

Exploring the scenario of a Gold Mine Boom in SW Ghana

Brief description model

The landscape selected for the model was the Wasa Amenfi West district where all participants had activities. Before the actual model-building was started the participants all listed their objectives and current activities in the landscape. The major sectors of the model, containing those features related to the participants' objectives are shown in Figure 1. The governance sector is related to certain scenarios like the mining boom which according to the participants could only happen under bad governance. The wildlife box contains some locally important (like cane rat and duiker) and globally important (like chimpanzee) wildlife species. However, since there is no ecological survey done for the moment nor is there an indication of the state of these populations (increasing/stable/decreasing) this sector is left aside.

The sectors 'land uses', 'population dynamics', 'cash income' and cocoa production are discussed in more detail here below.

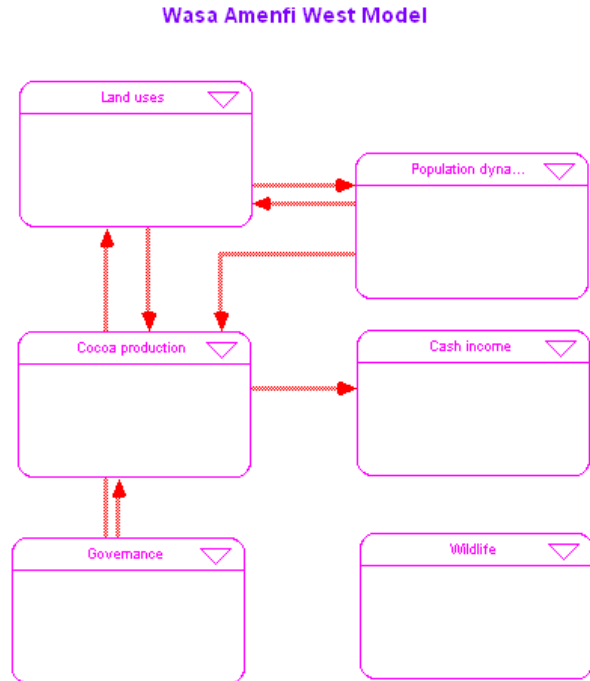


Figure 1. Wasa Amenfi West landscape model sectors: land-uses, population dynamics, cocoa production, cash income, governance and wildlife

Land uses sector

The modelling started off describing the major land-categories in the Wasa Amenfi West district and describing which land-use might be converted into which other land-use in the future and what are the driving factors behind this conversion. This resulted in the land use sector of the model shown in Figure 2, where many conversions are driven by increasing population pressure on the land (the conversion of fallow to other crops or cocoa, and the conversion of primary and secondary forest to cocoa). Therefore, the conversion per year is calculated as a function of 'total population' (see in Figure 2) whose dynamics are calculated in the population dynamics sector of the model. Note that only the conversions which were found likely to happen in the future are specified in this model. E.g. Fallow land should convert into secondary forest outside the reserve after a certain number of years though since the pressure on this land is high, none of the participants thought this was likely to happen.

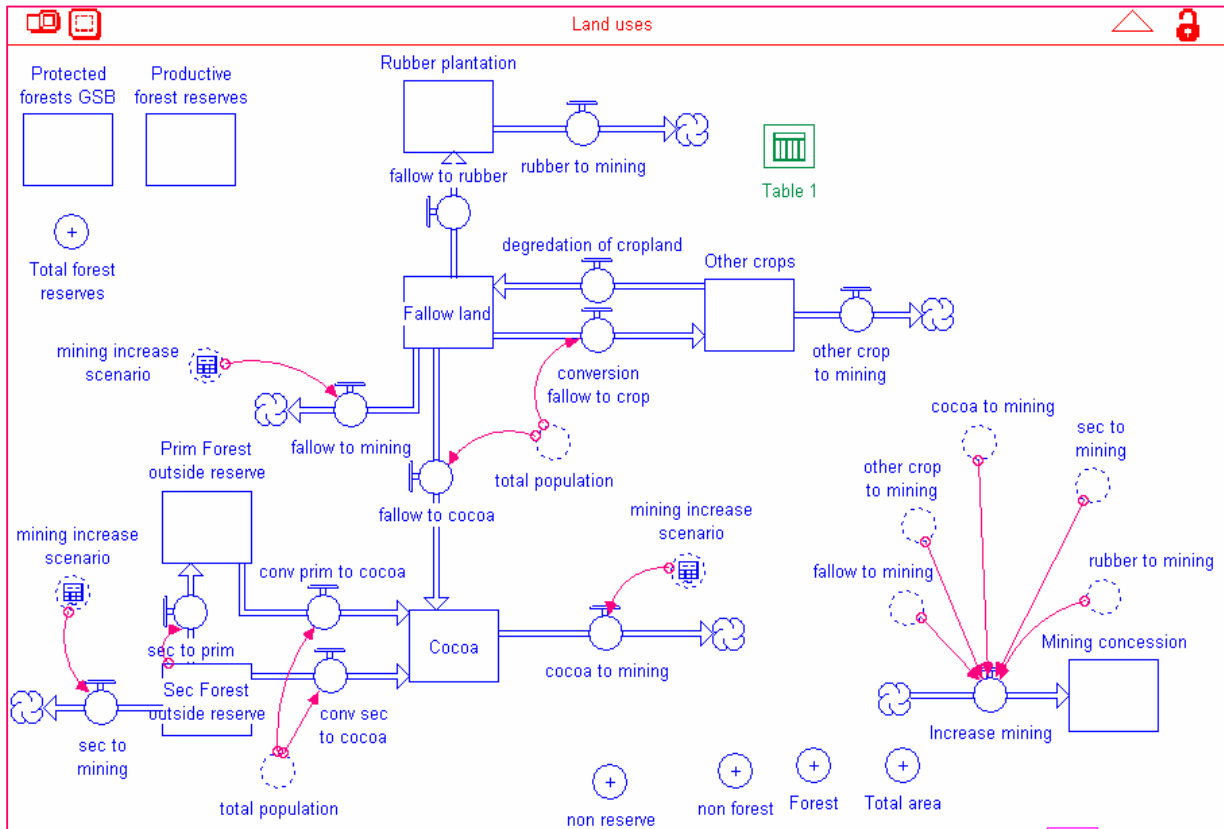


Figure 2. The 'land uses' sector of the Wasa Amenfi West landscape model describing the main land categories and the expected future conversions

The only scenario explored so far is the scenario of a boost in mining between 9-13 years from now where the simulation assumes 10% of the total land of the district to become a mining concession (the neighbouring zone of Tarkwa was taken as a realistic example for these numbers). In figure 2 we see mining is a potentially important driver of land-use change ('mining increase scenario'), which can confiscate land in whatever category as soon as gold is found on it. Under the mining boom scenario 30% of the simulated mining expansion of 35,000 ha in the district is taken from the three main land-categories: cocoa, fallow and secondary forest outside the reserve.

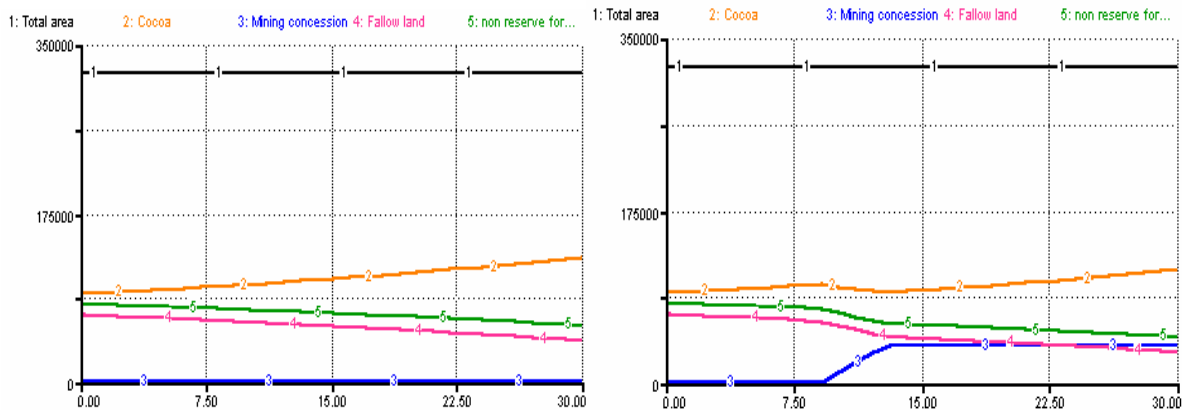


Figure 3. The output graphs showing expected land-uses changes under 2 scenarios, left being business as usual, and right being a mining boom in year 9-13 of the simulation

Population dynamics sector

When looking at population dynamics a distinction was made between migrants and local people, mainly because their income levels are thought to differ as well as their land tenure status (migrants normally 'lease' land from local land owners sharing the yields thereafter). Current population size and birth and death rates are obtained from a 2000 population census and extrapolating the rate of increase between '84-'00 gives a current population density of 50-60 people/km². Current annual immigration is estimated: the participants expected immigration to decrease in the next 30 years to almost zero since the land is almost entirely divided now (though there is still plenty land available under the leasing arrangement). The mining scenario was expected to result in an out-migration of migrants losing their cocoa land and moving on (between year 9-13 of the simulation). The participants did not expect to see a significant immigration caused by mining since they state the number of jobs for surface mining is very low, though we agreed to search for employment numbers in literature to verify this. The current population output graph is shown in Figure 4.

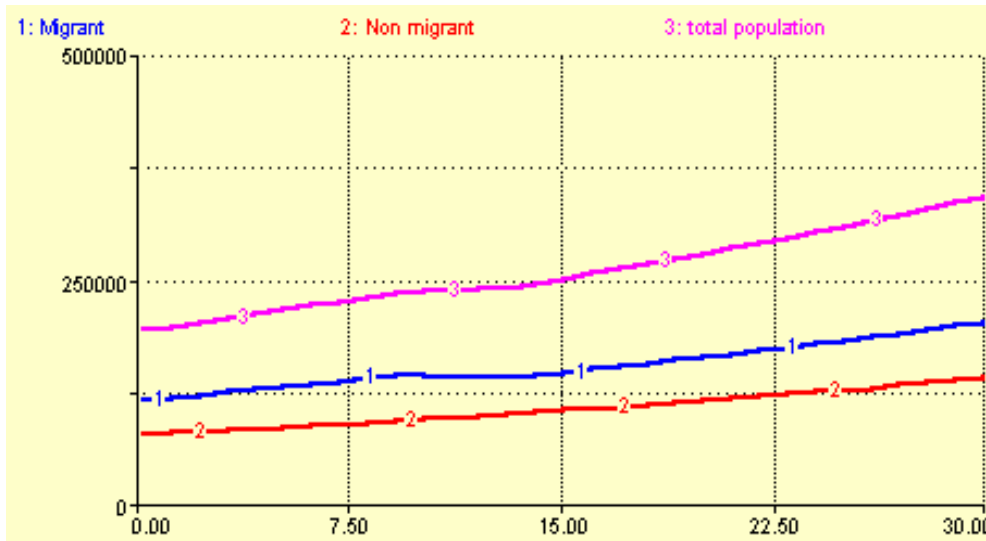


Figure 4. Expected population dynamics for the Wasa Amenfi West district

Cocoa production and cash income

It became obvious from the modelling and from the assessment of local poverty criteria that cocoa was the most important income source for the population, being rich or poor according to local standards is determined by the amount of hectares of cocoa you have. The participants estimated cocoa to contribute at least 85% of the average household income in the district. However, the population is expected to increase faster than other land uses to be converted into cocoa and this being true would mean income from cocoa would decrease in the future. However, new cocoa hybrids are introduced and fertilizer subsidized enhancing the cocoa yield and the participants expect new technologies to keep evaluating and enhancing the production. We explored what would happen with the average cocoa income per household throughout the simulation and the results are shown in Figure 5

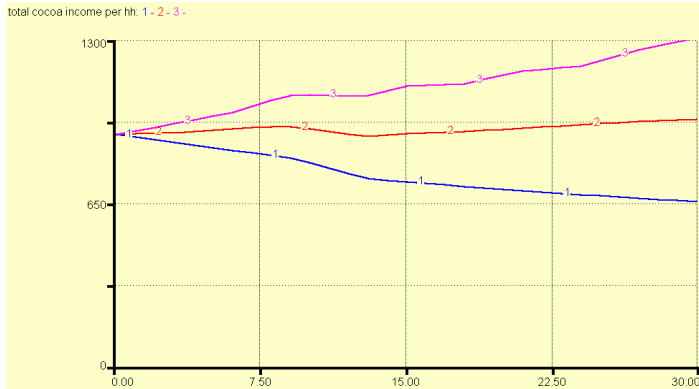


Figure 5. Average cocoa income per household under the mining scenario assuming constant yields per ha (blue), yields increasing with 50% per ha over

Data shortcomings

Most of the basic data for the model was actually missing. To start with, only the total area of the district and the reserves was known with precision, but no data was available on forest cover, total cocoa plantation area, total rubber plantation area, other crops and fallow land. As stated before, no monitoring data on wildlife population assessment was available, the only information was whether a species was present or not present in the district. No household surveys to our knowledge had been realised in the district giving basic socio-economic data like average household income or average household size. There was though the population statistics available from a census in 2000.

It was briefly discussed whether LLS could assist in setting up baseline inventories but no concrete proposal has been thought through yet.

This workshop took place from: 25/07/07 – 4/08/07

Institutions involved: IUCN, CARE, ICA (Institute of Cultural Affaires), Ministry of Agriculture

Purpose: Building scenarios addressing tradeoffs between conservation and development in SW Ghana in the frame of IUCN's LLS (Landscapes and Livelihoods Strategy)

Highlight: A model was build assuming a gold mine boom to occur in 9 years from now and its impact on forest cover and household income was simulated.

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