Meteorological Data Distribution Systems

Programme: RAFS then NRSP
Project Number: R5156CB Start
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Executive Summary

This adaptive research project began in 1992. During the first two years of the four year project. it concentrated on delivering easy-to-use systems to facilitate the reception, processing and dissemination of weather satellite and other data by African meteorological services. The project concentrated on forming and maintaining fruitful links with the UK Met. Office and World Meteorological Organization which have provided a solid base for more recent joint activities. The NRI now has a solid working partnership with the UKMO through adaptive research and commercial activities. The project has part funded the development and deployment of **NRI Media** systems which are designed to provide met. services with local facilities to deliver weather and environmental information via the Media. [The original development of the Media prototype was funded under project R5156CB (Q1 - 883-642-0010)]. During the last year the project has fended development of training materials (especially video work books) jointly with other ODA sources. These materials are now available to African met. services and will allow them further to improve their information dissemination. especially to fanning communities and the public. Other activities included part-funding of adaptive research towards utilising satellite data to improve rainfall estimation and catchment monitoring. Overall the project contributed to ODA's development goals by addressing and overcoming constraints to data use and information dissemination. towards improved management of renewable natural resources in Africa.

Background

The project was originally funded under RAFS Research Assessment Component to deliver improved use of meteorological information in Africa as part of NRI's Local Application of Remote Sensing Techniques (LA.RST) initiative. It was set tip to answer calls from African met. services for help in improving their access to data and their use and dissemination of these data. Throughout the world, national meteorological services have long been centres for meteorological and hydrological data collection, archiving, weather forecasting and international data exchange. By the early 1990s, African met. services were seen as central to many national early warning efforts but were weak in adapting to modern techniques and. in delivering effective use of satellite remotely sensed data. It was concluded that while meteorology could be applied nationally to deliver improved environmental monitoring and management, institutional constraints limited the effectiveness of the information available.

The LARST Applied Meteorology thrust was aimed at overcoming some of these limitations by: • delivering data in a timely and appropriate manner
• providing techniques for rapid processing of available data
• helping to increase local specificity of products generated
• improving information dissemination to decision makers Iocally and nationally

The project was one of several thrusts under RAFS Resource Assessment which dove-tailed to deliver objectives towards meeting the programmes and ODA's development goals. In essence, improved utilisation of remotely sensed data in developing countries can have a positive impact on management of renewable natural resources by using appropriate techniques and sustainable technologies.

Project Purpose

The project was specifically aimed at improving access to meteorological, hydrological and environmental data within national meteorological services, facilitating their timely product generation and rapid and appropriate systems for disseminating information for better decision making: for national early warning_ natural resource monitoring and management and locally to the general public and farmers.

Research Activities

During the project's four years, it changed to account for evolving needs within the context of a constant strategic vision. namely to deliver better environmental information to decision makers.

Outputs

The project is adaptive and was designed to deliver useful techniques and appropriate and sustainable technologies. Thus, in general little new science was undertaken (see below). Evolving objectives were achieved in full and throughout the project communications from African met. services, their governments, other organisations and the public in several countries have demonstrated the success of the technology transfers involved. The UKMO International Branch has recently written to ODA to declare that its collaboration with NRI over the past four years has been a most effective and successful use of limited WMO VCP funding.

Specific outputs have included:

a: **Meteorological Data Distribution Systems (MDDs):** Delivery and installation of MDD systems to several African met. services (systems supplied by UK Met. Office, under the WMO Voluntary Co-operation Programme), followed by training and support of local staff in their operational use.

b. **NRI** Media Systems: Development, delivery and installation of NRI Media systems in African met. services and provision of local training in their use to African met. service staff (all but one system was supplied by UKMO under WMO VCP).

c. **Training** Materials: Development of training materials and videos for local use to improve uptake of systems supplied (part funding from ASC.and R5981).

d. Rainfall Estimation: Development of techniques to improve rainfall estimation and catchment runoff monitoring. Improved techniques developed for use by the Namibian Dept. Water Affairs (Walker *et al.* 1995). This work has continued to March 1996 under R5981 funding and a paper discussing latest results is in preparation.

By March 1996, six MDD systems and six NRI Media systems are in place and fully operational in Africa. Four of these were funded by commercial contracts between UKMO and NRI. UKMO has plans to install upwards of six more Media systems by March 1997. Further development of rainfall estimation techniques is planned under ODA TC funding.

An assessment was completed of the ability of Meteosat Cold Cloud Duration (CCD) to estimate daily rainfall in Namibia using data for 1993 and 1994. The technical report of this recent work is attached as Annex 1. A journal paper is planned.

Over the four years of the project, outputs have included several conference papers, a poster display and one journal paper.

Contribution of Outputs

Overall this multi-disciplinary adaptive research project has delivered improved data acquisition and information dissemination to many African countries and has strengthened met. services, achieving improvements in their services.

While project work on delivering MDD systems does not lead directly to future work, the development and delivery of NRI Media systems has been taken forward as part of the ongoing commercialisation of LARST. The UKMO has plans to purchase further systems from NRI. The successful development of video-based training materials (part-funded by other projects) could be extended to include training materials for a wide range of applications in Africa. Adapting previous research to deliver improved rainfall estimation should also be continued as the methods developed have wide application in many developing countries. In summary, the project's successes point to several lines of possible future work, further to improve adaptation of previous research activities and uptake in Africa and elsewhere.

Dissemination Outputs (Publications):

Bettany, B.W, Copley, V.R. and Sear, C.B. The NRI-Media system. Proceedings of the 21st annual conference of the Remote Sensing Society: "Remote Sensing in Action", Southampton, UK September 1995, pp 1061-1068. 1995.

Saunby, M., Ellis, N. M., Stephenson, P., Stephenson, J., Trigg, S. and Sear, C. B. A modular software architecture for the local reception of satellite data. In: Proceedings of the 10th Meteosat Users Conference, Cascais, Portugal, September 1994. Eumetsat, 1994. (Part funding by ODA TC: Africa Regional remote Sensing Project)

Sear, C.B.. Griggs, D.J., Wooster M., Williams, J.B., Budgen, P. and Trigg, S.N. Enhancing African meteorological services with MDD. In: Proceedings of the First European Conference on Applications of Meteorology, Oxford, Sept. 1993, Session B. 5p. 1993.

Sear, C.B., Griggs. D.J., Wooster M., Williams, J.B.. Budgen, P. and Trigg, S.N. Enhancing African meteorological services with MDD. **Meteorological Applications, 1, pp** 99-101. 1994.

Sear, C.B.. Williams, J.B., Trigg. S., Wooster, M. and Navarro, P. Operating satellite receiving stations for direct environmental monitoring in developing countries. In: Proceedings of the International Symposium: Operationalisation of Remote Sensing, April 1993, ITC, Enschede, The Netherlands. Volume 8, pp 293-302. 1993. (Part funding from R5155)

Tadesse, T., Sear C.B., Dinku, T. and Flasse, S.P. The impact of direct reception of satellite data on an African meteorological service: operational use of NOAA AVHRR and Meteosat products in Ethiopia. Proceedings of the Eumetsat Meteorological Satellite Data Users' Conference. "Polar Orbiting Systems", Winchester UK, September, 1995.

Tadesse, T., Griggs, D.J and Sear C.B. The meteorological data distribution (MDD) system implementation, evaluation and operational use in Ethiopia. Proceedings of the Eumetsat Meteorological Satellite Data Users' Conference, "Polar Orbiting Systems", Winchester UK, September, 1995.

Walker, S.H., Dirkse, S., van Langenhove, G., Sear, C.B. and Williams, J.B. Use of Meteosat cold cloud duration to improve water resource management in Namibia. Proceedings of the 21st annual conference of the Remote Sensing Society: "Remote Sensing in Action", Southampton, UK September 1995, pp 99-106. 1995.

Other Outputs

Bettany B. and Sear C.B. Weather and the Management of Natural Resources. 1996

Bettany B. and Sear C.B. Media: a self-training workbook. 1996 (with R5156 and funding from ODA ASC).

Tucker M. An annotated bibliography of literature for the project `Identification and Monitoring of African Weather Regimes'. Phases 1 & 2: West Africa. 199.1. (Part funding from R5156)

Tucker M. An annotated bibliography of literature for the project 'Identification and Monitoring of African Weather Regimes. Phase 3: Southern Africa. 1995. (Part funding from R5156)

One paper has recently been submitted for journal publication:

Sear *et al.* 1996 The presentation of the weather information via the media: experiences in Ethiopia (submitted to Meteorological Applications).

Another paper is in preparation with the UK Meteorological Office. for submission to the WMO Bulletin.:
Budgen *et al.* 1996. Weather and the media (in preparation)

A four page flyer for the NRI Media system and corresponding world wide web page have also been produced.