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Moringa oleifera: A Sustainable Intervention To Address Malnutrition and Poverty in Khyber Pakhtunkhwa (KPK)- Pakistan

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Abstract- Rural inhabitants' lifestyles and health are greatly impacted by the recent growth in modernity, urbanization, and commercial farming as well as the loss of plant resources. Food should be consumed in the era of incredible multi-functionality and objectivity not only to energize and feed us but also to fight against many illnesses and diseases and boost our immune systems. In rising nations like Pakistan, such a strategy is absolutely needed. *Moringa oleifera* is a very useful and versatile tree popularly named Suhanjna in Punjab, Pakistan. The Moringa tree is cultivated predominantly in semi-arid, subtropical, and tropical environments. The *M. oleifera* belongs to the family Moringaceae is native to the sub-Himalayan areas of Pakistan, India, Bangladesh, and Afghanistan, and is grown internationally. In Pakistan, it is found commonly in southern Punjab and it is also considered the origin of Moringa plant. This plant has the potential to thrive in any kind of soil and can endure extremely hard conditions. Moringa has remarkable nutritive value and it is a rich source of protein, vitamins (A & C), and micro-nutrients (Ca, K, Fe, etc.) that are completely absent in the daily diet of the majority of the rural parts of KPK. Since 1998, the WHO has pushed Moringa as an alternative to imported food supplies to cure malnutrition in disadvantaged nations. Research has indicated that the dried leaves of Moringa contain 7 times more vitamin C than orange, 10 times vitamin A than carrot, 17 times Ca than milk, 15 times K than bananas, 25 times Fe than spinach and 9 times proteins than yogurt. In addition, it includes vitamin B-Complex, chrome, Cu, Mg, Mn, P and Zn. Its leaves are a great source of protein and may be exploited to combat malnutrition. In KPK, Moringa planting and distribution have significant potential to promote farm income, improve nutrition, build up food security, give a livelihood for rural people, stimulate rural development, and assist sustainable land care.

Keywords– Moringa Oleifera, Sustainable Intervention, Malnutrition, Pakistan

I. INTRODUCTION

Indigenous knowledge is understood to pose a serious threat to the sustainability of natural resources, and the fundamental reason for this degradation is the low value placed on it. More at risk than the deterioration of natural resources themselves is the loss of people's indigenous knowledge of them. Information technology, a loss of interest in farming, poverty, illiteracy, changing habits, and changing standards of living and eating could all be contributing factors to this degradation. Food should be consumed in the age of extraordinary multi-functionality and objectivity not only to energize and nourish us but also to fight against numerous illnesses and diseases and strengthen our immune systems. Such a strategy is crucial, especially in emerging nations like Pakistan.

Locally known as Suhanjna, *Moringa oleifera* is a highly important and useful tree. The "never-die tree" is another name for the moringa. Primarily semi-arid, subtropical, and tropical regions are where the moringa tree is grown. The sub-Himalayan regions of India, Pakistan, Bangladesh, and Afghanistan are home to the *Moringa oleifera*, a member of the Moringaceae family [5]; [6]. Africa, Central and South America, Sri Lanka,

India, Mexico, Malaysia, Indonesia, and the Philippines are currently among the countries where it is commonly grown. The Indians understood the value of the plant's various parts, including the leaves, roots, and seeds. Almost every part of this tree can be utilized for food, medicine, or some other beneficial property, making it one of the most useful trees in the world. In many other nations as well as the tropics, it is used as forage. It is widely found in southern Punjab in Pakistan, and it is also thought to be where the Moringa plant originated. It thrives on sandy, dry soil. It can withstand dry conditions and poor soil. Recent research demonstrates that this plant can withstand extremely hard temperatures, such as temperate and tropical, and can grow in any type of soil.

II. NUTRITIONAL IMPORTANCE AND MEDICINAL PROPERTIES

Moringa is a rich source of protein, vitamins (A & C), and micronutrients (Ca, K, Fe, etc.) that are severely deficient in the daily diet of the majority of KPK's rural regions. It also has a significant amount of nutritional value. In order to combat malnutrition in developing nations, the World Health Organization (WHO) has pushed Moringa as a replacement for imported food products since 1998 [15]; [18]. According to research, the dried leaves of the moringa tree have 9 times more protein than yogurt and 7 times more vitamin C than an orange. They also have 10 times more vitamin A than a carrot and 17 times more calcium than milk. Chromium, Cu, Mg, Mn, P, Zn, vitamin B-Complex, and other elements are also present [7]; [8]; [9]. According to [20], *M. oleifera* leaves are a good source of protein and may be used to combat malnutrition all over the world.

Researchers claim that moringa may help those who are deficient in vitamin A and other micronutrients [16]. On a fresh weight basis, moringa leaves contain 40139 g/100 g of total carotenoids, of which 47.8% were -carotene. On a dry weight basis, ascorbic acid is present at 6.6 mg/g, along with 0.26 mg/g iron, 22.4 mg/g calcium, 6.3 mg/g phosphorus, 11.2 mg/g oxalic acid, and 0.9 g/100 g fiber. Since ancient times, moringa has been used for both nutritional and therapeutic reasons. It also contains vitamin C, which protects against a variety of diseases like the flu and colds, vitamin A, which protects against heart disease, diarrhea, and many other illnesses, calcium, which strengthens bones and teeth and prevents osteoporosis, potassium, an electrolyte that is crucial for the health of the brain and nerves, and proteins, the fundamental building blocks of all of our body cells. All of the necessary amino acids are present in moringa leaves, which is unusual for a vegetable to do. While the Moringa tree has a healthy quantity of these amino acids. Argenine and histidin, two amino acids that are particularly crucial for newborns who are unable to produce enough protein to meet their development needs, are even found in moringa. For vegetarians and others who cannot purchase meat, these leaves are a huge perk. According to [1]; [3]; [1]; [7]; [8]; [15], moringa might be a very useful food source. To cure malnutrition in Pakistan, a variety of commercial goods including Zija soft drinks, tea, and nutraceuticals are available all over the world as alternatives to the imported food supply. The NGOs "Trees for Life" and "Educational Concerns for Hunger Organization" in particular have pushed moringa as "Natural Nutrition for the Tropics." In order to fortify meals, leaves were also employed [21]; 13]; [14].

Moringa leaves and pods may greatly help pregnant and nursing women maintain their health and pass on strength to the fetus or nursing infant. A woman might get about a third of her recommended daily intake of calcium from 100g of moringa leaves, as well as significant amounts of protein, iron, copper, sulfur, and vitamin B [1]; [12]. Since ancient times, people in India have utilized this herb to heal a variety of illnesses. It is one of the most valuable plants since every part of it is used. The seed of the moringa plant is used to purify water. The seeds that are used for cooking and lubricating sensitive machinery may be utilized to produce vegetable oil, and the crushed seeds can be used as fertilizer. It may be used to reenergize milk, bread, sauces, liquids, spices, and noodles. You may get a blue die from the wood. Fiber for ropes and matting may be extracted from the bark. For tanning skins, it has tannin in both its bark and gum. The traditional usage of this tree, however, is as a source of medicine. It helps with birthing and functions as an antibacterial and natural anthelmintic. It is used as a treatment for colds, diarrhea, and stomach and liver issues. Additionally, it can be used to make hair oils, tonics, and perfumes. Recent research has also

revealed that this plant has potent antioxidant qualities. Growing and distributing moringa in rural parts of KPK has enormous potential to increase farm revenue, improve nutrition, increase food security, give rural residents a means of subsistence, promote rural development, and encourage sustainable land care.

III. Economic Importance

Moringa oleifera is very important economically for Pakistan, particularly in Khyber Pakhtunkhwa (KPK). The following are a few ways the plant will help the economy:

Export potential: Pakistan can take use of the great export potential of *Moringa oleifera* products. In nations like the United States, Europe, and Japan, the leaves, seeds, and oil are highly sought for since they are utilized in food, dietary supplements, and cosmetics.

Job creation: Farmers and rural communities may have employment prospects as a result of the cultivation, harvesting, and processing of *Moringa oleifera*. The crop is perfect for Pakistani smallholder farmers because it is simple to grow and doesn't need much water or fertilizer.

Sales of *Moringa oleifera* products have the potential to bring in money for farmers, especially in regions where farming is the main source of income. Multiple harvests of the plant each year give farmers a reliable source of revenue.

Health advantages: *Moringa oleifera* has numerous health advantages, and there is an increasing global demand for natural and organic products. The plant's oil, seeds, and leaves can be processed, sold as dietary supplements, or used to make cosmetics.

Moringa oleifera has a deep taproot system that can loosen up compacted soil and enhance the quality of the soil. This may help other crops cultivated nearby, resulting in higher yields and better crop quality.

Pakistan can benefit from the plant's many uses to expand employment prospects, pay farmers a living wage, and enhance soil quality. *Moringa oleifera* has a substantial economic impact on Pakistan. Pakistan can take advantage of the rising demand for natural and organic products by investing in the cultivation and processing of *Moringa oleifera* and reaping the various health advantages of the plant.

IV. Scope

Growing and distributing moringa in rural Pakistan has the potential to significantly increase farm revenue, improve nutrition, increase food security, provide rural residents a livelihood, promote rural development, and assist sustainable land management. With so many advantages and applications, it is essential that every family in Khyber Pakhtunkhwa domesticate and grow a *Moringa oleifera* tree. The usage of moringa will improve the health and nutritional condition of the rural community, especially the female population of KPK province, and reduce reliance on synthetic multi-mineral and vitamin supplements. The hard cash used to import medicines and dietary supplements will be saved. Once we are able to generate enough trees to provide the necessary industry, the food and nutritional content of moringa may be exploited in the form of commercial items that are sold in the market. We wanted to introduce high-quality plant seeds for this reason, multiply them in the form of nurseries, and disperse them in the rural regions of all the districts of KPK together with methods for propagating plants.

V. What is the existing situation?

Indigenous knowledge, according to [19], is knowledge that is specific to a particular culture or civilization and serves as the foundation for local activities including agriculture, health care, food preparation, education, and environmental protection. With the help of thousands of specialists and their expertise spanning hundreds of years, indigenous people from all over the globe have evolved their own unique knowledge on plant resources, uses, and natural resource management and conservation [2]. The local populations in Pakistan's many areas have a long history of learning about and using the majority of the regional flora. Through oral transmission and firsthand understanding, this native knowledge of plants has been passed down from generation to generation [17]. Up to 84% of Pakistan's population relied on indigenous medicines for traditional medical procedures in

the early 1950s [11], but due to the death and scarcity of knowledgeable individuals, the lack of documentation of orally transmitted knowledge, rapid urbanization, the low value placed on indigenous knowledge, and the focus on modern lifestyle and education, only rural areas of Pakistan still practice these traditional medical procedures today. These are all caused by the loss of indigenous knowledge among people.

More at risk than the deterioration of the natural resources themselves is the loss of local knowledge about them among the populace. Information technology, a loss of interest in farming, poverty, illiteracy, shifting habits, and changing standards of living and eating might all contribute to this degradation. The food we consume should not only be eaten to feed and give energy in the era of excessive multi-functionality and objectivity, but also to fight numerous illnesses and strengthen the immune system. A strategy like this is crucial in emerging nations like Pakistan. This makes the planting of this tree in Khyber Pakhtunkhwa (KPK) particularly desired for the benefit of both the current and future generations. If not, this region would be robbed of the advantages of such a priceless tree.

VI. CHALLENGES AND OPPORTUNITIES TO ADDRESS THEM?

Given the immense advantages of *Moringa oleifera*, it is essential that this tree be planted in each and every Khyber Pakhtunkhwa residence. Biology, ecology, timing of germination, seed dormancy, life cycle, habit, habitat, eco-physiological and ecological characteristics, and dietary demands must be addressed on a scientific basis for the introduction and production of *Moringa oleifera*. Once we are able to generate enough trees to provide the necessary industry, the food and nutritional content of moringa may be exploited in the form of commercial items that are sold in the market. This initiative aims to provide high-quality plant seeds, multiply them in nurseries, and disperse saplings across the rural Peshawar Valley along with methods for plant culture, multiplication, and distribution.

VII. JUSTIFICATION FOR *MORINGA OLEIFERA* CULTIVATION

The only thing wrong with the universe's creations is that people don't know enough about them to take use of them. To support themselves and ensure their existence, prehistoric humans used to harvest food from wild plants. Later, when the human population grew and gathering food from the wild proved to be inadequate, a man considered domesticating plants, which marked the beginning of agriculture. Even though agriculture is at its height right now, domestication is still a process that is ongoing. Rural populations' life and health are significantly impacted by the recent boom in modernity, urbanization, and commercial cultivation of plants, which is causing a decline in plant resources and a quick abandonment of traditional usage. Traditional veggies and medicinal plants' flora are significantly impacted by the loss of indigenous plants and knowledge [4]. In contrast to the fact that every year new applications and medications for wild plants are found via exploration, study, and the development of new compounds. The process of using and reintroducing these priceless plants is still moving very slowly. Food should not only be consumed to fuel our bodies and provide us energy in this day of extraordinary multi-functionality but also to fight numerous illnesses and diseases and strengthen our immune systems. Such a strategy is crucial, particularly in emerging nations like Pakistan.

VIII. CONCLUSION

Moringa oleifera tree is valued for both its therapeutic and dietary benefits. Due to its many advantages, it is frequently referred to as the "miracle tree". Because the leaves, blossoms, and pods of the moringa tree are so high in vitamins, minerals, and vital amino acids, they are a fantastic source of nutrition for malnourished people in underdeveloped nations. Malnutrition and poverty are highly prevalent in the Pakistani province of Khyber Pakhtunkhwa, especially among young children. To solve these problems in the area, *Moringa oleifera* may be a viable intervention. Including *Moringa oleifera* in the local diet is one approach to making use of it in KPK. While the pods can be used in stews and soups, the leaves can be cooked and eaten as a vegetable. From the seeds, moringa oil can also be extracted and applied topically or used in cooking. *Moringa oleifera* can be utilized to provide income for local farmers in

addition to enhancing nutrition. The tree is simple to grow and can survive in different types of soil, even dry, arid areas. Farmers can earn money for themselves and their families by selling the leaves, pods, and seeds for use in food and cosmetic items. The application of *Moringa oleifera* as a natural fertilizer can enhance soil quality and boost agricultural output. This can aid local farmers in increasing food production, lowering the likelihood of food insecurity and poverty. In general, *Moringa oleifera* has the potential to be a long-term solution to the poverty and malnutrition problems in Khyber Pakhtunkhwa. *Moringa oleifera* can enhance the health and happiness of the local populace by introducing tree into the diet, providing income for farmers, and enhancing soil quality.

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