

Agriculture in multiple independent centres

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Core question

How did some human communities move from exploiting wild ecologies toward sustained relationships in which plant populations, landscapes and human societies changed together?

Historical and evolutionary context

Agriculture did not originate once and then simply diffuse everywhere. Archaeological and genetic evidence supports multiple centres or regions of domestication and food production, including Southwest Asia, China, New Guinea, Mesoamerica, the Andes and parts of Africa and eastern North America, although the timing, independence and boundaries of particular centres remain debated.

The chronologies are not simultaneous. In Southwest Asia, cultivation and domestication developed across the terminal Pleistocene and early Holocene, broadly around 11,500-10,000 years ago. In China, domestication trajectories involving rice and millets extend through roughly the ninth to eighth millennia before present. In Mesoamerica, plant management began early in the Holocene and maize domestication is generally placed by about 9,000 years ago. At Kuk Swamp in New Guinea, cultivation is evidenced by about 10,220-9,910 calibrated years before present and agriculture by at least about 6,950-6,440 years ago. Eastern North America later developed an indigenous crop complex during the mid-Holocene. African and Andean trajectories likewise unfolded on their own regional timescales. These ranges are deliberately approximate because “cultivation”, “domestication” and “agriculture” do not begin at a single archaeologically crisp moment.

This matters because agriculture is often told as a single “Neolithic Revolution.” In reality, cultivation, sedentism, domestication, storage and dependence on crops can appear in different orders and over long periods. Plant domestication is an evolutionary process produced through repeated human selection, harvesting, sowing and landscape modification rather than a single act of invention.

What could communities know before agriculture?

Foragers possessed detailed ecological knowledge of plant distributions, seasonality, soils, rainfall and regeneration. PIO therefore does not treat farmers as the first people to understand plants. The transition is instead about changing the **feedback loop between knowledge and reproduction**: humans increasingly altered which plants reproduced, where they grew and which traits became common.

What changed?

Cultivation makes future yield partly dependent on present action. Sowing, transplanting, weeding, irrigation or selective harvesting link decisions across seasons. Domestication then alters plant populations genetically over generations.

The epistemic change is profound: communities must track delayed consequences, distinguish seed stock, coordinate labour and often develop new storage and territorial practices. Knowledge of weather and seasonal cycles becomes increasingly tied to planned production.

Why could this capability emerge?

No single cause explains agricultural origins globally. Post-glacial climatic change, local population dynamics, resource abundance, social competition and niche construction all appear in different models. The correct historical approach is plural: similar broad outcomes arose under different ecological and cultural conditions.

Ancient DNA from the Near East also shows that early farming populations were not a single homogeneous people. Distinct regional groups contributed to later agricultural expansions and mixed over time.

What later forms of knowledge did it enable?

Agriculture supports denser settlements, food storage, labour specialization and eventually many institutions discussed in later PIO entries. It also creates new experimental environments: crops are selected, soils altered and irrigation systems maintained across generations.

New limits and risks

Agriculture can reduce dietary diversity, increase infectious-disease exposure in dense settlements and create dependence on a narrower ecological base. Surplus can support specialists but also hierarchy, taxation and coercive control. Agricultural knowledge is therefore not equivalent to universal improvement.

What changed in the architecture of human knowledge?

Knowledge became increasingly **prospective and intergenerational**. Communities acted on models of biological systems whose full consequences appeared months, years or generations later.

Loss, exclusion and uncertainty

The category “agriculture” can obscure mixed economies and long transitional periods. Archaeological visibility is uneven, and older narratives have often privileged the Fertile Crescent. PIO explicitly treats independent developments and regional trajectories as first-class historical cases.

Dependency map

- INDIRECT ← PIO-007 Indigenous landscape management and controlled burning
- PARALLEL ← PIO-008 Pottery, containers and controlled transformation
- PARALLEL → PIO-010 Animal domestication and pastoral knowledge
- INDIRECT → standards, calendars, accounting and state coordination

References

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