# INTRODUCTION TO CROP PRODUCTION pdf

## 1: Agriculture - Crop and Plant Production | The National Academies Press

*The physical environment and crop production. Adapting crops and management practices to the environment. Soil and water conservation. Farming, cropping and agro-forestry systems.*

However, the actual amount of nutrients available depends on the previously mentioned environmental factors. There are a number of poultry operations that will sell stockpiled litter for a nominal price; however, shipping can be prohibitively expensive. Spent mushroom compost, a by-product of the mushroom industry in Florida, may be a source of compost for organic producers. If compost or manure is purchased in bulk and stored on site, the storage area must be designed to prevent runoff and leaching during periods of heavy rain. Producers should request records of raw materials and their production history to ensure the compost does not contain residues of prohibited materials, such as the herbicide aminopyralid Ferrell et al. Contact the certifier to make sure that any new information regarding commercial compost sources is properly reviewed and approved. The average nutrient content of meals and compost materials used in organic production is summarized in Table 3. Mined and Other Natural Products Non-animal fertility inputs approved for use in organic farming systems are applied in their natural, unprocessed state and have a range of solubility rates. Some mined inputs that would not be eligible for use in organic production include certain types of synthetic processing or the addition of a prohibited substance after mining such as certain pelletizing agents. For example, although most agricultural lime is allowed for use in organic systems, hydrated lime slaked lime Ca OH 2 and burnt lime calcium oxide CaO are prohibited due to their method of manufacture. The average nutrient analysis of commonly mined or natural amendments used in organic production is summarized in Table 4. Nitrogen is frequently the most limiting nutrient in vegetable production systems, and N management can be challenging in organic production systems due to the variability of N concentrations in organic amendments. Furthermore, because the rate of N release depends on many environmental factors, even the best estimate may not always reflect the actual release rate. Nitrogen is typically supplied in sufficient concentrations to support crop growth in organic sources, but naturally occurring nitrates present in mined N rockâ€”such as sodium nitrate NaNO3 , Chilean nitrate, or bulldog sodaâ€”may be used. Sodium nitrate is prohibited under some foreign national standards European Union, Japan , so if the crop is for export such as citrus juices then producers will need to refrain from using sodium nitrate. Other plant nutrients including P, K, Ca, magnesium Mg , Cu, S, manganese Mn , and Zn are typically found in ample quantities in lime, organic amendments, and mined products. If producers can document a soil deficiency, then certain synthetic materials with relatively high solubility may be used with approval from their certifying agent, including sulfates, carbonates, oxides, or silicates of Zn, Cu, iron Fe , Mn, molybdenum Mo , selenium Se , and cobalt Co. Commercial Formulations A number of manufacturers have formulated fertilizers for organic cropping systems that are composed of dehydrated granular by-products of animal production. These products are typically composed of materials such as feather meal, bone meal, and poultry litter, plus other mined sources of P, K, and some micronutrients. Examples of available formulations are , , and  Analysis is guaranteed and the dry granulated forms are easy for producers to calibrate and apply, but these materials can be expensive. Cover Crops Cover crops are an integral part of organic production systems and are defined as any crop used for any other purpose other than to harvest as a food product. They are used to improve soil physical properties, add organic matter, reduce erosion, prevent sandblasting, supply nutrients, suppress weeds, and interfere with pest life cycles. Producers should identify specific objectives in the farming system and consider the potentially negative consequences alternate host to insect or disease, leaches compounds that may be toxic to small seeded annuals prior to selecting cover crop species. In Florida, cover crops that have been used successfully for partial N supply are sunn hemp Crotalaria juncea L. Other species such as sorghum sundangrass Sorghum bicolor x S. Leguminous species should be inoculated to ensure colonization by N fixing bacteria, unless the native soil has an adequate population. The majority of N that is returned to the soil following incorporation of a green manure is typically water-soluble nitrate. To moderate the potential for nitrate losses, producers can plant a mixture of cereal grains and legumes to increase the proportion of carbon to nitrogen added to the soil. In most cases, when cover crops are present,

weed suppression is attributed to increased competition for light, water, and nutrients. Some species, including rye, exude toxic substances through roots or incorporated stems and leaves into the soil. These substances are effective in killing some species of small seeded annuals and grasses, but may also be toxic to small seeded vegetable crops, such as carrot and onion. In this instance, increasing the time between cover crop termination and vegetable planting, or using transplants rather than direct seed, may reduce the negative effects of plant chemicals. Many species of cover crops do an excellent job of suppressing weeds, though the crop must be managed properly to avoid undesired regrowth. Some species of cover crops, including sorghum sudan grass and sunn hemp, are known to suppress nematode populations, while others such as hairy vetch Vicia villosia L. Seeds and Transplants Seed including cover crop seed , annual vegetable transplants annual seedlings , and perennial plants must be certified organic unless the desired variety is commercially unavailable. If no organic variety is available, then conventionally produced untreated seed or seed treated with an approved synthetic or non-synthetic material i. Methods used to genetically modify organisms that are not possible under natural conditions or processes are prohibited in organic production. Prohibited methods include recombinant DNA technology, cell fusion, and micro- or macroencapsulation. Examples of allowable natural methods include traditional breeding, fermentation, hybridization, in vitro fertilization, and tissue culture. Producers should make a reasonable effort to locate organic seed and plants, and they will be required to document their attempts on record. Producers are encouraged to save seed labels with documentation of commercial unavailability. Currently, the demand for organic seed and transplants frequently exceeds supply. The frequently higher cost of organic seeds and plants is not considered a valid reason to purchase conventional equivalents. As the demand for organic seed and plants continues to increase, it is anticipated that over time the availability will increase and costs will decline. Planting stock is defined as either annual or perennial, and the rules governing each are different. Annual seedlings are plants grown from seed that will complete their life cycle or produce harvestable yield in the same year they were sown. When the seedlings are removed from their original production location, transported, and replanted, they are considered transplants. Producers who grow their own transplants must also satisfy regulations regarding the use of pressure-treated wood in greenhouses and related structures, use of organic materials in soil mixes, and other inputs. Two exceptions exist for the purchase of organic annual seeds and seedlings: Perennial plants are those that will be maintained and harvested for more than two harvest cycles, or sold as a plant. If it is necessary to use non-organically produced planting stock for perennial crops, then produce from that plant, or the plant itself cannot be marketed as organic for at least one year following transplanting. For example, blueberries from non-organic replacement trees or shrubs in an organically produced area can only be sold on the conventional market until all the fruit is harvested from that plant. As always, consultation with your agency is highly recommended prior to purchasing non-certified produced seed or stock to ensure compliance. The challenge is to manage the interacting factors of the ecological environment to minimize pest damage to crops. Due to the limited number of approved substances for pest control, this is achieved largely through prevention. Regardless of the pest, organic farmers emphasize pest prevention through avoidance strategies, including soil solarization Gill et al. In addition to avoidance strategies, producers can employ tactics that exaggerate naturally occurring control mechanisms, such as attracting beneficial insects. A three-level approach is used to ensure producers are managing pests using physical, biological, and cultural means prior to relying on approved substances. Although the distinction between the levels is not always clear, the levels are defined by the NOP as follows: Level Oneâ€”Management practices that reduce the potential for the development of pests. These are proactive measures the producers must take to eliminate the need for additional management. Level Twoâ€”Involves the use of traditional management practices, primarily cultural and mechanical steps or the use of natural products. Level Threeâ€”Allows for the use of a wider array of biological and botanical products, including allowable synthetics. Producers must document their efforts toward compliance on the first two levels. Because some proactive measures are also traditional management practices, the distinction between Levels One and Two is often minimal. Producers should develop a pest management strategy to ensure all steps are taken to avoid reliance on Level Three controls. Examples of Levels One and Two practices include alternating plant families or plant growth habits in time and space rotation, intercropping ,

establishing predator populations in border crops, selecting resistant varieties, and using row covers. If a producer anticipates the need for curative controls Level Three , then that information should be included in the Organic System Plan. This may occur when the sum of preventative practices are predicted to be insufficient for adequate control. Weed Management Weeds are frequently cited as the primary pest in organic cropping systems. Due to the limited number of effective herbicide controls, prevention is the best strategy. When devising a weed management plan, producers should consider the weed density and spectrum of species present and avoid locating crops in fields known to have heavy infestations of weeds. Weed populations can be decreased over time with cultural and mechanical practices. Small-seeded annuals can be depleted with repeated shal- low tillage, soil inversion, and plant and plastic mulches. Large-seeded annuals and perennial weeds often require additional methods, such as rotation or solarization. Weed species that propagate vegetatively, such as nutsedge, are difficult to control in organic systems. Research has dem- onstrated that solarization has been effective in reducing nutsedge populations. Cover crops suppress weeds by several different mechanisms Schonbeck  Targeted drip irrigation that is direct to the crop minimizes the water and nutrient resources available to the weeds and helps to inhibit germination of some species. Insect and Nematode Management On the organic farm, ecological pest management is virtually site-specific. An understanding of insect life cycles is critical to avoid infestation and risk of crop failure. Each operation will develop a pest management plan that is effective and appropriate to their needs. Three key strategies to ecological pest management are 1 select, grow, and rotate a variety of crops that have natural pest resistance or are unattractive to the pest typical of your operation, and provide crops with adequate nutrition to alleviate plant stress and optimize growth; 2 stress the insects by interrupting their life cycles, remove alternate food sources, and confuse them with various visual cues or pheromones; and 3 enhance populations of beneficial insects that attack insect pests by providing them food and habitat Altieri et al. Cover crops in rotation with primary crops can interrupt insect life cycles and confuse some pests, discouraging colonization. Cover crops also attract many predatory and parasitoid beneficial insects that reduce pest populations. Beneficial insects can also be purchased from commercial suppliers and released on site and can be used to colonize an area for the first time or to augment existing populations. Beneficials should have adequate food and shelter in the field if released prior to immigration of their preferred host insect pest , and this can be accomplished using strips or borders of suitable plant species. Orders should be made in advance, as it may take several weeks for the order to arrive. Nematode management is primarily preventative. Once present, multiple strategies are needed to keep crop damage to below economic thresholds Krueger and McSorley  Disease Management As with insect pest management, an understanding of the disease cycle is precursory to developing a control plan. Sanitation, crop diversification through rotation, biological controls, and other cultural practices are common approaches to disease prevention. Sanitation practices during crop production should be followed, such as disinfecting tools after use. Few curative controls are available. Diseases caused by bacteria, such as bacterial spot on tomato and pepper Xanthamonas campestris pv. Resistant varieties should be selected, and if not available, seed can be treated with hot water prior to planting. Because bacterial diseases can be spread by splashing water, drip irrigation is preferred. Furthermore, scab can be suppressed by maintaining a pH below 5.

# INTRODUCTION TO CROP PRODUCTION pdf

## 2: Crop Production : USDA ARS

*AGRY INTRODUCTION TO CROP PRODUCTION Date Topic Class Type Assignment 1 / 11 Introduction to the Course - Review Syllabus Introducing Dr. Snyder.*

Page 10 Share Cite Suggested Citation: Lost Crops of Africa: The National Academies Press. The plant yields satisfactorily on marginal lands, and its tasty grain is remarkable for its long storage life. See chapter 2 , page  Fonio Acha An indigenous West African crop, fonio comprising two species, Digitaria exilis and Digitaria iburua is grown mainly on small farms for home consumption. But fonio is much more than just a fallback food; it is also a gourmet grain. People enjoy it as a porridge, in soups, or as couscous with fish or meat. The plant grows well on poor, sandy soils. It, too, is rich in the amino acid methionine. It also has a high level of cystine, a feature that is an even rarer find in a cereal. With its appealing taste and high nutritional value, this could become a widespread gourmet grain for savanna regions, perhaps throughout much of Africa or even much of the world. It might well have a big future as a cash crop and export commodity. See chapter 3 , page  Pearl Millet Some 4, years ago, pearl millet Pennisetum glaucum was domesticated from a wild grass of the southern Sahara. Of the major cereals, pearl millet is the most tolerant of heat and drought; it has the power to yield reliably in regions too arid and too hot to consistently support good yields of other major grains. These happen to be the regions that will most desperately need help in the decades ahead. Already, water is shaping up as the most limiting resource for numerous economiesâ€”even some of the most advanced. Thus, for nations that have never heard of it or that perhaps regard it with scorn, pearl millet might quickly rise to become a vital resource. See chapters 4 - 6 ; pages 17, 93, and  Page 11 Share Cite Suggested Citation: Only rice, wheat, maize, and potatoes surpass it in the quantity eaten. For all that, however, it produces merely a fraction of what it could. Indeed, if the twentieth century has been the century of wheat, rice, and maize, the twenty-first could become the century of sorghum Sorghum bicolor. First, sorghum is among the most photosynthetically efficient and quickest maturing food plants. Second, it thrives on many marginal sites where other cereals fail. Some types of its grains are boiled like rice, cracked like oats for porridge, "malted" like barley for beer, baked like wheat into flat breads, or popped like popcorn for snacks. The plant has many uses beyond food as well. Perhaps the most intriguing is its use for fuel. The stems of certain types yield large amounts of sugar, almost like sugarcane. Thus, sorghum is a potential source of alcohol fuels for powering vehicles or cooking evening meals. Finally, sorghum is a relatively undeveloped crop with a truly remarkable array of grain types, plant types, and adaptability. Most of its genetic wealth is so far untapped and even unsorted. Indeed, sorghum probably has more undeveloped genetic potential than any other major food crop in the world. See chapters 7 - 11 ; pages , , , , and  Tef This staple cereal Eragrostis tef is the most esteemed grain in Ethiopia. It is ground into flour and made into pancake-like fermented bread, injera, that forms the basic diet of millions. Many Ethiopians eat it several times a day when there is enough , particularly with spicy sauces, vegetables, and stews. Tef is nutritious; the grain is about 13 percent protein, well balanced in amino acids, and rich in iron. In many ways, it seems to have ideal qualities for a grain, yet research has been scanty and intermittent, and so far the crop is all but unknown beyond Ethiopia. In the last few years, however, commercial production has started in the United States and South Africa, and an export trade in tef grain has begun. These seem likely harbingers of a new, worldwide recognition of this crop. See chapter 12 , page  Page 12 Share Cite Suggested Citation: At least in part, the reason can be attributed to several unjustified perceptions. Inferiority of Displaced Crops. Introduced crops have displaced several African ones over the past few centuries. For example, in several areas maize has replaced sorghum; in West Africa, Asian rice has replaced African rice. As a result, there is a strong inclination to consider the introduced crop superior and the native crop obsolete and unworthy of further development. This is illogical, ill-conceived, and even dangerous. In much of the eastern United States, for instance, wheat was long ago displaced by soybeans; in the Southeast, peanuts replaced rice; and in the Great Plains, wheat has supplanted maize. But no one in America considers wheat, maize, or rice to be inferior, obsolete, or unworthy. People everywhere classify sorghums and millets in a different light from wheat, rice, and maize. All the categories have pejorative

connotations. For instance, these grains are typically referred to as: Many crops are scorned as fit only for consumption by the poor. Peanuts, potatoes, and other common crops once suffered from this same discrimination. In the United States the peanut was considered to be "merely slave food" until little more than a century ago, and in the s the English refused to eat potatoes because they considered them to be "Irish food. Yet these grains are now mostly cultivated in marginal lands under less than optimal management and the yields therefore do not reflect their true potential. Moreover, the use of yield figures can be totally misleading. Maize may be able to outyield finger millet, pearl millet, hungry rice, and tef, but only when soil fertility, moisture, and other conditions are good. Under poor conditions, African grains often outyield the best products of modern science. Millets are mainly used for making porridges, fermented products, couscous, and other foods that are alien and therefore somewhat suspect to non-Africans, especially Westerners. This has led outsiders, who often serve as "decision makers," to direct resources away from native grains. Disparaging comments about African foods are not uncommon in the writings of travelersâ€”especially in Victorian times. They are of course only personalâ€”often highly prejudicedâ€”opinions but, lingering in the literature, they have a pernicious influence that can last for decades or even centuries. Europeans treated the potato and tomato this way when they first arrived from the Americas. Myths about taste and safety helped block the adoption of both for two centuries. Farmers grow them for their own use rather than for market, and therefore there are no statistics on production or costs. A plant may be helping feed millions, but in the international figures on area sown, tonnage produced and exported, and prices paid it never shows. This situation might be of little consequence were it not for the fact that economic-development funding these days is overwhelmingly judged on "cost-effectiveness. Maize or wheat researchers can pull out impressive figures to justify the promise of their proposed studies. Finger millet or fonio researchers can only come up with guesses. To the hard-pressed, cost-conscious administratorâ€”ever fearful of accusations that public funds may be misspentâ€”the decision on which proposal to support is inevitably biased. Page 14 Share Cite Suggested Citation: See chapter 13 , page  At present, almost nothing can be said about its potential, but it clearly deserves exploratory research and support. Emmer This rare wheat Triticum dicoccum originated in the Near East, but it has a very ancient African heritage. Moreover, far from abandoning it, Ethiopian farmers over the last 40 years have actually increased the percentage of emmer that they grow. The plant is adapted to a wide range of environments and should be producible in many parts of the world. The fact that it is little changed from wheat eaten in the times of the Bible and the Koran could give it special consumer appeal. But it can stand on its own culinary merits. It is one of the sweetest and best-tasting cereals. Irregular Barley Although barley is also not native to Africa, it, too, has been used in Ethiopia for thousands of years. Indeed, Ethiopian barley has been isolated so long that it has been given its own botanical name, Hordeum irregulare, and has developed its own genetic "personality. Ethiopia is perhaps unmatched with respect to barley diversity. Indeed, some scientists think it is a source of new germplasm that could possibly boost barley growing in Africa and around the world. Ethiopian Oats In Ethiopia is found a native oats, Avena abyssinica. This species was domesticated in the distant past and is a largely nonshattering plant that retains its grain so people can harvest it. It has long been used in Ethiopia and is well adapted to the high elevations there. It is, however, unknown elsewhere. Page 15 Share Cite Suggested Citation: In modern times, however, various writers have discounted these grains as mere "scarcity foods. Many modern writers also imply that the wild cereals were gathered only on a small and localized scale. This, too, is apparently false. The harvest in the Sahara, for example, was large-scale, sophisticated, commercial, and much of it was export-oriented. The wild grains were a delicacy that even the wealthy considered a luxury. Examples of such untamed cereals are drinn, golden millet, kram-kram, panic grasses, wild rices, jungle rice, wild tefs, and crowfoot grasses. Resurrecting the grain-gathering industry of the past might be a way to help combat desertification, erosion, and other forms of land degradation across the worst afflicted areas of the Sahel and its neighboring regions.

# INTRODUCTION TO CROP PRODUCTION pdf

## 3: HS/CV Introduction to Organic Crop Production

*It is intended to be used for 20 hours of instruction as an introductory course on the crop industry. It provides a broad background of the industry, including production, marketing, processing, and transportation, with emphasis on identifying major crops and their uses.*

This broad-leafed annual, reaching heights of between 0. Tolerant of many habitat types, it grows in low-lying valleys and in highlands at altitudes of 2 m above sea level. It is usually grown as a dryland crop in the long and the short rainy seasons because it is drought sensitive and must have water throughout the growing period. Seeds and seedlings in the nursery need daily watering, which may be reduced to twice a week after transplanting. Mulching your crop can mitigate against dry periods by protecting and cooling the soil and improving its water holding capacity. Use straw, old leaf material, wood chips as mulch and make it part of your farming practice. Like many native plants, it is resilient and will tolerate soils that are less than ideal, but it performs best in sandy loam and friable clay soils with a pH of between 6 and 6. N is vital for leaf production and without enough of it you will have a smaller leaf area, reduced yield and less money in the bank for the same work. Do not be tempted to keep adding N ad lib to get higher yields because too much of it can make the soil toxic. An inter-plant and inter-row spacing of 20 cm is recommended for small-scale growers, who harvest leaves continuously during the crop season. Growers who have access to more land will get better leaf yields using greater distances of 50 cm between plants and 50 cm between rows. If you are planting for a seed crop use even wider spacing, 60 cm X 50 cm or 80 cm X 50 cm. Seed can be grown in flat trays or nursery beds, or broadcast directly into the field. Because the seed is so fine it is best to mix it with a medium like river sand to help even sowing. African nightshade tolerates a wide range of altitudinal environments from low-lying valleys to highlands like this one pictured where it is growing on the slopes of Mount Cameroon. Marco Schmidt on Commons. Flowers appear from eight to 11 weeks and first leaf harvest begins between 8 and 12 weeks after sowing. When the leafy stems are cut down to between 5 cm and 15 cm side shoots start regrowth immediately. After the first cut, growers can harvest every week to 2 weeks for up to 10 cuts. The length of harvested shoot really depends on the cultivar. Yields begin to fall off after the 6th cut without enough of the right kind of fertiliser. There is no better teacher for a farmer than experience, but farming can be an unforgiving business. The experience of your farming friends and neighbours, or family members who have farmed the crop is an invaluable learning resource. MARKETING Indigenous food crops are becoming more popular and the African nightshade now appears on supermarket shelves in East African countries, but is found throughout the region in local informal, fresh produce markets. The one challenge with this crop is that is must be marketed on the same day it is picked. This is difficult, but not insurmountable, for growers who live far from urban areas. The solution is to form groups and rent or jointly buy a light delivery vehicle. He did not do it to break even â€” he did it because it was profitable. The high demand for the African nightshade guarantees a strong market, always a winning trait in a commercial crop.

# INTRODUCTION TO CROP PRODUCTION pdf

## 4: CHAPTER 1: INTRODUCTION

*Introduction to basic crop production, post-harvest and financial management practices: a training manual for smallholder vegetable farmers in western Pacific island nations (ed. by C.J. Birch and B.E. Chambers).*

Neolithic Revolution Centres of origin , as numbered by Nikolai Vavilov in the s. Area 3 gray is no longer recognised as a centre of origin, and Papua New Guinea area P, orange was identified more recently. At least 11 separate regions of the Old and New World were involved as independent centers of origin. Rice was domesticated in China between 11, and 6, BC with earliest known cultivation from 5, BC, [9] followed by mung , soy and azuki beans. Sheep were domesticated in Mesopotamia between 13, and 11, years ago. Sugarcane and some root vegetables were domesticated in New Guinea around 9, years ago. Sorghum was domesticated in the Sahel region of Africa by 7, years ago. Cotton was domesticated in Peru by 5, years ago, [14] and was independently domesticated in Eurasia. In Mesoamerica , wild teosinte was domesticated to maize by 6, years ago. Studies of the transition from hunter-gatherer to agricultural societies indicate an initial period of intensification and increasing sedentism ; examples are the Natufian culture in the Levant , and the Early Chinese Neolithic in China. Then, wild stands that had previously been harvested started to be planted, and gradually came to be domesticated. Ploughs appear in pictographs around 3, BC; seed-ploughs around 2, BC. Farmers grew wheat, barley, vegetables such as lentils and onions, and fruits including dates, grapes, and figs. Farming started in the predynastic period at the end of the Paleolithic, after 10, BC. Staple food crops were grains such as wheat and barley, alongside industrial crops such as flax and papyrus. Sheep and goats were kept mainly for dairy products. The Mayas used extensive canal and raised field systems to farm swampland from BC. The natives controlled fire on a regional scale to create a low-intensity fire ecology which sustained a low-density agriculture in loose rotation; a sort of "wild" permaculture. Since , agriculture in the developed nations, and to a lesser extent in the developing world, has seen large rises in productivity as human labor has been replaced by mechanization , and assisted by synthetic fertilizers , pesticides, and selective breeding. The Haber-Bosch method allowed the synthesis of ammonium nitrate fertilizer on an industrial scale, greatly increasing crop yields and sustaining a further increase in global population. Pastoralism involves managing domesticated animals. In nomadic pastoralism , herds of livestock are moved from place to place in search of pasture, fodder, and water. This type of farming is practised in arid and semi-arid regions of Sahara, Central Asia and some parts of India. The land is then used for growing crops for several years. When the soil becomes less fertile, the area is then abandoned. Another patch of land is selected and the process is repeated. This type of farming is practiced mainly in areas with abundant rainfall where the forest regenerates quickly. This type of farming is practiced mainly in highly developed countries. In recent years there has been a backlash against the environmental effects of conventional agriculture, resulting in the organic , regenerative , and sustainable agriculture movements. The growth of organic farming has renewed research in alternative technologies such as integrated pest management and selective breeding.

# INTRODUCTION TO CROP PRODUCTION pdf

## 5: Crop Production

*Various lecture chapters comprise the first portion of this book. The lecture topics include crop terminology, climatic factors, influence of soils, tillage and planting management, harvest and storage issues, and plant growth and development.*

The soil gives stability to the plants; it also stores the water and nutrients which the plants can take up through their roots. The sunlight provides the energy which is necessary for plant growth Fig. The air allows the plants to "breath". Without water crops cannot grow. Too much water is not good for many crops either. Apart from paddy rice, there are only very few crops which like to grow "with their feet in the water". The most well-known source of water for plant growth is rain water. There are two important questions which come to mind: What to do if there is too much rain water? What to do if there is too little rain water? If there is too much rain, the soil will be full of water and there will not be enough air. Excess water must be removed. The removal of excess water - either from the ground surface or from the root zone - is called drainage see Volume 1, Chapter 6. If there is too little rain, water must be supplied from other sources; irrigation is needed Fig. The amount of irrigation water which is needed depends not only on the amount of water already available from rainfall, but also on the total amount of water needed by the various crops. With respect to the need for irrigation water, a distinction can be made among three climatic situations: The amount of rainfall is sufficient to cover the water needs of the various crops. Excess water may cause problems for plant growth and thus drainage is required. Sub-humid and semi-arid climates: The amount of rainfall is important but often not sufficient to cover the water needs of the crops. Crop production in the dry season is only possible with irrigation, while crop production in the rainy season may be possible but unreliable: Semi-arid, arid and desert climates: Reliable crop production based on rainfall is not possible; irrigation is thus essential. The two major factors which determine the amount of irrigation water which is needed are: In Chapter 2 the crop water needs are discussed; Chapter 3 discusses the contribution from the rainfall while in Chapter 4 the determination of the irrigation water needs is explained Fig. It is then not necessary to determine the crop and irrigation water need. However, there may be situations where it is not possible to obtain these data and it would thus be necessary to determine them on the spot. Part I of this manual allows the reader to make a rough estimation of the crop and irrigation water needs - without using any complicated calculations. Part II of this manual allows the reader actually to calculate - be it in a fairly simple manner - the crop and irrigation water needs. These calculations obviously lead to a greater accuracy, but they also require more time and background knowledge.

# INTRODUCTION TO CROP PRODUCTION pdf

## 6: Agriculture - Wikipedia

*Introduction to Organic Crop Production 1 Danielle Treadwell and Jose Perez 2 This document is written for commercial producers who are transitioning to or beginning organic production.*

Anton Alberts Wheat can be produced under varied climatic and soil conditions. The reason is the diverse genetic material available in the form of different cultivars. Production regions in South Africa can be divided into 3 broad areas: Moderate temperatures mean that spring wheat is also planted. Soils are very stony and have limited water storage capacity, so the wheat crop depends on rainfall throughout the growing season. The northern summer rainfall dryland area receives very little rain from planting time May to June until ears emerge in September. In this area, cultivation practices focus on soil water storage during the rainy season summer to ensure adequate soil moisture until the spring rains come. Early frost is a real threat, so planting dates are chosen to minimise the risk of cold damage during flowering. Intermediate types of wheat are produced in this area. Irrigation wheat is produced on deep, well-drained soils to ensure optimum root development and so sustain the high potential of cultivars grown under such intensive conditions. Two crops are often produced in a year to ensure acceptable cash flow, because high financial inputs are needed. Spring wheat is produced in irrigated areas. Under all these production conditions, good yields and profitability can only be achieved by careful planning and management. Higher yields mean higher profits, as production costs per ton of grain decline proportionately as yields increase. Avoid being inflexible about crop management. Learn to adapt and revise management strategies as the cropping environment, yield potential, commodity prices and input costs change. Total grain yield per hectare results from: The number of plants per hectare. The number of ears per plant. The number of grains per ear. These plant components and eventually grain yield are determined during the 3 main developmental phases and relevant growth stages. It is possible for a yield component determined later to partially compensate for reductions in one established at an earlier developmental stage. Stages for the different components overlap to some degree in their effect on potential grain yield, and they are determined in a specified sequence. Target yields form the foundation for crop management decisions. Cultivar selection, fertiliser rates, herbicide and insecticide applications and, in particular, financial planning and other management decisions can only be made with the aid of target yield objectives. There are a number of ways to set a target yield: Experience historical average yield over the past 5 years. Water available at planting the sum of stored soil water at planting, plus the average effective growing season rainfall. Using long-term climate projections. The risk associated with your selected yield target should be carefully considered. Profit is the compensation for taking risks, but be realistic. Certain management practices and target yields have a higher risk component. Planning for the entire farm, including soil selection. A healthy, well-planned crop rotation system. Effective management of soil water available to plants. Soil analysis to decide on a relevant fertilisation and liming programme. Applying effective soil cultivation practices. Correct planting dates and seeding densities for selected cultivars. Using suitable planter speed and planting depth. Monitoring the crop and noting observations. Making decisions about weed, insect and disease control timeously. Harvesting the crop at the right time. Applying agronomic management principles. Developing a financially sound marketing strategy.

## 7: Indigenous crop production: An introduction to African nightshade - African Farming

*Wheat can be produced under varied climatic and soil conditions.*

## 8: Crop - Wikipedia

*Crop Production Research USDA focuses on enhancing economical crop production through its Crop Production Program by producing sound, research-driven knowledge to be shared and leveraged by its users.*

# INTRODUCTION TO CROP PRODUCTION pdf

## 9: CROP Introduction to Crop Production | Department of Crop Science

*Introduction. The first great revolution in human history was the development and spread of agriculture which was about 10, years ago. 'Agre' means field and 'cultura' means cultivation.*

# INTRODUCTION TO CROP PRODUCTION pdf

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