Agricultural Research Networks and Working Groups with Special Reference to the Working Group on Nitrogen Fixing Legumes in Asia

C L L Gowda, A Ramakrishna, and O P Rupela[1]

Abstract

Funding constraints for agricultural research have led scientists to pool infrastructural, financial, and human resources to address and solve problems. Such collaboration in research and technology exchange is referred to as networking. Collaborative agricultural research networks are becoming increasingly popular as they facilitate efficient use of funds, facilities, and human resources, and avoid duplication of effort. The Cereals and Legumes Asia Network (CLAN) is a research and technology exchange network for Asia that assists and facilitates research and technology exchange activities on sorghum, pearl millet, chickpea, pigeonpea, and groundnut. This network also supports several Working Groups consisting of scientists interested in finding quick solutions to regional priority problems. This paper discusses the structure and operation of Networks and Working Groups, with special reference to the Working Group on Nitrogen Fixing Legumes in Asia. Such Working Groups consist of interested members from regional, national, or international programs or institutions, linked through a Technical Coordinator and cooperating efficiently to address important production constraints in developing countries.

1. ICRISAT Asia Center, Patancheru 502 324, Andhra Pradesh, India.
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Introduction

Funds for global agricultural research and development are declining annually. As a consequence, research administrators and scientists are being asked to reduce research expenditure and maximize cost effectiveness. Individual laboratories and institutions are unable to conduct comprehensive research projects due to paucity of funds, facilities, and staff. Therefore, the scientists from these various research institutions and/or universities have increasing incentives to collaborate in identifying and solving common priority problems. Linking research, development, or technology exchange can be called networking. An agricultural research network has a commitment to collaborate in addressing or solving a common agricultural problem or set of problems, and scientists meet regularly to review results and plan future research. Collaborative research networks are becoming increasingly popular as they help to avoid duplication of effort, and engage a critical mass of scientists at a lower cost than otherwise possible. Members can interact and exchange information, knowledge, technology, and materials through the network.

Example of an Agricultural Network – Cereals and Legumes Asia Network (CLAN)

The Cereals and Legumes Asia Network was established in April 1992 to serve as a research and technology exchange network for Asia, covering sorghum, pearl millet, chickpea, pigeonpea, and groundnut. The CLAN consists of scientists and research administrators in Asian countries, who are willing to commit resources for collaborative research, to participate in network activities, and to share results and technology. It combines activities of the erstwhile Asian Grain Legumes Network and the Asian component of the Cooperative Cereals Research Network, and serves as a focus for technology exchange activities of ICRISAT. Membership includes scientists from more than 15 Asian countries, regional and international institutions, and ICRISAT scientists. The CLAN has a Coordination Unit located at ICRISAT Asia Center (IAC) and supported by the ICRISAT Asia Region.

The overall objective of CLAN is to support, coordinate, and facilitate technology exchange involving CLAN priority crops and their resource management among Asian scientists. The ultimate goal is to improve the well-being of Asian farmers by improving the production and productivity of CLAN priority crops and their cropping systems in a sustainable manner.

Specific objectives of CLAN are wide-ranging, and seek to:

- Strengthen linkages and enhance exchange of germplasm, breeding material, technical information, and technology options among members.
- Facilitate collaborative research to address and solve high priority production constraints giving attention to poverty and equity issues according to the needs and priorities of member countries.
- Assist in improving the research and extension capabilities of member countries through human resource development.
- Enhance coordination of regional research on sorghum, millets, chickpea, pigeonpea, and groundnut.
- Contribute to the development of stable and sustainable production systems through a responsive research capability in member countries.

The coordination of regional research devolves to smaller groups of interested scientists forming a Working Group (WG). CLAN supports and assists several working groups of scientists working in Asia, including the Working Group on Nitrogen Fixing Legumes in Asia (NiFLA).

Working Groups

Working Groups involve a small group of network scientists, with common interests. A WG can be defined as a group of committed scientists addressing and finding solutions to a high-priority regional problem. It focuses on action plans by stimulating cooperative research involving expertise from developed and developing countries, international research centers, and specialized research laboratories and institutions, as equal partners.

Benefits of Working Groups

The sharing of responsibilities and resources to support a mutually agreed research agenda is the central tenet of the WG's concept. Enhanced research partnerships help address important production problems in developing countries, as needed. Some other advantages of WGs include:

- Flexibility in operation, as scientists can initiate a WG when a priority problem is identified, and can terminate it once solutions are found.
- Small size (in contrast to a bigger network) that makes a WG cost effective and efficient to operate.
- The use of existing facilities and staff to avoid duplication of effort, save time, and resources.

- Cost effectiveness and efficiency in operation that may attract donor support more easily.
- The support of overlapping activities of other WGs, e.g., training, are possible in a network such as CLAN.

Organization and Structure of a Working Group

A WG consists of interested members from national, international, and regional programs/institutions. Members nominate a Technical Coordinator (TC) who is responsible for liaison, coordination, and harmonizing research in each WG. The TC would normally be an expert in the subject, and can be from any of the collaborating institutions. An example of a WG structure is given in Figure 1. Usually the TC is supported by a network or institution for provision of necessary administrative and logistic support.

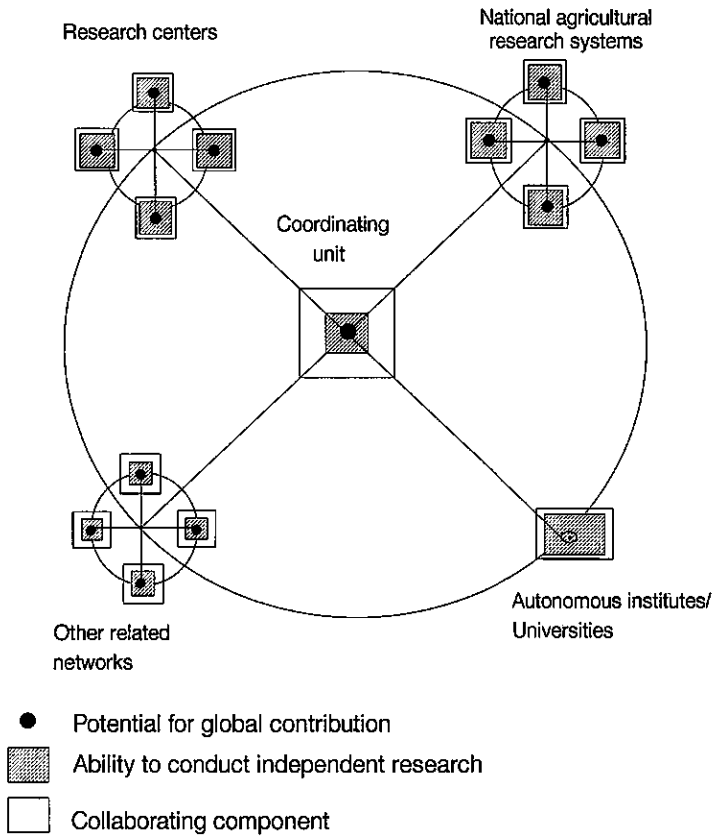

Figure 1. Structure of a Working Group.

Working Group on Nitrogen Fixing Legumes in Asia (NiFLA)

The first meeting on biological nitrogen fixation (BNF) and legume benefits was held 6–8 Dec 1993 at IAC, Patancheru, India. Twenty-six scientists from Bangladesh, India, Nepal, Thailand, the International Rice Research Institute, and ICRISAT participated. They endorsed the concept of a Working Group aimed at validating the benefits of BNF by legumes to develop sustainable agricultural production systems. The group agreed to work on BNF research, intending that outputs would be available within 5 years for on-farm validation. For example, studies were planned on rhizobial inoculation and ways of updating the technology (Rupela et al. 1994). Nine scientists from four research groups in India, two in Bangladesh and one each in Pakistan, Sri Lanka, and Vietnam conducted on-farm experiments. Results will be discussed during this workshop.

Another group undertook the investigation of the performance of high-nodulating BNF selections of chickpea. The high-nodulation selections of ICC 4948 and ICC 5003 gave a 10–31% higher grain yield than the low-nodulating selections of the same cultivars when grown in a N-limiting Vertisol at IAC during the postrainy seasons of 1991/92 and 1992/93. A multilocational trial was designed to validate the results in different environments on differing soil types. Most of these experiments have suggested that the relative differences in the nodulation capacities of the different variants were stable.

Mineral N is known to suppress BNF of several legumes. Limited surveys of soil N levels around the time of sowing chickpea on farmers' fields suggested that N levels that suppress BNF could exist to a significant extent. Attempts were made to validate the preliminary observations and create awareness about similar problems that might exist in other legumes. Because of limited interest shown by WG members, attempts were made to motivate ICRISAT scientists to conduct studies on this topic. Data on mineral N levels from farmers' fields in groundnut-growing areas and in benchmark sites on different legumes were collected. It is hoped that the progress made will motivate more members to take up collaborative experiments on these topics.

Another study was planned to validate the procedures used successfully for identification of nodulation variants in chickpea and pigeonpea. Scientists were encouraged to use these procedures with or without modifications to identify nodulation variants in legumes of their interest.

Benefits from WG cooperation are already forthcoming. Dr B Venkateswarlu of the Central Research Institute for Dryland Agriculture, Hyderabad, India, has identified high N_2-fixing selections for groundnut cv JL 24, and Dr S S Dudeja and Dr A L Khurana from Chaudhary Charan Singh Haryana Agricultural University, Hisar, India, have reported nodulation variants in pigeonpea. They have reported

that the variants developed through selection were more stable (stability index >80%) than those identified through induced mutation (stability index 52%).

Conclusion

The critical mass of scientists in a WG can address and solve production problems at a much faster pace, thus significantly reducing the 'research lag'. In addition to enhancement of research collaboration, WGs also help strengthen national programs' capabilities in basic and strategic research, and provide technological options that can be rapidly transferred to farmers. The support of more extensive agricultural research networks, such as the support of CLAN for NiFLA, enables rapid recognition and effective use of resources to address major regional agricultural problems.

Reference

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