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Representation of multiple cropping systems in land use data sets

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REPRESENTATION OF MULTIPLE CROPPING SYSTEMS IN LAND USE DATA SETS

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Sustainable agricultural production is required to maintain livelihoods in rural and urban communities especially where the demographic pressure leads to expanding urban areas accompanied with full exploitation of potential agricultural resources. Multiple cropping is a common and widespread management strategy in tropical and subtropical agriculture which allows for crop intensification and lowers the risk of crop failure. Furthermore, the occurrence of multiple cropping systems influences ground coverage, soil erosion, albedo, soil chemical properties, pest infestation and the carbon sequestration potential.

However, their spatial distribution is unknown in many parts of the world, thus multiple cropping zones are largely neglected or underestimated in agricultural statistics and land use data sets. As data on the type and location of agricultural systems is of crucial importance for, amongst others, modeling land use and land use change and research on the interactions between the atmosphere and biosphere it is important to improve the reliability of this data.

We construct a data set showing the spatial distribution of multiple cropping systems in tropical agricultural areas. For this we combine the global land use data set MIRCA2000 (Portmann *et al.*, 2010) with (i) regional land use data sets containing information on multiple cropping zones which exist e.g. for India (Frohling *et al.*, 2006), China (Frohling *et al.*, 2002) and Sub-Saharan Africa (Waha *et al.*, 2013), (ii) data on cropping intensity (Siebert *et al.*, 2010) in the tropics and (iii) data on farming and livelihood systems in Africa (Thornton *et al.*, 2006) and cropping calendars in Africa (FAO, 2010), which are based on satellite data or agricultural surveys. Additionally, if information on existing multiple cropping systems is still missing e.g. for crops and regions not covered by the data sets described above, the farmers' choice of crops and cropping systems can also be modeled as a function of climate conditions, soil properties, expected profit and household characteristics (Kurukulasuriya & Mendelsohn, 2006; Seo &

Mendelsohn, 2008), considering that in developing countries farmers probably give a higher priority to stable food supply than to high profit.

References :

Keywords :

multiple cropping systems, land use data set, agricultural statistics

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