

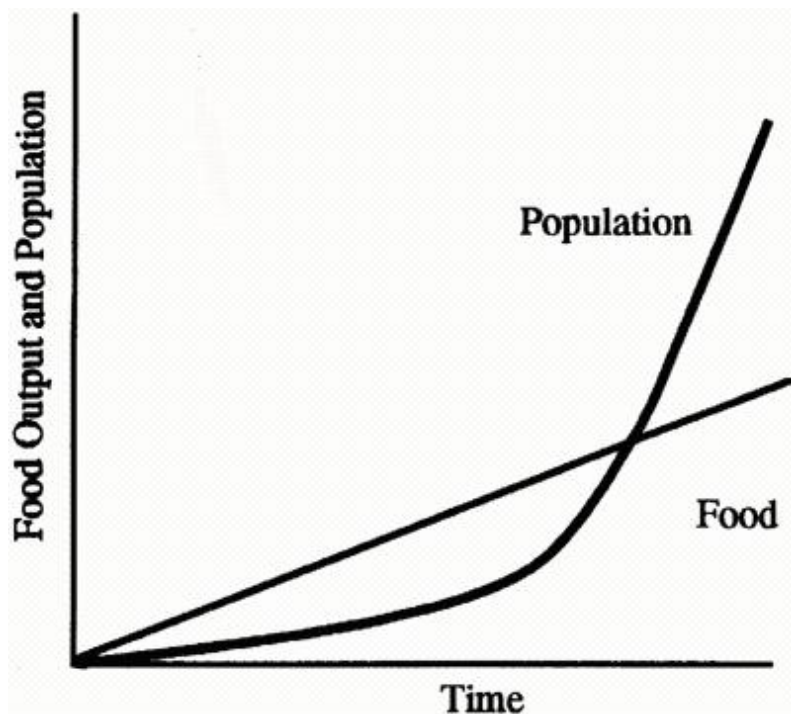
**Ester Boserup** (1910 - 1999), born *Børgesen*, was a Danish economist and writer who studied economical and agricultural development. She worked at the United Nations and other international organizations and wrote several books.

Boserup's most notable work is *The Conditions of Agricultural Growth: The Economics of Agrarian Change under Population Pressure* (Chicago, Aldine, 1965, ISBN 0-415-31298-1).

This book presented a "dynamic analysis embracing all types of primitive agriculture." In doing so, she upended the assumption dating back to Malthus's time (and still held in many quarters) that agricultural methods determine population (via food supply). Instead, she shows that population determines agricultural methods. A major point of her book is that "necessity is the mother of invention".

### **Malthus**

"The power of population is so superior to the power of the earth to produce subsistence for man, that premature death must in some shape or other visit the human race. The vices of mankind are active and able ministers of depopulation. They are the precursors in the great army of destruction, and often finish the dreadful work themselves. But should they fail in this war of extermination, sickly seasons, epidemics, pestilence, and plague advance in terrific array, and sweep off their thousands and tens of thousands. Should success be still incomplete, gigantic inevitable famine stalks in the rear and with one mighty blow levels the population with the food of the world." (Malthus's Theory)



This Principle of Population was based on the idea that population if unchecked increases at a geometric rate (i.e. 2, 4, 8, 16, 32, 64, 128, etc.) whereas the food supply grows at an arithmetic rate (i.e. 1, 2, 3, 4, 5, 6, 7, 8, etc.).

This explains the continual line of food resources and the ever increasing line of population. Rich a point that Population starts to decline due to what Malthus called Population Checks - war, starvation and disease.

One example of a supporting case study of Malthus's theory is Sudan. Sudan has long since grown out of its resources. Situated roughly in the northern east of Africa it is one

amongst many others of countries in Africa which are starving.

Surely famine is a supporting example of how population has outgrown its resources, with nothing left to eat, even with support from other countries the only thing left for Sudan is famine. For example; it now says that 2.6 million people in Sudan are in need of emergency food aid, particularly in the south, where malnutrition rates have increased to 60%. (BBC)

These facts thus support Malthus's theory and his essay on principles of population. Despite critics from fellow scientist famine now in the 21st Century exists and therefore Malthus in this one way was correct to predict what he did.

### **Back to Boserup**

For hundreds if not thousands of years, subsistence farming in LDC's yielded enough food for people living in rural villages to survive, assuming no drought, flood or other natural disaster. Suddenly in the late twentieth century, the LDC's needed to provide enough food for a rapidly increasing population, as well as for the growing number of urban residents who cannot grow their own food.

She argued that when population density is low enough to allow it, land tends to be used intermittently, with heavy reliance on fire to clear fields and fallowing to restore fertility (often called slash and burn farming). Numerous studies have shown such methods to be favourable in total workload and also efficiency (output versus input).

In Boserup's theory, it is only when rising population density curtails the use of fallowing (and therefore the use of fire) that fields are moved towards annual cultivation - she suggests this happens in two ways:

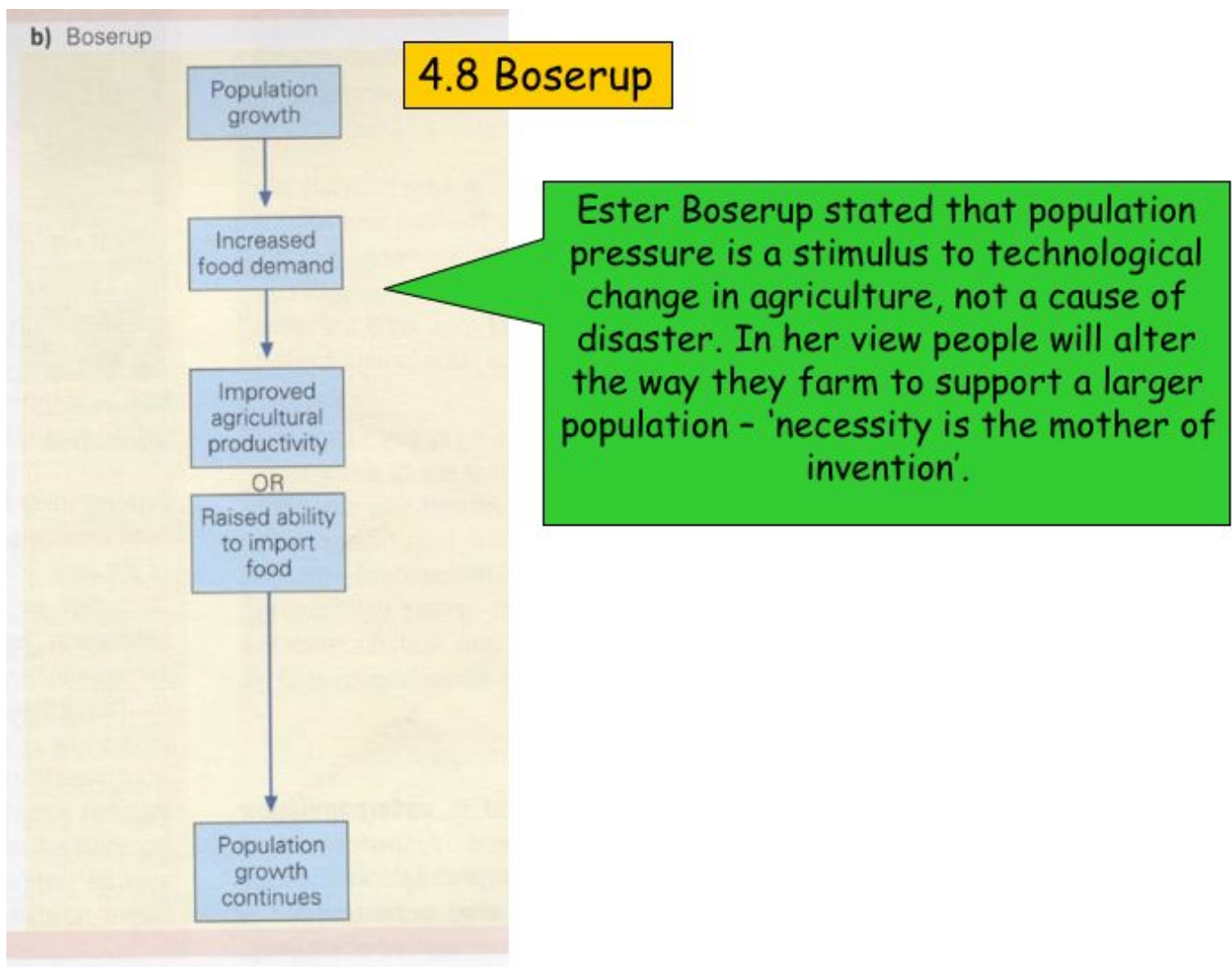
First Way - change fallow times or stages - Forest Fallow, Bush Fallow, Short Fallow, Annual Cropping, Multicropping. Contending with insufficiently fallowed, less fertile plots, covered with grass or bushes rather than forest, mandates expanded efforts at fertilizing, field preparation, weed control, and irrigation.

Second Way - New Farming Methods. These changes often induce agricultural innovation but in LDC's these changes also increase marginal labour costs to the farmer as well: the higher the rural population density, the more hours the farmer must work for the same amount of produce. Therefore workloads tend to rise while efficiency drops. This process of raising production at the cost of more work at lower efficiency is what Boserup describes as "agricultural intensification".

New Farming Methods can include:

- New Techniques - Hydroponics, weather control, improve irrigation (ground water, canals), fertilization, pesticides, herbicides, machines, Green Revolution (Hybrid seeds), GMO's, Green Houses, Desalination, stop Desertification, etc.
- New Organizations - Co-operatives, Agribusiness, Vertical Integration, Communes, Kibbutz etc.
- Land Reform - Gavelkind laws (absentee landlords), Plantations,
- Development of Marginal Lands - Greenhouses, fertilization, irrigation, Global Warming may help, etc.
- Cultivation of the Sea - Aquaculture
- Synthetic Foods - Chemicals to simulate, replicate food. EG. Cool Whip - no milk.

## Question of nutrition.



Boserup's idea is based upon field studies in Southeast Asia and she developed her idea under a number of assumptions. "The Green Revolution in Asian countries using HYV (hybrid) seeds from Mexico & the Philippines are seen as evidence to support Boserup. Food production in India has been rising faster than population in the 80's and 90's".