

## The approach of indigenous compilation and formal knowledge to sustain rural settlement with emphasis on animal husbandry activities in the geographical area of North East Iran Khaf

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### Abstract

This paper records the transformation process in rural husbandry activities, due to modernization and emphasizes the need for archiving some aspects of indigenous knowledge in the geographical area of Khaf in North East Iran. The researcher used descriptive- analytical method and with an applied approach. It suggests that modernization, within the changing operational use of pastures has increased livestock production on one hand, but has caused partial loss of employment, reduced income, increased migration, and degradation of renewable resources on the other hand. Thus, relying on the indigenous knowledge of livestock (environmental compliance) alone has not been able to provide socio-economic stability in rural communities. Combining indigenous and formal knowledge to balance a renewable resource management system is considered suitable approach in achieving rural sustainable development especially in a developing country like Iran

**Keywords:** Formal knowledge, indigenous knowledge, approach, sustainable development, rural settlement, Iran.

### Introduction

Human settlement in different natural environments has provided the possibility of using different natural conditions for them and thus by enjoying the different features they have achieved different sciences, of communication and efficiency, in the environment. These methods often were necessarily compatible with the environmental conditions, until the advent of the industrial revolution and the effects of modernization provided production tools and equipment, which on the one hand, have increased destruction of the environment and on the other hand, have provided faster and easier mass production with increasing productivity (Dorman, 1984; Chandrasekhar *et al.*, 2007).

Indigenous knowledge refers to the collection of knowledge, skills, beliefs, tools, and techniques of a social group, which has arisen from different fields of their life's interaction with the social and natural environment over the centuries. Today, this knowledge, which has been transmitted orally from generation to generation, is being perished rapidly. What has given importance in collecting, compiling, and disseminating indigenous knowledge in the late twentieth century is the necessity of achieving an appropriate technology and knowledge that, while answering the growing needs of the international community, make use of limited land resources in a manner of sustainability and put necessary sensitivity towards social and cultural diversity of different ethnic groups.

Considering the importance of animal protein in human nutrition, life based on subsistence and nomadic animal husbandry is one of the most important ways of human existence and has been progressed since times long past. Therefore, according to climate variability on different parts of the Earth, various livestock and nomadic customs and laws have been created. In Iran, these practices have been developed and ranchers have learned over time how to use the pastures or how to combine different types of livestock and how to operate logistics of consumption and maintenance of different livestock products (Hüttner *et al.*, 2001; Iran statistical

center, 2006).

With regard to the role of indigenous knowledge in rural sustainable development, and since this knowledge lies in the memory of local elders, it is essential for the proper extraction and use of it in conjunction with formal knowledge and modernization processes of animal husbandry. For this, one should explore within villages and be amongst the guardians of this knowledge.

Khaf city in the East of Iran, with its dry climate conditions, has with a glory for centuries in the light of ideas and cultural, political, economical achievement of its residents and scientists, and animal husbandry has been one of the most important ways of living. Recent studies show that pastureland area is about 680950 hectares. The population is about 461639 Heads and finally Statistical studies in 2010 indicate that income per capita in a year is about 824.29-928.92 dollars.

### Indigenous knowledge

To describe knowledge of rural peoples which has arisen from their environment the terms like traditional knowledge, indigenous technical knowledge, rural knowledge, knowledge of ethnic (or popular science) have been used. This knowledge is demonstrated in different fields such as language, botany and zoology and also in manufactured skills and agriculture, which all are consequences of human interaction with their environment. This information includes a collection of the best and most helpful approaches of using and living in a special environment, which has been, transmitted from generation to generation (Papadopoulos *et al.*, 2007; Molaei *et al.*, 2009; Lwoga *et al.*, 2010).

In the first decades of the twentieth century, a number western physicians and especially vegetal physicians, in order to make studies of indigenous methods of agriculture and nutrition, went amongst the world's indigenous peoples (Rao, 2006). In Iran, the same search, to collect the indigenous knowledge has been done by Jihad of Agriculture by Directorate of the Center for Rural Research, Review, and Construction in Jihad Ministry of Agriculture (Iran statistical center, 2006).

Implementing the "National plan of collecting, compiling, and disseminating indigenous knowledge of Iran" by Research and Studying Rural Issues Center will be encouraging scholars, researchers, and experts to study indigenous knowledge of Iran.

### Recognition of study area

Khaf area is located between longitudes  $59^{\circ} 21'$  to  $60^{\circ} 56'$  and between latitudes  $33^{\circ} 53'$  to  $34^{\circ} 57'$  and away from 250 km southwest of the metropolitan city of Mashhad. The climate of Khaf is dry with desert conditions, hot summers, and cold winters (which are relatively dry). The average annual temperature is  $18.26^{\circ}\text{C}$ . Average rainfall in the area is equal to 124.3 mm. Khaf area has a great history and it is considered as one of the centers of civilization in East of Iran. There are old buildings and mosques in Zovzan; the school of Ghyasyh in Khordgard and Salami Palace in the village of Salami indicates that in the past Khaf was an important center of cultural and social development in great Khorasan. Khaf area, in 2006, had 110,378 inhabitants of whom 47,709 people were living in urban areas and 62,669 people were living in rural areas. Employment studies in Khaf show that 46.9 percent have been employed in agriculture and animal husbandry, 25.4 percent in industrial activity, mining, and 26.4 percent in service activities. There are broad meadows, mountains and vast plains as well as specific weather conditions for the possibility of promoting animal husbandry in Khaf. So that the farmers always grow different species of sheep, goats, cattle and camels and thus began to produce meat, wool, and dairy (Fig.1).

### Effects of indigenous knowledge in Khaf livestock

Traditional methods of pasture utilization are encompassed by field of the capabilities of a shepherd. Shepherds are well aware of pasture plants and are trying to lead their flocks to the best positions in the least time possible, to avoid exhausting the cattle due to ineffectual movements, and to decrease the kicked or trodden rates of pastures.

For this purpose, the shepherd must select the proper location for cattle and teach them in a way that, with his voice, his moving and rotating of his stick, they understand the concept of this movement. Shepherds with calm songs show them that they must avoid scattering and movements around him are circular as the cattle slowly graze. This slow and scattered circular movement avoids the cattle from walking too steeply, grazing poorly, and downtrodden state of the pasturelands. Pasture rotation is the other skill of a shepherd.

In regards to our research, some indigenous knowledge can be used are feeding the herds; Pasture conservation; Producing dairy; Looking after the herds.

Guiding livestock in pasture should be in such a way that ends up towards the water supply or lead or leads them away from the local drinking water that

is stagnant and also away from flowing water. Watering the cattle is as important as the value of the herd itself. Cattle should go early morning each day for pasturing and reach water at 8am to 9am. The watering system is very important and should never be rushed or be delayed because this has negative effects on animal resistances against disease, delaying in mating time, quality of wool, breastfeeding, and so on. On the other hand, showing the consistency of indigenous knowledge of Khaf's farmers with climate conditions one can see that, in the summer's noon, if the animals are stationed at the watering points in hot weather then it hurts them severely and this has many negative consequences. Therefore, the herds' time at the peak heat and sunlight periods from 10am to 4pm should be spent on pasturelands. The estimated income from dairy and meat before modernization is about \$274.76-\$309.64 per year, which in compare with the period after modernization 824.29-928.92 increase about 48.52-54.82 %.

In relation to water source, governmental projects and plans have never been carried. Therefore, number of projects suggested is dredging the Qunats; Developing and reconstruction of springs; Healthy drinking water; Plans of transferring water. At the same time, necessary training to be imparted on husbandry health care, healthy herds looking after, marketing training for dairy production, and founding some producing NGO's are necessary. It should be said the study period is 5 years from 2005 to 2010 and research method is based on field observations and question sheets from husbandries.

Another aspect of indigenous knowledge in Khaf is that the shepherd never moves the animals in the opposite direction of the wind. Because it causes different diseases, such as pneumonia. Indigenous knowledge of selecting the best places to keep animals should select rich and vast pastures that could connect daily grazing of livestock and the possibility of access to water. Frequency of use of the

pasture is also one other type of indigenous knowledge in Khaf area in that ranchers apply it for optimal use of rangelands. For this purpose, during the first part of March to the end of April, a person called a plains watcher is keeping the meadows. This person patrols the pastures for two months to prevent entering the surrounding villages and that their cattle graze within the pasturelands. On the other hand, this causes the plants to complete their growth periods successfully and to avoid the weakening of grazing and pasture species. At the same time, in May, during time of milking and pastures are free, the possibility of having adequate forage for livestock production is to provide more milk.

Farmers believe that it is better to use pasturelands at the beginning of the year, and plains have to be abandoned and used for the warmer months. In the spring, temperature in upper elevations is colder and is suitable for cattle, but with warming the air in summer the wind is lower in those elevations than on the plains and for cattle

Fig.1. Study area



it is so difficult to bear. Therefore, it is better that livestock spend the summer on the plains. Iranian nomads in the West are applying these almost contrary ways.

#### Application modernization in the animal husbandry

With new device technology of milking, and putting it in the processing milk not only the number of working hours reduced but also, handy mixing and boiling buttermilk that requires a package of forage (average 200 liters of fossil fuel) and 10 to 12 hours is reduced and also the consumption of firewood has reduced. Regarding the milk-processing operation, it is the duty of women, they also have responsibility for spinning and weaving, and the use of machine technology has liberated more workforces and has a positive effect on increasing the production of many other aspects of rural production.

#### Consequences

Applying new techniques in animal husbandry operation started in Khaf about 30 to 50 years ago. The impacts of modernization in livestock are rather indirect. For example, the increasing of agricultural wells is an item that has no direct relation with livestock and is considered as an agricultural item. While the wells increase the production of agricultural crops and livestock forage requirements, and grass fed to livestock and traditional methods of utilization of natural pastures has been transformed. Following the increasing exploitation of the ground water, considering the lack of descending and enjoying the dry weather, in the long run, declining groundwater levels, desertification and desert conditions contribute to the region. This has followed destruction of vegetation and pasture species that have detrimental effects on the livestock system instability, especially in rural settlements and is a serious crisis for the region.

Although, some other industrial products such as handicrafts, raw materials, production of veterinary drugs and supplement feeds have positive outcomes such as the reduction of diseases, livestock mortality and increase in the relative birth rate of cattle, but their costs increase livestock costs that have, in turn, reduced the effects of the livestock net income more than in the past (Rischkowsky *et al.*, 2003; Smith, 2008).

Thus, using modernization capabilities in the field of livestock has seen increased livestock products and dairy products, however, because of unsuccessfulness in creating employment and increasing income of rural youth the migration trends in job search have increased. Also, interference with proper operations in using pastures, social-economical consequences have arisen, integrating indigenous Knowledge and utilization of new techniques has increased the possibility of sustainability in rural settlements and Khaf increases. It is necessary to apply all powers of local and indigenous capacities, particularly farmers and indigenous knowledge experts and Animal Science. Thus, the conservation and proper utilization of natural resources is related to utilization of indigenous knowledge. Therefore, to achieve sustainable development, it is essential to consider natural resources, scientific knowledge and accumulated indigenous farmers in combination with new knowledge and diversifying production functions considered to protect the environment while creating employment income, immigration

control and also provides the possibility of sustainability of rural settlements (Thapa *et al.*, 1997; Troster, 2002; Tisdell, 2003; Verlinden & Dayot, 2005; Wenche Barth & Kuhnlein, 2008).

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