Mr. Mallinath Hemadi is an Agriculture consultant from Kalaburgi, Karnataka. He says weeds can be used for economic benefit and the cost of removing them using chemicals can be reduced to maximize the profit.

People who have studied agriculture or doing agriculture know that the weeds are wild plants that grow where it is not wanted and in competition with cultivated plants. In reality there are no such plants that are not useful for human, just you need to understand the uses of them.

Direct losses: Reduction in crop yield through competition as they use the resources like light, nutrients, water, and space. Reduction in crop yield and quality through release of toxins. Interference with harvest operations, poisoning of animals, obstruct water flow, loss of water by transpiration, reduce the quantity of water.

Indirect losses: Hosts to many pests like insects, rodents and birds that attack crops, cause diseases in plant and animals.

Non Agricultural losses: Affecting human health like skin rashes and allergies.

Benefits of Weeds:

- Many weeds help to conserve **soil moisture and prevent erosion**. provide food and shelter for natural enemies of pests and alternative food sources for crop pests. valuable indicators of growing conditions in a field, water levels, compaction and pH. Food for wildlife and birds, and sources of pesticides such as chrysanthemum.
- Books indicate that by observing the weeds we can decide on the condition of the soil, crops to be grown, time, and kind of pests that they are handling. Weeds can be important source of **food for wildlife**, especially birds. Weeds are sources of pesticides, such as chrysanthemum. Weeds add organic matter and nutrients to the soil. *Gokhru (Tribulus terrestris)* and *Bavachi (Psoralea corylifolia)* add about 3-3.5% Nitrogen and many leguminous weeds will add about 1.5 to 6% of Nitrogen.
- It can take any time between 100-500 years to form an inch of topsoil on the surface. When we lose the topsoil, it is a great loss to the timeless effort of nature to create it. The natural way is the use of weeds to conserve it. And Currently there is a need to have more livestock, and fodder requirement increases. This huge gap between the fodder requirement and production can be bridged to some extent by using **weeds as fodder. Weeds check wind, water, and soil erosion.**
- Some weeds are used as **leafy vegetables** such as *Tandulaja (Amaranthus Polygamus), Jangali chaulai (Amaranthus viridis), Chanchali (Digera Arvensis), Noniya or luniya (Portulaca spp), Pathari (Lactuca Runcinata), Sonchus asper, and Portulaca quadrifida.* The WHO diet, nutrition, and prevention of chronic diseases recommend a daily intake of at least 400 grams or five daily servings, other than starchy tubers, to prevent diet related chronic diseases and micronutrient deficiencies.
- Vegetables like cabbage, radish, cauliflower and green peas are imported on a large scale. A solution like including weeds as source of vegetables can reduce the imports and can be beneficial to the **economy and reduction in malnutrition and micronutrient deficiency**. Normally we consume around 20-30 common vegetables but if we use weeds as vegetables, the list grows to more than 200.
- Some of the weeds having **medicinal properties** are *Bishkha (Leucas cephalotes)* – for snake bites, Oil of *Dhatura, Satyanashi pivala dhotra (Argemone Mexicana)*– for skin diseases, *Bringhraj (Eclipta Erecta)* – for cough and hair, *Hariyali (cynodon dactylon)* – Bhulokad

Sanjivini to treat several health issues. It costsRs. 1400-1600 per kg of powder, and Nut grass/Nut sedge, used for making essence sticks (agarbathis).

- Weeds help in **reclamation of alkali soils**. The application of powder of *Satyanashi pivala dhotra (Argemone Mexicana)* @2.5 tons/ha helps to reclaim alkali soils. Certain weeds have nematocidal properties, and many are used to prepare organic pesticides. Weeds like crotalaria spp commonly called rattle pod, parthenium etc. are incorporated into the soil to help control of nematodes. Some weeds are used as natural dyes and for making juices.
- If we kill weeds, we lose biodiversity. To increase the biodiversity there are around 116 schemes identified by the government 24 central ministers and 29 departments. Some of the costs can be reduced. Which saves or adds on to national economy.

So overall weeds can benefit by means of Pest repellent, edible and useful in prevention of soil erosion, habitat for beneficial insects, predatory insects. One example can be Bermuda grass powder can be used at home for many purposes and its powder form has market value of Rs 1500-1600 per kg. Means 4 to 5 Kgs of it will be equal to 1 bag of red gram grains. When we use the weeds wisely, we can manage human health and agricultural field's health also.

Still if we need to control weeds, Methods followed today include mechanical method, cropping or cultural methods, biological methods of weed control, chemical method of weed control.

If we use chemicals we lose many beneficial insects - among the insects, 80% are beneficial and 20% are damaging. If we use pesticides or herbicides to get rid of these insects or weeds, we are also damaging beneficial insects also one among that would be honey bee population. Just one hive in the field will increase Red Gram production by 10%, sunflower production by 25%. and 100% for cucurbit vegetables. Imagine the loss if we lose bee population.

In spite of these issues and losses, we need to get rid of weeds, to do that we need to learn to understand them and get benefits out of them. We know that weeds are not "**unwanted" but "less wanted"**. We can use as vegetable, harvest the weeds in their early stage before they reproduce, so we get less seeds, use as fodder by means of grazing, let the cattle graze before the crop flowers. Stop using chemical fertilizers to reduce cost of farming instead go for organic farming so that you add more of organic content in soil making it rich and reduce weed growth. Use weeds as medicine both for human beings and animals to get their value. And choose crop based on the weed types in the soil.

Along with the main crop, we can also manage and use the weeds for food and medicinal purposes. You can read the books "Weeds are the Guardians of the Soil" and "Alternate to Chemical Farming", second one written by me, on how to use these weeds in various ways. Ever since green revolution started, there is extensive use of chemicals, herbicides, and pesticides in the soil, and studies show these chemicals cause Cancer. So at least now we need to act to reduce use of chemicals and for this we need to understand uses of weeds and start taking benefits of it.

How do we identify weeds with medicinal and nutritive qualities?

Currently it is based on the virtue of experience of local people and word of mouth. Even animals can guide us. Also, you can consult any Ayurveda expert in your locality. We are working on a book with more information on weeds cataloguing and how to use them.

Would there be any adverse effects if we consume weeds that are not to be?

Yes! Usually weeds that release milk are dangerous to eat and also thorny weeds.

Can you give reference of the books those you mentioned?

There are several research papers those are available on the internet. You search for “Weeds as Food”, “uncultivated food”, “uncultivated vegetable” etc

How to control Nagarmotha (Cyprus rotandus), a densely grown weed without chemicals?

This is a very valuable weed with fungicidal property, its presence in field will manage soil borne fungi diseases. This is also used in the agarbathi industry. Due to the fungicidal property, this was placed in the cow shed or sheep/goat shed which is to manage fungi disease in animals also this is to get mixed up with cow dung/urine and when this compost was applied to soil, soil is to be benefited and in turn crop yield.

How do we tackle weeding issue in organic farming?

They have successfully tested an organic herbicide with salt, cows’urine (2-3 lit cow urine + 2-3 KG of Salt in 8 lit of water) to be sprayed only on the weeds. Once you identify the weed and start using them for food in the early stages of life, the number of weeds decreases.

Does glyphosate get converted to readily available phosphate P_2O_5?

WHO says they cause cancer. It is banned in several parts of the world. Understanding the requirement of phosphorous is complicated. The negative effect of glyphosate is it reduces the next crop.

While starting Organic farming, how to make sure that there are smaller number of harmful weeds?

We applied only “Jeevamrutha” and pesticide. Plants get affected only if the shadow of weeds falls on the crops. If this is not the case, there will be no issues. With intercropping, weeds growth is curtailed. When continued for 2 or 3 cycles, the weed growth will be reduced.

Parthenium – is it a weed? Is there any use out of it?

Parthenium is a dangerous weed. They have started to use that as pesticide. When you weed before flowering and put for mulching purpose, the number of plants will come down. There are specific insects that kill parthenium.

Weeds as nematicides – can you explain?

Parthenium and *madhar / safed aak (Calotropis gigantea)* are used in paddy fields as nematicides and to increase the pH of the soil. Decompose the weed in water and make it to a kind of slurry/liquid and mix it with 1:10 water and spray. Milky weeds and bitter tasting weeds can be used as nematicides.

How is the soil condition affected by using glyphosate?

Using glyphosate will kill the weeds and also must be affecting the soil microbes and insects, thus affecting the soil condition. So, after some time we cannot cultivate any crop in the soil. We have to change our thinking that weeds are not needed but use them for their benefits.

Can we use the latex from Calotropis gigantea to spray on mealybugs?

We have not personally used them, but you can try using it and because it is an insecticide, it may help in controlling that bug.

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