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CONTENTS

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PROMISING TECHNOLOGIES

Monoclonal antibody-based ELISA and dot blot hybridization developed for diagnosis of rotavirus infection in bovine-calves

Diarrhoeal diseases continue to be the leading cause of morbidity and mortality in human-infants and neonates of most farm-animals throughout the world. Various aetiological agents associated with neonatal diarrhoea include bacteria (*Escherichia coli*), parasites (*Cryptosporidium*) and viruses.

Diarrohea in new borne calves is a major problem in dairy industry; causing financial losses in the organized cattle and buffalo farms. A concerted epidemiological study in the Rotavirus Molecular Biology Laboratory, over a prolonged period of time, showed prevalence of rotaviruses (between 10 and 52%) in calves below one month of age. Economic impact of rotaviruses on a national basis is not available, however, the magnitude of financial losses can be clearly assumed. Keeping in view the impacts of rotaviruses, extensive efforts have been underway world over during the last 2 decades to study their structure, biology, diagnostic tools and prophylactic measures, including vaccines.

Rotaviruses are characterized by 11 double-stranded genomic RNA segments, enclosed by a triple-layered protein shell. Antigenically, rotaviruses are classified into groups, subgroups and types (G and P types). Group-specificity in rotaviruses is primarily determined by VP6 (a group-specific protein) and based on it, they are classified into 7 groups (A through G). Members of each group share their own distinctive common antigen. Epidemiologically significant rotaviruses of man and animals belong to A group. There are two neutralizing antigens, located on the viral outer surface, namely VP4 and VP7. These antigens show a greater variability. Emergence of new rotavirus strains is common both *in vitro* and *in vivo* due to segmented nature of genome, and consequent development of new reassortants. A binary system of classification for rotaviruses employing G (VP7) types and P (VP4) types (similar to that used for influenza viruses) is accepted. Probably, reassortments occur during natural coinfection of animals or humans with 2 or more strains

TILL early fifties, the Indian National Agricultural Research System (NARS) had only two main streams; one consisting of National Institutions and the other consisting of the State Agricultural Universities. Both demanded an effective mechanism for proper interface and co-ordination among themselves.

The Indian Council of Agricultural Research (ICAR) responded to this need as early as 1957 when the first All-India Co-ordinated Research Project (AICRP) on Maize was initiated. Over the years, the model of the AICRP has proved to be an innovative institutional structure, linking multidisciplinary scientists working in different institutions together, to address to problems that have national or regional dimensions. The concept of the AICRPs has gradually evolved to accommodate more crops, commodities, livestock species, natural resources, etc., so much so that by now the Council has almost 80 AICRPs in operation. The growth of the AICRPs in terms of the manpower, financial outlay and diversity of centres had been quite considerable. They not only contributed significantly to the overall development of the agricultural sector but also hastened the process of technology generation, assessment and refinement. The rapid development of new crop varieties and their testing, recommendation of proper doses of fertilizers, pesticides and insecticides, development of new machines, processes, production and post-harvest technologies are the cornerstones of success through the AICRPs approach. This approach had even prompted a number of Asian and African developing NARS to emulate this model with varying successes.

Dr R.S. Paroda, Director-General, ICAR

Over the years, some significant changes relating to their institutional set-up, modes, mechanisms and systems of operation, funding, players and partners, etc. have taken place. Another important development has been the creation of the State Agricultural Universities that have a strong component of agricultural research to address to eco-regional problems. Obviously, all these developments, besides resource crunch, have affected functioning of the AICRPs. At the same time, the AICRPs also witnessed some system's weaknesses such as complacency and mediocrity in research, lack of individual initiative, leadership crisis, routine work programme, regimentation and rigidity, programme isolation, avoidable duplication of work and related organizational inefficiencies. And over the years, the funding constraints have also necessitated the process of prioritization of activities, resulting in reduced size of various programmes.

Considering above factors in view, the Council decided to review AICRPs with regard to their organizational structure, relevance to crops/commodities, linkages with partners and among disciplines/other co-ordinated projects, duplication of work and overall efficiency. Accordingly, a high power Committee under Dr H.K. Jain was constituted to review functioning of the co-ordinated programmes. The Committee has made a number of valuable recommendations which Council contemplates to implement during the IXth Five-Year Plan in a phased manner. It has been observed that a number of these AICRPs have outlived their utility and hence need effective restructuring. Some are to be reorganized as network programmes or are to be combined or split for effective co-ordination and management; and some of them may even be phased out subsequently.

In a changed scenario of new National Research Centres, several State Agricultural Universities to address their eco-regional problems, and with the emergence of Private Sector, R & D institutions, one must revisit Co-ordinated Research Programme Approach now and ensure its revitalization and continuance only in situations of comparative advantage. In future, programmes must ensure convergence of all effective partners in a matrix mode with new management structures such as consortia or networks, with greater partnership and resource-sharing role.

Accordingly, the review of AICRPs is seen as yet another step towards the renewal and reorientation of NARS to effectively address daunting challenges ahead. Today, India has one of the largest agricultural research systems in the world, which can be made more effective and efficient through required reorientation of its on-going programmes. Hence, what is desired is to change our mindset and be prepared for needed reforms. Let us all make a conscious effort towards transforming Co-ordinated Programme Approach into the one that is most relevant to meet our future challenges successfully.

(R.S. PARODA)