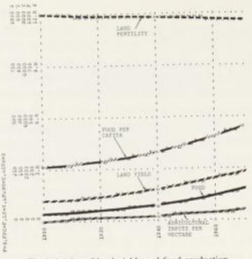
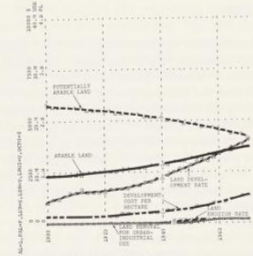


A. The behavior of land yields and food production

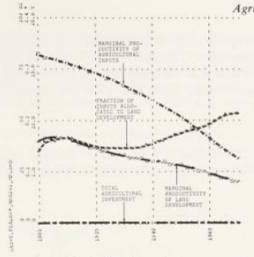


B. The behavior of arable land

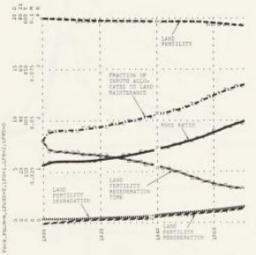
Figure 4-69 Run 4-1: historical run

Run 4-1B shows that arable land AL increases as more and more potentially arable land PAL is developed. As the level of PAL decreases, development costs per hectare DCPH increase, but not enough to stop the development of more land each year. The land erosion rate LER and land removal for urban-industrial use LRUI remain small during the historical period.

Run 4-1C shows how the model's decision to invest in land development or in more agricultural inputs was made over the historical period. Since the marginal productivity of agricultural inputs MPAI is greater than the marginal productivity of land development MPLD, a larger fraction of the total agricultural investment TAI is used for more intense cultivation of existing arable land rather than for land development. The marginal productivities of both agricultural inputs MPAI and land development MPLD fall slightly over the period, due to the onset of diminishing



C. The allocation mechanism



D. The behavior of land fertility

returns. The ratio of the two marginal productivities is not greatly changed, however, so that the fraction of investment allocated to land development FIALD changes only slightly (from 15 percent to 20 percent). Total agricultural investment TAI is actually growing exponentially, but the growth pattern is not evident in this plot because of the large vertical scale chosen for this variable.

Run 4-1D shows that the rate of land fertility regeneration LFR is always slightly lower than land fertility degradation LFD over the 70-year period. This discrepancy causes a small decrease in land fertility LFERT, despite the increasing fraction of agricultural inputs allocated to land maintenance FALM. The increase in FALM is caused by the rise in the food ratio FR—as food becomes more plentiful,