Spatial Layout and Division of Agricultural Land

- The pattern of agriculture on the landscape is a variable of different physical and cultural elements that come together in a number of ways. They include:
  - Climate, landform, soil and water resources.
  - Local customs, legal restraints, economic factors, technological abilities, government regulations and religious tenants.
- The size, preparation, use and resultant visual patterns of agricultural fields varies with culture groups, economic systems and commodities.

Field Patterns of Vietnam

- Mu Chang Chai
- Bac Son Valley
- Mekong Delta
- Central Highlands

Von Thünen Model

- Johann Heinrich von Thünen: a town-based farmer and economist.
- He noted that as one moved away from the town, one type of commodity or crop gave way to another.
- His model is often described as the first effort to analyze the spatial character of economic activity.

- The greater the distance to market, the higher the transport costs. Also the greater the daily distance to field sites, the more time-consuming the chore would be (travel time) and the less time the farmer would have to do other things (time-distance principle).
- These factors must be added to the cost of producing a crop or commodity and therefore the price charged for it.
- Even when agricultural production does not conform to the concentric rings of the model, his underlying concern with the interplay of distance, time, land use and transportation costs still is a factor in today’s agricultural patterns.

Von Thünen Model applied to Agricultural Land Use

- The concentric rings represent the ideal of equidistance from the farm house (base).
- Daily chores (attention) needed to be close to the base while those commodities that required minimal or sporadic attention could be located further away.
Von Thünen's Model applied to Agricultural Land Value

- This model was also applied to the cost of land.
  - Land uses are a function of differing "rent" values that reflect cost of overcoming distance to a market town.
  - Land close to markets is used intensively in small units for high-value crops
  - Land far from markets is used extensively in larger units for low-value crops

- Reminder: This model was developed in early 19th century when transportation systems were less efficient (slow) and product preservation was difficult.

Time-Distance Variables with Transportation Added

Spatial patterns of land use, land value with transportation.

- Road and rail connections increase the distance without increasing time spent traveling.

Relevance of Von Thünen's Model to Present Conditions

1. New and more accurate models of transportation are available
2. Transportation costs do not always vary similarly in all directions
3. Refrigeration has prolonged the life of perishable commodities like milk and vegetables
4. Firewood is no longer the major fuel and wood no longer essential.

Aspects of the model can be seen in the agricultural pattern of small developing countries where the focus is on a main city or port and where the transportation network is limited.

Shapers of the Visual Landscape

- Agricultural Landscape
  - Cultural appearance of agricultural areas including field pattern, crops and products, techniques, buildings, transportation.
- Cadastral Pattern
  - The shapes formed by property borders, the pattern of land ownership.
- Survey Patterns
  - Original land survey patterns imposed by government regulation or large land owners.
- Hamlets
  - Small rural settlements that house local farmers.
- Field Pattern
  - Sub-division of land for agricultural use: may be dependent on cadastral and survey patterns
- Field Sectioning
  - The visual separation of agricultural spaces: result of methods used to enclose or protect space.

Agricultural Landscape

View includes:
- Roads
- Survey pattern
- Hamlet
- Field pattern
- Field sectioning (Can't see legal property lines)
Rural Cadastral Plans

Plat showing numbered properties in rural France.

Named property owners with fields Chesterfield County, VA, USA

Land-Survey Patterns

English Metes and Bounds land division

Small house-lots

Land-Survey Patterns

American rectangular land division

European long-lot land division

HAMLETS

Hamlets are a concentration of living quarters along a road close to the fields. They are smaller than villages and usually do not provide residents with essential services. Fragmented land holdings are common around the world. Farmers own land in different venues to get the benefits of a location (good soil, pasture, woodland, access to water). Scattered holds are not efficient and can lead to conflict between farmers.

Commons

A public area "held in common" and used by all residents, usually for grazing animals, gathering wood, hunting or fishing.

A collective farm, commune or kibbutz is an extension of this concept.

Rural Settlement Landscapes

Commons

English rural layout with "common" lands

Newcastle, UK

Salem, MA
**Field Patterns**

http://earthobservatory.nasa.gov/IOTD/view.php?id=6605

**Artificial Landscapes**

- **China** – Reclaimed field
- **Libya** – pivot irrigation in desert using well water
- **Arizona** – Desert irrigated with water brought in from afar
- **Viet Nam**
- **Israel** – Drip irrigation in Negev desert
- **Egypt** – Oasis based agriculture
- **Netherlands** – Polders reclaimed from the sea

**Infrared satellite image of the US-Mexico border area (red = healthy vegetation)**

**Artificial Landscapes**

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**Field Sectioning**

Any agricultural landscape will have partitioned areas which are readily apparent when viewing it (as seen in previous illustrations).

These areas may be created by roads/paths, fences/barriers, methods of cultivation, the types of crop grown (colors and heights) or the commodity raised (plants and animals).

Fences and other types of barriers are very common partitions especially in more densely populated area.

**Fences**

Various structures have been created to separate fields and land uses.

- Construction method and composition varies with culture group and materials available.
- Common materials: wood, stone and live dense vegetation (hedge)
- Techniques include: digging trenches and moats and building raised ridge-lines.

Main purpose of using fences and barriers is:

1. To keep livestock in and predators out.
2. To keep pests out.
3. To prevent trespassing and/or theft.
4. To demarcate ownership of property.

**Forms of Field Separation**

- Wood
- Hedge
- Stone
- Barbed wire
- Metal
- Trenches and moats
Worldwide Food Security

National Research Council of the U.S. National Academy of Sciences identifies four major issues that affect food security worldwide:

1. Varying abilities to balance production and consumption across regions and countries
2. Accelerating conversions of agricultural land to urban uses
3. Increasingly energy-intensive food production methods in a world of shrinking fossil fuel resources
4. Expanding use of food crops for biofuel production

The Challenge of Feeding Everyone

- Food deserts are areas with limited access to fresh, nutritious foods. Worldwide, about 1 billion people are malnourished.
- Inadequate distribution systems and poverty prevent surplus food supplies from being sent to where they are needed.
- Monocropping for profit has replaced traditional garden agriculture in many areas.
- Luxury crops are non-subsistence crops (such as tea, cacao, coffee, spices, tobacco, cola, poppies, etc.) have high demand.
- Some of the most fertile, productive farmlands have been lost to expanding cities.

Local-Global Food Provision

- Through the centuries exploration, colonization, globalization have created new regional cuisines.
- Fresh fruits/vegetables are now available year-round. Exotic products can be shipped anywhere in the world for a price.
- But have resulted in decreased biodiversity, abandonment of local crop varieties, and market prices too low for subsistence farmers to survive on.

Environmental Issues Facing Agriculture

- Sustainability of agriculture
- Intensity of land use
- Land clearing and deforestation; soil erosion
- Use of chemical fertilizers and pesticides
- Desertification – water diversion
- Organic agriculture – low output at higher cost
- Biofuels and horticulture – replacing food grown for humans
- Invasive species – plant and insect
- Overfishing – depletion of supplemental food resources

NEXT

URBAN GEOGRAPHY and CULTURE