

# DOWNLOAD PDF NEW DEVELOPMENTS IN FARM MACHINERY AND CROP MANAGEMENT

## Chapter 1 : Intensive crop farming - Wikipedia

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Farmers now have a plethora of intricate, technologically advanced machinery to help in all aspects of their management practices – from tilling, to planting, to chemical applications, and harvesting. The different types of equipment greatly reduce the amount of time it takes to complete jobs on the farm, increasing efficiency and helping to drive agricultural sustainability. Even with all of the technology available in farming machinery, companies still find ways to continuously push the envelope. Transforming all levels of machinery from the most intricate down to the simplest of machines, these nine companies are delivering great technological advancements to farmers in

**EM3 AgriServices** A startup in India is bringing rural farmers the opportunity to get their hands on specialized, expensive farming equipment that would normally be out of their reach. EM3 AgriServices This helps them to pay off their purchases or generate additional revenue while farmers with limited capital can get access to quality equipment and machinery on a pay-as-they-use basis. In an area where most farms are smaller than 3 acres, this concept is revolutionary and will change the way many farmers manage their land, helping to modernize their processes.

**Machinio** Online marketplaces make it easy to buy and sell commodities by allowing users to search for products outside their local area. The innovators behind Machinio, an online marketplace for used metalworking, construction, and agricultural machinery, look to do for used machinery what Expedia did for hotels and flights. Using proprietary technology, they connect buyers with thousands of global sellers who have the equipment they are looking to purchase. Machinio A multistep vetting process ensures that buyers are legit, helping to reduce red flags before they reach the sellers. To support global business, a second office was opened in Berlin in It is the latest development in its vision for sustainable farming.

**New Holland Farms** with the biomass needed to generate their own methane could open the doors to self-sufficiency and less reliance on fossil fuels. The visionary design concepts of the methane-powered tractor combine with advanced technologies, extended connectivity, and reliable power train to provide farmers a glimpse into efficient, productive, sustainable farming.

**Blue River Technology** Robotic nozzles target unwanted plants and apply herbicides accurately and precisely to weeds, simultaneously avoiding the cotton crop and weed-less areas.

**ASI** They are known to be one of the most notable companies in the global robotics industry, recognized by the Robotics Business Review for four consecutive years. In partnership with CNH Industrial, the two leaders have developed and launched the autonomous tractor concept, an automated steering system utilizing advanced technology to plan end-of-row turns into the headlands of a field, and they are working hard to launch a driverless tractor concept engineered to perform a wide variety of farming tasks.

**Autonomous tractor** – ASI The unmanned vehicle can be remotely monitored, commanded, and controlled via a computer or portable tablet interface. This technology gives a single user the ability to manage numerous tractors simultaneously with remarkable precision and reliability, increasing efficiency considerably while reducing the manpower needed to complete tasks and also delivering farmers and farm hands from dangerous situations. This venture is the single biggest product development project ever for AGCO.

**Sukup** The family-owned corporation is a leader in grain bin machinery and equipment, continuously winning awards for their innovations. Their grain bins are known to be the best fitting and easiest to put together on the market.

**AgDNA** The platform integrates directly with in-field equipment and automates data management with little manual input. See precisely which regions of a field are performing and make informed decisions on how to address profit limiting factors. Only AgDNA can offer this level of financial data management.

**Kuhn** The North American division of Kuhn is a leading innovator in agricultural equipment, specializing in spreaders, mixers, and hay and tillage tools. Their list of awards is lengthy, and new products are constantly being recognized for their exemplary performance. In early , they

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launched the Axent Kuhn With the ability to precisely spread product in swaths up to feet, this large-volume, trailed precision spreader is making a name for itself, quickly. It also has the ability to switch between the Axis spreading system and the Lime PowerPack which can spread lime or organic fertilizers.

## Chapter 2 : Agriculture Machinery: 9 Companies to Watch in - Disruptor Daily

*At the Farm Progress Show in August , New Holland Agriculture debuted a concept tractor powered by methane. It is the latest development in its vision for sustainable farming. This methane-powered tractor has the performance and durability of the diesel equivalent with a savings in operating costs of up to 30%.*

Inevitably such an approach leads to a plethora of farm types. A different approach is taken here. Emphasis is on farm-system structure from a farm management and farm-household perspective with classification based on: From such a structural viewpoint there are basically six major types of farm system to be found in Asia and elsewhere around the developing world with dozens of subtypes constituting a continuum of farm types between the extremes of a totally subsistence to a totally commercial orientation. The six basic farm types are: Small subsistence-oriented family farms. Small semi-subsistence or part-commercial family farms, usually of one half to two hectares, but area is not a good criterion: Small independent specialized family farms. Small dependent specialized family farms, often with the family as tenants. Large commercial family farms, usually specialized and operated along modified estate lines. Commercial estates, usually mono-crop and with hired management and absentee ownership. Each of the six farm types is now discussed in turn. Small subsistence-oriented family farms There are two main subtypes. First, and of lesser numerical importance, are those based on only one or two crops or livestock types e. Some farms of this subtype are based more on exploitation or management of a local natural resource - in the extreme case, by use of shifting cultivation or by nomadism - than on deliberate choice of their main farm enterprise e. However, the main group of Asian subsistence-oriented farms is based on a wide range of crops and animal types. This second subtype is of necessity more highly mixed than are Type 2 part-commercial farms. Farms which are completely self-sufficient are rare, but self-sufficiency remains the operating objective and, if forced by circumstances, farms of this type could exist in isolation from the outside world. The structure of a Type 1 farm is exemplified in Figure 2. The focus for evaluation and analysis of Type 1 farms is the household rather than the farm component of the system. However, Type 1 farms have most of the characteristics of Type 2 farms and these are discussed below in relation to this latter type. Small semi-subsistence or part-commercial family farms This type is predominant throughout South and South East Asia in terms of the number of such units, the large number of people supported by them and the total volume of their production - especially of basic foodstuffs. Such cash is obtained primarily by sale of commodities which are surplus to family requirements, and secondarily - where this is possible - by production and sale of some cash crop raised specifically for this purpose. The comparative operating objectives of this and other farm types are discussed in Chapter 6. Type 2 farms can be further classified according to geographical occurrence e. However, they are all basically similar in their crop activities which consist essentially of one or more staple food crops plus a leguminous protein source plus an oil crop see Section 9. Some examples of geographically typical crop mixes are: Livestock, whether fish, poultry or larger animals, are typically important on Type 2 farms. They are closely integrated with the crop activities, and here - unlike the situation on farms in developed countries - they are kept for a range of purposes: The combination of livestock with crops results in a large number of activities, and an even larger number of different farm products. A special subtype of this highly-mixed farm type consists of the forest-garden farms of the wet tropics as found in Kerala, Sri Lanka, Malaysia and Indonesia. These consist of both whole farms, e. Except for poultry, livestock are relatively unimportant on this subtype. Discussion of system boundaries in Chapter 3 mainly relates to farms of this type. Briefly, boundaries of Type 2 farm systems and of Types 1, 3 and 4 segregate them distinctly from the external world, but the boundaries between individual farms are relatively weak. In contrast with farms in developed countries, they often have much stronger links to and interdependence with other farms in the local community than they do with the outside world, i. Whatever the basis for such informal integration - culture, religion, isolation - its effect is to provide strong structural boundaries around groups of farms, hamlets and villages rather than around individual farms.

Each Type 2 farm is very much a part of the community and often could not function effectively if divorced from it. Diversity, or the degree to which farm income however measured is derived from a range of activities and products rather than from a single source, is discussed in Section 6. Type 2 farms are typically the most diverse of all farms. Diversity has three elements: The mixed farms of the Punjab commonly consist of four to six crop activities and three to six livestock activities; those of Bhutan somewhat fewer. This contrasts sharply with the situation on farms of Type 6, the estates producing a single product tea, rubber etc. Even a common field crop such as maize may be managed so as to yield four or five primary products green pick, dry grain, fodder leaves and stalks, fuel, live stripped stalks as supports for a companion bean crop, and two or three subsequent processed products maize cakes - an important kitchen industry in parts of Bhutan, alcohol etc. Diversification of Type 1 and 2 farms has several bases. Broadly it follows from their sustenance orientation. In remote tracts of Nepal and Bhutan it is a necessity. In the Punjab it results largely from the possibility of growing a wide range of summer and winter crops and combining these with livestock. On the closely integrated vegetable-poultry-pig-fish farms of West Malaysia and Sarawak it results from a business-like approach to profit maximization. If they did not, the space would soon be filled anyway through natural seed fall and germination. Sources and uses of farm resources: An important characteristic of Type 2 farms and of farms of Type 1 is the high proportion of farm and household resources generated on the farm and, correspondingly, the low level of dependence on purchased inputs. Further, where purchased resources are used, it is common practice to restrict their use to cash crops cotton, sugarcane, tobacco etc. Farm-generated resources including food supply as distinct from purchased resources are obtained in a wide variety of ways as follows: These, as distinct from cash-generating activities, are relatively important on farms of Types 1, 2 and 3. The most common example is livestock kept primarily for manure production as well as for other purposes. Growing a green manure crop serves a similar purpose. Growing and lopping the leaves from leguminous trees for paddy fertilizer is still common in Java. Such activities need not be elaborate: The first, typically a high-yielding improved variety, might be deficient in taste and storability but will generate cash. The second might be capable of long storage and possess other qualities valuable in rural but not in sophisticated urban markets. A common example is provided by farm boundary and roadside fences. In the Matale district of Sri Lanka most of the fences consist of kapok trees planted at very close spacing. Farm fences in the Yogyakarta-Boyolali area of Central Java are used to generate a wider range of resources or to directly produce a marketable commodity. There are four main types: The cassava stems are then used also as a bean trellis. The list suggests the high level of self-sufficiency that characterizes these farm-system types, especially in isolated areas. Small independent specialized family farms The key characteristics of Type 3 farms are a their specialization in some particular crop or livestock activity which distinguishes them from the mixed farms of Types 1 and 2; and b their management independence which distinguishes them from Type 4 farms. In this latter situation such farms are also a subtype of subsistence farms Type 1, but differ from the main body of near-subsistence farms in that only one main production activity is pursued. A sub-classification of Type 3 farms is shown in Figure 2. Some examples of these Type 3 farm subtypes are noted below. Probably the most important are the Subtype B near-continuous paddy farms of the wet tropics. The development of such profit-oriented peri-urban farm activities is a reflection of economic growth with its demands for intensively produced products with a high income elasticity of demand. Yet other bases for specialization are historical accident e. Small dependent specialized family farms Structurally, except for their lack of independence, Type 4 farms are quite akin to Type 3 farms and contain the same three A commercial B part-commercial and C near-subsistence subtypes; however, they are sufficiently important to be examined as a separate type. The characteristics which set them apart from farms of Types 1, 2 and 3 are their high degree of activity specialization and the lack of real decision-making power possessed by the farm family. The specialization characteristic may be based on the same factors noted above for Type 3 independent specialized farms. The dependence characteristic arises from the fact that on Type 4 farms the family is not free to decide what to produce, nor frequently the conditions under which some obligatory activity is to be carried on. This

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lack of independence can be due to several factors, viz.: Tenant farmers are often obliged to produce one or more specific crop or livestock products, as dictated in a landlord-tenant agreement. The tenant-operated vegetable farms of Qatar are an example. In this situation small family farms are integrated more or less closely as the production arm of some larger farming cum processing system. Small tenant-operated farms supplying sugarcane to a mill or leaf to a tobacco-processing factory are common examples of such vertically integrated farms. Not only is the crop which is to be grown specified, but the conditions of production - timing of planting and harvesting, amounts of fertilizers to be used, spraying programs etc. Some agro-industrial units such as milk processing plants often provide farmers with input factors such as cattle, feed and technical assistance in order to achieve a regular or higher quality supply of their needed raw material e. These advances are usually made in the form of a loan at attractive terms, but often the only way farmers can liquidate this loan and perhaps eventually regain their independence is to continue to produce the particular commodity - usually under conditions set by and to the relative advantage of the lender. A second kind of debt, that entered into for consumption rather than production purposes, can also provide the basis for farmer dependence. The only hope these farmers have of liquidating such debt - usually used for food, clothing and household items - is to continue to grow this specialist crop and sell it at whatever terms may be offered by the traders. Typically each hectare of land, owned by individuals of the village, might be under sugar for one year during which time it is farmed by the company as part of a larger estate. It then reverts to its owner for three years during which period he or she will operate it as a complete and independent farm, until it is again taken for sugar. During this three-year period the farmer has all normal decision-making powers crop selection and how each is grown. This system thus involves the alternating of two distinctly different farming systems as shown diagrammatically in Figure 3. Absence of any real independence in management can also be due to lack of alternative market outlets, especially when the product is too bulky or fragile to be transported far from the farm. For example, most of the small cassava farms of Perak in West Malaysia are located on poor soils which would grow little else except cassava many are located on tailings or spoil from tin mines. This accounts for their specialization. There is little practical possibility of seeking higher prices by transporting the raw cassava further afield. Similar situations face the citronella grass and cinnamon leaf farmers of the Galle-Matara district in southern Sri Lanka. Source of farm resources: Farms of Type 4 and Type 3 are usually not self-sufficient in resource-generation; e.

## Chapter 3 : FARM MANAGEMENT AND FARM TYPES

*Subscribe to Farm Industry News Now e-newsletter to get the latest galleries and more straight to your inbox twice weekly. Start Slideshow* € TAGS: GPS Tires Internet of Things Technology Crop Protection.

Wheat Wheat is a grass that is cultivated worldwide. Globally, it is the most important human food grain and ranks second in total production as a cereal crop behind maize ; the third being rice. Wheat and barley were the first cereals known to have been domesticated. Cultivation and repeated harvesting and sowing of the grains of wild grasses led to the domestication of wheat through selection of mutant forms with tough years which remained intact during harvesting, and larger grains. Because of the loss of seed dispersal mechanisms, domesticated wheats have limited capacity to propagate in the wild. With population growth rates falling, while yields continue to rise, the area devoted to wheat may now begin to decline for the first time in modern human history. Crop management decisions require the knowledge of stage of development of the crop. In particular, spring fertilizers applications, herbicides , fungicides , growth regulators are typically applied at specific stages of plant development. Maize mechanical harvesting [ edit ] Main article: Maize Maize was planted by the Native Americans in hills, in a complex system known to some as the Three Sisters: Modern technique plants maize in rows which allows for cultivation while the plant is young, although the hill technique is still used in the cornfields of some Native American reservations. Haudenosaunee Confederacy is what a group of Native Americans who are preparing for climate change through seed banking. Now this group is known as the Iroquois. This will open growing areas for maize. A corn heap at the harvest site, India In North America, fields are often planted in a two- crop rotation with a nitrogen-fixing crop, often alfalfa in cooler climates and soybeans in regions with longer summers. Sometimes a third crop, winter wheat , is added to the rotation. Fields are usually plowed each year, although no-till farming is increasing in use. Many of the maize varieties grown in the United States and Canada are hybrids. Over half of the corn area planted in the United States has been genetically modified using biotechnology to express agronomic traits such as pest resistance or herbicide resistance. Before about World War II , most maize in North America was harvested by hand as it still is in most of the other countries where it is grown. This often involved large numbers of workers and associated social events. Some one- and two-row mechanical pickers were in use but the corn combine was not adopted until after the War. By hand or mechanical picker, the entire ear is harvested which then requires a separate operation of a corn sheller to remove the kernels from the ear. Whole ears of corn were often stored in corn cribs and these whole ears are a sufficient form for some livestock feeding use. Few modern farms store maize in this manner. Most harvest the grain from the field and store it in bins. The combine with a corn head with points and snap rolls instead of a reel does not cut the stalk; it simply pulls the stalk down. The stalk continues downward and is crumpled into a mangled pile on the ground. The ear of corn is too large to pass through a slit in a plate and the snap rolls pull the ear of corn from the stalk so that only the ear and husk enter the machinery. The combine separates the husk and the cob, keeping only the kernels. Soybean genetic modification [ edit ] Main article: Soybean Soybeans are one of the " biotech food" crops that are being genetically modified , and GMO soybeans are being used in an increasing number of products. In , Monsanto introduced " Roundup Ready " RR soybeans that have had a copy of a gene from the bacterium, *Agrobacterium* sp. Glyphosate, the active ingredient in Roundup, kills conventional soybeans. Soybean also has a version of this gene, but the soybean version is sensitive to glyphosate, while the CP4 version is not. No-till agriculture has many advantages, greatly reducing soil erosion and creating better wildlife habitat; [8] it also saves fossil fuels, and sequesters CO<sub>2</sub>, a greenhouse effect gas. As with other " Roundup Ready crops ", concern is expressed over damage to biodiversity. Hydroponics The largest commercial hydroponics facility in the world is Eurofresh Farms in Willcox, Arizona, which sold more than million pounds of tomatoes in They are grown in rockwool with top irrigation. Some commercial installations use no pesticides or herbicides , preferring integrated pest management techniques. There is often a price premium willingly paid by

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consumers for produce which is labeled " organic ". Some states in the USA require soil as an essential to obtain organic certification. There are also overlapping and somewhat contradictory rules established by the US Federal Government. So some food grown with hydroponics can be certified organic. In fact, they are the cleanest plants possible because there is no environment variable and the dirt in the food supply is extremely limited. The water table can be impacted by the water use and run-off of chemicals from farms, but hydroponics may minimize impact as well as having the advantage that water use and water returns are easier to measure. This can save the farmer money by allowing reduced water use and the ability to measure consequences to the land around a farm. With this growers can make ultra-premium foods anywhere in the world, regardless of temperature and growing seasons. Growers monitor the temperature, humidity, and pH level constantly.

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## Chapter 4 : Agricultural Machinery and Farm Technology – Agricultural and Farm Machinery

*Farm Industry News features the latest updates on new agricultural equipment, from planters and sprayers to tillage tools and more. The Farm Equipment section is exclusively sponsored by Martin Industries.*

History[ edit ] The Industrial Revolution[ edit ] With the coming of the Industrial Revolution and the development of more complicated machines, farming methods took a great leap forward. Instead of threshing the grain by beating it with sticks, threshing machines separated the seeds from the heads and stalks. The first tractors appeared in the late 19th century. With the invention of steam power came the portable engine , and later the traction engine , a multipurpose, mobile energy source that was the ground-crawling cousin to the steam locomotive. Agricultural steam engines took over the heavy pulling work of oxen , and were also equipped with a pulley that could power stationary machines via the use of a long belt. Their slow speed led farmers to comment that tractors had two speeds: Instead of cutting the grain stalks and transporting them to a stationary threshing machine , these combines cut, threshed, and separated the grain while moving continuously through the field. Types[ edit ] A John Deere cotton harvester at work in a cotton field. From left to right: A New Holland TR85 combine harvester Combines might have taken the harvesting job away from tractors, but tractors still do the majority of work on a modern farm. Tillage implements prepare the soil for planting by loosening the soil and killing weeds or competing plants. The best-known is the plow , the ancient implement that was upgraded in by John Deere. Plows are now used less frequently in the U. The most common type of seeder is called a planter , and spaces seeds out equally in long rows, which are usually two to three feet apart. Some crops are planted by drills , which put out much more seed in rows less than a foot apart, blanketing the field with crops. Transplanters automate the task of transplanting seedlings to the field. With the widespread use of plastic mulch , plastic mulch layers, transplanters, and seeders lay down long rows of plastic , and plant through them automatically. After planting, other implements can be used to cultivate weeds from between rows, or to spread fertilizer and pesticides. Hay balers can be used to tightly package grass or alfalfa into a storable form for the winter months. Modern irrigation relies on machinery. Engines, pumps and other specialized gear provide water quickly and in high volumes to large areas of land. Similar types of equipment can be used to deliver fertilizers and pesticides. Besides the tractor, other vehicles have been adapted for use in farming, including trucks , airplanes , and helicopters , such as for transporting crops and making equipment mobile, to aerial spraying and livestock herd management. New technology and the future[ edit ] The basic technology of agricultural machines has changed little in the last century. However, technology is changing the way that humans operate the machines, as computer monitoring systems, GPS locators [3] , and self-steer programs allow the most advanced tractors and implements to be more precise and less wasteful in the use of fuel, seed, or fertilizer. In the foreseeable future, there may be mass production of driverless tractors , which use GPS maps and electronic sensors. Open source agricultural equipment[ edit ] Many farmers are upset by their inability to fix the new types of high-tech farm equipment.

## Chapter 5 : Smart Crop Management Equipment from Van Walt - Tillage - best practice crop establishment

*Five key management tasks for agricultural machinery management were selected that span the various management phases and levels ().These management tasks are capacity planning, task times planning, scheduling, route planning, and performance evaluation.*

## Chapter 6 : TARC/NARO:Farm Machinery and System Group

*Developments in applying crop nutrients and pesticides have come fast and furious during the last decade. Many of the newest breakthroughs are aimed at 'site-specific' management of inputs, nozzles and individual nozzle control, and soil*

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*applications.*

## Chapter 7 : Machinery | Successful Farming

*Built on 88 years of expertise, Yetter Farm Equipment leads the agriculture industry in designing effective and innovative equipment for residue management, seedbed preparation, precision fertilizer placement, harvest attachments, strip-tillage, and more.*

## Chapter 8 : Agricultural machinery - Wikipedia

*Management of farming operations is currently rapidly changing toward a systems perspective integrating the surroundings in terms of environmental impact, public entities and documentation of quality and growing conditions.*

## Chapter 9 : Machinery News | Successful Farming

*Don't miss the latest farm machinery news, including new products and mergers and acquisitions of manufacturing companies.*