

## Grant-in-Aid for Scientific Research(S)

Principal Researcher	Toshiyuki WAKATSUKI			Number of Researchers	4	
Research Institution · Department · Title	Shimane University · Faculty of Life and Environmental Science · Professor			Location of Institution	1060 Nishikawatsu-cho, Matsue 690-8504, Japan	
Title of Project	Watershed Ecological Engineering for Sustainable Increase of Food Production and Restoration of Degraded Environment in West Africa					
Abstract of Research Project	<p>Past 16 years the project leader has been continued various surveys and trials on on-farm researches and participatory developments at two benchmark watersheds in Guinea Savanna zone, Nigeria and Forest Transitional zone, Ghana. Major target is to develop sustainable eco-technologies to increase food, especially rice, and the same time to restore the degraded watershed. The results showed that various sawah based rice farmings in lowland is a key technology. This further enforces the improvement of the traditional mixed cropping and agroforestry systems in upland. Major outcome of this research is to consolidate a comprehensive plan for the sustainable development of 20 million ha of lowland sawah systems. Based on the increase food productivity through the sawah development, our final target is the regeneration of 200 million ha of forest in West Africa. A prototype technology to convert various organic wastes to functional humified organic fertilizer has been developed recently by this research group. Various degrees of refractory, humified, organic fertilizers may become a core of revolutionary technology to restore upland soils in tropics where rapid decomposition of organic matter is the major limiting factor for sustain the soil fertility, conserve hydrological cycles, and carbon sequestration in soils. Japan has been chaired the TICAD, Tokyo International Conference for African Development. The results of this research can be used for the formulation of one of the major program of Japanese International Cooperation Policy for the creation of new global society (to establish Japanese identity) in 21st century through the settlement of Global Environmental Problems and the correction of the gap between south and north countries.</p>					
References	<p>Hirose and Wakatsuki, ed., "Restoration of Inland Valley Ecosystems in West Africa", Nourin-Toukei-Kyoukai, pp 600, 2002</p> <p>Wakatsuki, T., Otoo, E., Andah, W.E.I., Cobbina, J., Buri, M.M.m and Kubota, D., ed., "Final Report, JICA/CRI Joint Study Project on Integrated Watershed Management of Inland Valleys in Ghana and West Africa---- Ecotechnology Approach", Japan International Agency, Tokyo, and Crops Research Institute, Accra, Ghana, pp 337, 2001</p>					
Term of Project	Fiscal years 2003 – 2007. (5 years)					
Budget Allocation ( in thousand of yen)	FY2003 22.7 million yen	FY2004 17 million yen	FY2005 16.2 million yen	FY2006 15.7 million yen	FY2007 15.7 million yen	TOTAL 87.3 million yen
Homepage Address	<a href="http://www.soil-shimane-u.tpj.co.jp/ifontisv2/index.htm">http://www.soil-shimane-u.tpj.co.jp/ifontisv2/index.htm</a> <a href="http://www.ipc.shimane-u.ac.jp/ecotech/index.html">http://www.ipc.shimane-u.ac.jp/ecotech/index.html</a>					

## Benchmark sites and concept of this research

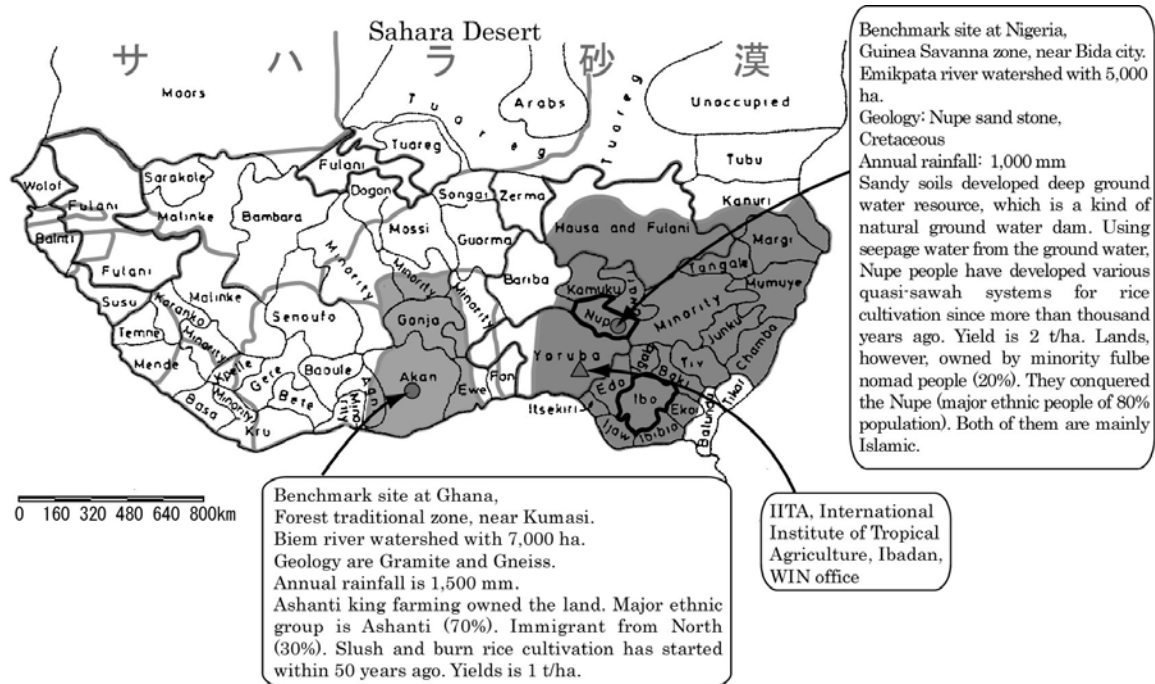


Fig. 1. Two benchmark watersheds in Ghana and Nigeria countries with major ethnic groups in West African

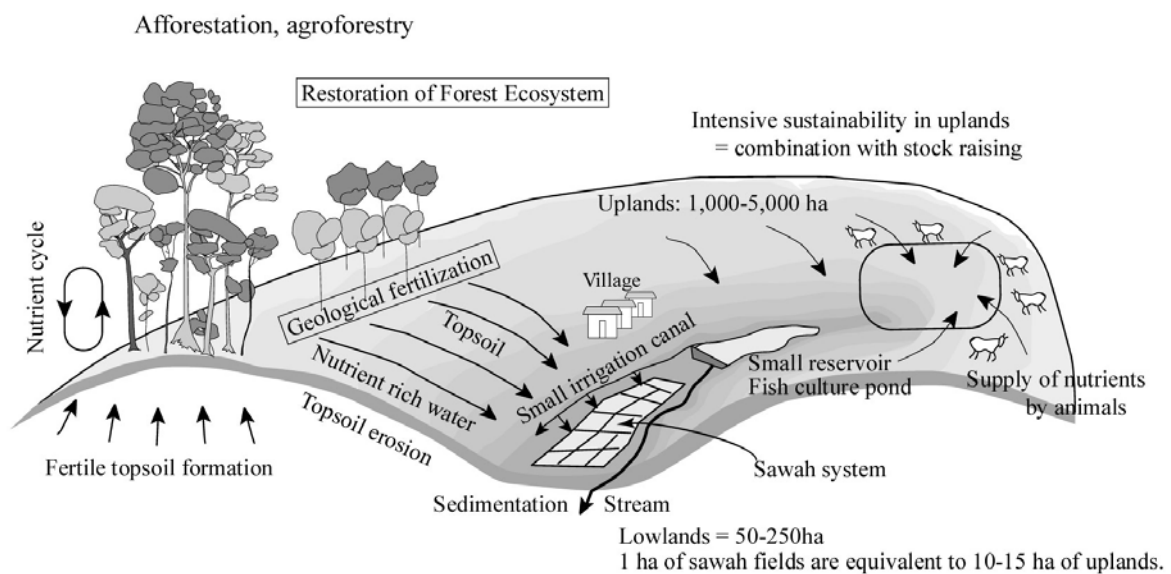


Fig. 2. Watershed Ecological Engineering: Integration of Forestry and Sawah in a unit Watershed. Sawah is a functional constructed wetland.

Fertile topsoil formation in forest ecosystem and sedimentation of eroded topsoil in lowland Sawah are the Geological Fertilization Process. The geological fertilization and well known biophysico- chemical processes under the submerged irrigated Sawah enhance the intensive sustainable productivity of Sawah system. As the results one hectare of Sawah has sustainable productivity equivalent to 10-15 ha of upland fields (Sawah hypotheses).