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Stimulating innovation for global monitoring of agriculture and its impact on the environment in support of GEOGLAM

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There is an urgent need to ensure food supply for a growing global population. To enable a sustainable growth of agricultural production, effective and timely information is required to support decision making and to improve management of agricultural resources. This requires innovative ways and monitoring methods that will not only improve short-term crop production forecasts, but also allow to assess changes in cultivation practices, agricultural areas, agriculture in general and, its impact on the environment.

The G20 launched in June 2011 the "GEO Global Agricultural Monitoring initiative (GEOGLAM), requesting the GEO (Group on Earth Observations) Agricultural Community of Practice to implement GEOGLAM with the main objective to improve crop yield forecasts as an input to the Agricultural Market Information System (AMIS), in order to foster stabilisation of markets and increase transparency on agricultural production. In response to this need, the European Commission decided in 2013 to fund an international partnership to contribute to GEOGLAM and its research agenda. The resulting SIGMA project (Stimulating Innovation for Global Monitoring of Agriculture), a partnership of 23 globally distributed expert organisations, focusses on developing datasets and innovative techniques in support of agricultural monitoring and its impact on the environment in support of GEOGLAM.

SIGMA has 3 generic objectives which are: (i) develop and test methods to characterise cropland and assess its changes at various scales; (ii) develop and test methods to assess changes in agricultural production levels; and; (iii) study environmental impacts of agriculture. Firstly, multi-scale remote sensing data sets, in combination with field and other ancillary data, will be used to generate an improved (global) agro-ecological zoning map and crop mask. Secondly, a combination of agro-meteorological models, satellite-based information and long-term time series will be explored to assess crop yield gaps and shifts in cultivation. The third research topic entails the development of best practices for assessing the impact of crop land and cropping system change on the environment.

In support of the GEO JECAM (Joint Experiment for Crop Assessment and Monitoring) initiative, SIGMA has selected case studies in Ukraine, Russia, Europe, Africa, Latin America and China, coinciding with the JECAM sites in these area, to explore possible methodological synergies and particularities according to different cropping systems. In combination with research conducted at regional and global scale, it is one of the goals to improve the understanding of dynamics, interactions and validity of the developed methods at the various scales.

In addition, specific activities will be dedicated to raising awareness and strengthening capacity for what concerns agro-environmental monitoring, data accessibility and interoperability in line with the GEOSS Data-core principles. The SIGMA project will also anticipate on the availability of the SENTINEL satellites for agricultural applications as open-data in the near future.

References
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