will increase twice as rapidly as in Run 6-4. Thus the persistent pollution assimilation rate PPASR is always lower in Run 6-8 than in Run 6-4, and the upper limit to PPASR is cut by 50 percent to 12.5 times the 1970 level. Because of the lower PPASR, PPOLX grows more rapidly in Run 6-8 than in Run 6-4. The time of the maximum damage to life expectancy LE and land fertility LFERT occurs only 10 years earlier in Run 6-8 than in Run 6-4, however, and the basic mode of behavior is unchanged.

Run 6-9 (Figure 6-36) assumes that an increase in the accumulated level of persistent pollutants has no deleterious effects whatsoever on the assimilation half-life AHL. Thus AHL remains constant throughout Run 6-9, which means that there is no upper limit to the rate at which persistent pollutants can be assimilated by the ecosystem. Therefore, PPASR continues to grow throughout the model run, and PPOLX is significantly lower after the year 2000 than in Run 6-4. When no interference with the assimilation process is assumed, PPOLX grows at the same rate as PPGR, more slowly than in the reference run, and the severe pollution crisis observed in Run 6-4 does not occur within the time frame of Run 6-9. While the lower rate of persistent pollution growth in Run 6-9 is still sufficient to decrease LE and increase LFDR

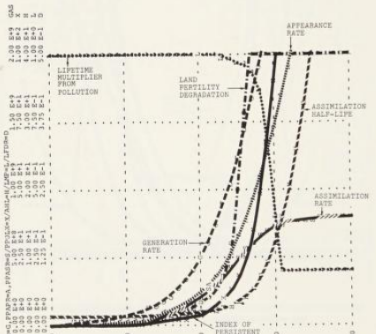

Figure 6-35 Run 6-8: behavior of the pollution sector when the assimilation half-life is assumed to increase twice as fast with a rising index of persistent pollution

within the 200-year time horizon of the model, the differences between Runs 6-9 and 6-4 are significant. Clearly, it is important to gain a better understanding of assimilative processes and limits in the real world.

The basic pollution crisis behavior mode shown in Run 6-4 is caused by continued increases in the rate of generation of persistent pollutants, coupled with an assumed limit to the rate of assimilation of those pollutants. This basic mode was altered significantly by only one of the five changes presented in this section. Only the change made in Run 6-9 affects one of the two basic causes of the pollution crisis. However, assuming that AHL does not increase with PPOLX is more than a simple parameter change: it is in reality a structural change that removes the positive feedback loop relating AHL, PPASR, and PPOL. The removal of this feedback loop implies that there is no finite limit to the rate of assimilation of persistent pollutants. It implies that the assimilative processes of the global environment could deal with a molecule of persistent material as effectively in the presence of 100 times the 1970 level of pollution as they did in 1970. With this assumption Run 6-9 shows that the growth rate of PPOLX is significantly reduced, confirming the general rule that changes in the feedback-loop structure of a dynamic model have a greater effect on a model's behavior than simple parameter changes.

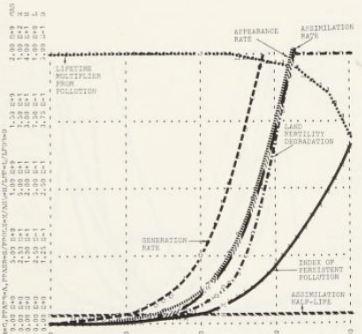

Figure 6-36 Run 6-9: behavior of the pollution sector when the assimilation half-life is assumed to be constant