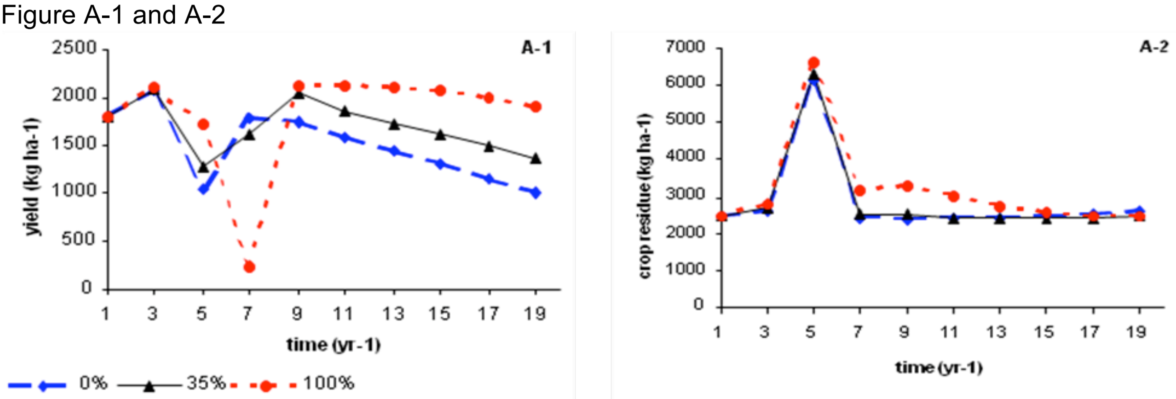
**Appendix.** An example of the use of models to predict sustainability in small farming systems under conservation tillage in the Purepecha´s highlands, México. The model was APSIM (Keating et al. 2003; www.apsru.gov.au). In discussions and workshops with stakeholders, scenarios were constructed comprising three levels of maize forage left over the soil -hereafter named "crop residue retention"- (0%, 35% and 100%), in a maize farming system. Two sustainability attributes were explored through maize yield and crop residues modeled for 20 years under different weather sequences. Figures A-1 and A-2 show the resilience of the system, i.e., the ability to recover from an abrupt perturbation. This was tested by using a weather file with one 'stress' year of low precipitation (884 mm $yr^{-1}$) (year 5, the third cropping year) in a 20 year weather sequence. It can be seen that in the year of stress, the 100% crop residue retention system yields are the best of the three management types. However there is a fall of maize yield in the first cropping year after the stress year, namely year 7, after which maize yields go up again and stay higher than yields from the 0% and 35% crop residue retention systems. This fall in yields is due to nutrient immobilization. Figures B-1 and B-2, illustrate the adaptability of the systems, i.e., their ability to cope with new long-term environmental conditions, illustrated in this case through a weather sequence with decreasing amounts of precipitation. The 100% crop residue retention management shows very fluctuating yields and crop residue production between years. After a very low maize yield and a relatively low crop residue production in year 5, the 100% regime produces higher yields and crop residues than the 0% or 35% residue retention systems (Speelman 2004).

Figure A-1 and A-2




Figures B-1 and B-2