CHAPTER I

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More than 175 million hectares of waste land and barren land of India, if converted into cultivable land, will certainly be a boon for Indian economy. As interest of rural population is directly associated with agricultural land, so proper utilization of the problem soil will escalate the living standard of Indians specially rural Indians. Poor farmers of India in general and Eastern U.P. in particular are not able to invest enough money to improve their problem soils to normal soil by using costly amendments, so alternatives should be explored. Some non edible crops of commercial value that can grow on problem soils may be tried. One of such crop is jatropha (*Jatropha curcus*). Cultivation of aromatic crops like peppermint (*Mentha arvensis*) may also be tried with jatropha under a cropping system of jatropha and mint. Use of sulphur may amend problem soil having high pH and improve fertility status. On the other hand Zinc as plant nutrients may be very useful for jatropha-peppermint cropping system on the concerned wasteland and barren land.

Considering these facts present field experiment was planned using non edible crop such as jatropha and aromatic crop like peppermint. Both crops have industrial importance.

*Jatropha* (*Jatropha curcus*) is a biofuel crop. It is native of tropical America and belongs to family Euphorbiaceae. This plant was first introduced to Africa and is now cultivated worldwide. It is drought resistant and may be grown in arid and semi-arid conditions besides other
climatic conditions existing in India. So, India with its varied agro-climatic conditions may be considered as an ideal country for cultivation of Jatropha. Tamilnadu Government has already initiated and encouraged cultivation of Jatropha. This tree has been valued as a shade loving tree and living fence, mainly because of its easy propagation. It is also not browsed by animals even by Neelgay (Blue bull). Seeds of Jatropha are very rich in oil and the oil can be used as bio-diesel after transesterification. So it will be useful to cultivate these crops (jatropha & peppermint) of industrial importance in India specially eastern U.P. to improve economic conditions of farmers. These crops may prove very useful in reclamation of problem soils by providing appreciable amount of organic matter. Amending capacity of these crops may further increase in presence of S. So, it may be useful to grow peppermint under jatropha on problem soils of economically backward eastern Uttar Pradesh.

It is a known fact that unscientific farming practices have caused deficiency of S and Zn in different soils of Uttar Pradesh. However, effect of S and Zn application to edible crops in different type of soils of U.P. have earlier been reported but no such research experiments have been conducted on Jatropha–peppermint cropping system specially on problem soils.

Therefore, the present research experiment was conducted to study the Effect of S and Zn application on mint production under Jatropha-mint cropping system on a problem soil (waste land). The objectives of the experiment were as following.
4.1 Effect of S and Zn on fertility status of soil

4.2 Response of S and Zn on selected physico-chemical properties of soil.

4.3 To find out the effect of S and Zn on nutrient content of Jatropha and mint

4.4 To assess the growth parameters of Jatropha and peppermint as influenced by S and Zn

4.5 To study the influence of Jatropha on growth and yield of peppermint

4.6 To identify the role of S and Zn on yield and quality of mint oil

4.7 To work out interrelationship between plant nutrients and growth of crops