livelihoods. On the other hand, the tribes have strong indigenous knowledge in this regard due to their specific culture. Therefore, participation and use of their indigenous knowledge in rangeland management can be considered.
2. In management of natural resources, close communication with local communities should be carried out by relevant government agencies. This leads to their participation in government projects. In this regard, the indigenous peoples must justify the issue. One of the most basic things to accomplish the process is to create briefings and justification classes at the district level. In this case, for the further effect, the culture and customs and even their dialect should be considered.
3. One of the points that have been mentioned in some studies and its application in Iran also seems to be the formation of local institutions in such a way that these institutions have different organizational levels. The relationship between these levels must be completely tangible and dynamic. In this way, it is possible to easily

transfer various cases between the relevant government agencies and local communities, and the participation of the people of the region and their knowledge.

4. In the end, it should also be noted that local communities, and in particular tribal societies, are entirely dependent on their elders and leaders. This should be taken into consideration by the relevant government agencies that intend to work together with local communities and use their influence to resolve potential problems.

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