

CR002504**DATA HOLDING ON DROUGHT STUDIES****ROYM
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CERAAS, Centre d'Etude Régional pour l'Amélioration de l'Adaptation à la Sécheresse (Regional Centre for Studies on the Improvement of the Adaptation of Plants to Drought), is a national laboratory and a regional base-centre of WECARD¹ for the study of the adaptation of plants to drought. It is situated in Thiès (longitude 14° 42', latitude 16° 28'), 70 km east of Dakar, Senegal. The climatic conditions are typical of the semi-arid sudano-sahelian zone. In Thiès, the annual rainfall varies between 400 and 600 mm, and temperature between 19°C and 45°C.

CERAAS found its origin from the expertise developed by a research team in Senegal which started work in 1983, on a new multidisciplinary research programme for improving the adaptation of peanut to drought. The aim of the programme was to contribute to stabilising and/or improving peanut production in Senegal. This team consisted of physiologists and breeders of ISRA² and CIRAD³, based at the Plant Physiology Laboratory of CNRA⁴ at Bambey, one of the national research centres of ISRA. The programmes were funded by the European Union (DG XII) in the framework of its STD⁵ 1 and 7 programmes. Based on the interesting results obtained for agricultural development in the sub-region, in 1987, WECARD and CILSS⁶ mandated the research team in Senegal working on this programme, to develop its expertise and to extend it to other crops as well as other NARIs⁷ in the region. This initiative was further re-enforced with the drought resistance network (RDS⁸), one of WECARD's networks, to bring upon the team the role of organising and conducting research activities at the regional level, on one of its research themes: "Physiological mechanisms of plant adaptation to drought and creation of drought resistant varieties". With the association to a regional research network, the laboratory thus assumed a regional dimension and was formally established as CERAAS, within ISRA, in 1989.

For a larger number of researchers from the South to benefit from the expertise of CERAAS, a complementary project, prepared by CERAAS with the support of WECARD and CILSS, was jointly financed by the European Union in the framework of its STD⁹ (DG XII) and Regional Indicative Programme funded by EDF⁹ (DG VIII). These funds were destined to improve the research and technical capacity of CERAAS. Furthermore, to facilitate its position as a component of a developing country NARS, open to regional and international co-operation, CERAAS was placed under the tutelage of WECARD, after the signing, on 7 December 1996, of an agreement between ISRA and WECARD.

2. Subject and nature of the research

Desertification, originating from climatic changes such as drought, is a crucial problem to populations, causing social and economic disaster. Rainfall (water) and productivity feature in the list of critical indicators of desertification. In the Sahel, where rainfed agriculture is the order of the

¹ West and Central African Council for Agricultural Research and Development

² Institut Sénégalais de Recherches Agricoles

³ Centre de Coopération Internationale en Recherche Agronomique pour le Développement

⁴ Centre National de Recherche Agronomique

⁵ Scientific and Technical Committee

day, water is an essential resource for agricultural production. Moreover, its importance increases with the necessity to feed an ever increasing population. The development of an integrated water resources management system is therefore an increasing necessity. The integrated approach of water management involves a number of scientific areas, notably the environmental and agricultural sciences, which leads naturally to the development of multidisciplinary research activities.

At CERAAS, a multidisciplinary approach conjugating specialists in agronomy, physiology, biochemistry, molecular biology, bioclimatology, crop modelling, biometry and statistics has been developed to work on the research theme "Physiological mechanisms for the adaptation of plants to drought and creation of improved varieties". The programmes on which the research activities are based correspond to national and regional priorities and are grouped under the following three sub themes :

- improving, in an integrated manner, the knowledge on the agronomic performance and physiologic behaviour of crops cultivated locally and/or introduced in semi-arid regions;
- developing and improving tools that could be used to increase the efficiency of breeding programmes for the creation of crop varieties better adapted to drought;
- developing and improving tools and methods for forecasting agricultural production and food security.

These themes could be characterised as fundamental, strategic and applied as regards tackling the problem of drought and optimising the management of water resources for agricultural production.

3. Data holding

Information and data acquired by and/or generated at CERAAS are managed by the information and communication service of CERAAS. This service is headed by an information and communication specialist.

3.1. Existing data archives

The information and data available at CERAAS could be grouped as follows:

- methods for investigating the agronomic performance and physiological behaviour of crops cultivated and/or introduced in semi-arid zones;
- information on relevant reproducible physiological and agronomic traits that may be integrated into breeding programmes for creating varieties that are better adapted to drought;
- methods and tools (physiological, biochemical and molecular biological) for screening crop varieties more resistant to drought for the development of plant material resistant to drought;
- physiological and agronomic methods for determining the water needs of crops, managing water resources and scheduling irrigation;
- methods and tools (crop models and geographic information systems) for predicting yields and identifying zones of potential agricultural calamity; information which could be used by decision makers.

Information and data are also available on soil physico-chemical, rainfall and climatic parameters.

3.2. Data: types

The data acquired, elaborated and/or treated are numerical, graphical, textual, photographic, cartographic and tabular. In order to facilitate their management, these have been grouped into primary and secondary data.

3.3. Data quality

Raw data is collected and treated either manually or automatically during research activities

3.4. Accessibility of the data

The information management system at CERAAS is computerised. Data could therefore be accessed directly. However, the system is not integrated into any networking system as yet. External users can, in addition to the traditional channels provided by the service, receive information and data they require through the internet or by e-mail.

4. Conclusion and perspectives

The operating environment in the information management sector is changing rapidly with the introduction and adoption of new technologies. The information manager at CERAAS needs to be trained to be well equipped for the new "services" environment and technical skills that are required. The information manager should also be given the opportunity and means to interact with users to assess the demands, to design more appropriate services, to market them and to monitor and assess their impact.

CERAAS possesses a considerable amount of grey literature not available in international systems. The grey literature data base has to be developed and strengthened. Moreover, it is necessary to establish a brokerage function to digest and repackage information into more value-added services for users.

In addition, the following actions will contribute to consolidating the information and data management system of CERAAS :

- sensitising a large majority of users and decision makers on the necessity to invest in research for a sustainable solution to fight against drought and desertification, through the conduct of modern research programmes;
- improving the valorisation of local results;
- re-enforcing North-South partnership;
- re-enforcing the operating environment of the information and data management systems in Africa (annexe 1).

Annexe 1

OUTCOMES, CONCLUSIONS AND ACTION PLAN (DRAFT) RESULTING FROM A MEETING ORGANISED BY THE GFAR¹⁰, IN DAKAR, SENEGAL (26 AND 27TH JULY 1999) ON DEVELOPMENT OF A SUR-SAHARAN AFRICAN AGRICULTURAL INFORMATION STRATEGY.

Outputs and conclusions

The Executive Secretaries and ICT¹¹ specialists of the three SROs¹² (WECARD, ASARECA¹³ and SACCAR¹⁴), recognised the value of this first consultation to exchange, information and compare experiences. The participants reaffirmed that a sub-Saharan Agricultural Information Strategy can only be developed based on the three sub-regional information strategies, and that the information and communications activities of the NARS are the building blocks of the sub-regional information strategies.

At the national level, the sub-regional organisations foresee the need of developing and strengthening National Agricultural Information Focal Points (NAIFP), as the information and communication arm of the NARS. These NAIFPs would have a key role to play as:

1. the national gateway (within the country and between the country and the regional and international information systems); and

2. the knowledge brokerage agent (acquisition, interpretation, synthesis and dissemination) for the different categories of users.

The NAIFPs could be hosted by universities or NARIs, but should have quality access to communication infrastructure. High priority should be given to e-mail connectivity between NAIFPs and users, especially remote research stations, extension services and farmers' organisations, without neglecting other types of media (radio/TV, meetings and newsletters, etc.).

The functions envisaged for the SROs are: to gather information on information systems and networks in member countries; to promote common formats and standards; and to act **as** the gateway between the national and the global information systems.

With regard to the NARS, the SROs should play the following roles:

- Develop and implement sensitisation programmes for policy-makers and senior managers on the value of IM/IT¹⁵ in order to ensure the allocation of adequate resources to NAIFPs.
- Advise and assist the NARS to develop their own information and communication strategy.
- Promote a new role of information and communication professionals (from librarians to "cybrarians") through training curriculum development in the area of library and information services with more ICT-oriented content and agricultural/scientific background.
- Co-ordinate sub-regional programmes (e.g. training, traditional and electronic publishing, including newsletters) and to provide advice to NAIFPs on cross-cutting issues (e.g. connectivity, equipment procurement).
- Mediate, on behalf of the NARS, with international information providers over the means and terms of access to STI and with library schools over expertise development.
- Promote the development and maintenance of national databases on research expertise, programmes, activities and facilities and the adoption of management information systems to improve access and use of these data within and between the sub-regions.

The SROs recognised the need for external assistance for the establishment of their sub-regional information systems and the network of NAIFPs, but considered this need **to be** temporary. They decided to address, in consultation with their NARS members, the basic issue of sustainability as related to recurrent costs and management.

The sub-Saharan Agricultural Information Strategy will result from the co-ordination of the three sub-regional information strategies that the SROs agreed to develop, and from **close** interconnection through an electronic network based on interactive Web Pages. As the first steps toward information sharing, the SROs also agreed to develop a common database with details of their research networks and to establish a regular mechanism of consultation between their respective ICT specialists.

Finally, the SROs requested the participating agencies (Africalink/USAID, CAR International, CTA, FAO/WAICENT, ISNAR and the NARS Secretariat of GFAR) and their other partners in the field of ICT to continue to support the development process of their information systems according to their strengths and comparative advantages.

Follow-up actions

The SROs recognised that some of the activities defined above are of a long-term nature and were already addressed in their existing plans and schedules (i.e. ASARECA and the RAIN Project; WECARD and its Plan of Action; and SACCAR and its outline strategy). As a result of this consultation, the SROs agreed to implement the following additional actions within the next six to twelve months:

- Initiation of negotiations with scientific information providers to facilitate access at a reduced costs

ASARECA, WECARD and SACCAR agreed to pursue this initial dialogue through electronic communications. They will formulate their own specific action plan taking into account the issues and options raised and will share them with the other SROs. Each SRO will contact the appropriate partners in support for implementation of its action plan.