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Traditional Food Practices in North Western Himalayan Region: Case of Uttarakhand

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Abstract—*In North West Himalayan Region (NWHR) people practice integrated systems of farming like forestry, horticulture, livestock and off-farm activities. The Uttarakhand and NWHR is the source of biological diversification in relation to topography, elevation, geographic phenomena, habitat, cultural, demographic, socioeconomic and ethnic diversity. The ecology of the Himalayas is unique and has an extensive and pervasive influence on the life of people. The cultivation of several types of crops-cereals, millets, pulses, vegetables, oilseeds, spices and fruits yielding plants are the specific feature of this region. The low productivity of crops is the major obstacle in food security agenda in the region. In conjunction, socioeconomic, demographic, administrative and low technical knowhow and few technological interventions also hindrances the food security. To meet the requirement for qualitative and quantitative food for life saver, local communities have administered the traditional local food pattern which is full of their biological nutrient requirement. In order to ensure their food security and to combat malnutrition local farming communities have encouraged through the scientific discussion and method demonstration of improved technologies. The food commodities of Uttarakhand are renowned for their extremely high nutrient value and taste. The population of NWHR is preferably taking high protein energy rich food as they have excessive physiological workload and energy requirement and consumption is also more. Millets, Cereals, Pulses and Oilseeds and fruits and vegetables are major food groups are considered important in their diet. The food system of Uttarakhand hills includes nutritionally rich food as Madua ki Roti , Lessi Roti, Dubke, Chutkani, Ras, Lingura ki Sabji, Bedu Roti, Choyee Roti, Singhal Pua, and Madire ki Kheer. The therapeutic characteristics of various food consumed in hills includes treatment of stone in kidney and urine vein, helpful in indigestion/constipation, improves blood level, increase lactation, helpful in reduction and management of Diabetes Mellitus and helpful in jaundice. The food pattern followed in hill region is very good source of nutrients as Protein, Carbohydrate, Iron, Calcium, Minerals, β-carotene, ascorbic acid, Riboflavin, Niacin, Thiamine.*

Keywords*: NWHR, Traditional Food Pattern, Therapeutic Characteristics, Nutritionally Rich Food*

1. INTRODUCTION

North West Himalayan hills have four agro-climatic zones viz., lower hills, mid-hills, high-hills and very high-hills. Low-hills include foot hills with the elevation ranging from 600 m to 1200 m above mean sea level. Climate in this zone is tropical to sub-temperate. The land comprises of mild sloping or rolling hills and valleys and soils in the area are deep and fertile and irrigation sources are available. Mid-hills include area situated between elevations of 1201 m to 1700 m amsl. The slopes in this region are mild rising at places to very steep. Agriculture is mostly rainfed. High hill region extends from the elevation 1701 m to 2500 m amsl, with temperate climate. Agriculture is rainfed and region is mainly suitable-for growing temperate fruits and pasture. The altitude of very high-hills is between, 2501 to 3500 m above mean sea level[12]. Permanent snow line lies around 5,000 m above mean sea level and areas above this elevation remain continually snow-bound. Even lower areas of this region remain covered with snow during winters and hence only mono-cropping is being practiced. This zone is known for its luxuriant pastures.

Like most other hill economy in Uttarakhand, people practice integrated systems of farming like forestry, horticulture, livestock and off-farm activities. In the state out of 13 districts, 11 districts represent the hill region that has varied agro-ecological and climatic conditions. High mountains, small hills, snow peaks, rivers and rivulets, glaciers, valleys, lakes, large forests, terraced fields are the integral features of Uttarakhand. The hill region has meager resources in terms of land, irrigation water, technology, farm implements and transport. Agricultural practices are the main stay of the people in Uttarakhand due to variations in climatic conditions, unavailability of reliable market accompanied by large family size on small fragmented farms on small terraces covered on steep slopes have led the farmers to adopt the subsistence farming systems which are characterized by substantial diversity[3,10,11,13,15].

NWHR differs from plains in topography, elevation, geographic features, diversity of habitats for flora and fauna, ethnic diversity, land use pattern and demographic and socio-economic phenomena. The ecology of the Himalayas is unique and has an extensive and pervasive influence on the life of people[2]. The undulated topography, rugged terrain, unfavorable cold climate and lack of production and marketing infrastructure have made the area poorest in terms

of production and productivity of the crops. Though, a lot of agricultural technologies have been generated for hills, yet it could not reach to the farmers and they are still practicing the subsistence farming. With the changing scenario of the state, need of farmers for cash income has become inescapable. Due to stiff competition, it is difficult to find jobs outside and therefore, agriculture is the only option they can depend on. Therefore, it is very important that the improved agricultural knowledge be transferred to them for increasing their farm income.

The cultivation of several types of crops-cereals, millets, pulses, vegetables, oilseeds, spices and fruits yielding plants are the specific feature of this region. But due to harsh conditions of hill agriculture system and low productivity of cereals, oilseeds and pulses is a major hindrance to the food security in the region[4]. Millets are a major food source in North West Himalayan Region of the India. Millets are good sources of energy. They provide protein, fatty acids, minerals, vitamins, dietary fibre and polyphenols. Typical millet protein contains high quantity of essential amino acids especially the sulphur containing amino acids (methionine and cysteine). Processing millet by milling removes the bran and germ layers that are rich in fibre and phytochemicals, causing significant loss. The millets are source of antioxidants, such as phenolic acids and glycated flavonoids. Millet foods are characterized to be potential prebiotic and can enhance the viability or functionality of probiotics with significant health benefits. The nutritional significance of millets demands for an examination of the nutritional characteristics and functional properties of different millet cultivars as well as developing value added products from millets.

Millets are one of the cereals asides the major wheat, rice, and maize food in the Hills of Uttakarkand. Finger Millet and Barnyard Millets are major food sources for thousands of people living in the Hiily areas of NWHR. They are grown mostly in marginal areas under agricultural conditions in which major cereals fail to give substantial yields[1]. Millets are classified with maize, sorghum, and Coix (Job's tears) in the grass sub-family *Panicoideae*[17]. Millets are important foods in many underdeveloped countries because of their ability to grow under adverse weather conditions like limited rainfall. It has been reported that millet has many nutritious and medical functions[14,17]. It is a drought resistant crop and can be stored for a long time without insect damage[1].

To meet the requirement for food for life saver, local communities have identified a large number of plant species from the local germplasm. In order to ensure their food security and to combat malnutrition local farming communities have encouraged through the scientific discussion and method demonstration of improved technologies (especially varieties of Millets, Cereal and Pulses and Oilseeds).

2. TRADITIONAL FOOD PATTERN OF NWHR OF INDIA

With growing needs of the villagers and the desire for comfortable and materialistic living, there is a huge change in the pattern of agriculture in the hills. The cultivation of staple crops has taken a beating and is being intensively replaced by cultivation of cash crops such as fruits and exotic herbs as they are much more profitable to grow in comparison to other staple crops. The food commodities of Uttarakhand are renowned for their extremely high nutrient value and taste. The population of NWHR is preferably taking high protein energy rich food as they have excessive physiological workload and energy requirement and energy consumption is also more. Millets, Cereals, Pulses and Oilseeds and fruits and vegetables are major food groups are considered important in their diet. Use of fermentation in specific food products are also a part of traditional food habits and practices. Specific varieties of Millets (Ragi, Pseudo Millet, Barnyard Millets, Buckwheat) Pulses (Horse gram, Black soybean), Vegetables as Lingura is major source of nutrients in their diet. The Journal of Nutrition and Nutrition Reviews endorsed black soybean's curative powers and its iron and protein content – making it an excellent meat substitute. It's not a magic pill but a humble nutrition-filled product of nature. It also has medicinal properties and has proven to help in manage diseases like beriberi, lockjaw, promotes blood circulation and reduces cholesterol. The traditional preparation method and practices makes the food more appetizer and healthy in today era of fast food life. Traditional food pattern, therapeutic use, major ingredients, nutritional value, and perceived characteristics of the Food are presented in Table 1. Traditionally, chapatis (Mandua roti), are made from flour obtained from finger millet seeds and buckwheat (ugal- used in fasting). which is calcium rich food, is generally consumed during the cold and harsh winters. Some species of millets such as kauni (fox tail millet) and madira/jhingora (barnyard millet) replace rice and kheer as staple food. These millets are known to contain medicinal properties, and are easy on the stomach and good digestive source. NWHR cuisine makes good use of local herbs and spices as taste maker which is enhancing the apatite. Typical condiments include jamboo (Allium stracheyi), kala jira (black cumin seeds), gandrayani (Angelica glauca) and jakhiya (Cleome viscose). Chutneys are made from bhangjeera (Perilla frutescens) and til (sesame)[16].

3. SOME POTENTIAL HEALTH BENEFITS OF FOOD PATTERN OF NHWR

The food pattern of North West Himalayan Region is different from plain region as described as carbohydrate rich food system due to locally available carbohydrate rich crops and preparations of food in such manner which gives fullness to stomach, rich source of energy, helpful in treatment of many disease and improves digestive system. The food system of Uttarakhand hills includes nutritionally rich food as *Madua ki*

Roti , Lessi Roti, Dubke, Chutkani, Ras, Lingura ki Sabji, Bedu Roti, Choyee Roti, Singhal Pua, and *Madire ki Kheer*. The therapeutic characteristics of various ingredients/recipe shown in Table 1 includes treatment of stone in kidney and urine vein, helpful in indigestion/constipation, improves blood level, increase lactation, helpful in reduction and management of Diabetes Mellitus and helpful in jaundice. The food pattern followed in hill region is very good source of nutrients as Protein, Carbohydrate, Iron, Calcium, Minerals, β-carotene, ascorbic acid, Riboflavin, Niacin, Thiamine etc which is somewhat as per Recommended Dietary Allowances (RDA) given by ICMR (Indian Council of Medical Research). Millet and Pulses and Oilseeds are more than just an interesting alternative to the more common grain, also rich in phytochemicals, including phytic acid, which is believed to lower cholesterol, and phytate, which isassociated with reduced cancer risk[5].These health benefits have been partly attributed to the wide variety of potential chemopreventive substances, called phytochemicals, including antioxidants present in high amounts in foods such as millets[9].

4. VPKAS CROP VARIETIES FOSTERING GROWTH OF HILL ECOSYSTEM IN NHWR

Agricultural growth is essential for fostering economic development[6]. Among many factors, contributing to the growth in agricultural productivity, technology is the most important. The rate of adoption of a new technology is subject to its profitability and the degree of risk and uncertainty associated with it, and is highly influenced by the capital requirement, agricultural policies and the psycho-socio-economic characteristics of farmers. Adoption of modern agricultural technologies causes resource-poor farmers to improve their income and decrease the propensity to fall below the poverty line[7,8]. VPKAS, being the pioneer institute in hill agricultural research, has been playing a great role in developing improved agricultural technologies like better (high yielding, input responsive and biotic/ abiotic stress resistant/ tolerant) crop varieties presented in table 2 and associated packages of practices, remunerative cropping systems and soil and water management practices. These improved technologies are being popularized among farmers through various extension programs of the institute.

Conclusion

The hills and mountain areas have a unique feature with respect to topography, climate and production system. Most of the hill farmers have small and scattered land holdings, low investment capacity and very little technical know how about improved crop production practices which may create hindrance to food security of the region. To mitigate the problem of provision of sufficient food, the local people have identified ways to get nutritive food from the local food sources. This nutritionally rich food system may include underutilized cropping system of the region viz. finger millet, barnyard millet, foxtail millet, yam, *Diplazium spp*, horsegram, black soyabean which is good source of various essential nutrients and micronutrients.

Table 1: Traditional food pattern followed in Hills of Uttrakhand.

SR. No.	Tradition Food Pattern	Major Ingredients	Scientific name	Nutrient availability	Traditional Preparation Method	Therapeutic characteristics	Other perceived characteristics of farmer
1	Madua ki roti	Finger millet flour	*Eleusine coracana*	Carbohydrate, protein, calcium, minerals and fiber	with dough of finger millet (ragi) and make thick chapattis, served with butter/ghee	helpful in reduction of diabetes mellitus increasing lactation	Provide precaution from cold, improves digestion
2	lessi roti	Finger millet and wheat flour	*Eleusine coracana*	Carbohydrate, protein, calcium, minerals and fiber	with dough of wheat and fill finger millet dough and ghee and prepare thick chapattis	helpful in reduction of diabetes mellitus good for lactating mother	improves digestion
3	Dubke	Bhatt/gahat (Horse Gram)	*Glycine max/ Macrotyloma uniflorum*	Carbohydrate, protein, minerals	overnight soaking of Bhatt/gahat and grind it, cooking in slow heat, serve with rice	Helpful in jaundice Gahat (Horse gram) helpful in treatment of stone in kidney and urine vein	Fullness of stomach
4.	Chutkani	Bhatt	*Glycine max*	Carbohydrate, protein, minerals	frying of bhatt and cooking as dal, add some rice/wheat/ besan for thickness	Very rich source of protein	
5.	Ras	Gahat (Horse Gram), Bhatt	*Macrotyloma uniflorum/ Glycine max*	Carbohydrate, protein, Iron, minerals	overnight soaking of ingredients, boil and cook in Iron utensil, add rice flour (1-2 tsp), serve with rice	Very rich source of protein Gahat (Horse gram) helpful in treatment of stone in kidney and urine vein	Provide precaution from cold, improves digestion

6.	lingura ki sabji	lingura*	*Diplazium spp*	Vitamin, mineral and iron	cook in Iron utensil		Improves blood level
7.	Bedu roti	Urd dal	*Vigna mungo*	protein, carbohydrate and fiber	stuffing of Urd dal in wheat, served with ghee	helps in indigestion	
8.	Choyee roti	rice flour	*Oryza sativa*	carbohydrate	make better of rice flour and cook in a pan like dosa	-	Fullness of stomach
9.	Singal-pua	rice flour and semolina, curd and sugar	*Oryza sativa and Triticum durum*	protein, carbohydrate and fiber	make thick better of ingredients and fry the bolls		God/Goddess may happy
10.	Madire ki kheer	Barnyard millet, milk	*Echinochloa spp*	Carbohydrate, protein	Kheer preparation	-	Food for fast (Falahar)

*Diplazium spp

Table 2: Suitable varieties of various crops for hills

Crops	Improved crop varieties
Wheat	VL Gehun 738, VL Gehun 804, VL Gehun 802, VL Gehun 832 (for higher hills), V: Gehun 616, VL Gehun 829, VL Gehun 892, VL Gehun 960
Rice	i. Spring sown : VL Dhan 207, VL Dhan 208, VL Dhan 209 ii. June sown (Direct sown) : VL Dhan 221, Vivek Dhan 154 iii. Transplanted : VL Dhan 81, Vivek Dhan 82, Vivek Dhan 85, VL Dhan 61, VL Dhan 62
Barley	VL Jau 56
Lentil	VL Masoor 103, VL Masoor 125, VL Masoor 507, VL Masoor 126
Field Pea (Pulse)	VL Matar 42
Garden Pea	VL Ageti Matar 7, Vivek Matar 10, Vivek Matar 11
Finger millet	VL Mandua 149, VL Mandua 315 and VL Mandua 324
Barnyard millet	VL Madira 207
Maize	Vivek Hybrid 5, Vivek Makka Hybrid 9, Vivek Makka Hybrid 15, Vivek Makka Hybrid 17, Vivek Sankul Makka 11 and VL Amber Popcorn, Vivek Makka 31, Vivek Makka 35, Vivek Makka QPM 9
Buckwheat	VL Ugal 7
Amaranth	VL Chua 44
Kidney-bean (Rajmash)	VL Rajma 63(Red), VL Rajma 1 (White)
Horsegram	VLGahat 8, VLGahat 15, VLGahat 19
Soybean	VLSoya 2, VL Soya 21, VL Soya 47, VL Soya 59, VL Soya 63
Frenchbean (Early)	VL Bauni bean 2
Tomato	VLTamatar 1, VL Tamatar 4
Bhindi	VVL Bhindi 2
Onion	VL Pyaj 3,
Garlic	VL Garlic 1, VL Garlic 7
Capsicum	VL Shimlamirch 2

Source: www.vpkas.nic.in

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