Global climate change

The impact of global climate change to the region has been defined as an increase in the uncertainty of rainfall. This will include an increase in the frequency of floods and droughts, with the associated human catastrophe. During 2002-2003 we have already witnessed the impact of drought on the regions of northern Zimbabwe and Zambia, where famine is rife. This pattern is not however mirrored throughout the region, as above-average rainfall has been experienced by the eastern and southern portions of South Africa.

One of the well-known impacts of climate change is the increased CO_2 levels in the atmosphere. This has precipitated a debate on the impact of elevated CO_2 on the balance between woody C_3 shrubs and C_4 grasses. There is clear and unequivocal evidence of an increase in woody shrubs throughout the sub-continent. This evidence has been building up for many years with the earliest accounts of increased woody shrubbiness being provided in the 1950's. The photographic record from position-exact photographs shows that woody shrub encroachment has occurred throughout the region. Efforts to halt the process using herbivory (increase in goat numbers), burning and herbicides has largely been unsuccessful and ecologists have looked for explanations for the process. (Bond and Midgley (in press) argue that the increased CO_2 levels have provided the C_4 shrubs with a competitive advantage over the C_4 grasses. These shifts in the structure of the vegetation mean that the type of herbivore using the vegetation is changing. There are more goats and browsing wild ungulates (kudu, impala, bushbuck, duiker) than previously recorded. Although no obvious decline in the total grazer population is evident at present, there has not been an increase in the consumption of beef products, whereas there is an increase in the consumption of other protein sources (poultry) as the human population has increased.

One of the ways of managing global climate change and its impacts is to better understand the climatic uncertainty.Using the data from the NOAA AVHRR sensor, we developed an image (Plate 19) which reflects the uncertainty of annual production throughout the region. This image shows that inter-annual variation in production is a serious concern in the western regions of South Africa, the central region of Botswana, and coastal zone and southern portions of Namibia.

Livestock owners in these regions have to have well-developed strategies for coping with these uncertainties in production.

Desertification

Desertification in the region is a serious problem, with much of the western side being subjected to changes in production as a result of land degradation. In the region, there are a number of processes operating which affect the land's ability to sustainably produce forage for livestock and wild herbivores. The first of these is woody encroachment which has been mentioned previously. This continues to reduce the production potential of rangeland throughout the region, replacing grassland with undesirable woody species. Nutrient loss through soil erosion is another major problem in the higher rainfall regions, with evidence of re-distribution and loss of nutrients on land under communal tenure (Plate 20).

There have been admirable efforts made to encourage communities to continue living in the deserts of the south west, making the most of the eco-tourism opportunities which these deserts provide. Special mention must be made of the success of the initiatives in Namaqualand, the Namib and Botswana, where local communities have been encouraged to develop sustainable farming and eco-tourism practices.