Medicinal plants facilitation centres

One of the important activities of the National Medicinal Plants Board (NMPB), an apex body of the Government of India, is area extension of medicinal plants cultivation programmes through training and education. Medicinal plants being new to the farming system, their farming requires an effective institutional mechanism for technology transfer on crops and varieties that can be grown in an agro-climatic zone. Besides, information is required to transfer on the soil suitability for a particular crop, cultivation practices, sources of seeds and quality planting material, market information on prices, 'mandies', traders, manufacturers and demand assessment of different species.

At present, there is no designated agency at the state level, which can effectively meet this requirement for information and inputs. Also farmers/growers have been facing hardship. To meet the desired objectives, the NMPB identifies partner institutions to act as a one-stop shop for solving or mitigating the problems of farmers on the cultivation of medicinal plants. Establishing Medicinal Plants Facilitation Centre (MPFCs) is primarily to address these critical gaps and step ahead to meet these challenges. An organization/institution that has the necessary expertise and infrastructure may be designated as MPFCs by the NMPB. It is proposed to designate one or two such centres in each state. So far, the NMPB has identified 19 such centres in different states for providing financial support. The major activities that are envisaged for the MPFCs are as follows:

- Provide a service window for growers for supporting cultivation.
- Authentication of quality raw materials on the basis of taxonomic identification and chemical parameters.
- Act as a clearing house of information on the elite germplasm to be cultivated, varieties to be taken up (for plants for which varieties have been developped), source of germplasm/varieties, the species to be planted based on market demand and agro-climatic suitability, market prices in different mandies, the list of traders, manufacturers within the state and in the adjoining state, agro-technique and practices relating to collection, harvesting, storage, drying and value-addition.
- Provide testing facilities for the material produced where such facilities exist with the institution.
- Organizing frequent buyer–seller meets (between growers, traders and industry) for establishing linkages between cultivation and marketing, and encourage market-driven cultivation.
- Develop modules of training and conduct training programmes for farmers. Publish and disseminate information on agro-techniques, markets, prices, herbal mandies, traders, industries, etc.

The above activities may be carried out in most cases through the Krishi Vigyan Kendras, with which State Agricultural Universities have an organic link. In districts where Agriculture Technology Management Agency has a presence, they may also be involved in the technology dissemination and capacity-building. It is realized that the presence of MPFCs in each state will sort out the problems in the medicinal plants sector and help the different stakeholders of this sector.

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Wastelands as water sanctuaries

Most water sources in our country have become irreversibly polluted. On agricultural land, fertilizers and pesticides have leached into the unsaturated zone above the rainfed (unconfined) aquifers and into the aquifers. Urban tracts have their own share of pollution coming from waste. Rivers in India have no protection by law and have been heavily polluted by industry and city waste. Wilderness areas, which have goodwater, are few and far between.

The USGS (http://water.usgs.gov) has extensive data available for the quality of ground water for different land uses across the country. One such set of data for the Long Island, New Jersey coastal drainages shows that in a majority of samples taken from shallow groundwater the nitrate content exceeds the permissible health limits, whereas for urban groundwater it falls within permissible limits and is largely absent in the groundwater of undeveloped land. A similar pattern emerges for pesticides.

It is quite evident that the quality of water in the undeveloped areas is far superior to the one where there is urban or agricultural land use. The quality can only improve further for the case of a protected forest where the root system of trees provides additional filtering of pollutants. There is lesson here. The water quality is worst for agricultural areas, followed by urban areas and the best for undeveloped areas. An amusing corollary to this is that we can get better groundwater in wasteland than in prime agricultural land.

Interestingly, wastelands occupy 20% or more of the area of the country. Since these wastelands are neither in agricultural or urban use, they would fall in the undeveloped category above. In other words, they have under them an invisible resource – good quality groundwater. Ironically, this is the only source of uncontaminated groundwater available in the country apart from the forest area.

There are some uncertainties about the area under wastelands.

Chopra and Goldar[1] state, 'Early attempts at estimating this category, made primarily by the National Wasteland Development Board (NWDB), were based on a reclassification of the standard land-use data described above. These estimates yield the oft-quoted figure of 129.57 million hectares (m ha) with non-forest wasteland being estimated at 93.69 m ha. Remote sensing techniques

Table 1.

Category of wasteland useful for groundwater	Area (sq. km)	Percentage of country area
Gullied and ravine land	20,553	0.65
Land with or without scrub	194,014	6.13
Degraded notified forest land	140,652	4.44
Degraded pasture	25,979	0.82
Degraded land under plantation	5,828	0.18
Sands – inland/coastal	50,022	1.58
Barren rocky/stony waste/sheet rock area	64,585	2.04
Waterlogged and marshy land	16,568	0.52
Total	518,201	17.2

Source: 1 : 50,000 scale wasteland maps prepared from Landsat Thematic Mapper/IRS LISS II/III data.

(NRSA) provide an alternative classification of land use/land cover. The NRSA has two sets of estimates of wastelands in India using data based on these techniques. The first uses Landsat data on a 1 : 1 million scale of mapping. The second uses LISS-I and LISS-II data with a 1 : 250,000 mapping. These two sets give differing estimates of wastelands. The second estimate puts wastelands at 75.53 m ha; the first at 53.3 m ha. Both estimates yield a much lower figure for wastelands than the NWDB exercise'.

We use LISS II/III data to compile Table 1. Thus useful wasteland for the extraction of groundwater amounts to 518,201 sq. km (51.8 m ha) or 17% of the country area. This is substantial.

Providentially, the impoverished wasteland has unpolluted aquifers under it. Leaving out saline, mined land, shifting cultivation land and glacial and mountainous segments, we still have 17% of the country area left for water resourcing. This has not yet been noticed. We would like to forest and preserve these lands as water sanctuaries. They need to be notified as water sanctuaries with strict laws prohibiting agriculture or industry on them. Any contamination of these, the only good groundwater sources left, would be unpardonable. There is no other choice, as there is no other source of good water.

1. Chopra, K. and Goldar, B. N., Report prepared for UN University, 2000.

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Soil nutrient management: Feast and famine approach vs life-cycle assessment approach

Agricultural production in India has increased largely due to the introduction of high-yielding cultivars and improved crop and soil management practices. Yet, there are concerns, in fact, qualms due to the growing needs of the ever-increasing population. The responsibility of finding ways to increase the production from the limited natural resources is heavy on our creativity. The current inequalities in the production of individual crops in different agroecological regions still baffle researchers. There are numerous factors which contribute to the failure in realizing the production potential of a crop. Discrepancies in the nutrient-supplying capacity of different soils can be due to the differences in their geochemical and soil biological factors; they are largely responsible for the failure in achieving higher productivity. Crop and soil-management practices are considered the key strategies to maximize the production potential of a crop at different locations. Among these practices, fertilizer application to crops is the most important. In order to avoid short supply or over use of fertilizers, it is always advised to apply fertilizers after testing the soil. The chemical fertilizers are generally applied at specific stages of crop growth, mostly at the time of planting or with the initial preparation of land, is popularly known as 'basal method'. There are different fertilizer recommendation schedules for different crops. The application of chemical fertilizers is largely from the understanding that soils do not have adequate levels of certain plant nutrients throughout the cycle of plant growth and at the required levels. But these recommendations appear to have limited applicability since they do not consider the requirement of crops, which differs depending on soil-biotic factors, and do not consider the nutrient requirement of crop plants throughout their growth cycle. The present soil nutrient-management approach may be referred to as the 'feast and famine approach', for the nutrition of crop plants. Application of fertilizers with one or two nutrients at specific stages of growth of crop plants in the mode of 'feast and famine approach', and expecting to maximize the crop productivity may not be enough. Like any other organism, plants demand nutrients daily, and at different levels during specific stages of their growth, depending on the environmental and biotic stresses. There are also problems related to the inefficient utilization of applied fertilizer. Certain cultivars have better nutrient-absorbing capacity, while there are reports about the agricultural produce lacking essential minerals such as iron and zinc. As soils are considered as 'living entities', there is an absolute necessity that nutrients are supplied to meet the requirements of other living organisms too. Soil microorganisms are known to decompose, degrade or immobilize the applied fertilizers and their activities add up to the demands of plant requirement for nutrients from both chemical and natural sources. Numerous reports are available on the losses of applied fertilizers, especially from nitrogenous and phosphatic fertilizers; these losses have a greater impact on the quality of the environment due to atmospheric and water pollution[1,2]. Thus, the present 'feast and