

(Weed Science and Weed Management)

Weed science is the scientific discipline that studies plants that interfere with human activity. **Areas of study** range from basic biological and ecological investigations to design practical methods of managing weeds in agricultural fields. The overall goal of weed management is to indicate the most appropriate methods in a variety of situations that ensure a sustainable ecosystem and a minimum influence of nuisance weeds. The first question is “**What is a weed?**” Before a plant can be considered a weed, humans must provide a definition. Many varying definitions have been developed for weeds, the definition could be that a *weed is a plant growing where it is not desired, or a plant out of place—some plant that, according to human criteria, is undesirable*. The Oxford English Dictionary (Little et al., 1973) defines a weed as a “*herbaceous plant not valued for use or beauty, growing wild and rank, and regarded as cumbering the ground or hindering the growth of superior vegetation.*”

Weeds are also classified as pests and included with insects, plant diseases, nematodes, and rodent pests. A chemical used to control a pest is called a *pesticide*, and a chemical used specifically for weed control is known as a *herbicide*. Weed control is the segment of weed science that most people are familiar with and where the greater part of education and training is focused. **The methods employed to manage weeds vary**, depending on the situation, available research information, tools, economics, and experience. Improved agricultural

technology over the centuries has contributed greatly to increased food production and a related increase in our standard of living. Advances in weed control practices have been an important part of these gains, as shown in the figure below it is obvious that integrated weed management lowered human activities in the sake of weed management practices.

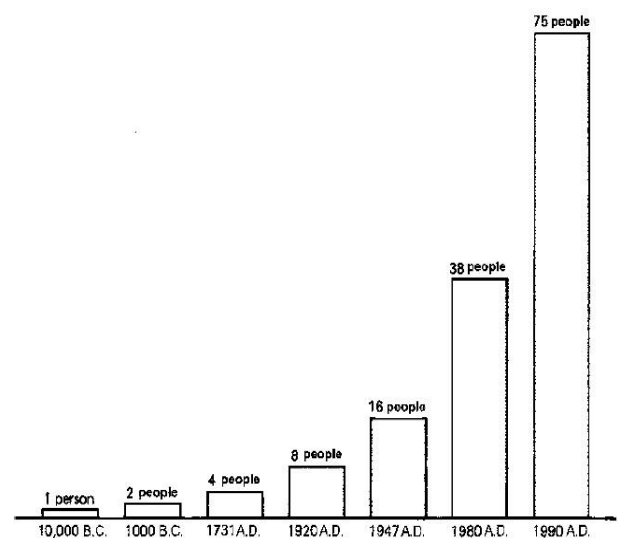


Figure 2. Crop energy output per farmer or the number of people fed by one farmer. Data for 1920, 1947, 1980, and 1990 are for the United States.

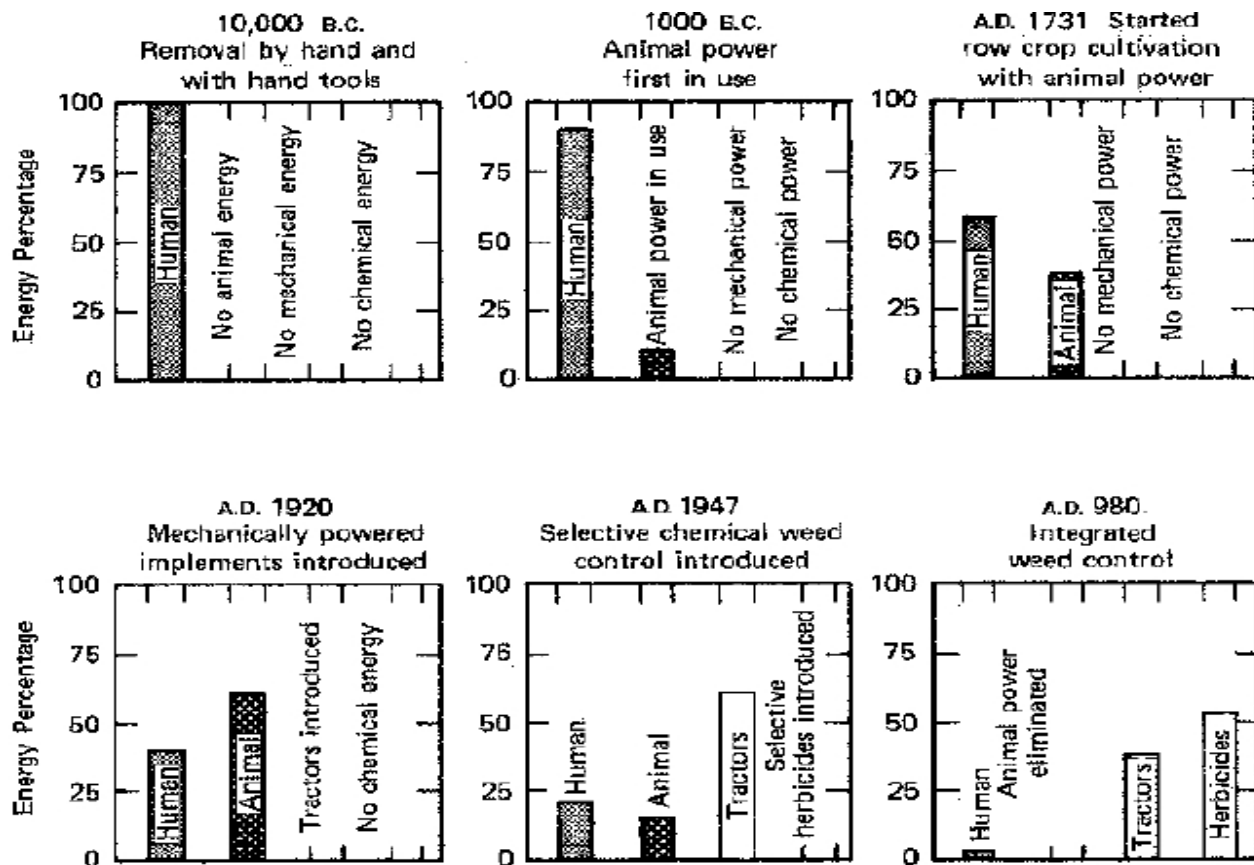


Figure 1 Energy sources providing weed control at different times. Data shown for 1920, 1947, and 1990 are for the United States.

One farmer could feed how many people, is an important question so if we take in account human bean history as shown in (figure 2) During the intervening years, many new herbicides have been developed and extensively used, resulting in chemical energy becoming the major tool of weed control in the United States and other countries (Figure 2). In 1990, one farmer could feed 75 people. This means that multitudes of people who previously worked on farms mainly hoeing weeds have been able to pursue other jobs and provide inputs into a wide variety of goods and services that have helped to increase our standard of living. As we continue to investigate new approaches to weed management, additional chemical, cultural, biological, and biotechnology- based practices will provide ever-improved tools to permit a sustainable agriculture.

Four major advances in agriculture have significantly increased food production:

1. The introduction of mineral fertilizer.
2. Agricultural mechanization, which began in the United States with Eli Whitney's invention, the cotton gin, which separates cotton from its seeds in 1793

3. Genetic research in plant and animal production which leads to improve the yields quality and quantity
4. The use of pesticides and plant growth regulators in agricultural practices all over the world.

HARMFUL ASPECTS OF WEEDS: -

Definitions of weeds usually include trouble with crops, harm to people, or harm to animals. The nature of weeds' harmful effects will be explored briefly in this section and briefed as

I. Plant Competition: -

From an agricultural perspective, we are concerned about weeds because weeds compete with crop plants for nutrients, water, and light. If they did not, those who grow things

TABLE (1)A Comparison of Yield in Weeded and Unweeded Crops (Mercado, 1979).

Crop	Yield (T/ha)		Increase from weeding (%)
	Weeded	Unweeded	
Lowland rice			
Transplanted	3.9	2.9	34
Direct-seeded	4.1	1.0	310
Upland rice	2.8	0.6	367
Corn	5.1	0.53	862
Soybean	1.15	0.48	140
Mung bean	0.75	0.57	32
Transplanted tomato	9.2	5.5	67
Direct-seeded tomato	5.1	1.5	240
Transplanted onion	10.8	0.44	2,355

would be more willing to tolerate their presence. If weeds did not compete, they would not need to be managed because crop yield would not be affected by their presence. But it is, and often complete crop failure (100% loss of marketable yield) can occur if weeds are not controlled.

- II. **Added Protection Costs:** - Weeds increase protection costs because they harbor other pests. There are different diseases, insects, and nematodes that use weeds as alternate hosts. Beside the Weeds harbor a wide range of organisms thereby increasing opportunities for those organisms to persist in the environment and re-infest crops in succeeding years.
- III. **Reduced Quality of Farm Products:** - Weed seed decreases in quality and losses from dockage and cleaning. Weed seed in grain crops perpetuate the problem when the crop seed is re-planted.
- IV. **Less Efficient Land Use:** - The presence of weeds on a given piece of land can reduce the maximum efficiency of the use of that land in a number of ways.

These include increased costs of production and harvest, reforestation, and non-cropland maintenance, as well as reduced plant growth, root damage resulting from cultivation, limitation of the crops that can be grown, and reduced land values.

V. Water Management

Problems: - Aquatic weeds can be a major problem in irrigation and drainage systems, lakes, ponds, reservoirs, and harbors. They restrict the flow of water (Figure-3), interfere with commercial and



recreational activities, and may give off undesirable flavors and odors in domestic water supplies. Their control is often difficult and expensive. Terrestrial weeds growing at the edges of aquatic sites can also be a problem.

VI. Lower Human Efficiency: - Weeds have been a curse to humans ever since they gave up the hunter's life. Traveling in developing nations, one may feel that half the world's population work in the fields, stooped, moving slowly, and silently weeding. These people are a part of the great mass of humanity that spends a lifetime simply weeding in such manner it lowers their efficiency in conducting farming practices.