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Medicinal Plants: An emerging sector for improving livelihood of rural population in Uttarakhand

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Medicinal plants had been an integral part of the Indian civilization for ages. Various indigenous knowledge and traditional medicinal system form a strong base and vast history for the utilization of medicinal plants. The utilization of medicinal plants is mentioned in a variety of texts all over the world. Apart from their medicinal use, these plants are also a part of various traditional ceremonies, religious offerings as well as for ornamental and aesthetic purposes **(Verma *et al.*, 2018)**. India with sixteen agro-climatic zones is the centre origin for many plant species. India is one of the seventeen mega-biodiversity countries and ecological hotspots contributing about 7% of the world's total biodiversity. It has been considered a treasure house or botanical garden of plant genetic resources due to a wide variety of climatic and topographical conditions. **(Rao and Smitha, 2018; Gautam *et al.*, 2020)**. There are about 45000 different plant species across the country, out of which 17000 are of medicinal use. The traditional health care practitioners of India are using about 4500 to 5000 species of plants for the medicinal purposes **(Nautiyal *et al.* 2002)**.

Currently, society is moving from illness to wellness through treatment of aliments to the prevention and early diagnosis. The pharmaceutical industry is now moving toward personalized medicines from generalized medicines. The market is now a day moving toward nature-based products causing lesser side effects at comparatively low cost. It has been reported that around 80-85% of the total world population relies on herbal-based medicines and health products. The rapid growth in the herbal market was observed in recent years that values worth $1.1 billion during the year 2000 it and increases to $1.8 billion in 2009. By the world health organization (WHO) it had been projected that the global market of herbal medicines would grow to $5 trillion from the current market value of $62 billion **(Gautam *et al.*, 2020; Yadav, 2019)**.

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In India, the demand for herbal raw material was estimated at around 1,95,000MT during 2014-15 and total domestic consumption was estimated around 12,000MT. It was also reported that only 22% of total herbal raw material is procured through cultivation **(NMPB, 2019)**. Instead of having all the advantages, India is the second-largest exporter of herbal raw products and herbal medicines after China. India and China account for about 70% of the global demand for herbal medicines. In 2017-18 India exported raw herbal drugs of worth approximately $330.18 million and of value-added herbal products was around $456.12 million with growth rate of 14.22% over the year 2016-17 and export of value-added extracts of the medicinal plant were valued around $456.12 million with the growth rate of 12.23% over the year 2016-17 **(MoC&I, 2019)**. Out of 4500-5000 medicinal plants species used in traditional medicinal system across the country only 1178 plant species are currently under trade. Out of which 42% are herbs, 31% shrub and climbers, and 27% trees. Only 242 species shares major share in trade annually (> 100MT) **(Goraya and Ved, 2017)**. India is among global leaders in the production of medicinal and aromatic plants. The aim of the cultivation of medicinal plants is to increase the uniformity and concentration of bioactive constituents of plant. In recent years, the demand for herbal-based medicines and herbal raw products has increases rapidly due to their utilization in the value addition of food products and acceleration of pharmaceutical interests.

Uttarakhand is a hilly state consisting of about 70% area in hilly regions. It is located in northern part of India between 28º43'N and 31º27'N (Latitude) and 77º34'E to 81º02'E (Longitude). The majority of the area belongs to the temperate or alpine region of which 19% area is covered with snow all over the year. Due to the diverse geography, the state is rich in flora hence some of the plants are confined within this geographical area. The Himalayan region is rich in medicinal plants. A total of more than 2000 species of medicinal plants are found in the region which includes a majority of herbs out of which currently about 960 plants are actively in trade. The total cultivation of medicinal plants in the state accounts for about 200MT/year by volume. The demand for plant-based medicine is continuously increasing and the productivity is low in comparison to the market demand. In hilly states like Uttarakhand, there are many constraints in conventional crop production which ultimately ends with a decrease in the interest of farmers in agriculture leads to unemployment, lower living standards, and migration. Many of the medicinal plants are cultivated substantially and are not exploited

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to the commercial level. It opens the window for cultivation. Their cultivation will not only helpful to meet the market demand but also improves the living standard of the farmers. Studies conducted on economics and employment generation in medicinal and aromatic plant sector shows that the number of registered farmers engaged in the cultivation of MAPs increasing year by year the number which was 301 in year 2003-04 increases to 2714 in year 2006-07 and increases to approximately 8936 people during 2008-13 **(Pangriya, 2015)**. The number of registered farmer has been increased to 18,176 in 2019. The area under cultivation of medicinal and aromatic plants in Uttarakhand is negligible in compared to the other state where area under medicinal and aromatic plant in country is 720.3 thousand hectare with production of 866.4 thousand metric tons **(NHB, 2018)**. Now a days the area under cultivation of medicinal and aromatic plants is increasing continuously in Uttarakhand and also increase in the number of farmers involve in the cultivation of medicinal and aromatic plants seems to increase. Major medicinal plants under cultivation include Satarvar, Sarpgandha, Harar, Baheda, Aonla, Kutki, Atis and plants of Ashtaverga. Aromatic plants include Mints, Aromatic grasses, Rose, Rosemary, Camomile and Lavender. The cultivation of medicinal and aromatic plants will not only help in the upliftment of the farmers but also it will reduce the rate of unemployment, migration and losses due to animal encroachment in agricultural fields. The cultivation of medicinal plants has been proven to be successful in increasing farmers' income in the Ghesh village situated in the high altitude region of Chamoli district of Uttarakhand. The major medicinal plant grow in village is *Picrorrhiza kurrooa* it has been cultivated alongside other traditional crops of Uttarakhand this cultivation not only increases farmers income but also help in reducing illegal collection from wild **(Purohit *et al.*, 2016)**.

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