Assessment of Land Use/ Land Cover Changes Using Multitemporal Satellite Imagery (South Darfur, Sudan)

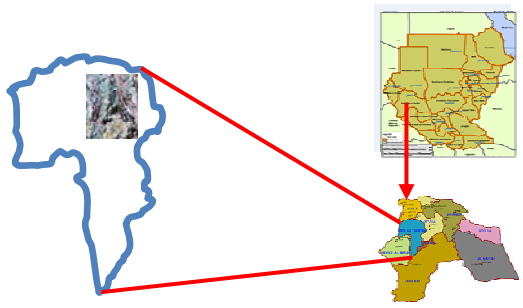
Masarra Bashir, Elmar Csaplovics

Introduction

South Darfur lies in a region that suffers from the significant impact of environmental degradation. Overgrazing, deforestation and over-cropping have caused the poor soil in the area to deteriorate further, and consequently, yields have deteriorated. However, due to land-use/ land cover change, most rural inhabitants have become unable to cope with environmental hazards. This has led to competition and overexploitation of natural resources. Subsequently, conflicts and war have emerged and most rural inhabitants have abandoned their homelands and become internally displaced or refugees. Recently, remotely sensed data have become a useful tool and an important scientific value for the study of human-environment interaction, particularly vis-à-vis land use/land cover changes.

The main aim of this study was to map and assess of land use land/ land cover change in Edd Al Fursan locality, Southern Darfur State during the period 1999–2008.

Study Area and Methods



Edd Al Fursan locality is located in the south-western part of southern Darfur State, It covers an area between longitude 24° 00′ to 24° 30′ E and latitude 11 ° 30′ to 12° 00′ N. of approximately 11,000 km².

Fig.1 Location of the study area

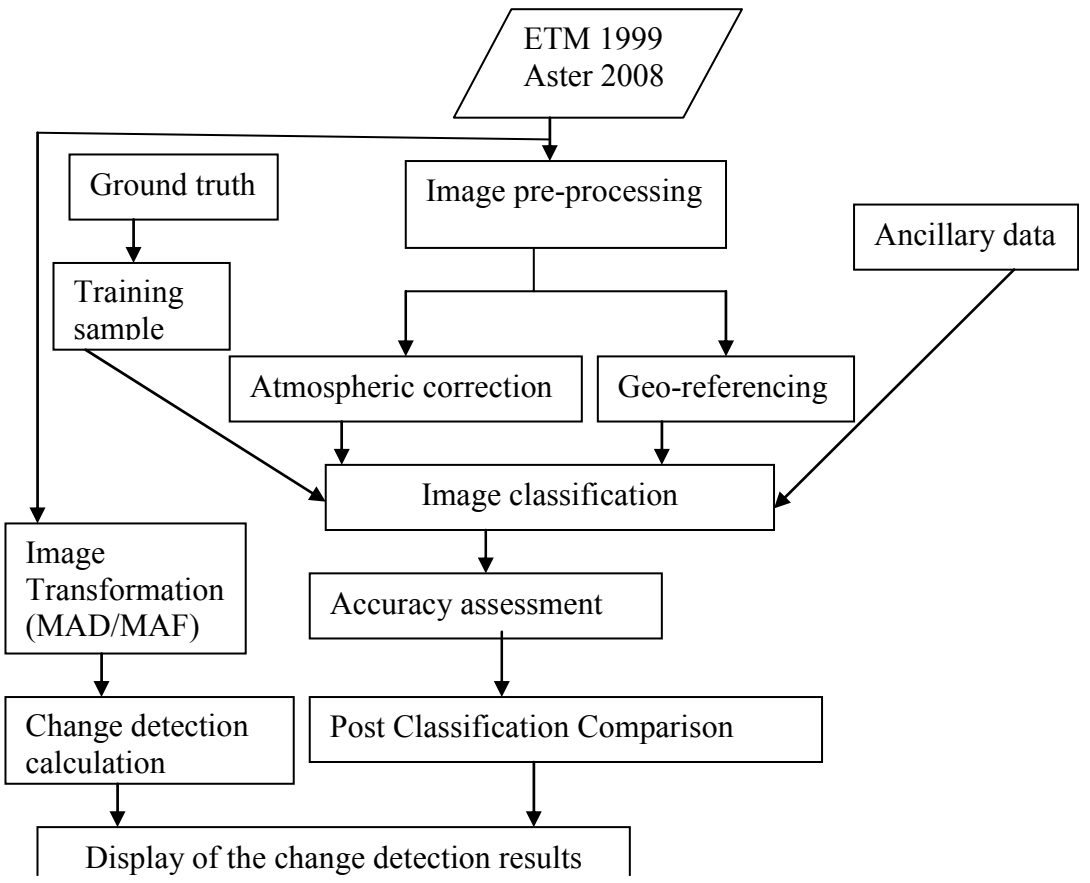


Fig. 2 Methodological framework of the study

Results and Discussion

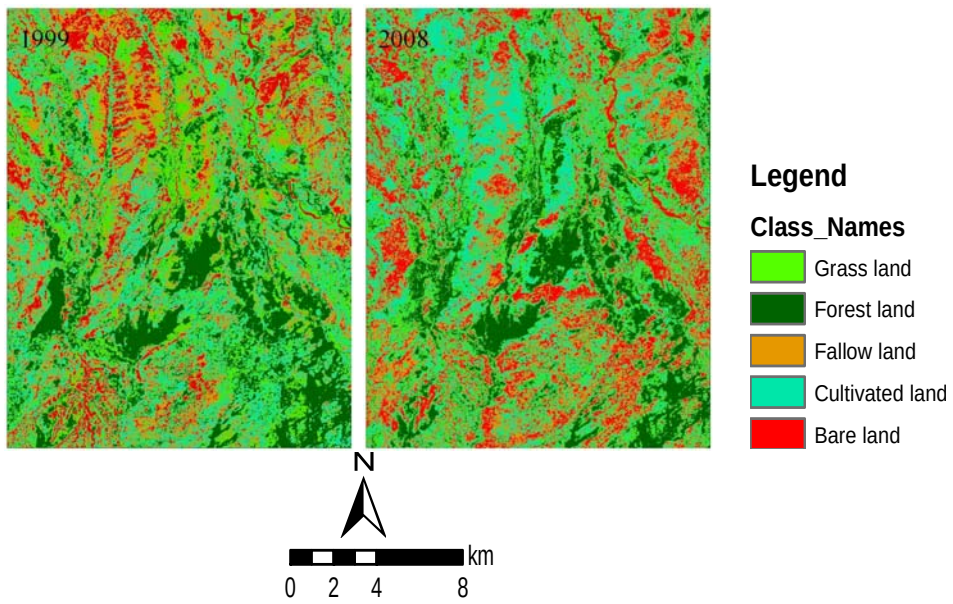


Fig. 3. Maximum likelihood classification showing LULC during the period 1999-2008

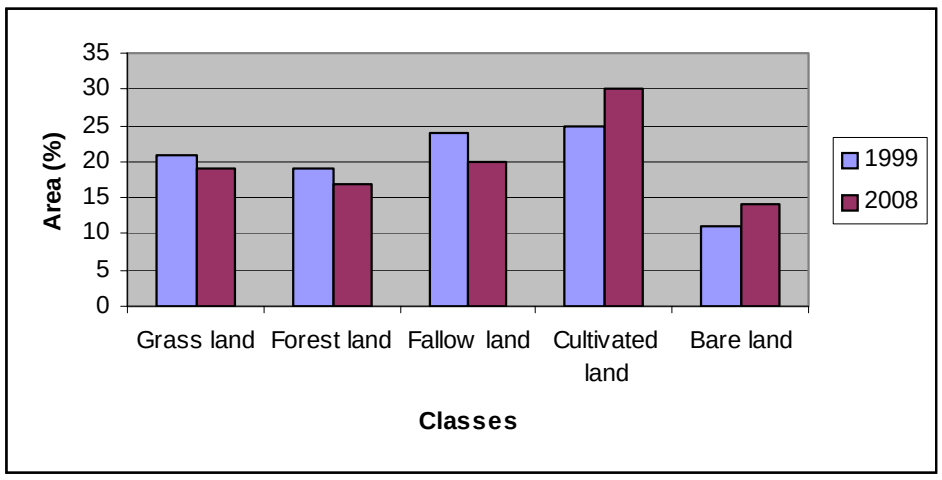


Fig. 3.1 Area percentages of land use/land cover classes

The result of Post Classification Comparison showed that there was a dramatic change in vegetation cover, as human and animal populations have increased in recent years due to conflict and environmental degradation resulting in high demand on food and fodder, which led to over-cultivation and overgrazing as indicated by decrease in fallow land and increase in bare land area (Fig. 3.1).

Contact Address: Masarra Bashir, Technische Universitat Dresden, Institute of Photogrammetry and Remote Sensing, Hochschulstraße 2, 01069 Dresden, Germany, e-mail: masarrabashir@hotmail.com

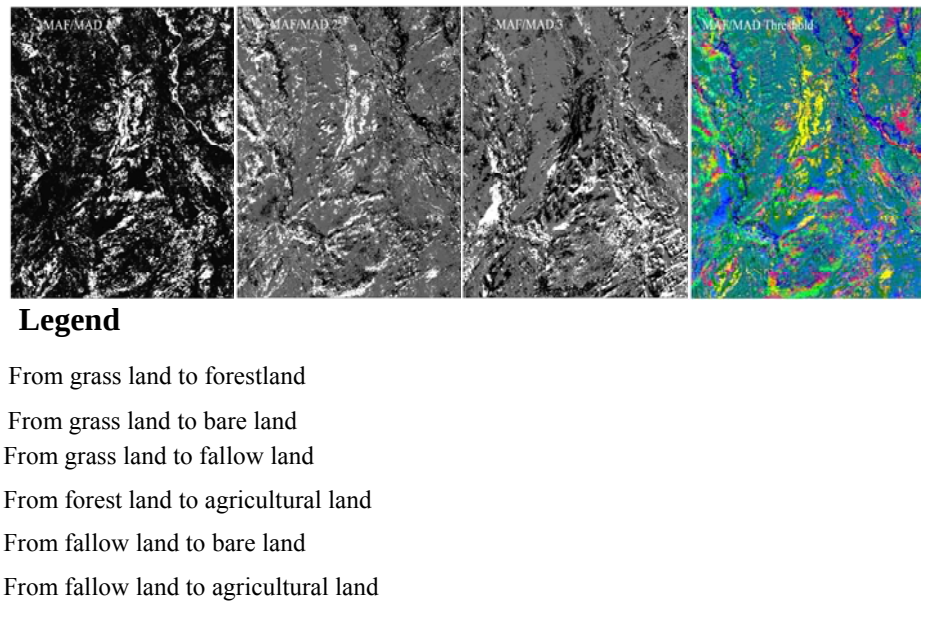


Fig. 4 MAD/MAF components (1-3) and RGB view of MADs/MAF (1999-2008)

The results MAD/MAF post-processing (first three components) for 1999-2008 are shown in Fig.4. The very bright or very dark areas represent maximum change areas — positive and negative change — respectively. While the gray color indicate unchanged areas.

Conclusion

Maximum likelihood classification provided an accurate means to quantify, map, and analyze changes over time in land use land cover change. It has also been found that the automatic threshold determination procedure of MAD/MAF provides a good unsupervised change detection method for satellite imagery in terms of visualizing the changes that have occurred over time.