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Scholarship 2015 Geography

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INTRODUCTION

Agriculture Definition

The practise of cultivating the soil: the growing of crops, all forms of livestock raising including the use of natural vegetation for feeding the animals, and the gathering in of crops, whether for subsistence or exchange.

The Penguin Dictionary of Human Geography

“The discovery of agriculture was the first big step toward a civilised life.”

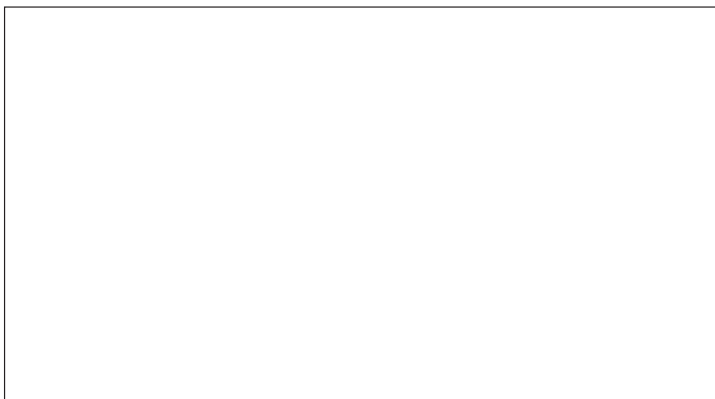
Arthur Keith (Scottish Scientist and Anthropologist).



Figure 1: Soil is the stomach of the plant

Long ago, Aristotle described the soil as the stomach of the plant.

The UN has therefore designated 2015 as the International Year of Soils (IYS). The focal theme for the year has been ‘healthy soils for a healthy life’.



2014 was the International Year of Family Farming (IYFF).

Figure 2: Family farming is part of the solution to the hunger problem

With 2016 designated as the International Year of Pulses (IYP), such as beans and lentils, an opportunity should be provided to grow more legumes, which can increase soil nitrogen.

THE IMPORTANCE OF AGRICULTURE AND CHANGE

Agriculture is an important sector of the global economy and employs many millions of people across the world. However, there have been significant changes over the past seventy years or so.

Table 1: Worldwide Employment by Sector from 1950 to 2010

Sector (%)	1950	1970	1990	2005	2010
Agriculture					
Industry					
Services					

Table 2: Transformation of Work and Society

1800	2010

“Even as the population doubled from three to six billion, we managed to race ahead with all kinds of technological and scientific events in agriculture – from using more fertilisers to mechanisation to advanced plant breeding.”

Nina Fedoroff (Life Sciences and Biotechnology Researcher and President of the American Association for the Advancement of Science (AAAS) from 2011 to 2012).

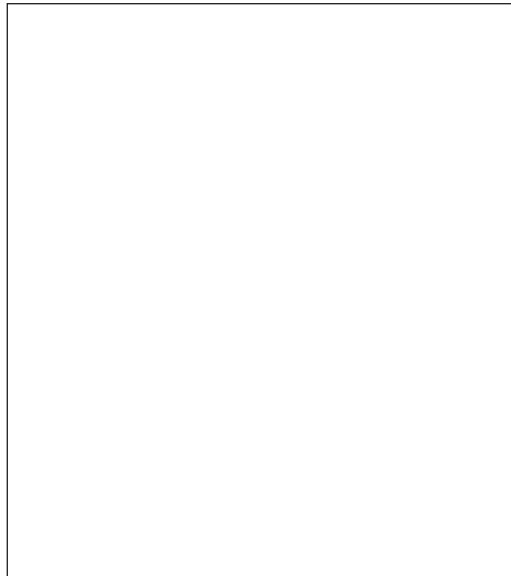


Figure 3: Brenda Schoepp, Canadian cattle farmer, author, and speaker on agriculture and sustainable practices

Agriculture employs half of the population in about 50 countries, and even 75 per cent in the poorest nations.

The contribution of agriculture to employment and GDP for selected countries is shown in the table below.

Table 3: The Contribution of Agriculture to Employment and GDP

Country	Employment in agriculture (% of total employment)		Agriculture's share of GDP (%)	
	1995	2010	1995	2010
Australia				
Brazil				
China				
Egypt				
Honduras				
India				
Indonesia				
New Zealand				
Tonga				
Uganda				
United States of America				

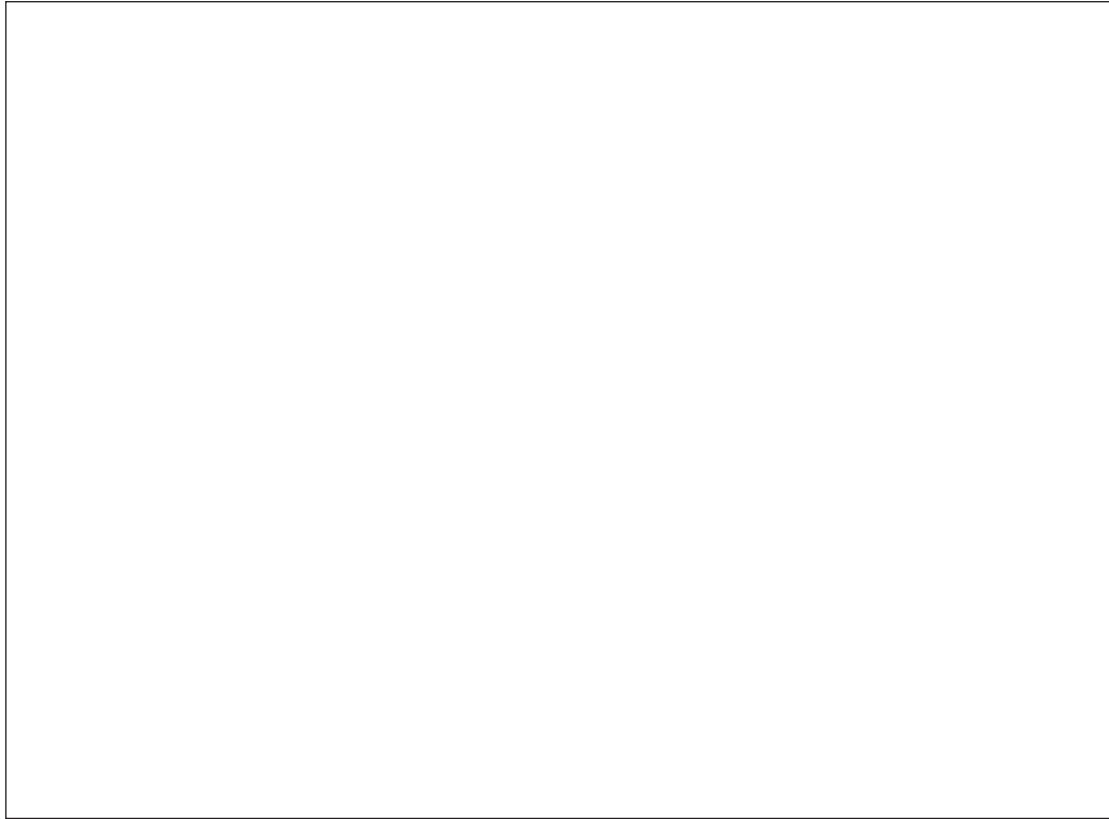


Figure 4: World Distribution of Farming Types

Table 4: World's Farms by Region / Country

Region/Country	World's Farms (%)
China	
India	
Other East Asia and Pacific	
Sub-Saharan Africa	
Europe and Central Asia	
South Asia	
Latin America and the Caribbean	
Middle East and North Africa	
Other	

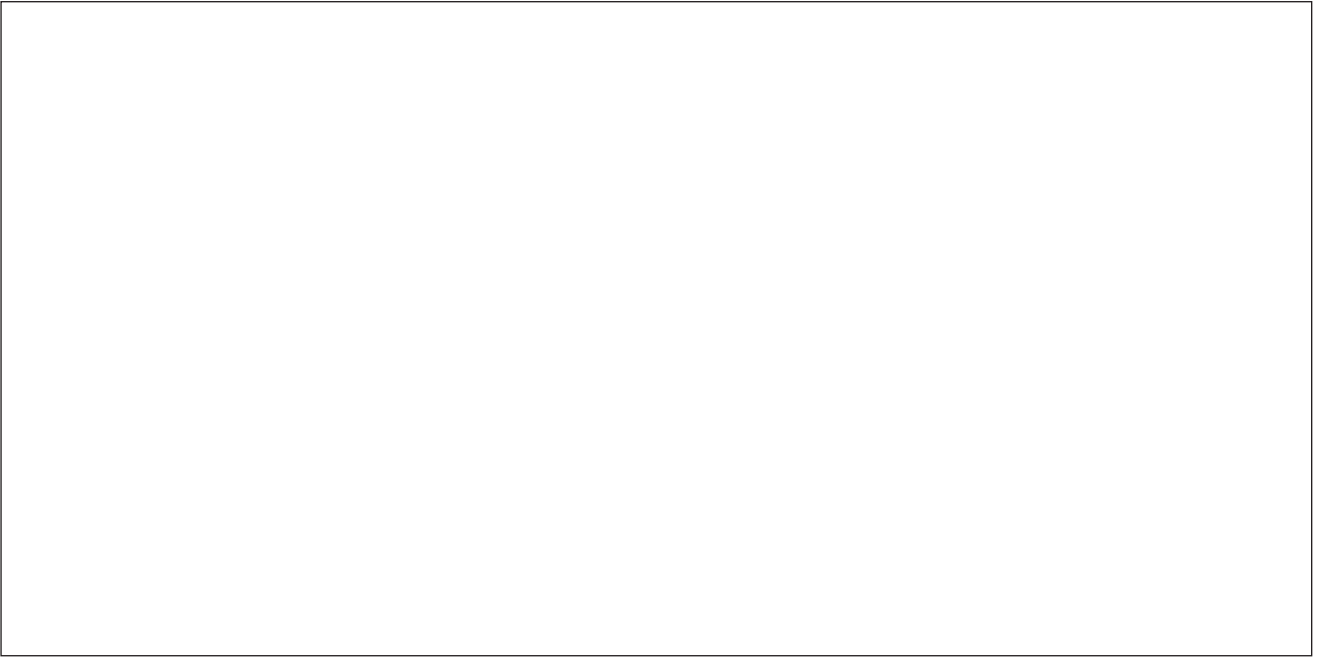


Figure 5: Percentage of cropland vs pasture land

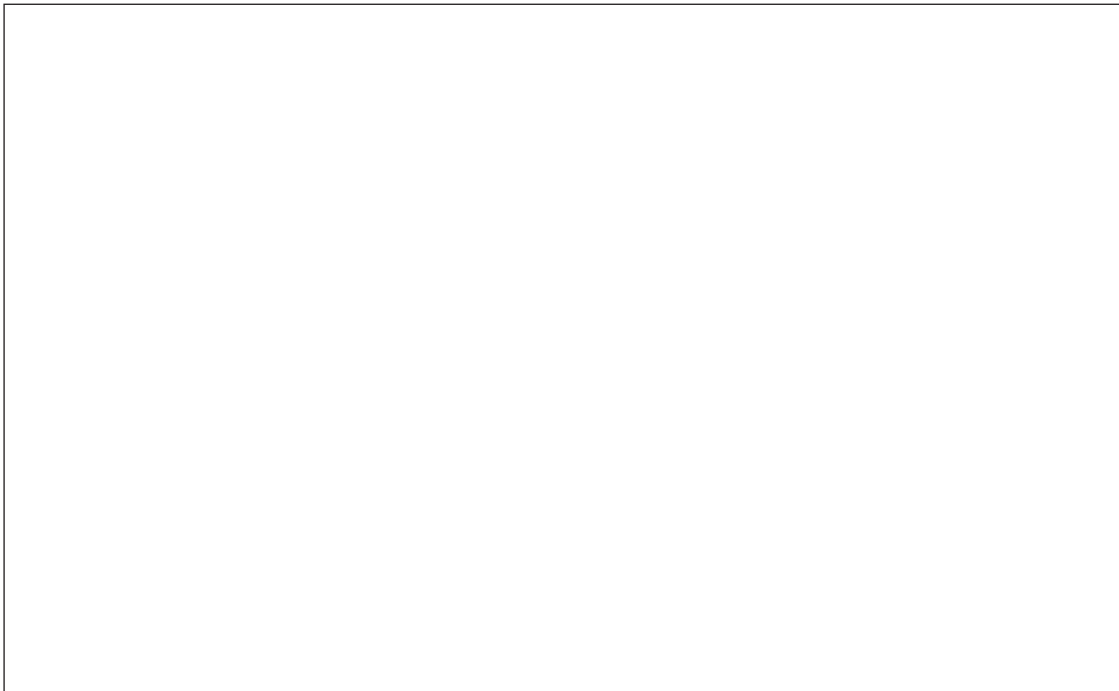


Figure 6: Animal husbandry, by countries and main species, around the world

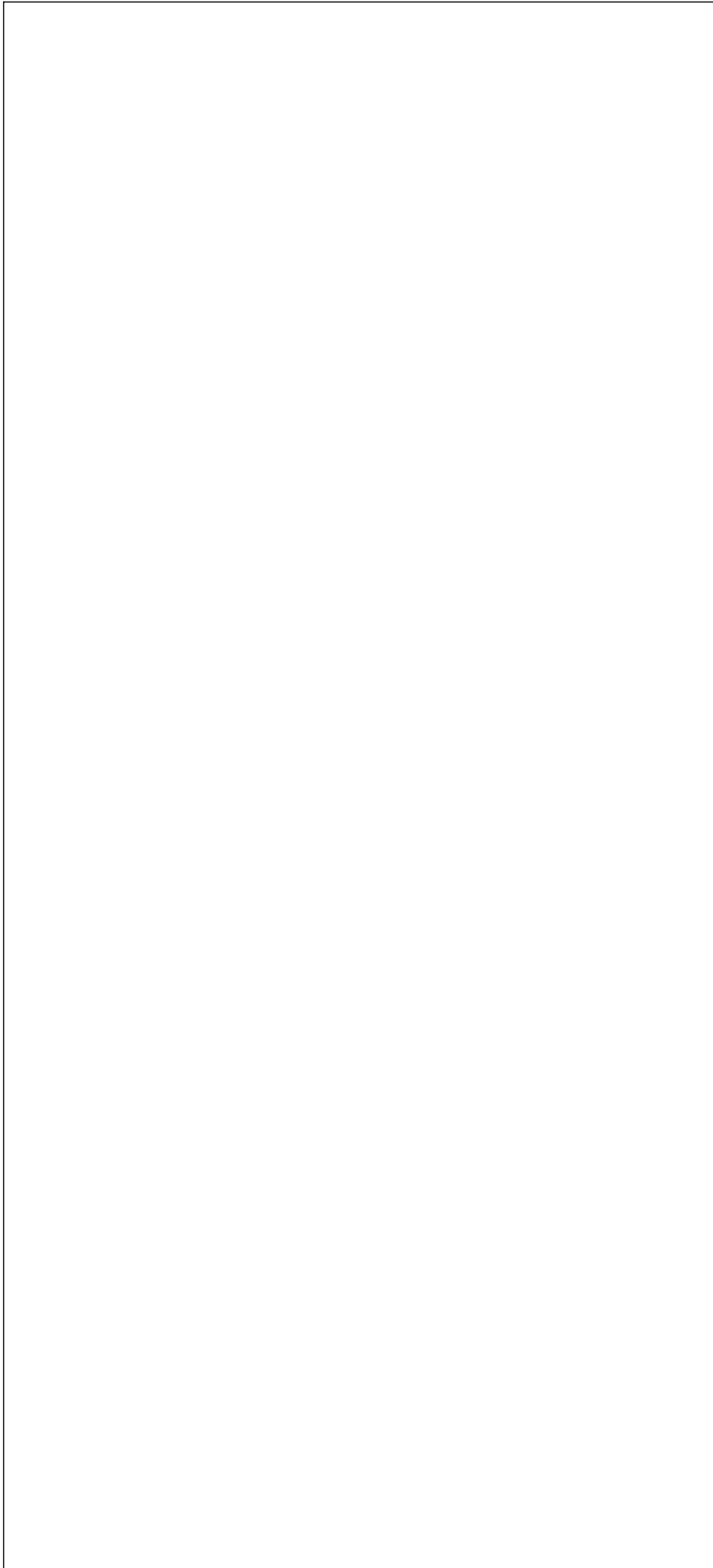


Figure 7: World Maps of Crop Areas

Per capita food consumption has changed over time and is predicted to grow still further in the future (**Figure 8**). At the same time, agricultural land available per capita has decreased (**Table 5**) and people across the globe have had to use land available to them in a much more intensive way (**Figure 9**).



Figure 8: Per capita food consumption – historical (with projections to 2030)

Table 5: Arable Land Per Capita of World Population

Year	Arable land per capita (sqm)	World population (billion)
1950	5 100	2.8
2000	2 700	6
2050	2 000	9 (estimated)

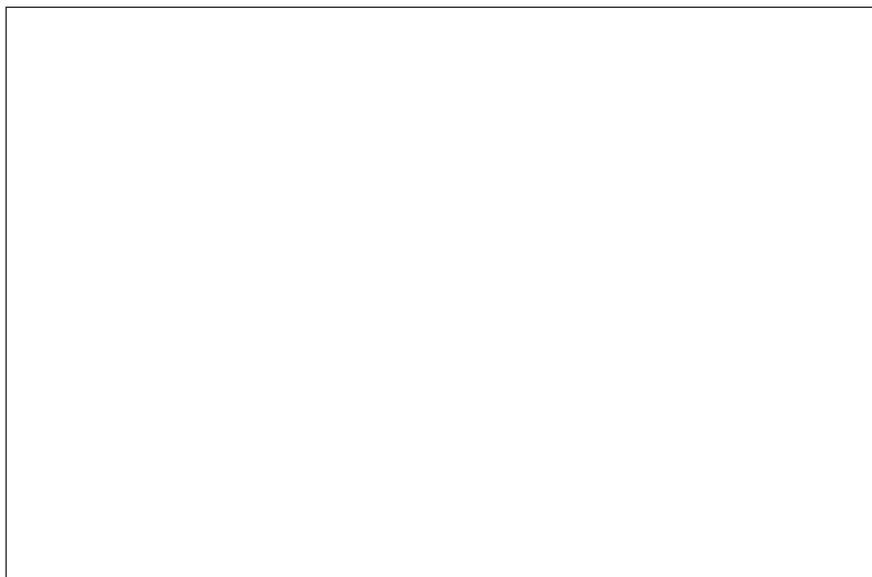


Figure 9: Terraced fields in Sa Pa, Vietnam

Insufficient water or land resources impact on the percentage of a country's population that depends on imported agricultural food products (**Figure 10**). Land use patterns and international trade flows were factored into the production of statistics that form the basis of the map. In 2012, about 16 per cent of the world's population, or 950 million people, were in this situation and relied on trade to meet their demand for agricultural food products.

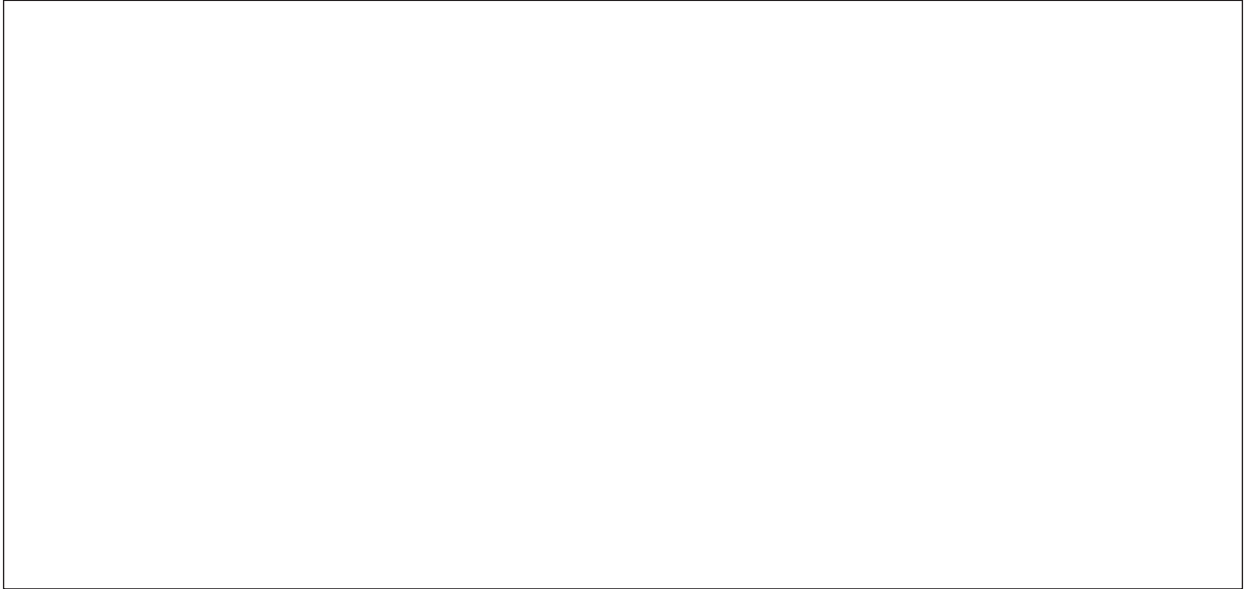


Figure 10: Percentage of a country's population that depends on imported agricultural food

Africa

Agriculture in Africa currently stands at the crossroads of persistent food shortages compounded by climate change threats. Communities in several African countries are battling food security, as many are not producing enough crops and grain to feed themselves, let alone to sell as surplus. Michael Hailu, director of Tech Centre for Agriculture and Rural Cooperation (based in Amsterdam), told CNBC Africa: “Many young people are leaving the rural areas, with millions migrating to the urban cities, as they do not see much of a future in the agriculture industry.”

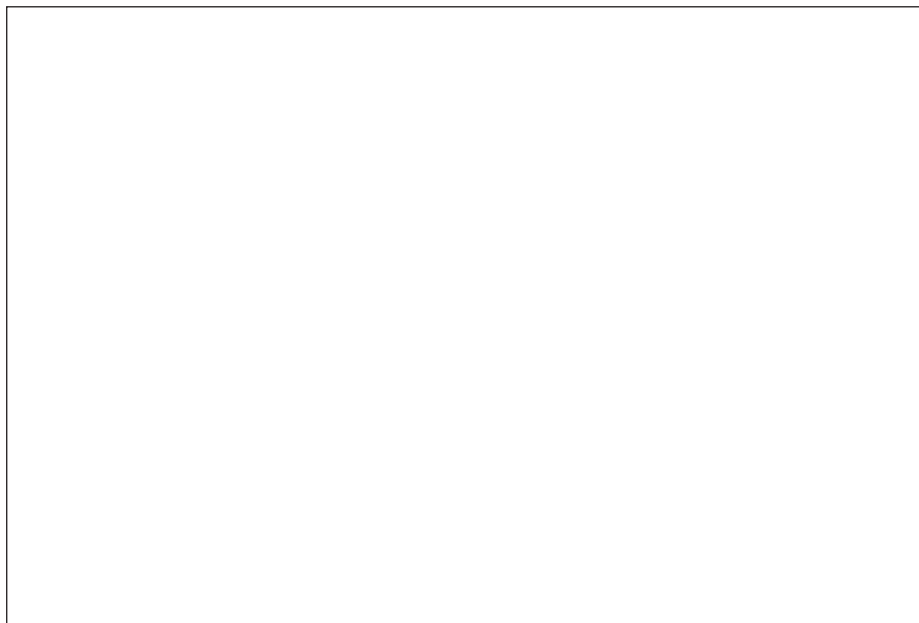


Figure 11: African proverb

Asia

Despite great successes in increasing food production, Asia still faces enormous food security challenges.

Organisations such as Ecoagriculture are working across Asia (and other regions), to help feed the world in a sustainable way and to save biodiversity.

United States of America

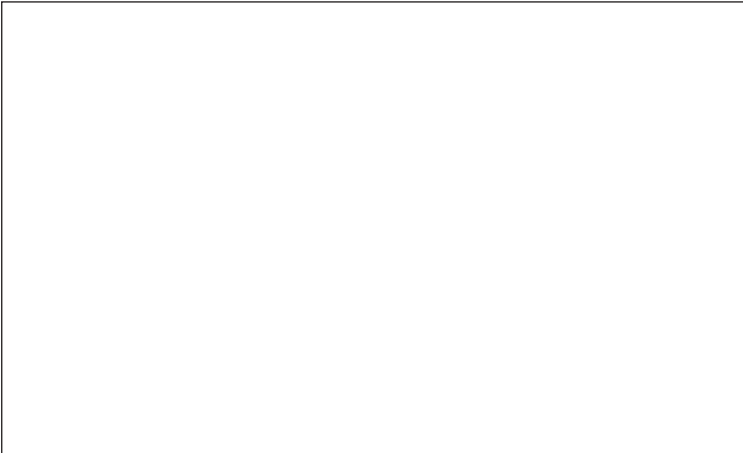


Figure 12: Some of the more than 500 000 tomato plants at Backyard Farms Greenhouse

When Backyard Farms Greenhouse was built three years ago in Maine, USA, the company's first 24-acre greenhouse in Madison was already the largest building in Maine. This second connected greenhouse (**Figure 12**), completed in 2014, brought the total area under glass to some 42 acres, or roughly the size of 32 American football fields. Even in the depths of winter, a million tomatoes ripen indoors to harvest each week, snipped from their vines by workers in T-shirts and shorts.

Cattle being fed in feed-lots in the USA. In this industrial model of farming, animals are kept at high stocking densities (**Figure 13**). Cattle are usually fed an energy-dense diet of soy, grain, small quantities of hay and other ingredients.

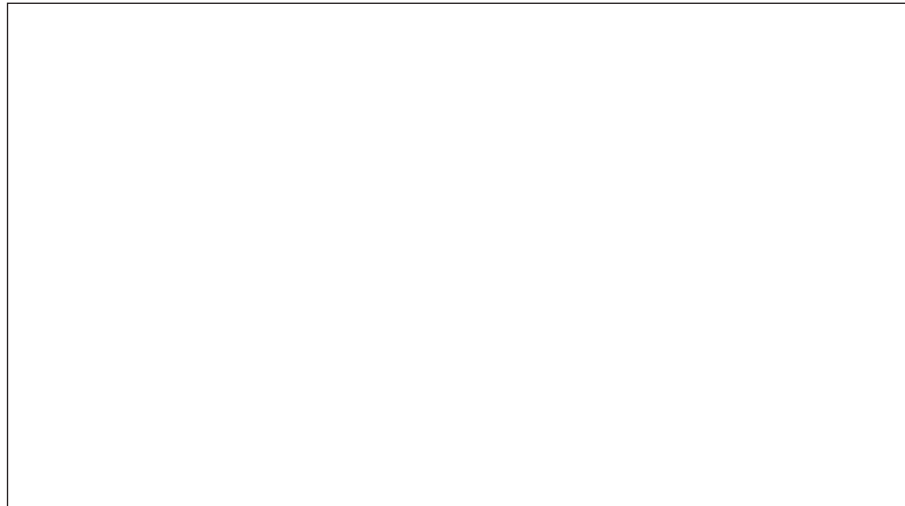


Figure 13: High stocking densities

Brazil

Harvesting soya bean in Brazil (**Figure 14**) has become very industrialised and scientific. Other legumes and arable crops have also become high-tech, especially in more economically developed regions of the world.



Figure 14: Harvesting soya bean in Brazil

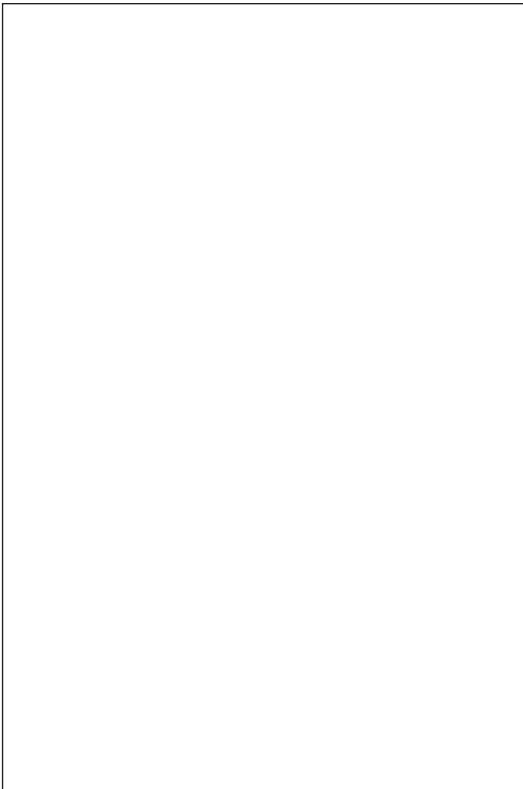


Figure 15: Battery cages

Similarly, poultry farming is also highly industrialised (see **Figures 15 and 16**). These hens in battery cages in Bastos, São Paulo, Brazil show the intensive nature of agriculture that is being practised in order to deal with increased demand. In other places, free range chickens are farmed to cope with demand for free range / organic chicken.

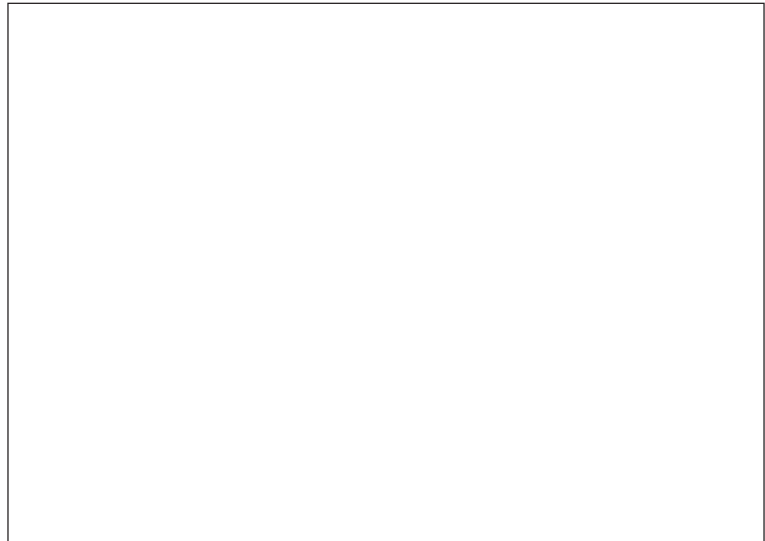


Figure 16: Free range chickens find shade in their simple coop

MECHANISATION

Mechanisation has increased efficiency of agriculture across the globe (**Figure 17**), however not all countries have been able to achieve this (**Figure 18**).

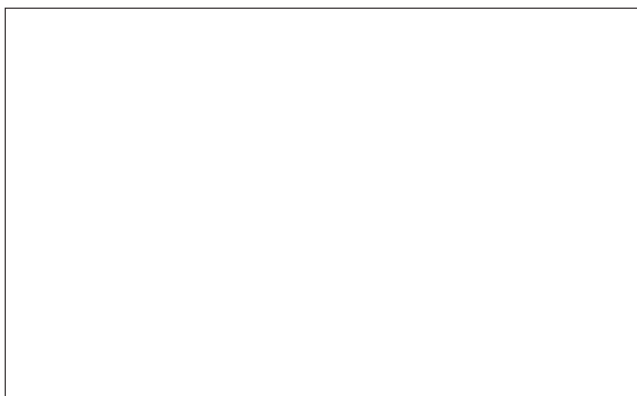


Figure 17: Harvesting oats in an enclosed, air-conditioned cab, with rotary thresher and laser-guided hydraulic steering



Figure 18: Chinese labourers harvest a wheat field in Zouping, a county in Shandong province

In Asia, reports from rural Bangladesh say landlords are having trouble getting enough labour, so they are looking to mechanise.

Similar trends can be seen in Indonesia, Vietnam and other countries.

“The food systems of the future need to be smarter, more efficient. ... Competition for resources and energy necessitates a ‘paradigm shift’ – biofuels should be part of the mix.”

José Graziano da Silva (Director-General of the Food and Agriculture Organisation (FAO)).

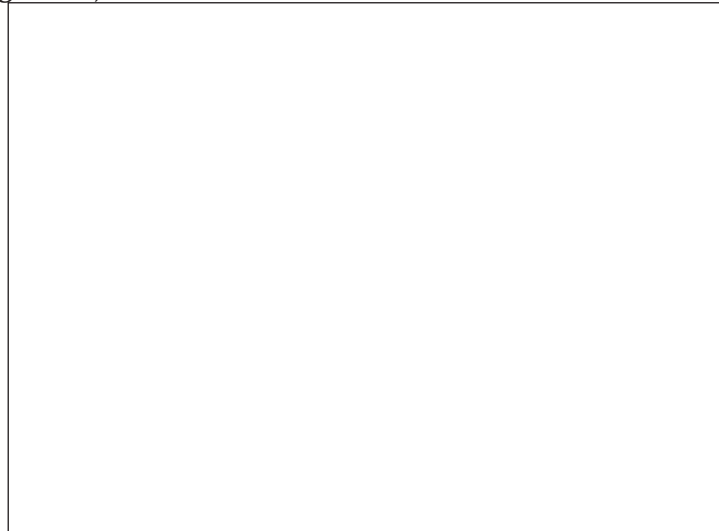
MARKETS



**Figure 19: Outdoor market
in Yangon, Myanmar**

Markets across the world are varied, and the methods of selling food and other agricultural products are indicative of the huge variety in culture, level of urbanisation and economic systems (**Figure 19**).

Cycling is faster than walking and means farmers can travel to more distant markets where their produce gains a higher price (**Figure 20**).



**Figure 20: Bicycles are being
used in Karamoja, Uganda**

“We must then build a proper relationship between the richest and the poorest countries, based on our desire that they are able to fend for themselves with the investment that is necessary in their agriculture, so that Africa is not a net importer of food, but an exporter of food.”

Gordon Brown (Former British Prime Minister).

“I feel it is an obligation to help people understand the relation of food to agriculture and the relationship of food to culture.”

Alice Waters (American chef, restaurateur, activist, author, and owner of Chez Panisse Restaurant in Berkeley, California, famous for its organic, locally grown ingredients).

A farmers’ market is a physical retail market featuring foods sold directly by farmers to consumers.

Farmers’ markets in more economically developed countries (MEDCs) are also becoming increasingly important places for people to buy products grown locally (**Figure 21**).

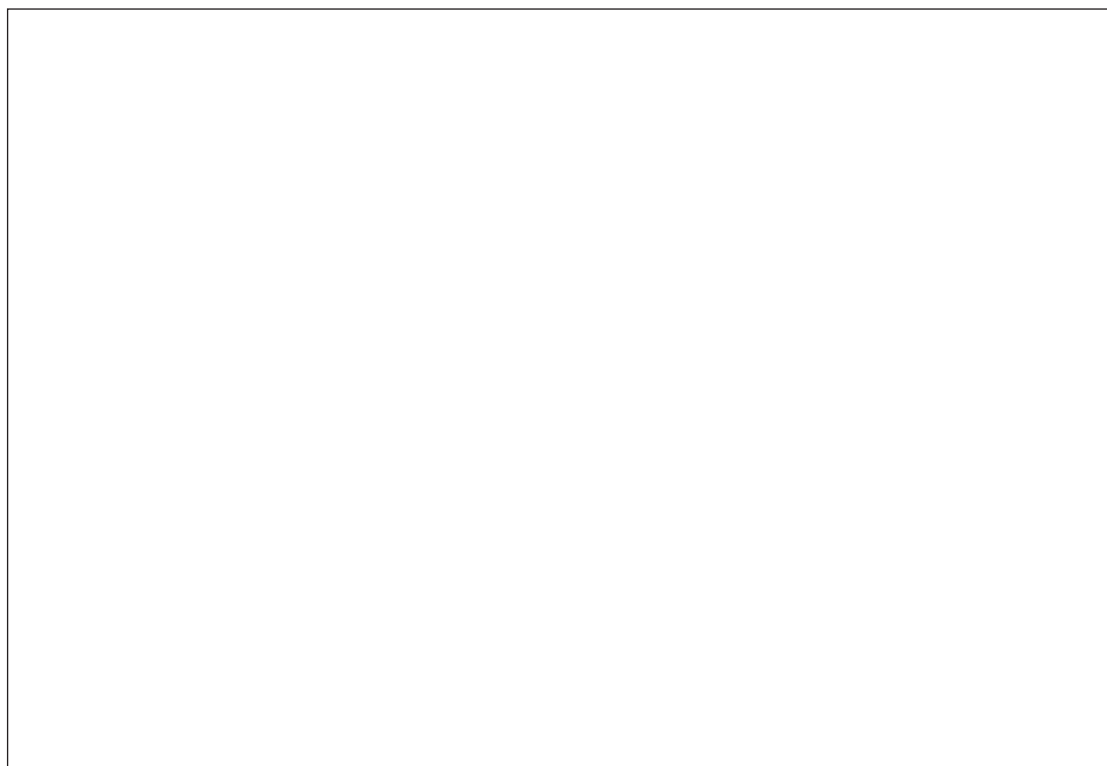


Figure 21: St. Jacobs Farmers’ Market in Ontario, Canada

“ ... the extent to which I am not self-sufficient reminds me constantly that I depend, as we all do, on neighbours – increasingly remote neighbours – to carry on for us the demanding work of food production. Because farmers keep planting and harvesting, tending trees and vines, and caring for animals and birds, none of us is required to survive on our own productive capacity.

Consequently, the invisibility of these people as the source of our food never ceases to alarm me ... ”

Joan Dye Gussow (retired professor of nutrition education at the Teachers College at Columbia University, New York and also an author, food policy expert, environmentalist, and gardener), from her book: *This Organic Life: Confessions of a Suburban Homesteader*.

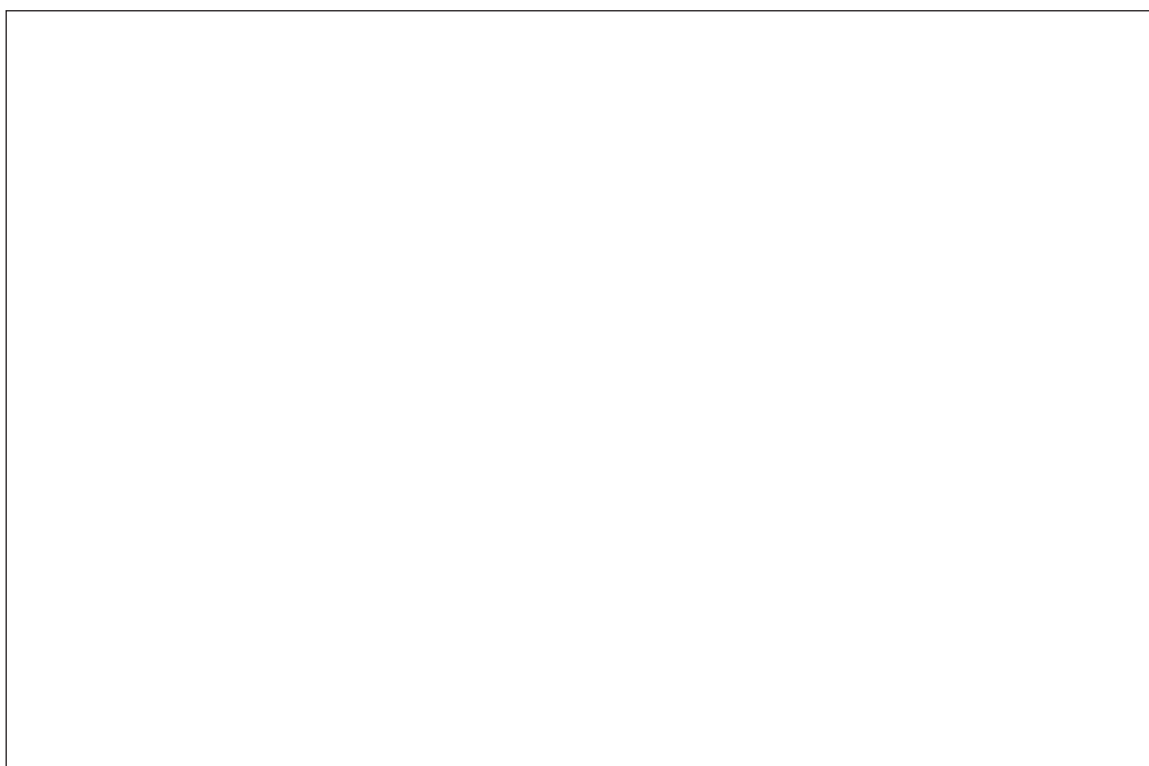


Figure 22: Packaged food items in a new Fred Meyer Hypermarket Portland, Oregon, USA

OTHER AGRICULTURAL PRODUCTS

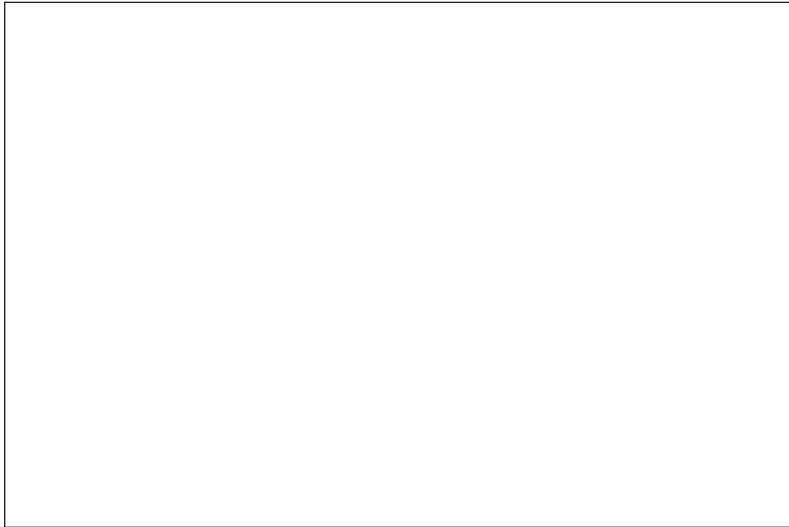


Figure 23: The Pendleton Woollen Mills

Of course, agriculture results not only in food products, but also products such as cloth, leather, wool, and cash crops such as jute and cotton.

The Pendleton Woollen Mills are an American textile manufacturing company located in Portland, Oregon, United States, and are well-known for their blankets, cloth, and woollen clothing (**Figure 23**).

The tanning industry employs many people across the globe.

Tannin is in turn named after an old German word for oak or fir trees, from which the compound was derived.

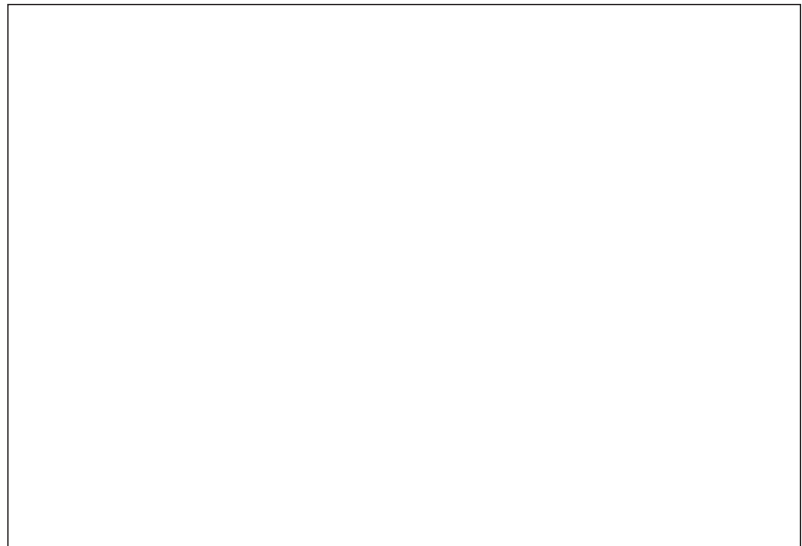


Figure 24: Fes Tanneries in Morocco

“Land degradation did not start with chemical agriculture, but chemical agriculture offered new tools for annihilation.”

Joel Salatin (Organic farmer in Virginia, USA).

AGRICULTURE AND SUSTAINABLE DEVELOPMENT

“Put farming first in Africa: without sustainable agriculture, sustainable development in Africa will remain a dream.”

Lindiwe Majele Sibanda (CEO of the Food, Agriculture, and Natural Resources Policy Analysis Network – an organisation based in South Africa with centres across many countries, whose vision is to have a food-secure Africa, free from hunger and poverty).

Civilisations have risen and fallen throughout history due to soil quality and how people manage the soil.

As the International Year of Soils (2015) draws to an end, people across the globe have been reminded about the importance of soil in their daily lives. Each month in 2015 has had a specific focus, with the last two months of the year focussing on soil climate (November), and soils, culture, and people (December).



Figure 25: Producing food for an ever-growing world population

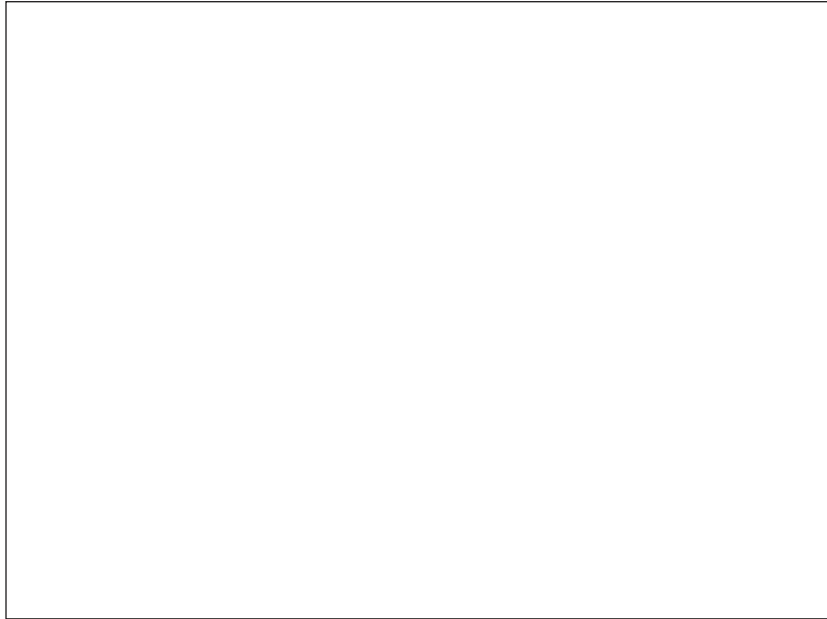


Figure 26: Sustainable yield process

Sustainable development is a process, not a singularly defined end-point to be achieved. It requires the development of technical, governance, and financing frameworks to ensure that the agricultural sector can be engaged in innovative changes in the industry (**Figure 26**).

Stewardship of both natural and human resources is of prime importance in the agricultural sector in the future (**Figure 27**).

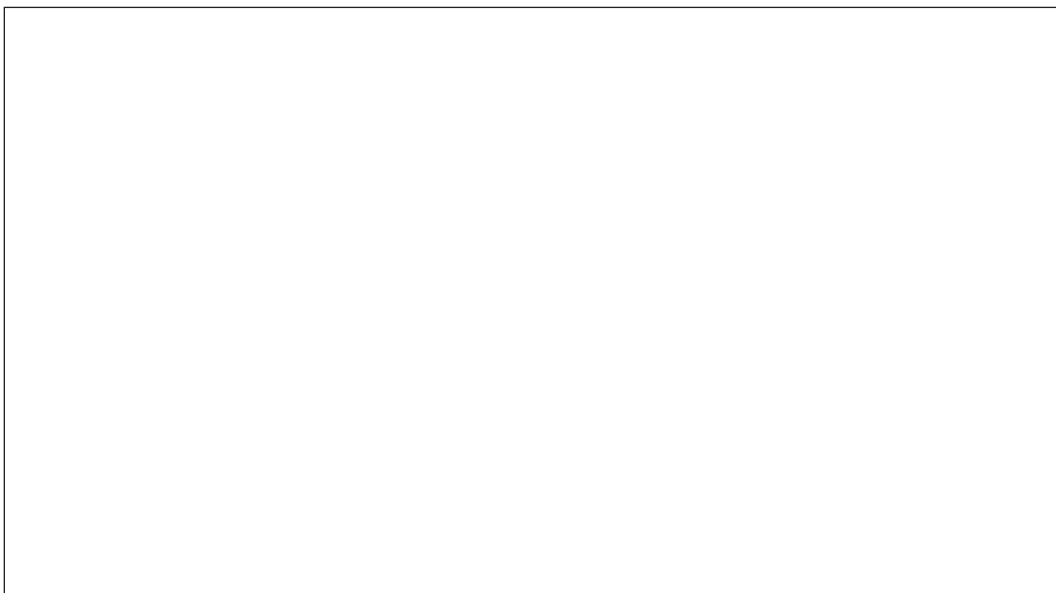


Figure 27: Stewardship of natural and human resources

“Agriculture looks different today – our farmers are using GPS and you can monitor your irrigation systems over the Internet.”

Debbie Stabenow (US Senator).

The art and science of modern agriculture (**Figure 28**) joins together global positioning and geographic information systems to develop and implement new methods of processing critical location and environmental information for precision agriculture and site-specific farming.

The GPS (**Figure 29**) enables farmers to spray, sow seeds, or fertilise their crops more efficiently. The products of TeeJet® are an example of precision agriculture. Drones are also being used to assist farmers in their decision-making.

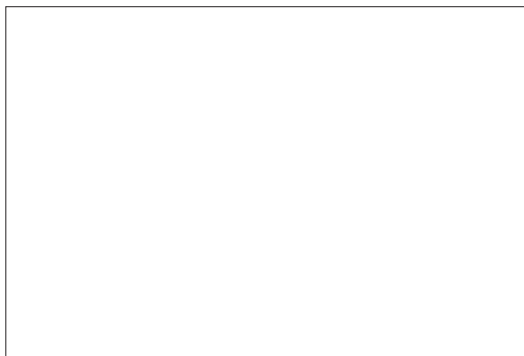


Figure 28: Global positioning and geographic information systems help create an environmentally friendly farm

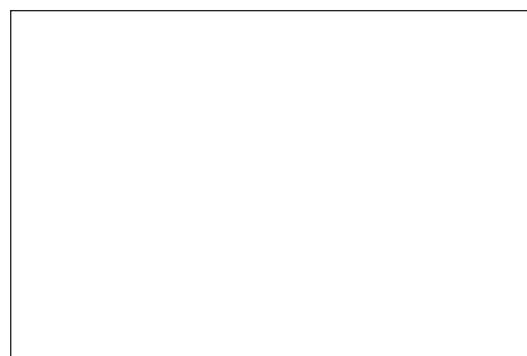


Figure 29: A GPS from American firm TeeJet® is used to guide a tractor over a field



Figure 30: Fast food vs slow food

Although recent news about 3-D printing has focused mostly on weapons and medicine, there are some other interesting applications for this technology: one of them is the production of food (**Figure 30**).

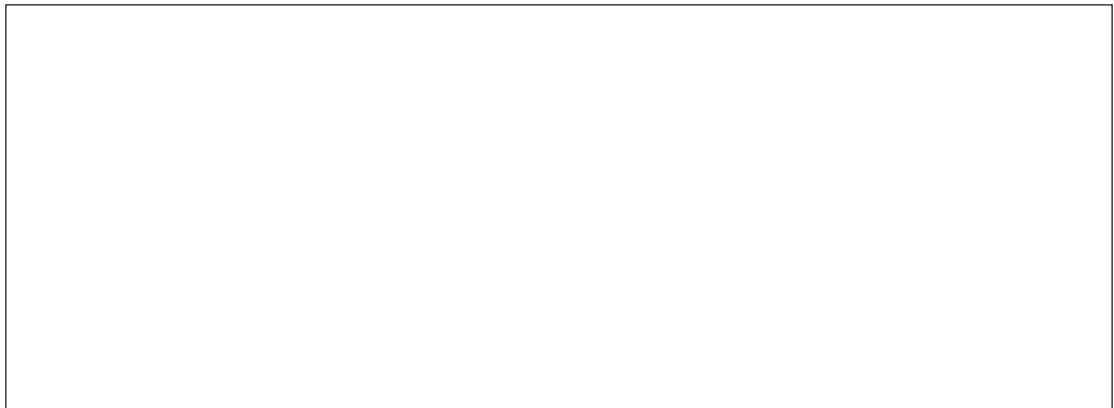


Figure 31: Sustainable development

Acknowledgements

Material from the following sources has been adapted for use in this examination.

- | Page | Source |
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