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Potential utilization of wetland ecosystem for enhancing productivity and sustainability of Indian sub-continent

A.M. PUSTE

Professor of Agronomy & SAARC-Agriculture Specialist (ADB, Philippines)

Bidhan Chandra Krishi Viswavidyalaya, Mohanpur-741252 (West Bengal)

(E-mail : ampuste_bckv@yahoo.co.in)

"Wetlands are the ecotones, inter-phase or transitional between dry terrestrial and permanent wet or aquatic ecosystem". Accordingly, Ramsar Convention, the first Global Conservation of Wetlands held in city of Ramsar, Iran (1971), brought this subject in international arena, - framed a universally accepted wetlands, highlighted on this subject and emphasized on "Wetland conservation and wise use". Wetland comprises 6.4 per cent (855.8 million ha) of the world total area, of which 23.5 million ha covered in India in different forms and of situation-specific, viz. permanent type, semi-permanent and temporary in nature. In the country, sometimes this devastating areas may be exceeded >40.0 m ha during peak rainy months of the year if it is in severe form, dominated (25-30%) mostly in north-eastern and coastal part of the country. Actually, the same environmental condition also exists in south-east Asian countries like China, Japan, Philippines, Thailand, Malaysia, Sri Lanka, Bangladesh etc. Survival of human civilization is inextricably linked with the wetlands since about 4500 B.C., which sustained economic stability of hundred million of people and this swampy environment of the carboniferous period produced and preserved many of the fossil fuels on which we greatly depend now, moreover, as it is imperative part for balancing ecosystem in an area, for this James has rightly termed as 'nature's kidney' of the world. Wetlands are highly exploitable for the benefits of mankind, although it is not used wisely, degraded day by day. Water potentiality, particularly in precision agriculture is still a setback in Indian agriculture, exists, even in humid to sub-humid environment accomplished with tropics to sub-tropical environmental condition prevalent in greater part of rural Indian sub-continent.

Wetland has a pivotal role for the production of various aquatic food crops (deep-water rice, water chestnut, makhana, swamp taro or lati kachu etc.), food-cum-ornamental crops (water-lily, lotus, royal water-lily etc.), non-food commercial crops (mat-sedges, shola, cane, hogla etc.) etc. are mostly grown as sole and sometimes integrated with fish variables (indigenous fishes, sweet-water carps, live fishes including snake-head etc.), which are valuable, nutritious and popular to the common urban people in the regions of north-eastern part of the country. But these are not always agro-ecologically suitable e.g. not practiced wisely, systematically following proper scientific approach, resulted poor yields due to number of causative factors (dereliction of the productive areas; delink with the main river system due to sedimentation, siltation; urbanization; industrialization; pollution, industrial affluent and lack of knowledge-skill of farming community etc.).

So, emphasizing on this great tasks, an initiation was undertaken through the implementation of government sponsored research projects during last 15-16 years for proper utilization of this vast wetland ecosystem systematically, particularly for enhancing productivity per unit area per unit time and economic sustainability for the rural farming communities in the different agro-zones of West Bengal. At its initial foot-step, system approaches like - regular cleaning, need-based excavation, renovation programme were performed to get a new shape of these waste wetland ecosystem, side by side developing awareness, need-based trainings, improvised TOT programmes for the beneficiary group of farming communities. It was thus possible to conserve more runoff or surplus water in newly-shaped renovated watershed ponds, effective for further works. Number of case studies was initiated on integrated fish-crop biodiversity under aquatic system, duckery as semi-aquatic and seasonal vegetables including horticultural plantation crops and valuable tree plantations under terrestrial ecosystem suited to zone-specific (new alluvial, old alluvial and coastal zones) were carried out in greater part of aqua-terrestrial ecosystem of West Bengal. It is well-known facts that due to sharing of more advantageous lies with IFS modules, responds were holistic, congenial and well accepted in respect to more productivity, which were economically viable to the rural farming communities in the regions. The result also reveals that these wetlands are the integral part of the ecosystem, maintaining its sustainability and effective for production scenario in developing countries like India, not only for optimum utilization of available land-water resources, but also for minimizing the risk element in single crop enterprise for greater income. It is primarily because of the natural compatibility that exists between crops and fishes in a controlled ecosystem as fishes in wetlands plays a significant role in the economic utilization of waste wetlands for food production as dual purpose, can turn material and energy into fish production, accelerate the growth of crops and increase solar energy fixation and thereby, raise the productivity of the crop, fish as a whole. Thus, this symbiotic relationship between crops and fish makes one of the successful integration in India including equally effective for other Asian countries. This results in IFS had gone the outcome >3 folds than monoculture.

Prof. (Dr.) ANANDAMOY PUSTE, is working in Crop Science (Agronomy, specialized in Water Management) >3 decades, been carrying out important field works including valuable wetland ecosystem, soil & water characterization, plant nutrition, additionally on integrated wetland management, made heuristic models on farming systems (IFS) sustainable for rural people, researchers, planners etc. His work is prolific and internationally visible, evidenced through implement of government sponsored 10 research projects, guiding students (10 Ph.D. and 12 Masters), evaluated foreign Ph.D. theses (10), national and international leading publications (161+ papers and 9 books, 38 project reports, 30 popular articles), as well as numerous national (35) and international presentations (27, out of which 13 times in abroad). Besides, due to expertise and significant contribution, ADB (Philippines) and 'SAARC' has been recognized as 'SAARC-Agriculture Specialist' for SAARC countries for formulating project on "Enhancing food productivity, sustainability & security". Besides, 'MARQUIS - WHO'S WHO' (USA) has published his Biography in their various volumes. The countries and organizations he has covered more than times include Bangladesh, Nepal (Katmandu), Japan (Tokyo), China (Beijing), UK (Reading University & IACR-Rothamsted), Thailand (Bangkok), Netherlands (WUR, Wageningen), USA (UC Davis) and Edinburgh (Scotland), respectively supported by Scientific Council of Japan, Chinese Academy of Sciences, World Green Research (WUR, Netherlands, Wageningen), UNESCO (Bangkok), IIFET (USA), CIDA (Canada), SEI (UK), ADB (Philippines) and SAC (Dhaka). Besides, Dr. Puste has visited BAU (Bangladesh) and Kasatsert University, Bangkok, Thailand on academic mission.