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Current trends in agro-environmental research for alpine regions

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The fields of agricultural and rural environmental sciences are composed of several branched fields including pedology, topography, meteorology, hydrology and ecology. In the meteorological field, for monitoring the local climatic conditions in alpine areas where most highland crops are growing, we have installed 17 automated weather stations (AWS) and collected the data since 1993. Collected daily climatic data were processed in conjunction with a 1km by 1km grid network to produce text files which can be further analyzed by analysis programs. Several models for plant growth pattern, potato late blight forecasting, and soil water contents estimation have been developed and connected with the climatic data in alpine areas. In the soil science field, the development of estimation system for the evaluation of the soil erosion from the non-point pollution sources has been carried out. Currently, soils, geography, land use and climates around the Doam-dam watershed are under processing for soil loss. To estimate the public benefit of highland agriculture, the characterization and partitioning of agricultural regions in alpine area by the slope degree and altitude has been conducted. The characterization map of alpine regions by using GIS and simulation of environmental load by determination factors can be used for the estimation of function, productivity, and selection of optimum crops and agricultural system. And this can be utilized for sustainable highland agriculture in Korea. Based on these results, we will keep on studying the agriculture and rural amenity for well balanced income, preservation of the environment and improvement of the landscape in rural community.

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Geospatial climatology for the site-specific agriculture

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Geospatial information has been a most important tool in terrestrial ecosystem management including production agriculture and silviculture since the human history. Combined with the geographical information system technology, it is now more powerful than ever and expected to be used in the site-specific management of agricultural land for both sustainable and profitable farming. Among the long array of digitized geospatial information related to the farmland, most layers including soils, streams, water tables, cadastral maps and watersheds have already been prepared on a national standard coordinate and projection enabling an integrated spatial analysis. These georeferenced land data can be used to run many agronomic models in a "distributed mode" to produce the spatial variation of the model outputs across geographic areas. This kind of site-specific crop response to the local environmental conditions is of great use in the land related decision making. However, some of decision aids like matching crops or trees with the site will be of little use unless the local climate is known. The spatial resolution of local weather and climate information for agronomic practices exceeds the current weather service scale. Geospatial climatology can supplement insufficient spatial coverage of official climate data by preparing higher resolution gridded climate data. Presentation will focus on field experiences in geospatial climatology over complex terrain.