MA Ecological Anthropology SANT 512

LECTURE 7

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Topic: Food production and biotechnology

Biotechnology: Genetically Modified food

- As I mentioned in the previous lecture on biodiversity and eco-feminism the relation between food, its production, biotechnology (the merging of science and technology) and biodiversity is a complex one.
- I will focus on the relation between food production, particularly commercial agriculture and bio(technology).
- Genetically-modified (GM) food is one major outcome of technological advances.

Definition of “Genetically Modified” food

- Genetic modification is defined as “the process of altering the genes of a plant, animal or micro-organism, or inserting a gene from another organism” (food.gov.uk).
- In 2004 the European Union instituted new rules for labelling any products, both food and animal feed, that contain “genetically modified organisms.” The basis for the inclusion and exclusion of certain products is quite complicated. For example, eggs from chickens fed on GM corn do not need to be labelled but the poultry is required to be labelled as “GM”.

The “Green Revolution”

- The use of technology in producing larger amounts of food is theoretically meant to feed more people in the world, particularly in the poorest countries of the Global South with large populations and/or with high population densities.
- This was the aim behind the “green revolution” of the 1950s-1960s.
- During this period biotechnological outcomes were implemented, especially in countries of the Global South, in order to increase crop yields.

The “Green Revolution” (continued)

- The main elements of this so-called revolution were high yield varieties of maize, wheat, rice and barley, and developments in “fertilizers, herbicides and pesticides” (Willis 2005: 152).
- The beneficial outcomes of this use of biotechnology included India “achieving self-sufficiency in wheat by 1980 and Indonesia moving from being a rice importer to a rice exporter” (ibid).
- However, in reality the poorest people in poor countries do not have access to food, particularly diverse nutritional foods.

Environmental problems from the Green Revolution

- There were also serious environmental problems that arose later in these countries which included,
- - “reductions in genetic diversity, increased demand for water because of irrigation needs and pollution from agrochemicals (Barrow 1995 cited in Willis 2005: 152) and
- - “increased inequality as those farmers who could afford to participate reaped the benefits, while others were often forced to abandon their own land and become agricultural labourers” (ibid).
- This leads us into a discussion of these high yield varieties of seeds and therefore crops.

High yield crops: advantages

- As I mentioned in the last lecture, high yield varieties of seeds must be planted only with the same seeds in a monoculture but there are certain advantages to growing these seeds.
- The features of these high yield seeds include
- - photo insensitivity (whether the sun is out or not does not affect crop growth),
- - drought resistance (if there is not enough rainfall the crop will still grow),
- Lack of response to natural fertilisers (which means that chemical fertilisers must be used for crops to grow).
- Resistance to herbicides and pesticides (the crop will grow even if sprayed) which is an advantage and disadvantage.

High yield crops: disadvantages

- However, there are long-term disadvantages.
- Over time monoculture results in a decline in soil fertility since crop diversity is an important contributor to soil fertility.
- The chemical herbicides and pesticides that may be required also lead to a decline in soil fertility and destroy flora and fauna in the soil. This has a domino-like effect on the eco-system.
- These pesticides may remain in the crop and are dangerous to peoples' health.
- Lack of germination of harvest which means that farmers must buy new seeds instead of re-planting seeds.

High yield varieties and crop diversity

- Crop diversity “is also essential for protection from pest and disease because diverse populations of crops help maintain pest predator balance and diversity of plants provide ecologically safe pest control” (Shiva 1992: 212).
- One long-term health disadvantage of monoculture, as Shiva indicates, is nutritional deficiency in humans since commodity crops (meaning for export) like cereals (wheat, barley etc. as noted in the slide on the green revolution) are grown on land that was previously used for diverse high-protein crops like oil seeds, for example palm oil.
- If, as Shiva argues, seed is “the first link in the food chain” (1997: 2582) then in the long-term high yield crop “monocultures transform farmers into more consumers of purchased seed, creating dependency, increasing costs of production and decreasing food entitlements at the local level” (Shiva 1992: 212).

Food worldwide

- According to the “State of Food Insecurity in the World 2012” report, United Nations agencies estimate that there are 870million people in the world or 1 in 8 who are chronically malnourished (un.org).
- Of these, 852million are in developing countries. In Ethiopia about 12million people suffer from some form of malnutrition (there are different degrees of chronic, acute and transitory malnutrition depending on height and weight ratios, physical condition and other factors).
- Childhood malnutrition is the cause of death for more than 2.5million children in the world every year.
- Clearly there is a gap between large-scale food production and consumption.

Food security

- Food security is a priority internationally and in Ethiopia “food and nutrition security” is one of three priority areas for the current Country Programme Framework 2012-2015.
- The other two priority areas are “agricultural productivity and competitiveness” and “sustainable natural resources development and management” (fao.org).
- In Ethiopia between 2004-2010 “the agriculture sector expanded by an estimated 13 percent with per capita cereal production rising from below 150kg in 2004 to more than 213kg in 2007, and 235kg in 2010. Despite impressive improvements in yields, between 9.5 and 14million people continue to depend on safety nets and humanitarian assistance each year” (2011: 6).

Conditions for agricultural production in Ethiopia

- According to data collected by the Ministry of Agriculture, Ethiopia has “one of the highest rates of soil nutrient depletion in sub-Saharan Africa…Land degradation is further exacerbated by deforestation and poor forest and rangeland management practices, inappropriate land use planning and periodic droughts (GoE, 2010)” (cited in 2011: 6).
- The government is therefore taking “different approaches to agriculture” which entails focussing on “adequate soil moisture, moisture deficit and pastoral areas (in varied) agro-ecological zones” (2011: 9).
- In order to help in achieving certain targets Ethiopia was allocated US$51.5 million from the Global Agriculture and Food Security Program in 2011.

Major UN FAO projects in Ethiopia

- To focus on these targets the FAO Sub-Regional Office for Eastern Africa has implemented projects on “adequate soil water moisture, moisture deficit, and pastoral areas (in) the drier areas of Amhara, Oromiya, SNNPR and Tigray and the pastoral areas of Afar and Somali National Regional States. The projects cover a wide range of technical interventions ranging from policy support through livestock and crop production, to natural resource management and value chain/marketing, agribusiness and land administration” (2011: 13).

Intellectual property rights

- Intellectual property rights (IPRs), “such as patents and breeders' rights, are exclusive rights, granted for inventing something new. These exclusive rights prevent others from providing, using, distributing, or selling the patented, or "protected," product” (Shiva 2001: 13).
- Seed Acts are another way of protecting the rights to biotechnology. It means that the right to distribute and sell the seeds is only held by the company.
- Farmers who usually share their seeds with each other are no longer allowed to do this with patented seeds.

Food production and agri-business

- The reality is that commercial agriculture in both the Global South and North is largely done by large companies. One well-known example is that of Monsanto in the USA.
- Monsanto keeps expanding and buying small biotech companies as well as larger food companies. In the 1990s Monsanto bought "Agracetus, a subsidiary of W.R. Grace with species patents on cotton and soybean, acquired by Monsanto for 150 million dollars" (Shiva 1997: 2582).
- Growing food is now a profitable business. As Shiva notes, "biodiversity, food, and water are being commodified, privatized, and transformed into corporate property" (2001: 12).
- Legislation such as Seed Acts passed on national and regional bases as well as patents protect commercial interests like Monsanto.

Seed Acts and patents: impact on farmers

- In an example from Scotland involving farmers who grow potatoes and sell seed potatoes to other farmers, in the 1990s “holders of plant breeders' rights… started to reduce the acreage and reduce the prices. In 1994, seed potato bought from Scottish farmers for 140 pounds sterling, was sold for more than double that price to English farmers, whilst the two sets of farmers were prevented from dealing directly with each other. (Scottish farmers continued to sell seeds directly to English farmers and) in 1995, the British Society for Plant Breeders (filed legal charges against a farmer from Scotland). The farmer was forced to pay 30,000 pounds sterling compensation to cover royalties lost to the seed industry by direct farmer to farmer exchange” (Shiva 1997: 2582).
- Another example of these processes is a patent for “neem oil” by a large American food company, W.R Grace.

The neem oil patent: corporate theft of indigenous resources

- The "neem oil" which is extracted from the seeds of the neem tree has been used by rural women in India, but was patented by W. R. Grace (Shiva 2001).
- Vandana Shiva and other politicians, academics and activists challenged this bio-patent in the European Patent Office with the support of the European Green Party.
- As she explains, "we filed this legal "opposition" because the use of neem extracts as fungicide and pesticide has been practiced for centuries and had been investigated scientifically and commercially for decades prior to the claim to invention in the USDA-Grace patent" (Shiva 2001: 20).
- The European Patent Office eventually revoked the patent. This is one of the few success stories of protecting indigenous resources.

Organic food

- In response to the increasing public awareness of the long-term damaging health consequences of GM foods and other types of biotechnology, there is now a movement to grow food and raise cattle and poultry “organically”.
- Again this is a response to advanced technologies that are more available in the Global North than in the Global South. In the South large amounts of food consumed locally is grown on a smaller scale without using pesticides and herbicides. However, biotechnology is used on a commercial scale.

Degrees of “organic” in food labelling

- According to the United Kingdom Register of Organic Food Standards “in relation to crops, ‘organic’ refers to foodstuffs grown without the use of artificial pesticides, herbicides or fertilizers; in relation to meat, it refers to animals raised in non-intensive farming conditions, free from unnecessary medication such as antibiotics and growth stimulants, and eating feed or grazing pasture which is itself organically grown” (James 1993: 204).
- However, “other terms must be used for produce which is ‘nearly’ or ‘not quite’ organic. For example, ‘conservation grade’ is used for produce which, although it may not have been sprayed with pesticides, has been grown in soil containing certain non-organic fertilizers or chemical weedkillers…Similarly, ‘free range’ eggs are not equivalent to ‘organic’ eggs; to conform to the latter label, hens would have to eat feed which was made up of at least 80 per cent organically grown corn” (ibid).

Eating organically

- Having a largely organic diet in the Global North is now synonymous with being healthy so there are other connotations associated with the consumption of organic food.
- Allison James argues that “in the conceptual linkage of organic food consumption and lifestyle or “lifestylism” other small advertisements (in Britain) reinforce the conceptual links between organic food and lifestyle: advertisements for aromatherapy, house co-ownership, water purification systems and courses in yoga and spinning all foster a perception that the production and consumption of organic food must be part and parcel of alternative ways of living” (1993: 210).
- However, she cautions that “the rise of an organic food market cannot necessarily be seen as an indication of the integration of environmentalist principles into British culture. Organic food has been incorporated into other food discourses centred on lifestyle and health” (1993: 213).
- Remember also the economic dimension since it is more expensive to buy organic food than food produced ‘normally’ using biotechnology.

END



Required readings

- James, A. 1993. “Eating green: discourses of organic food” In K. Milton (ed.) Environmentalism: the view from Anthropology. London and New York: Routledge.
- Shiva, V. “Women’s Indigenous Knowledge and Biodiversity Conservation” In India International Centre Quarterly, Vol. 19, No ½, (Spring-Summer 1992), pp.205-214.
- Shiva, V. “Special Report: Golden Rice and Neem: Biopatents and the Appropriation of Women’s Environmental Knowledge” In Women’s Studies Quarterly, Vol.29, No. ½, Earthwork (Spring-Summer, 2001), pp.12-23.
- Shiva. V. “Biodiversity Totalitarianism: IPRs as Seed Monopolies” In Economic and Political Weekly, Vol.32, No.41 (Oct. 11-17, 1997), pp.2582-2585.

References

- 2011. Food and Agriculture Organisation Ethiopia Country Programming Framework 2012-2015. Addis Ababa: Office of the FAO Representative in Ethiopia to AU and ECA.
- Willis, K. 2005. *Theories and practice of development*. London and New York: Routledge.
- Website: un.org.

Appendix 1. “Food Inc.” (2008)

- The documentary “Food Inc.” demonstrates the connections between capitalism, particularly the rise of transnational corporations, food production and food consumption and public health.