# 12. Rehabilitation And Modernization: A Research Agenda For Nigeria's Irrigation Systems.

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## 12.1 INTRODUCTION

The development of large scale irrigation systems in Nigeria dates back to the early 1970s. But notwithstanding the Federal Government's commitment to this sector, its performance has not been entirely satisfactory. Part of the cause of this poor performance is the fact that the design criteria have not conformed with realities. All the irrigation projects tend to suffer from inherent structural defects; a discordant relationship between the design criteria and socio-economic as well as the physical realities, which creates technical limitations (Kolawole, 1989). These systems would seem to have been designed with erroneous climatic and socio-economic presumptions. It is probably in this light that the process of rehabilitation and modernization is called for.

Rehabilitation is defined as the process of renovating a project which has fallen into disrepair and whose performance is failing to meet the original criteria and the needs of the project. It enhances improvements to the physical infrastructure, the operation, management, and institutional aspects which are designed to improve the economic and social benefits to the project (Weare,1989). On the other hand,modernization is the process of improvement of an existing project to meet enhanced criteria which, otherwise, is meeting the original criteria. It enhances changes to the physical infrastructure and the operation, management and institutional aspects which are designed to enhance the economic and social benefits of the restoration to the original design criteria. Modernization implies development to meet enhanced criteria.

But why is rehabilitation necessary. The need for rehabilitation may arise from the effects of climatic variability which no longer accord with the original design criteria, with the attendant dysfunctional consequences for the physical infrastructural facilities. The other need arises from the rapid changes in the socio-economic parameters which informed the original philosophy of such projects.

## 12.2. CLIMATIC VARIABILITY AND CHANGES IN PHYSICAL STRUCTURES:

The linkage between climatic change and water resources development is probably the most neglected aspect in water resources development. This apparent neglect, according to Novaky (1985) derives from a number of principal factors. First, the accelerated socio-economic transformation at present tends to create situations for which little or no historic experience is at hand. Second, the rapid advances in science and technology have not only triggered the process of socio-economic changes,but have also offered new strategies and tools for coping with climatic impact, nevertheless, without historical experience. Third, recent technological innovation has also reduced apparent demands for water, which have often proved to be illusory. Fourth, historic experience of responses to climatic changes need to be supplemented by systematic impact assessment of the processes of climate formation.

The neglect has had profound implications for the planning and design of water resources development projects on the one hand, and their operation and management on the other, thereby revealing one of the major weaknesses of conventional engineering statistics (Kolawole,1992a). Armed with conventional statistical figures, design engineers tend to have a myopic conception of climate events. In some cases, designers treat climate events either as an extraneous factor; taken for granted, ignored altogether, or an irrigation project is seen as a panacea for climatic changes. More than often , they assume a periodic re-occurrence of climatic anomaly but failing to recognize the possibilities of clustering of events; a non-periodic variation, that is, the likelihood of persistence of drought up to four years or even longer as in the case of the sudano-sahelian droughts of 1969 - 73 and that of 1979 - 85, respectively. Climatologists have argued that there is a tendency for abnormal wetness or drought to persist from one year to the next or succeeding years in this environment. There is no doubt that major water management activities are indeed variously affected by climate events, depending on their time-scale within-year, whether yearly fluctuations, multi-year variations, and century or longer cases (Novaky,1985). This is because all forms in which drought expresses itself involve water deficiency as manifested in withering of vegetation, including crops; dehydration or death of animals, including man; excessive overdraft on controlled human water supply; and insufficient natural running water for public utilities, waste transport, low river discharges and lake levels (Hewitt and Burton,1971).Longer fluctuation could adversely affect the level of upper ground-water and stream flows, as well as the underground water.Longer fluctuations in climate also alter the level of large lakes thereby affecting navigation,hydropower production, and riparian access as in Lake Chad and the Nile (Grove and Kolawole,1987). Protracted drought usually leads to canal siltation,salinity,alkalinity and deterioration of irrigation infrastructures such as pumps following from long disuse.

## 12.3 CHANGES IN THE SOCIO-ECONOMIC PARAMETERS.

Large Scale irrigation projects under the aegis of River Basin Development Authorities(RBDAs) adopted advanced and sophisticated intrinsic irrigation technology package which cannot be separated and introduced bit-by-bit but goes together(Stewart,1978). This would seem to be obvious given the fact that the use of the high yielding varieties of crops requires for their effective performance not only

the irrigation superstructure but also a wide range of supportive services such as heavy mechanization; technical expertise and high level administrative organization; and water legislation.

RBDAs were established at the height of the oil-boom and were consequently financed largely from internal resources generated from the petroleum economy. This has had some striking implications for irrigation development in Nigeria. As they were financed mainly from the oil revenue, there was no need to fulfil any of the conditionalities expected by donor countries, notably detailed feasibility studies. Where feasibility studies were carried out, the benefits had been bloated to the detriment of costs, ostensibly to justify their establishments. Therefore, technical viability, detailed economic analyses and cost recovery were not given profound consideration as the RBDAs were seen in the main as "social service" or form of "drought relief package"(Kolawole,1992b).

With the down-turn in the economic fortune of the country in the early 1980s, however, Nigeria, like other less developed countries of the world, had to adopt the structural adjustment programme(SAP) in 1986.This led to the re-organization of the RBDAs, which involved a radical shift in the original philosophy of the programme,thereby undermining the intrinsic technology package(Kolawole,1992b). With this re-organization, the role of the RBDAs was confined to the sale of irrigation water; both the extension and the input delivery systems were transfered to the state controlled World Bank assisted Agricultural Development Projects(ADPs) in their respective areas . In addition, farmers were enjoined to pay fully for all the infrastructural facilities and services of the RBDA hence the hike in water charges.

The various questions to ask are: Can large scale irrigation projects originally conceived and operated as "social service" function as a commercial enterprise? Can the farmers optimize the productivity of water without the necessary supportive services?

## 12.4 RESEARCH AGENDA

The theory of what needs to be done has been itemized as follows by Weare(1989):
i) define overall objectives;

ii) carry out diagnostic analysis of existing systems-in particular identify the causative factors that brought about the need for rehabilitation in the first instance. It may not be simply a matter of age of scheme;

iii) learn from the farmers and managers, by bringing them into the rehabilitation process;

iv) look at operational rehabilitation. In most cases operational rehabilitation has to be carried out first, followed by physical rehabilitation to achieve a particular set of hydraulic conditions; and

v) evaluate the benefits. Ideally a monitoring programme should be established from the diagnostic phase to evaluate benefits throughout the rehabilitation programme.

The research methodology is multi-disciplinary. This is based on the understanding that irrigation is a field of study which concerns the relationship between the natural environment and society, presenting a totality that no single academic discipline could claim as its own. The disciplines concerned range from the hard sciences such as engineering (agricultural, civil, mechanical, electrical) to the softer sciences (agronomy, chemistry, biology, agricultural communication, entomology) and the humanities (history, geography, economics, sociology and politics) to mention but a few. The cost of rehabilitation and modernization could be significantly high, and has to be balanced against the benefits that could ensue.

## 12.5 REFERENCES

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