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agronomy

Dictionary: a·gron·o·my (ə-grŏn'ə-mē)

n.

Application of the various soil and plant sciences to soil management and crop production; scientific agriculture.

agronomic **ag'ro·nom'ic** (ăg'rə-nŏm'ĭk) or ag'ro·nom'i·cal *adj.*
agronomist **a·gron'o·mist** *n.*

Sci-Tech Encyclopedia: Agronomy

The science and study of crops and soils. Agronomy is the umbrella term for a number of technical research and teaching activities: crop physiology and management, soil science, plant breeding, and weed management frequently are included in agronomy; soil science may be treated separately; and vegetable and fruit crops generally are not included. Thus, agronomy refers to extensive field cultivation of plant species for human food, livestock and poultry feed, fibers, oils, and certain industrial products. *See also* Agriculture.

Agronomic studies include some basic research, but the specialists in this field concentrate on applying information from the more basic disciplines, among them botany, chemistry, genetics, mathematics, microbiology, and physiology. Agronomists also interact closely with specialists in other applied areas such as ecology, entomology, plant pathology, and weed science. The findings of these collaborative efforts are tested and recommended to farmers through agricultural extension agents or commercial channels to bring this knowledge into practice. This critical area is now focused on the efficiency of resource use, profitability of management practices, and minimization of the impact of farming on the immediate and the off-farm environment. *See also* Agroecosystem; Soil conservation.

Britannica Concise Encyclopedia: agronomy

Branch of agriculture that deals with field crop production and soil management. Agronomists generally work with crops that are grown on a large scale (e.g., small grains) and that require relatively little management. Agronomic experiments focus on a variety of factors relating to crop plants, including yield, diseases, cultivation, and sensitivity to factors such as climate and soil.

For more information on agronomy, visit Britannica.com.

Columbia Encyclopedia: agronomy
agronomy (əgrŏn'əmē) , branch of agriculture dealing with various physical and biological factors—including soil management, tillage, crop rotation, breeding, weed control, and climate—related to crop production. Agronomy commonly refers to field crops, e.g. wheat, rice, corn, sorghum, soybean, cotton, as well as pasture, sugar, and forage crops; while horticulture is concerned with fruits, vegetables, flowers, and ornamental plants; silviculture, or forestry, with forest trees; and agroforestry, with mixtures of trees with other crops.

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Food & Culture Encyclopedia: Agronomy

Agronomy embraces the branch of agriculture that deals with the development and practical management of plants and soils to produce food, feed, and fiber crops in a manner that preserves or improves the environment. The term "agronomy" represents the disciplines of soils, crops, and related sciences. In the soils area, specialties include soil microbiology, soil conservation, soil physics, soil fertility and plant

nutrition, chemistry, biochemistry, and mineralogy. Specialties in the crops area relate primarily to plant genetics and breeding, crop physiology and management, crop ecology, turf-grass management, and seed production and physiology. Researchers in agronomy often work in close cooperation with scientists from disciplines such as entomology, pathology, chemistry, and engineering in order to improve productivity and reduce environmental problems. Even though less than 2 percent of the U.S. population are farmers who actively produce farm crops, the need for agronomists by other segments of society is increasing.

In the United States, field crops consist of those plants grown on an extensive scale, which differs from horticultural crops, which are usually grown intensively in orchards, gardens, and nurseries, but the distinctions are disappearing. Some of the major agronomic crops grown in the United States are alfalfa and pasture crops, peanuts, corn, soybeans, wheat, cotton, sorghum, oats, barley, and rice. Soil management aspects of agronomy encompass soil fertility, land use, environmental preservation, and non-production uses of soil resources for building, waste disposal, and recreation. Agronomists who work as soil scientists play extremely important roles in helping preserve water quality and preserve natural environments.

Agronomy is not a new field. As early as 7000 B.C.E. wheat and barley were grown at Jarmo, in present-day Iran. One could argue that the first farmers were in fact agronomists. In prehistoric times, humans shifted from foraging to cultivating specific crops, probably wheat or barley, for their food value. At harvest time, plants with easily gathered grain were selected first. This natural selection eventually made these food plants better adapted to continued cultivation because they were more easily harvested. Throughout the centuries, selection also occurred for other crop characteristics, such as taste, yield, and adaptation to specific soils and climates. The goal of today's production agronomists is essentially the same: to improve the quality, adaptability, and yield of our most important crops.

The Science of Agronomy

There are both basic and applied aspects of agronomy. Agronomists examine very basic components of soils and crops at subcellular or molecular levels. For example, at the basic level, agronomists use sophisticated techniques to unravel the genetic makeup of major crops in order to change their adaptation, nutritive value, or to breed medicinal benefits into agronomic crops. Genetic improvement is an area where major breakthroughs are likely to occur. Agronomists have developed highly specialized computer models of crop growth in order to better understand how environmental and management components affect the way crops grow. These models help in the development of such things as precision fertilizer application techniques, which provide the crop with the correct amount of nutrients at the correct time in its life cycle. This technique helps reduce fertilizer overapplication, which is costly to the farmer, and may increase groundwater pollution. Models of how chemicals move in the soil also help assure proper application of animal manures, municipal waste, and soil amendments necessary for crop growth. Molecular components of soil constituents are studied to determine basic interactions affecting plant growth and nutrition, and soil and water quality.

Crop Production and Soil Management

Crop production consists of integrating all aspects of the field environment to assure an economically feasible and environmentally sound system of growing crops. At the applied level, agronomists use basic research information to help manage crop production systems and soil and water conservation programs. Agronomists provide a wealth of information to farmers to assure the soundness of their production programs.

Environmental and economic conditions vary dramatically, and crops must be adapted to the soils and climate for efficient crop production. Crops such as wheat grow best in the Great Plains of the United States, because wheat is well suited to the soils, rainfall, and length of growing season of the area. Likewise, crops such as cotton and peanuts are best adapted to the southern United States because these crops require warmer temperatures, a longer growing season, and more rainfall than does wheat.

Applications of sound principles of soil management are key to maintaining a healthy environment. Agronomists aid in identifying environmental risks and devise methods of reducing these risks. Management techniques developed by agronomists include terracing, strip cropping, and reduced tillage methods to reduce soil erosion. Developments in Global Information Systems (GIS) and site-specific technology are being used by agronomists to more precisely manage how, when, and where to apply soil amendments and fertilizers. GIS is also extremely useful in identifying type and extent of pest

infestations. This helps reduce environmental pollution by pinpointing when and where to apply pest control and reducing the amount of pesticides used in crop production.

International Agronomy

Agronomy is an international discipline. Many of the problems, issues, and challenges faced by societies around the world are universal in nature, and require international cooperation. For example, a major problem facing the developed world is that of how best to use our land resources. Within the developing world, the same problems exist. The questions of how much and which land should be saved for food and fiber production and which land should be used for nonagricultural uses must be addressed by both developing and developed societies. Agronomists play a crucial role in assessing land quality to assure an environmentally friendly use of land. Studying how plants adapt to differing climates and environments has allowed plant scientists to increase food and fiber production in regions of the world where the necessities of life are most limited. Knowledge gained and disseminated by agronomists in the developed world has helped improve the human condition in the developing world. For example, plant geneticists and breeders use similar hybrid and variety development techniques in both developed and developing countries. Through plant breeding, for example, agronomists have developed high-yielding rice that is adapted to tropical climates. Breakthroughs in gene transfer permit plant breeders to improve grain quality and nutritional traits. These techniques have also contributed to increased production efficiency by genetically incorporating into food crops increased pest resistance and by broadening their range of adaptation.

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—James J. Vorst

Wikipedia: Agronomy

An agronomist field sampling a trial plot of flax.

Agronomy is the science and technology of using plants for food, fuel, feed, and fiber. Agronomy encompasses work in the areas of plant genetics, plant physiology, meteorology, and soil science.[1] Agronomy is the application of a combination of sciences like biology, chemistry, ecology, earth science, and genetics. Agronomists today are involved with many issues including producing food, creating healthier food, managing environmental impact of agriculture, and creating energy from plants.[2] Agronomists often specialize in areas such as crop rotation, irrigation and drainage, plant breeding, soil classification, soil fertility, weed control, insect and pest control.

Contents

[hide]

- 1 Plant Breeding
- 2 Biotechnology
- 3 Soil Science
  - 3.1 Soil Conservation
- 4 Agroecology
- 5 Theoretical modelling
- 6 Agronomy Schools
- 7 Career Outlook
- 8 See also
- 9 References
- 10 Further reading
- 11 External links

Plant Breeding

Main article: Plant breeding

This area of agronomy involves selective breeding of plants to produce the best crops under various conditions. Plant breeding has increased crop yields and has improved the nutritional value of numerous crops, including corn, soybeans, and wheat. It also has led to the development of new types of plants. For example, a hybrid grain called triticale was produced by crossbreeding rye and wheat. Triticale contains more usable protein than does either rye or wheat. Agronomy has also been instrumental in fruit and vegetable production research. It is understood that the role of agronomist includes seeing whether produce from a field of 'x' meets the following conditions: 1. Land and water access, 2. Commercialisation (market), 3. Quality and quantity of inputs, 4. Risk protection (insurance), 5. Agricultural credit. [*citation needed*]

Biotechnology

An agronomist mapping a plant genome.

Agronomists use biotechnology to extend and expedite the development of desired characteristics listed in the Plant Breeding section.[3] Biotechnology is often a lab activity requiring field testing of the new crop varieties that are developed.

In addition to increasing crop yields, reducing crop vulnerability to environmental stresses, improving health and taste of foods, and reducing the need for field applied chemicals, agronomic biotechnology is increasingly being applied for novel uses other than food. For example, oilseed is at present used mainly for margarine and other food oils, but it can be modified to produce fatty acids for detergents, substitute fuels and petrochemicals.[4]

Soil Science

Agronomists describing a soil

sample in
Uganda, Africa.
Main article: Agricultural soil science

Agronomists study sustainable ways to make soils more productive. They classify soils and reproduce them to determine whether they contain substances vital to plant growth such as compounds of nitrogen, phosphorus, and potassium. If a certain soil is deficient in these substances, fertilizers may provide them. Soil science also involves investigation of the movement of nutrients through the soil, the amount of nutrients absorbed by a plant's roots, and the development of roots and their relation to the soil.

Soil Conservation

In addition, agronomists develop methods to preserve the soil and to decrease the effects of erosion by wind and water. For example, a technique called contour plowing may be used to prevent soil erosion and conserve rainfall. Researchers in agronomy also seek ways to use the soil more effectively in solving other problems. Such problems include the disposal of human and animal wastes; water pollution; and the build-up in the soil of pesticides. No-tilling crops is a technique now used to help prevent erosion. planting of soil binding grasses along contours can be tried in steep slopes. For better effect, contour drains of depths up to 1 metre may help retain the soil and prevent permanent wash off.[*citation needed*]

Agroecology

Agroecology is the management of agricultural systems with an emphasis on ecological and environmental perspectives.[5] This area is closely associated with work in the areas of sustainable agriculture, organic farming, alternative food systems and the development of alternative cropping systems.

Theoretical modelling

See Theoretical production ecology

Agronomy Schools

Agronomy programs are offered at colleges, universities, and specialized agricultural schools. Agronomy programs often involve classes across a range of departments including agriculture, biology, chemistry, and physiology.

Career Outlook

Past agricultural research has created higher yielding crops, crops with better resistance to pests and plant pathogens, and more effective fertilizers and pesticides. Research is still necessary, however, particularly as insects and diseases continue to adapt to pesticides and as soil fertility and water quality continue to need improvement.

Emerging biotechnologies will play an ever larger role in agricultural research. Scientists will be needed to apply these technologies to the creation of new food products and other advances. Moreover, increasing demand is expected for biofuels and other agricultural products used in industrial processes. Agricultural scientists will be needed to find ways to increase the output of crops used in these products.

Agronomists will also be needed to balance increased agricultural output with protection and preservation of soil, water, and ecosystems. They increasingly encourage the practice of sustainable agriculture by developing and implementing plans to manage pests, crops, soil fertility and erosion, and animal waste in ways that reduce the use of harmful chemicals and do little damage to farms and the natural environment.[6]

Most agronomists are consultants, researchers, or teachers. Many work for agricultural experiment stations, federal or state government agencies, industrial firms, or universities. Agronomists also serve in such international organizations as the Agency for International Development and the Food and Agriculture Organization of the United Nations.[*citation needed*]

See also

Ecology portal
Environment portal

Sustainable Development portal

- Agroecology
- Agrophysics
- Green Revolution
- Food systems

References

1. ^ http://en.wiktionary.org/wiki/agronomy
2. ^ I'm An Agronomist!
3. ^ Georgetown International Environmental Law Review: http://findarticles.com/p/articles/mi_qa3970/is_200004/ai_n8898629
4. ^ http://en.wikipedia.org/wiki/Biotechnology#Production_of_novel_substances_in_crop_plants
5. ^ Agroecology
6. ^ Agricultural and Food Scientists

Further reading

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- *Storia delle scienze agrarie* by Antonio Saltini, 4 vols, Bologna 1984-89, ISBN 88-206-2412-5, ISBN 88-206-2413-3, ISBN 88-206-2414-1, ISBN 88-206-2414-X

External links

Look up ***agronomist*** in Wiktionary, the free dictionary.

At Wikiversity you can learn more and teach others about **Agronomy** at: The Department of Agronomy

- The American Society of Agronomy (ASA)
- European Society for Agronomy
- The World Food Prize
- The National Agricultural Library (NAL) – Comprehensive agricultural library.

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Translations: Agronomy

Dansk (Danish)
n. - agronomi, landøkonomi

Nederlands (Dutch)
landbouwkunde

Français (French)
n. - agronomie

Deutsch (German)
n. - Agronomie, Ackerbaukunde

Ελληνική (Greek)
n. - αγρονομία

Italiano (Italian)
agronomia

Português (Portuguese)
n. - agronomia (f), agricultura (f)

Русский (Russian)
агрономия

Español (Spanish)
n. - agronomía

Svenska (Swedish)
n. - agronomi

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□□□□□□(Chinese (Traditional))
n. - □□, □□□□□, □□□

□□□ (Korean)
n. - □□□, □□□□□

□□□ (Japanese)
n. - □□□□□, □□□

العربيه (Arabic)
(الاسم) علم ألزراعه, هندسه زراعيه

עברית (Hebrew)
n. - מדע החקלאות, חקלאות, אגרונומיה

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- Horticulture

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- **Agronomy** is mangement of soil neuclic and worker? *Read answer...*

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