

# **Relationships Between the Global Decision Support System and Regional Projects**

## **SANREM II - A Conceptual Framework <sup>1</sup>**

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### **ABSTRACT**

SANREM research involves development and application of methods to enhance the sustainable use of natural resources to achieve the USAID goals of improving food availability and economic growth. The current mandate is to provide improved tools for decision making at landscape/lifescape, sub-national, national, multinational, and global levels. How can we make the best use of the total SANREM resource to address the broader mandate? What is the appropriate level of engagement and integration between global and regional projects? Regional projects are extending community-based methods to other communities in different locations and developing applications for decision makers at higher levels of scale. The Decision Support System involves development and application of economic, environmental, and biophysical models in East and West Africa to support decision makers at multiple levels of scale. Collaboration with FAO is developing a global system of models and databases for use by national programs. In this paper, we suggest both parallel and linked approaches between projects including a combination of communication, coordination, and collaboration – three different levels of engagement. The paper provides a basis for discussion at the Synthesis Conference to review present status and plan future relationships to help ensure the pieces of SANREM fit together.

### **INTRODUCTION**

Scientists and managers in the SANREM CRSP projects are presently involved in research in the fourth of a five-year cooperative agreement with USAID. This is the second such agreement with the Global Bureau. The annual SANREM meeting provides an opportunity to assess progress and consider plans for the final year of SANREM II. There is need to consider how to put the results together and to shape the final year of research to make the SANREM II product as responsive as possible to the sponsor's mandates. There is also need to consider the strategy for SANREM III. The Management Entity has provided their plans for the development of this strategy (9/20/02), forming a point of departure for discussion at the coming meeting. The timetable for developing the overall strategy for SANREM III is very tight. The key interactions among players need to occur, as much as possible, at this meeting. The results of these deliberations must be reflected in year-five plans for SANREM II and in proposals for SANREM III.

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## **HISTORICAL CONTEXT**

The University of Georgia recruited new leadership for SANREM II. However, there was considerable valuable continuity in participants being involved in the regional projects under both SANREM I and II. Texas A&M became part of SANREM as it began its second five year agreement with USAID. The historical perspectives about this are different among key players. Some of the points in this history are contentious and, do not seem to contribute to a productive debate about the future. However, there are a few key historical points that are important to our planning at this point. These are presented with the notion that they may be debated and, as necessary, modified during the meeting.

USAID has, as one principal focus, the development of ways to enhance food security and develop economic activity while making sustainable use of natural resources. As a global agency, they are seeking to develop public goods (processes and products) that can be used at levels of scale ranging from local to global. In moving from the first to the second SANREM agreement, the sponsor continued to value the SANREM approach in sustainable development and natural resource management at relatively local levels. But, they also sent a clear signal of their interest in creating products that meet their objectives at levels of scale above the household, village, watershed, and landscape.

At the time SANREM II was being defined, Texas A&M had ongoing research for USAID on development of holistic methods to evaluate economic, biophysical, and environmental consequences of policy and technology options to sustainably enhance food security in developing countries. The continuation of this research was incorporated into and funded under SANREM II as part of the global subproject. In year four the TAMU component became a separate.

One of the overall goals of SANREM is to create program integrity that ensures the parts of the project are complimentary and that the overall goals of the sponsor are met. This paper is about the issues and opportunities involved in achieving that goal.

## **MOVING AHEAD IN SANREM II**

During SANREM II, the three regional projects have in part evolved to take methods and principles developed in SANREM I to application at other locations and levels. This has involved both lateral and vertical transfer. Lateral transfer is defined here as taking technology from one location to another at the same level of scale, ranging from household to watershed. Vertical transfer is defined here as the application of results or methods developed at smaller levels of scale such as village or watershed to provincial, national, or multinational levels. The regional projects have not evolved at the same pace. For instance, the Southeast Asia Project is well along toward its vertical and lateral evolution, while the West Africa Project, as a new start in SANREM II, still concentrates its effort at a relatively local level. The products of the regional projects include methods for participatory planning and actions aimed at sustainable use of natural resources for food security and research to develop new practices and technology to meet these same objectives.

The project to develop and apply the Decision Support System (DSS) has involved development of methods and their application to a set of priority issues identified by decision makers at varying levels of government. A participatory process is also being used here with the participants being decision makers at varying levels involved in defining their needs, participating in development of

methods and products, and evaluating outcomes. The participatory process here, as it is in general, is critical to the successful building of capacity and ensuring use of products. The DSS project is conducting research in Mali and adjacent West African states, in Kenya and adjacent East African states, and at the global level in collaboration with FAO.

The DSS is a suite of economic, environmental, and biophysical models that is being developed at levels of scale from household to multinational. A major element of the research is to develop the means of linking these models in a geospatial framework to provide a holistic approach to assessing the options facing decision makers on the use of natural resources to sustainably increase economic activity and food security. In this respect, the models and related databases are central to the overall objective of SANREM to provide results that range from local to global in their application. As the system evolves, there is recognition that the name of the project does not fully convey its science and application. A more meaningful description might be something like “Precision Landscape Analysis System”. This is still under consideration and mentioned here only to reflect the evolution of the current effort and the implications on future directions.

## **LINKAGES OF REGIONAL PROJECTS AND DSS**

Over the course of SANREM II, there has been ongoing discussion of more explicit linkages between the DSS and regional projects. The External Evaluation Panel and the Management Entity have encouraged the development of these linkages. Because of the co-location of research in West Africa, plans were made for the first such linkage between DSS and the WAP. There are specific year-four plans for this engagement. The collaboration has been paced by the need for the WAP to achieve consensus among its participants on the next steps in their program.

Why have we not developed a more interactive engagement between the regional projects and the DSS? Looking back is useful if it helps to identify problems to be solved as we move ahead. The DSS has two operating locations and an ambitious research plan. Two of the regional projects are in different parts of the world. Developing models and databases for new locations is resource intensive. The EEP has noted that the project is spread thin with its existing resources and has encouraged it to ensure that it has sufficient focus to ensure a viable product. The WAP has not matured to the point where there is an internal mutual consensus among collaborators of how to implement the collaboration. While there are some substantial common threads, there are substantial disciplinary and cultural differences between the regional projects and the DSS. Our challenge is to take advantage of this diversity to achieve the common goals of SANREM II – which is to provide tools and results that help decision makers at multiple institutional and governmental levels. As the methods and models in the DSS are evolving, substantial progress is being made in generating more utility of the system. In the future, it will require less resources to apply the DSS to new scenarios than in the past.

For collaboration to be effectively done in the future, in SANREM III, the engagements will need to be part of the initial plans of the various SANREM players. The experimental design of the related projects must include the explicit details of the collaboration from the start. ***A clear perception of mutual benefit must be achieved and a commitment to the collaboration made.***

## ACHIEVING SANREM PROGRAM INTEGRITY

The USAID mandate for SANREM II is to provide products that can be used at levels of scale from local to global. The mix of global and regional projects lends itself well to achieving this goal. But, program integrity does not mean that all parts of SANREM II have to be intimately integrated. Program integrity can be achieved by varying levels of linkages that include effective communication, cooperation, and collaboration. With important recognized exceptions, it seems fair to say that the regional projects have focused their efforts on relatively local levels of scale. The DSS has focused on engagements with decision makers at higher levels of scale – provincial, national, multinational, and global. Figure 1 shows a concept of how the two approaches might have a useful intersection.

While opportunities for collaboration might be recognized at any level of scale, it would seem particularly fruitful to look for these possibilities at the intersection of the global and regional parts of the overall project. It is here that some of the methods and results of local participatory driven activities might find application in upward scaling and where the outputs of national models (markets and prices) might be valuable inputs to more local models and strategies.

**Figure 1**

### **Relative areas of emphasis and potential intersection of Global and Regional Projects**

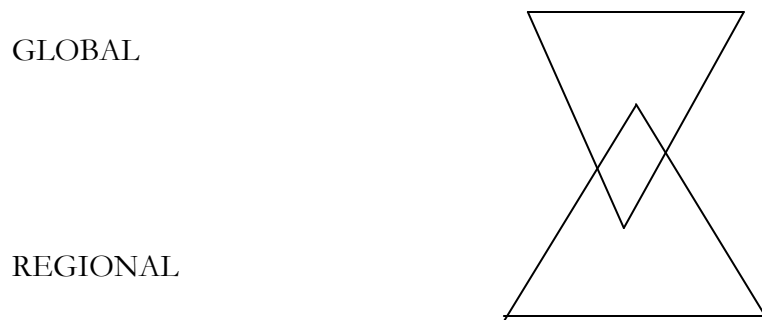
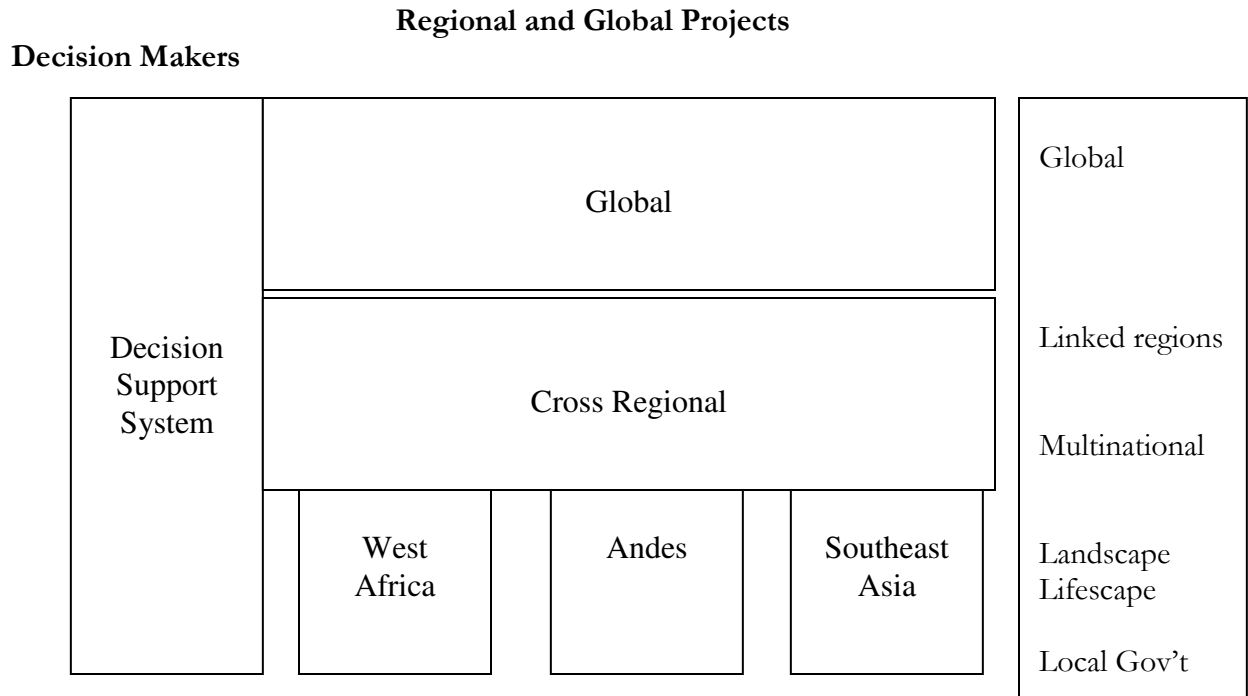


Figure 2 depicts a concept of the relationship between the DSS and regional projects. It shows that the two kinds of activity may usefully evolve either in parallel or in tandem. The three regional projects are, to varying degrees, applying products developed at local levels to other locations in the region – both within countries and between countries. The regional projects are also defining and documenting cross regional implications of their individual results. A cross regional comparison between the DSS East and West Africa studies is part of the year-four plan of work. Cross regional products logically progress towards global interpretations of results. The DSS involves modeling from farm or household to global levels. However, it does not develop the detailed methods and results at household and village levels that are done in regional projects. The DSS is involved in developing methods that explicitly link and upwardly aggregate the results of the holistic analysis done using the integrated suite of models.

**Figure 2**  
**Relationships Between Global and Regional Projects**  
**Relative to Decision Makers and Level of Scale**



The ability to aggregate economic and environmental models and their results to larger levels of scale remains a challenging research area, although workable solutions are becoming available, if imperfect. This is an area of continuing research for the DSS and presumably with the regional projects. This is a capability that the regional projects will ultimately need to take their local results to larger levels of scale.

An example of complementarity is the varying levels of complexity of models and related expertise required to use them. The regional projects, at least in part, focus on providing farmers and village level decision makers with tools they can use themselves. The DSS is inherently more complex and one of its challenges is the packaging of the models into a common framework that provides access and utility to users with varying levels of modeling skill. Clearly both kinds of capacity are needed to meet the broad USAID mandate. But the same model does not need to be used at all levels. It could and should be possible to provide interfaces between models, in cases where it is useful to do so.

How does this stack up with regard to the overall USAID mandate and the commitment to SANREM program integrity? In the short run, SANREM can provide useful tools to decision makers at all levels including households and villages and higher levels of government using complimentary methods. These methods and databases are not necessarily closely integrated and analyses can be done independently between the DSS and regional projects. In other words, SANREM is covering its bases in terms of both institutional and biophysical scaling by the complimentary set of tools being developed. On the other hand, not all the DSS models will find utility in the more site-specific local applications and these local applications developed by regional

projects will not always be useful in analyses at broader levels of scale. Program integrity could and probably should be considered more at the conceptual level – where general principles of modeling and analysis are complimentary.

### **BACKGROUND FOR PLANNING SANREM III**

Year-four activities are well along in the regional projects and DSS. The objective of linking the DSS in Mali with the West Africa Project remains to be achieved and the planning sessions at the annual meeting offer good opportunity to re-examine the details of the engagement and develop a timetable for getting underway. For the DSS, year five will require substantial effort in documenting models and data bases as well as continuing to develop methods for developing country partners to access and use these products. Year five is also a time when detailed planning of SANREM III can be accomplished. The areas of engagement to further build program integrity in SANREM III need to be defined as proposals are developed in early 2002. There are several general issues for which additional clarification and guidance would enhance our planning capability.

- Planning SANREM III obviously provides opportunity to revise the overall strategy and to create substantial new change from a programmatic and process standpoint. Creating needed change in the course of continuity of long-term objectives should be the mission.
- It will be important to know of any strong guidance coming from the sponsor at the time of planning of the new agenda, rather than later. Are the general premises of SANREM I and II still valid? Is the sponsor still expecting the program to cover the range of scale from household to global? What, if any, changes in philosophy and general direction does the sponsor envision?
- This meeting provides an opportunity to place new issues and opportunities into the context of the ongoing program to develop an enlightened overall agenda for SANREM III. It is important that the Technical Committee looks past the current effort and ensure a forward facing agenda that addresses the issues of sustainable development that will be most relevant over a 5-15 year time frame.
- It is important to consider restating the SANREM strategy to more explicitly link the sustainable use of natural resources to the explicit goals of USAID to reduce poverty and enhance food security. This seems understated in the draft strategy of the ME.
- Institutional strengthening is unfortunately severely limited by the constrained institutional funding in almost all developing countries. The need is for actions outside the immediate purview of the CRSPs to provide an institutional framework on which we can build specific programs. How to achieve this is not an easy question to answer. Institutional strengthening would be better considered in the context of the government as a whole, not just the research and teaching institutions with which we collaborate.
- We would like to be doing more short term as well as long term training to provide a capacity to use the methods we are developing. We, as other parts of SANREM, believe that the most effective method is through active participation in planning, conducting, and evaluating the results of research. Collaborators can then become teachers and

practitioners when our job is done.

- Research is the engine that drives outreach and extension, education and training or institutional strengthening. It is suggested that, in the overall SANREM III planning, it would be appropriate to examine the balance between research and outreach. Without a relevant base of new knowledge upon which to build, the other parts of the SANREM mission could perhaps be as well or better done by NGOs, PVOs and others

## **NEXT STEPS – CONTINUING AND EXPANDED AREAS**

In looking forward to the next round of SANREM, The Texas A&M Impact Assessment Group has identified a number of issues and opportunities that could be a part of the new program. Some of these represent continuation of current work; many are what seem to be logical additions or new directions to build on the fundamental precepts of SANREM. A number of these areas appear to lend themselves well to consideration for either coordination or collaboration with the regional projects. They are suggested as topics for discussion at the Annual Meeting.

**Linked Models:** We believe (with admitted bias) the ability to link environmental, biophysical, and economic models that can be applied at varying levels of scale is fundamental to the overall goals of SANREM and that additional emphasis should be placed on this area of research. Biophysical and environmental upward scaling moves from field to farm to watershed, while economic scaling moves upward along politically defined boundaries, since this is how secondary economic data are acquired and stored. Methods to improve the ability to link upward aggregation of biophysical, environmental, and economic data are badly needed.

**Putting Models to Practice:** In SANREM III, there is the opportunity to put the methods developed in SANREM II to practice at several levels of scale. For example, the use of satellite imagery combined with biophysical models of crop-livestock farming systems could be developed to provide forecasts of agricultural outcomes within and between cropping cycles. Such estimates would be central to improving the current FEW system, especially in West Africa.

**Global Climate Change:** The impact of global climate change on small farmers in the South, taken at a macro level, is predicted to be very substantial. More specific knowledge is needed on how global climate change will affect these operators, and on strategies to reduce the impact of climate change, including alternative production practices that are sustainable over time. Answers involve environmental, economic, and biophysical aspects linked in a holistic approach to analysis.

**Measuring Status of Degraded Lands:** Methods are needed to measure progress toward achieving restoration of degraded lands or to measure the impact over time of production practices with varying levels of threat to sustainability of natural resources. Estimates of soil carbon may provide one such indicator. The use of modern satellite imagery coupled with new point-based infrared reflectance monitoring technology could provide an affordable approach if the methods are sufficiently accurate. Similar methods are needed to improve the ability to assess the status of water quality and quantity as a function of agricultural and forestry practices.

**Understanding Markets:** Farmers and regional, national, and international planners concerned

with improving food security and economic growth all state that they believe one of the key factors is providing better methods for smallholders to understand and operate in increasingly complex local, regional, national, and international markets. It would be very important to include this as part of the total systems approach taken in SANREM III.

**Livelihoods:** There should be useful opportunities to define relationships between the methods used in the DSS and those less quantitative approaches used in livelihoods analysis. Some elements of the product could be useful in assessing the impact of SANREM and its component parts.

**Unifying Principles for Scaling:** One of the more important but difficult issues is how to provide the development of methods used to relate research done at one level of scale to others and to build unifying principles that allow for scaling research results or experiences up or down as we develop and improve methods for use by decision makers.

**Indicators of Ecosystem Health:** For NRM in general, there needs a better set of metrics or indicators that allow one to quantitatively assess the impact on ecosystems of alternative policies or technologies that are intended to enhance food security and reduce poverty. This metric is probably not entirely an economic one. It is more complex than just estimates of water and soil quality.

**Better Linkages Between NRM and Food Security – Poverty Reduction:** More emphasis is needed on development of methods that explicitly and quantitatively link the environmental and natural resource consequences of methods to enhance food security and reduce poverty through intensification or extensification of production practices under varying developing world conditions.

**Capacity Building:** Texas A&M is actively seeking funding outside SANREM for substantial regional capacity building efforts in both West and East Africa. Working with regional associations and national programs, we are proposing to establish research and demonstration units in key countries where teams of people from national programs in the region can learn to use the DSS. This will be collaboration between regional associations and SANREM.

**Global Decision Support System:** Texas A&M and FAO are collaborating to raise funds move from the East and West African experiences with the DSS to the establishment of an FAO-based global network of models and databases that can be accessed and used by developing and developed country analysts. We plan to include ICASA as a part of this collaboration.

## CONCLUSIONS

Our assessment leads us to conclude that the separate regional projects and the DSS justifiably have relatively distinct agendas that address the SANREM program in complimentary ways. We believe there is good program integrity in the overall project. We do not believe that all parts of SANREM must be closely integrated to achieve overall program integrity. However, we conclude that there are opportunities to improve program integrity by better communication, coordination, and, in some cases collaboration between SANREM elements. In SANREM II, we learned that this requires a perception of mutual benefit among players and a strong commitment to action.

When the draft approach on strategy provided by the Management Entity and the agenda for the research conference were considered, it was the feeling of our group that we needed to bring better balance to the overall discussions about current and future directions of SANREM. We feel more



consideration should be given to the goals of SANREM at larger levels of scale and with decision makers at levels above the local scale. We felt that this would provide opportunity to show how the overall project is meeting the goals of the sponsor and provide the venue for some serious planning about how to better work together.

Our group met November 5, 2001 to review and extend our discussions on future directions for our overall activities, including SANREM. This provided input from the Group to use in this paper. However, I should say that time constraints precluded a chance to provide for adequate review by my colleagues. Accordingly, I hope that you will not blame them for either sins of omission or commission in these remarks. Carlos Perez was kind enough to provide some extra time to complete preparation of this paper after our Group met last week.

Colleagues participating in the SANREM Research Conference are asked to forgive this obviously one-sided treatment of the interface between the Decision Support System planning and thinking and that of the Regional Projects. This was done with the intent of bringing a better total balance to the conference and, most certainly, to the deliberations about future relationships between regional and global projects. We did not wish to presume to address these issues from the viewpoint of the regional projects, but rather to present our ideas of where useful interfaces might exist. It is our hope of that this will stimulate colleagues in other parts of SANREM to surface their own topics for discussion of our interface and to elicit guidance from the sponsor and management entity.

We sincerely hope that the agenda for the meeting will provide time when the issue of interface between the DSS and regional projects can be given appropriate consideration. We reckon that unless this occurs then, there it will be difficult to have face-to-face discussions before it is time to prepare reports and proposals.