Title of project	West African rice green revolution by Sawah ecotechnology and the creation of African Satoyama systems
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Abstract of Research Project **Number of Researchers: 5** **Japanese:** **T. Wakatsuki,** **Ghanaian coordinator** **M.M. Buri** **R. Bam** **Nigerian coordinator** **S.Y. Ademiluyi** **I.O. Oladele** **Term of Project & Budget** **Key words** **Key concepts**	Even 40 years after the green revolution in tropical Asia in 1970s, the green revolution has yet materialized in Sub Sahara West Africa. After the September 11, what clear is north-south problem has to be tackled with global environmental issues simultaneously. The materialization of the rice green revolution is the major target of the millennium development goals of the United Nations. Although high yielding varieties, i.e., biotechnology, were the core technologies in Asian green revolution in 1970s and African Rice Center, WARDA, had innovated NERICA technologies, the successful path to the green revolution is still unclear. This research examines the Sawah hypothesis that the core for West African green revolution is eco-technologies that can improve farmers rice growing environment, such as lowland sawah technologies in Asia. Originally the two benchmark inland valley watersheds, about 10,000ha each, at Guinea savanna zone in Nigeria, 10-20km south of Bida, and forest transitional zone in Ghana, 40-60km northwest of Kumasi, were selected for long term action research to test the Sawah hypothesis in collaboration with hundreds of sawah group farmers and local collaborators including postdoctoral fellows trained at Japan. Now our action research sifted from basic research to dissemination in collaboration with JIRCAS, Africa Rice Center and various national institutes in Ghana and Nigeria. Therefore our sites are now not only at Bida, but also UN millennium village at Zaria and Ondo and Kwara states as well as Nsukka/Abakaliki areas in Nigeria. In 2010 NCAM, National Center of Agricultural Mechanization, has officially started the collaboration with Fadama III project of Federal Government to incorporate our Sawah technology for sustainable fadama development in Nigeria. New benchmark sawah project site had selected at FCT, Federal Capital Territory, Fadama III site in May 2010. 2007: 84million Yen, 2008: 40million Yen, 2009:36millionYen, 2010: 51million Yen, 2011:45million Yen 1. Eco-technology, or, Ecological Engineering: Sustainable technology to improve ecological environment of crops, trees and animals. Sawah technology is an example 2. Sawah hypothesis (I): The core technology to realize the green revolution in West Africa is eco-technology, such as lowland sawah ecotechnology 3. Sawah hypothesis (II): Sustainable Productivity of lowland Sawah is more than 10 times than upland fields, if appropriate lowlands are selected, developed and managed. 4. African Satoyama systems: Sato means villagers' habitat and Yama means multipurpose forests managed by villagers. Because of intensive sustainability of lowland sawah systems, degraded upland fields can be converted to multipurpose forests, which will eventually contribute the combat to global warming.

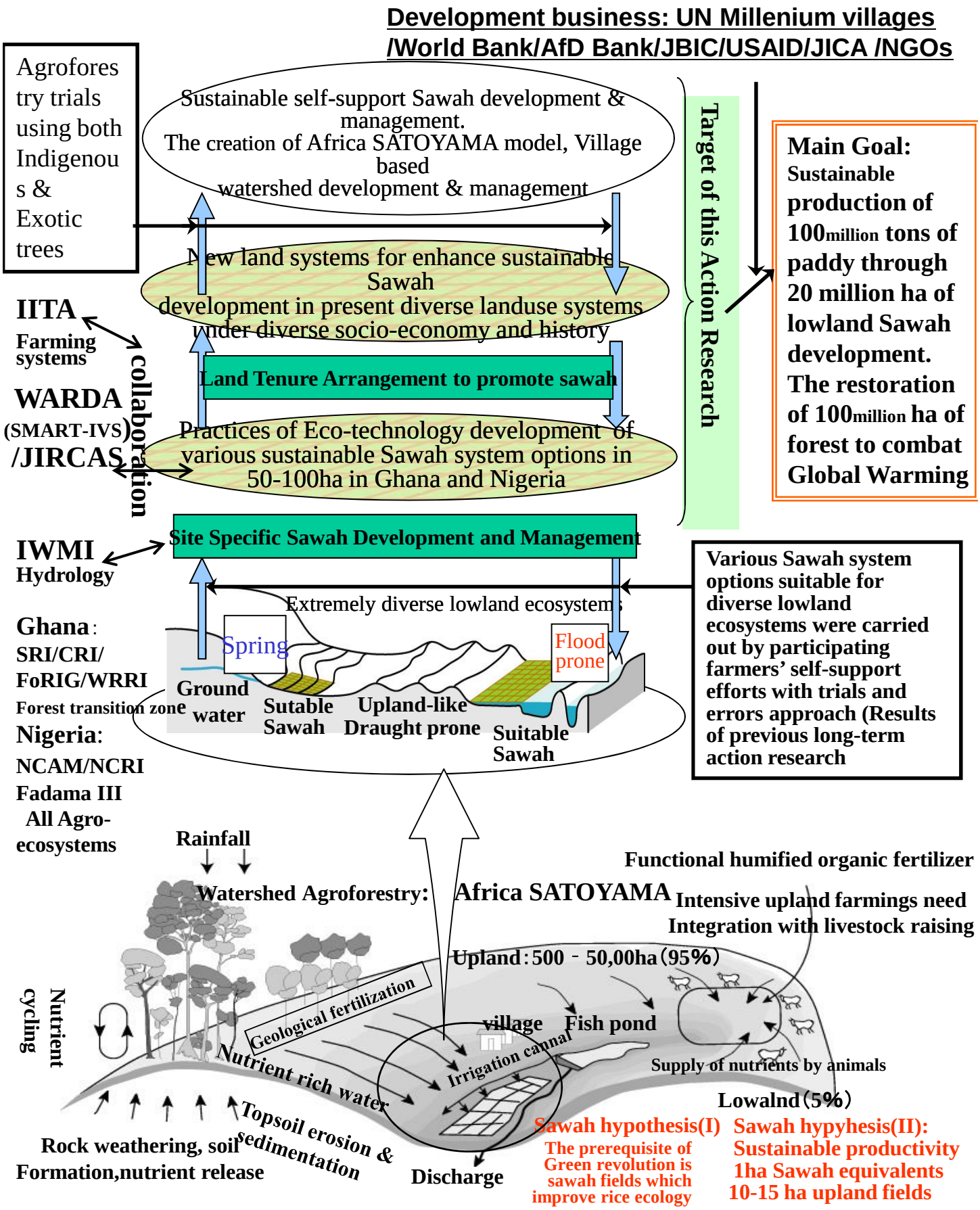


Fig. Materialization of Green Revolution in SSA:
Massive Action Researches and Creation of Africa SATOYMA watershed Model

Macro-scale watershed eco-technological mechanisms to support Sawah hypothesis II: Geological Fertilization of eroded top-soils and accumulation of nutrient rich water in lowland Sawah

Sustainable green revolution by sawah and SATOYAMA systems for combating Global warming: (1) efficient use of water cycling and conservation of soil fertility, (2) Ecological safe carbon sequestration by CDM, Bio-char and humus accumulation in sawah Soil layers, which will eventually transfer to sea floor, and (3) increase soil productivity by bio-char and humus accumulation

Micro-scale eco-technological mechanisms to support Sawah hypothesis II: Enhancement of the availability of N, P, K, Si, Ca, Mg, and micronutrients and quality carbon accumulation

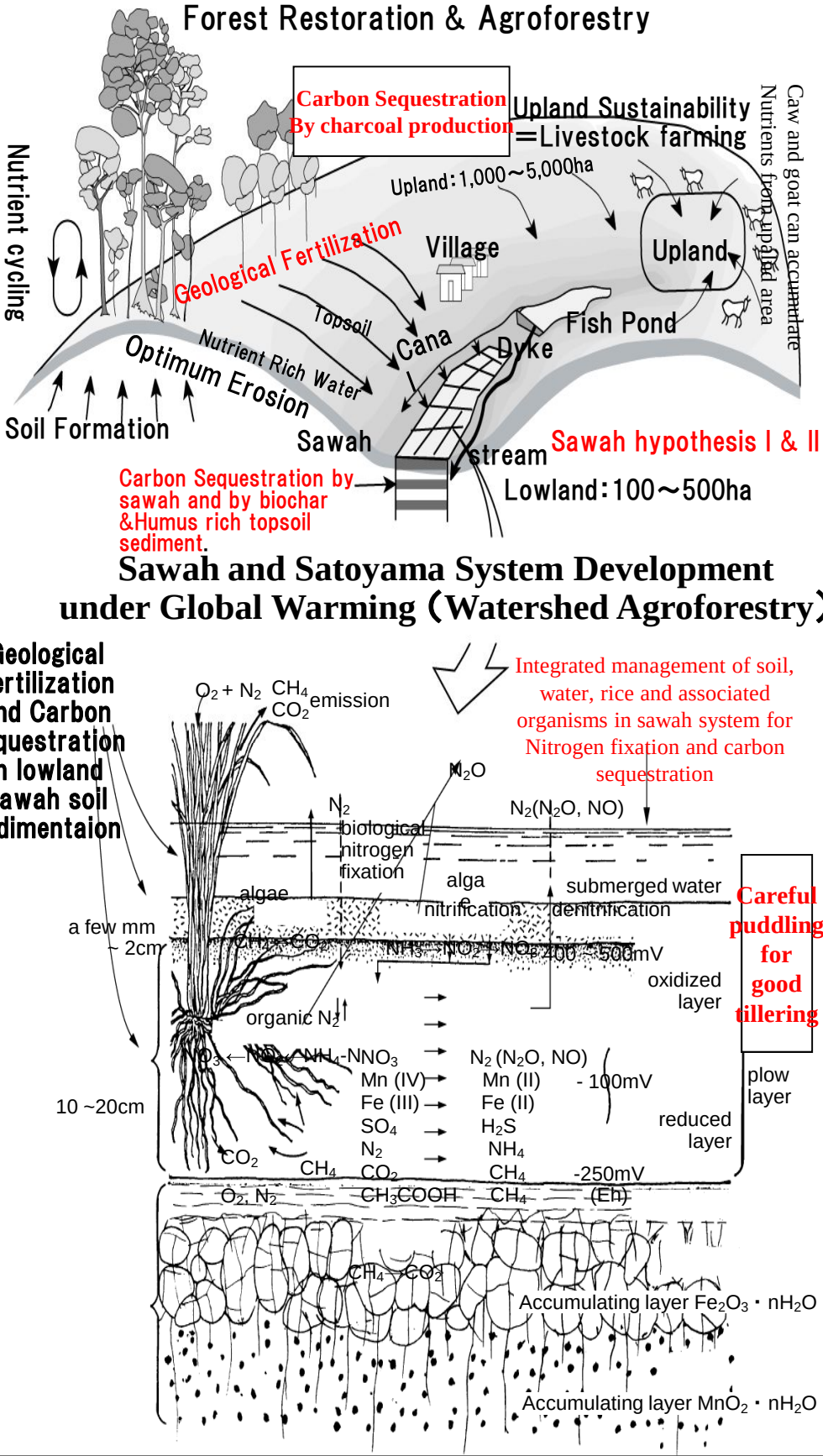
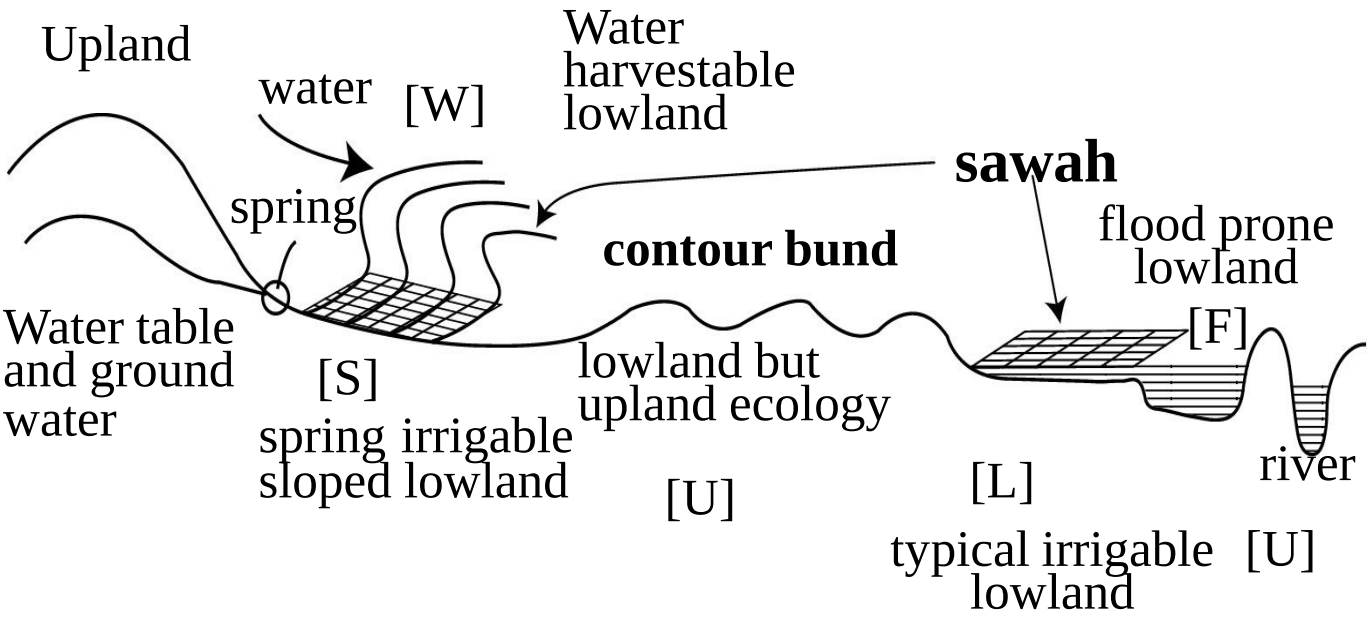


Fig. Sawah hypthesis (II) and creation of African SATOYAMA watershed systems to combat food crisis and global warming



Irrigation options: Sawah to sawah/contour bund water harvesting, spring, dyke, river, pump, peripheral canal, interceptor canal, tank

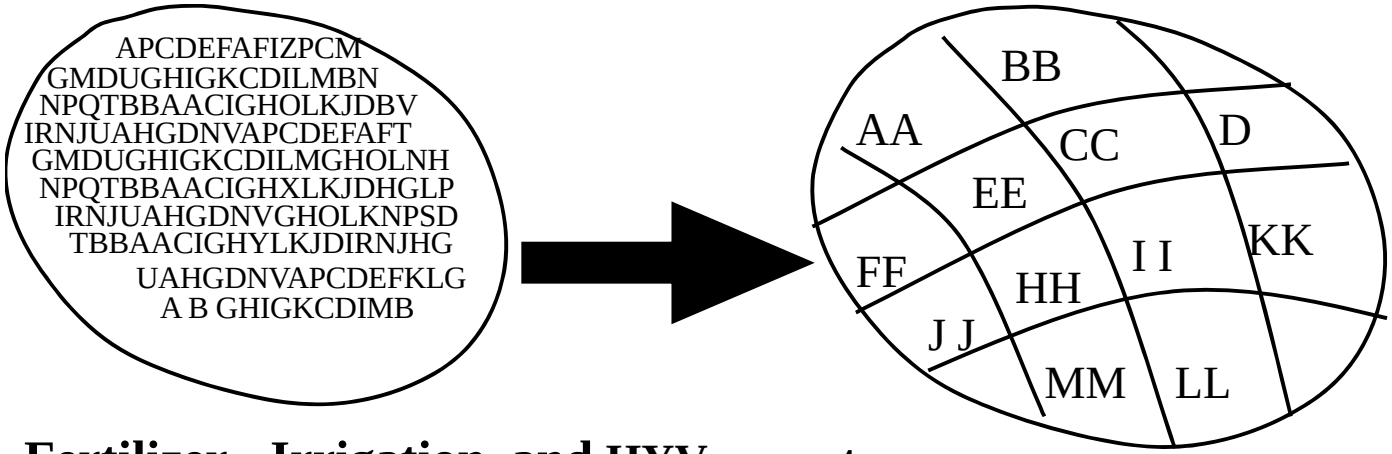
Lowland sawah development priority

[S] > [L] > [F] > [W] > [U]

Fig. : Very Diverse Nature of African Lowlands Need on Large Scale Action Research and On The Job training on Site Specific Sawah Development and Sawah Based Rice Farming

Farmers' Paddy Fields: Diverse and mixed up environment.No clear field demarcations

Sawah based eco-technology can improve rice ecology, especially for water control. Green revolution technology of fertilizer, irrigation and HYV are useful.



Fertilizer, Irrigation, and HYV are not effective No Green Revolution possible

Sawah based Farming system

Fig. Sawah hypothesis (I): Farmers Sawah should comes the first to realize green revolution. Successful Integrated Genetic and Natural Resource Management needs classified demarcated land eco-technologically