Food and Agriculture Organisation of the United Nations

Land Cover Mapping of Eastern Africa

Based on

Satellite Remote Sensing

GCP/RAF/287/ITA

(Phases I and II)

REPORT

OF

TERMINAL EVALUATION MISSION

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Abbreviations

AFRICOVER	Africa Land Cover Mapping Project
ADG	Africover Database Gateway
AID	Africover Interactive Database
AIM	Africover Interpretation and Mapping System
CTA	Chief Technical Advisor
FGDC	US Federal Geographic Data Committee
GEOVIS	Geographical Vector Interpretation Software
FSAU	Foof Security Assement Unit (for Somalia)
GIS	Geographical Information System
GISD	Geographic Information for Sustainable development
GLUCC	Global Land Use and Cover Classification Committee
GSDI	Global Spatial Data Infrastructure
IAO	Istituto Agronomico per l'Oltremare, Florence
IGBP	International Geosphere-Biosphere Programme
JRC	EU Joint Research Centre, Ispra
LCCS	Land Cover Classification System
LUCC	Land Use and Cover Change Project
MADE	Multi-purpose Database for Environmental Resources
MAP	Mapping Accuracy programme
MTP	Medium-term Plan of FAO (currently from 2004 – 2009)
NCM	National Coordinators Meeting
NTE	Not to exceed date
NWG	National Working Group
OIC	Officer in charge
PRODOC	Project Document
PSC	Project Steering Committee
PWB	Programme of Work and Budget of FAO (biennial)
RCMRD	Regional Centre for Mapping of Resources for Development
REIMP	Regional Environmental Information Management Project (Congo Basin)
RS	Remote Sensing
SDI	Spatial Data Infrastructure
TPR	Tri-partite Review
USGS	US Geological Survey
WSSD	World Summit on Sustainable Development

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Executive Summary

1) Project GCP/RAF/287/ITA – Land Cover Mapping of Eastern Africa based on Satellite Remote Sensing - was implemented in two phases from January 1997 to September 2003. It was funded by the government of Italy (total cost $9.54m) and executed by FAO in cooperation with ten countries of Eastern Africa. Participating countries were Burundi, Egypt, Eritrea, Kenya, Rwanda, Somalia, Sudan, Tanzania, Uganda, and the Democratic republic of Congo. These countries, which cover an area of 8.5m sq km, make up the East Africa module of FAO's 'Africover' initiative to establish for the whole of Africa a digital geo-referenced land cover database and a geographic referential, using satellite remote sensing data.

2) The terminal evaluation mission visited the Project from 20 July to 4 August 2003. The purpose was to assess its progress and achievements todate, and to provide recommendations to the participating governments, FAO and the donor on further steps needed to consolidate results and ensure achievement of stated objectives (Mission TOR in annex 1). In view of time limitations, only four countries (Kenya, Uganda, Sudan and Egypt) were visited; an e-mail questionnaire was however administered to obtain feedback from other project countries (Mission itinerary, persons met, and evaluation questionnaire in annexes 2 – 4).

3) Most of the project countries were low income countries. Common needs were to tackle the twin problems of food insecurity and reverse the trend in natural resource degradation linked to inappropriate use. The Project was meant to strengthen the capacities of East African countries for sound planning of natural resources development, to be achieved by: production of up-to-date Africover environmental resources databases for each country, aided by state-of the-art methodologies; creating an enabling environment for accessing and disseminating such information; enhancing physical and technical capacities of national and regional institutions; and undertaking case applications demonstrating the use of Africover products.

4) The mission found the project bold and imaginative, underpinned by sound concepts and innovative use of technology. It is rated as highly successful and overall cost effective. It provides a visible example of fruitful cooperation between East African countries, the Italian government, FAO, and partner institutions in the region and in Italy. Substantive results had been achieved, which were highly appreciated by the participating countries. These results accord with current national and regional initiatives aimed at enhancing environmental information systems, spatial data infrastructure development, and promotion of e-governance. The Project is relevant now as when first conceived, due to far sighted decision to be at the forefront of new technology.

5) The most significant project results are related to: a) development of the methodological and normative components of Africover; and b) the homogeneous multi-purpose environmental resources databases for ten East African countries, or a third of the African continent. The former, including essential software components (LCCS, AIMS and GEOVIS), were available to the project countries at the start of phase II. The national databases were available to most countries from early 2002, following the Project Steering Committee Meeting in Massawa.

6) Various national institutions have, through their National Focal Points and Working Groups, started or are planning to start utilising the Africover products for a wide range of resource monitoring and planning applications. Whilst still at an early stage, transition from database development to technological implementation and application has commenced within the project countries. The Africover website data download facility, installed in late 2002, had also elicited tremendous response, with requests for Africover datasets coming from well over 400 users todate. Whilst users were predominantly from outside the project countries, the methodologies and results, which would be shared as part of the data access arrangements, would add to the case applications already being undertaken by the Project collaboratively with end-users in five project countries.

7) Conceptual and practical elements of the Project's normative component, notably the LCCS (land cover classification system) had been peer reviewed and well received globally. This had led to strategic partnerships being forged between FAO and key international and national institutions, and to the Artemino declaration of May 2002 to establish a Global Land Cover Network. National participation in the Project's committees had also been an important avenue for information exchange among project countries, exposure to new technology, as well as technical cooperation across national boundaries. National working groups had provided an entry point for extending RS/ GIS technologies to national and sub-national stakeholders, and the initiation of cooperative effort in planning and management of sustainable development. A large number of nationals had received hands-on training in photo-interpretation and contributed valuable inputs to the development of their respective countries' land cover databases.

8) Despite the above achievements, there remain gaps in the project results. The number of nationals provided specialised training were still quite inadequate. No more than two individuals per country on average received such training, which was also limited in scope. Lacking also were coherent strategies for in-country dissemination of Africover products and technology transfer to national stakeholders and potential users. Some planned software developments were incomplete or were shelved. The project is closing just as East African countries are moving from database development to the utilisation stage for the Africover products. This process is unlikely to be sustained if the above weaknesses are not addressed. The main needs are:

- Further training to produce a critical mass of RS/ GIS personnel with requisite skills to manage, update and revise the Africover databases, and provide support on their utilisation in value-added applications.
- Continued technical support on the use of Africover products, including software packages and databases.
- A systematically prepared in-country dissemination strategy and communication plan, based on a thorough identification and analysis of national stakeholders' requirements.
- Maintaining an Africover forum with a distinct East African identity and membership as a logical follow-up to the Project Steering Committee.

9) **Future Measures** The mission's broad recommendations on measures which should be considered for the near future are as follows:

In-country training programme Formulating and conducting an enhanced training programme for management and utilisation of Africover products for around 15 – 20 individuals for each country, to be conducted in-country to the extent possible.

Technical and normative support A help-desk for Africover products should be established, dedicated initially to on-line technical support to the ten East African countries. This may be dovetailed into facilities to be established under GLCN. The mainstreaming of this important normative component within the regular programmes and strategies of FAO should be given priority consideration.

Dissemination of Africover Products Project countries should formulate a clear dissemination strategy for technological implementation of Africover products. This would require systematic in-country analysis of stakeholders, including the role each could play in enhancing (conversely, impeding) Africover utilisation, both in the public and private sectors.

Institutionalising a regional Africover forum A distinct identity for an Africover forum for the countries of East Africa should be retained, so as not to lose the institutional capital built up through the project over the past six years. Besides web-based communication, the establishing of an Africover network for the East Africa region, with a permanent secretariat and current NFPIs as members is proposed.

10) **Follow-up Actions** A number of follow-up actions on the part of FAO, the Italian government, and the project countries would be needed. Mission recommendations are:

- FAO and the Italian Directorate for Development Cooperation should jointly explore the future possibility of and options for funding support to the above measures. A fresh proposal should be prepared to prioritise and operationalise such support, in consultation the countries and partner organisations. Special attention should be given to the requirements of the in-country training programme and national Africover dissemination strategies.

- In the event that imminent donor funding is unlikely, FAO should as an interim measure consider hosting the East Africa network secretariat, within the ambit of its regular programme structure, such as the major programme thrust for Research, Natural Resource Management and Technology Transfer or under the relevant PAIA.

- Where still feasible, FAO might consider explicit inclusion of 'Land Cover Training Courses and Appraisal Workshops' when undertaking future GLCN initiatives, with special focus on practical application of the updated land cover data to sustainable development planning and management within the East Africa region, in line with the Artemino Workshop deliberations.

- Project countries should, as follow-up to the Project, undertake an initial assessment of overall national training requirements relating to Africover methodologies, tools, and databases. This should include a training needs assessment workshop with substantive involvement of participants in past training activities of the Project, moderated by a resource person with a background in training methodology and human resource development.

- In formulating the Africover dissemination strategy, countries should involve national experts with skills in communication, marketing, development planning and/or other social sciences. How institutional linkages between the NFPIs and other national stakeholders, besides the present NWG members, could be further strengthened, should also be explored. The need for external technical support should be identified and articulated at an early date.

11) **Possible Lessons** GCP/RAF/287/ITA had been a relatively complex project due to the innovative technology involved, interdependencies between its normative and field delivery components, the wide geographic coverage, and the large number of countries participating. Its successful overall outcome demonstrates that such complexities can eventually be overcome provided the underlying concept is sound, project participants are committed, and the end product is relevant to the practical needs of the target group. Possible lessons which emerge are:

- Careful account needs to be taken of the risks involved in interventions involving technology development, particularly in time and cost over-runs, and to factor these into the project design;

- Taking calculated risks in technology development could lead to enormous benefits, provided informed judgement and flexibility are applied;

- Adopting an adaptive approach to technology development can have advantages over more ambitious ground-up approaches;

- Sustainable development interventions based on new technology is best served by a more holistic involvement of inter-disciplinary skills besides the purely technical, both at design and implementation stages;

- Projects may not be the most reliable vehicle to support development of normative components, and mainstreaming these within regular programmes should be an option which ought to be vigorously explored.

I. INTRODUCTION

Purpose and Scope of the Evaluation

1. This evaluation of Project GCP/RAF/287/ITA was undertaken by a two-member team some two months prior to its closure[1]. The Project was completing its second phase, but both phases were covered as there had not been a formal evaluation of the first phase. The main purpose was to assess the progress and performance of the project todate, and to provide recommendations to the governments participating in the project, FAO, and the donor on further steps necessary to consolidate results and ensure achievement of stated objectives (detailed TOR of the mission in annex 1). This was intended to draw specific conclusions, document lessons learned, and make proposals for further actions to ensure sustainable development. Consideration was also given to project implications for food security, gender and the environment.

2. In accordance with the TOR, the evaluation included an assessment of the following:

a) The relevance of the project to development priorities and needs;
b) Clarity and realism of project objectives;
c) Quality, clarity and adequacy of the project design;
d) Efficiency and adequacy of project implementation;
e) Project results (outputs and progress towards achieving immediate objectives);
f) Cost effectiveness (where possible).

3. The Project was originally conceived as a field project[2], focusing on land cover information gathering and mapping for countries of Eastern Africa. Methodologies and tools developed and standardised for this purpose have since been field tested in ten countries, which could have significance for countries and regions beyond the project area. The evaluation scope thus comprised both field as well as normative programme perspectives, whilst keeping in view target beneficiary and other stakeholder interests at country, regional and global levels.

Evaluation Methodology

4. Information for this evaluation was obtained from a range of sources, including:

- Interacting with national focal points, other national stakeholder institutions, and past participants in project training activities, in short actual or potential end-users in a number of the project countries;
- Administering an e-mail questionnaire to national focal points in all countries, including those not visited[3];
- Discussion with project staff and consultants, past and present, and other FAO staff who had been involved in Africover activities;
- Discussion with Italian institutions which had provided technical support to the Project, such as for photo-interpretation and training (IAO), and in software development (Terra Nova), both based in Florence; and
- Examining project files, reports of international workshops/ forums and other recent documents, and websites in which Africover activities and/ or outputs had been the subject of review or discussion.

5. Particular attention was given in the evaluation to both output delivery by the Project and progression towards stated immediate and development objectives. A re-examination of the

[1] Marco Ramazzotti (representing the Italian Directorate for Development Cooperation) and K.C. Lai (FAO consultant), who visited the project countries from 20 July to 4 August 2003.
[2] Operated by TCOC, Field Operations Division of FAO; this was transferred to SDRN in September 2000.
[3] Except for Somalia, where the current situation precluded formal and structured responses to the questionnaire.

logical framework documented by the Project (available for phase II only) was carried out, and the logical hierarchy, performance indicators, validity of key assumptions and risks reviewed. Project results were then assessed in terms of quantity, quality and timeliness and, where possible, cost effectiveness.

Mission Schedule

6. Taking into consideration the time and resources available for this evaluation, visits and interactions in the project countries were limited to only four Eastern African countries: Kenya, Uganda, Sudan and Egypt. In three of these countries, discussions were held with the Italian Ambassadors or Cooperation Attaché. The mission also met with the FAORs in Kenya and Sudan (those in Uganda and Egypt were unavailable at the time of the mission's visit). Because of the tight schedule of the mission, most of the questionnaire responses from National Focal Points were received and analysed only after return of the mission to FAO headquarters. The report was finalised by the two mission members at home, in London and Rome, respectively. (Details of mission itinerary are set out in Annex 2; list of institutions and persons met in Annex 3; and the questionnaire administered in Annex 4).

II. PROJECT BACKGROUND AND CONTEXT

Project Genesis and Evolution

7. FAO first embarked on "Africover" development and organisation in 1992, in response to requests from a number of African countries, with the goal of establishing for the whole of Africa a digital geo-referenced database on land cover. This continental initiative was formally endorsed and launched at an international consultation at ECA headquarters, Addis Ababa (July 1994), attended by representatives of eight African countries and various national, sub-regional, and international organisations, including IGADD, SADCC, RCMRD, UNEP and FAO.

8. Meanwhile, the first regional project of Africover (GCP/RAF/287/ITA) was formulated on land cover mapping for Eastern Africa, with Italian government agreement to support it as a trust fund project under the FAO cooperation programme. It was envisaged that twelve countries would participate, with RCMRD based in Nairobi and National Remote Sensing Centres as the Government Implementing Agencies[4]. It was to run for three years. Advance activities that would contribute to the Project's technical and normative content took place at a number of AFRICOVER International Working Groups seminars/ workshops during 1996 (July and September, respectively) on: a) Legend and Land Cover Classification (Saly, Senegal); and b) Africover standards for Geometry and Cartography (Addis Ababa, Ethiopia)[5].

9. Following signing of the Project Agreement by a number of East African countries (early signatories were Egypt, Sudan and Uganda, which joined in 1994; Eritrea signed only in 1999) and by RCMRD, the project was declared operational in January 1996 but became active only in January 1997 following resolution of logistical issues and with key staff in place. It was to run for three years. One important project strategy was the development of an hierarchical legend for land cover classes. Another was extensive involvement in project execution by African remote sensing centres at sub-regional and country levels.

10. It became apparent over the course of the Project that more time and effort than originally anticipated had been necessary in developing and finalising the standards and software tools that

[4] Countries invited to participate were Burundi, Djibouti, Egypt, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, Sudan, Tanzania, Uganda, and Zaire (now the Democratic republic of Congo). Djibouti and Ethiopia did not join the project.
[5] Supported by Trust Fund Project GCP/INT/311/FRA.

were prerequisite to delivery of planned outputs to the project countries. Project assumptions (implicit, since these had not been specifically spelt out in the PRODOC) that such standards would be prepared under other FAO normative activities had proved invalid. RCMRD had meanwhile undergone set-backs in financial and human resources, which impacted negatively on its technical capacity and role in the Project[6].

11. By early 1999, development and digitisation of land cover data were completed in only two countries (Somalia and Kenya), with two more (Egypt and Tanzania) planned to be completed before the end of that year. A decision was taken by the Project to secure sustainability by strengthening capacity within each country through national working groups and greater involvement of country personnel in the image interpretation work. It was also decided to migrate from a purely data collection and mapping operation to an enhanced mechanism for improved natural resource management: this would involve introduction and evolution of an information management system, focusing on ease of access to Africover generated information. Such a decision was prompted in part by the recognition that the map production was not an appropriate mechanism for dissemination of the results of the project, but also by recent technological developments in computer hardware and GIS software globally.

12. The project National Coordinators (NPC) Meeting and Tripartite Review in February 1999 (Nairobi, Kenya) made a strong recommendation for a project extension beyond its original closing date, up to end of 2000 (NTE date initially to May 2000, then to December 2000). Further delays in project delivery were however encountered during 1999, posed by problems in acquisition of satellite imagery and the effort needed in finalising the land cover classification system and AIMS software. At the following NCP and Tripartite Meetings in January 2000 (Sharm El Sheick, Egypt), a decision was taken to seek further extension of project activities, by formulating a new project phase that would complete core activities and help build sustainability. The phase II project proposal for a two year extension was approved by the FAO/ Government of Italy Technical Review Panel in September 2000. By September 2001, the NTE date of the Project was postponed without additional budget to 31 Dec 2002. This was subsequently extended for six months to 30 June 2003 (with further funding), thence to September 2003 (without additional funding).

13. In summary, the timeframe of project GCP/RAF/287/ITA through its project life todate was as follows: a) An advance phase (July 1994 – Dec 1996); b) Operationally active phase I (for three years, from January 1997 to Dec 1999, extended to August 2000; c) Operationally active phase II (for two years, September 2000 – August 2002, and extended by a total of one year to September 2003).

Conceptual Underpinnings

14. The Project was underpinned since commencement of its operational phase by concepts and procedures relating to harmonisation and standardisation in land cover classification. These were developed largely through work of the Africover Working Group on Legend and Land Cover Classification and contributions of other international agencies such as UNEP, ITE, ITC, WCMC and the EU Corine programme (through 1995/ 96). Whilst the Project relied essentially on use of remote sensing data and GIS tools, its main vehicle was a land cover classification system, subsequently packaged as the LCCS software, which served as the basis for a universal reference system, independent of the scale or mapping source, and could accommodate any identified land cover. All project countries could thus use a common language and data standards for land cover classification.

[6] The situation in RCMRD had since improved, in terms of funding & human resources, following its restructuring and renewed mandate for mapping and geographic information in the sub-region in 2001.

15. Through the use of a priori classifiers, the LCCS would permit correlation of land cover with independent diagnostic criteria, rather than being nomenclature based, and also allowed correlation with existing classifications or legends. The classification was designed to facilitate incorporation of land cover classes into GIS and databases, and be used in overlay procedures to create new classes. This meant, in principle, flexibility by any user to integrate different types of data or to make re-definition of classes based on the classifier(s) of interest. Provision was made for peer review and continual enhancement of the LCCS software.

Target Beneficiaries

16. The Project's target beneficiaries identified in the original PRODOC were decision makers responsible for development planning and management of natural resources and for environmental protection at national and district levels in the twelve countries, as well as regional and international development agencies. The phase II PRODOC indicated immediate beneficiaries to be the units related to natural resource and environmental management, and related survey departments in the relevant ministries in the recipient countries. Ministry staff and members of the National Working Groups and other national officials covering various disciplines, such as environmentalists, economists, planning specialists, engineers, and photo-interpreters were to benefit directly from the Project's assistance and capacity building activities.

17. Also mentioned were professionals and private sector entities who would benefit from involvement in the planning and implementation activities. In the long term, beneficiaries were to be the East African countries and their populations, through the process of improved sub-national, national, regional, and international access to the databases and improved information extracted using Africover tools.

Project Objectives

18. Main objectives and outputs of the Project, as stated in the PRODOCs for both phases are set out in table 1 below. The overall development objective, of strengthening capacities of East African countries for sound planning of natural resources development and their sustainable management, has remained largely unchanged between the two project phases. However, an important element, already present in phase I and further articulated in the second phase was the 'possibility to develop and implement a worldwide methodological approach and tools' for building the multi-purpose Africover database for environmental resources (MADE). Subsumed here is generating of project outputs of a global, normative nature that were prerequisite to attaining higher project objectives.

19. The stated immediate objectives, along with the anticipated outputs, had altered significantly between the first and second phases, reflecting the latter's gravitation from data collection and mapping towards incorporating computer technology into the operational methodologies, facilitation of information access, and supporting countries in natural resource management processes. Project outputs in the second phase no longer referred to land cover map production for the participating countries. Instead, production of a database management system and the related digital database of land cover units (based on interpreted 1: 200,000 and 1:100,000 scale satellite imagery) were to be undertaken as part of institutional development, stakeholder involvement and capacity building. As such, data acquisition, interpretation, analysis and mapping became more as a means to achieving higher objectives than as an end in themselves.

Table 1 Stated Project Objectives and Outputs: Phases I and II

Project Timing & Duration	Overall Development Objective	Immediate Objectives
Phase I (Planned from July 1994 for 36 months; actual implementation from Jan 1997 – Aug 2000)	To strengthen the capacities of East African and Riparian Nile countries for sound planning of natural resources development and their sustainable management. 1/	1. To produce a current regional assessment of land cover of East Africa as basis for regional and national level planning. Output 1.1: To produce 1:1,000,000 colour and black & white satellite interpreted land cover maps of the whole of East Africa (12 countries). Output 1.2: A consistent hierarchical land cover classification legend for East Africa at mapping scales of 1:1m and 1:250,000.
		2. Development of a network of trained personnel in the utilisation of remote sensing and GIS technologies for land cover inventory and monitoring. Output 1.1: 20 trained technicians in basic remote sensing and methodologies for field data collection, image interpretation and cartography.
Phase II (From Sep 2000 for 24 months; but further extended to September 2003)	*To strengthen the capacities* of East African countries for *sound planning* of natural resources development and their sustainable *management*, **by producing** the Multipurpose Africover Database for Environmental Resources (MADE), **and** *strengthening* national institutions' *capacities* in the use of remote sensing applications 2/	**1.** To contribute to regional and national *management* and *planning*, including socio-economic and environmental analysis **in support** of sustainable development and environmental monitoring related to international conventions and initiatives. Output 1.1: A fully operational methodology with relevant software, tools and normative components: the overall concept, the interpretation/cartographic standards and the database management, browsing and updating software tools, namely AIMs, ADG, LCCS and MADE. Output 1.2: Increased access to AFRICOVER information and methodological approach at regional and national level, enhanced **through** the development of an enabling environment which can facilitate, at regional level, a more effective participation in the implementation of the United Nations Conventions on environmental issues.
		2. To support *institutional development* at national level, **including** *capacity building* and stakeholder involvement **through** the planning and implementation of operational activities, mainly at the sub-national level. Output 2.1: *National capacities* in natural resources management *strengthened* in each participating country, **through** staff trained in database development and management, AFRICOVER database (MADE) made available, and training given on application of the AFRICOVER database. Output 2.2: Case studies and AFRICOVER applications developed in natural resources development activities at national and sub-national level, aimed to any potential user.

1/ Specific development objectives stated were: provision of reliable information on agriculture and forestry land use and water resources categories at regional and country levels; standardised and homogeneous information on renewable natural resources compatible with other regional cartographic/ GIS programmes; assisting food security planning & implementation; basis for monitoring of changes in renewable natural resources; and identification of areas requiring international development assistance, which may involve projects dealing with such areas as irrigation, reforestation and aquaculture.
2/ Major elements were: a) a worldwide methodological approach and relevant tools for MADE; b) developing reliable homogenous databases on agricultural and forestry land use & water resources at regional and country levels; and c) development of human resources, including on-the-job training for sustainable transfer of the system to national institutions.

Project Logical Framework

20. A logframe had been prepared as part of the phase II proposal (annex 4); this followed in part the format in the EC's Project Cycle Management Manual. Each level of the intervention logic corresponded to a stated PRODOC objective, output or activity (part of this is shown in table 1 above). Various elements in the logframe however lacked specificity and clarity, especially the objectively verifiable/ performance indicators, in relation to the objective or output concerned. Some indicators of project outputs/ results (e.g. access to information and methodological approaches) were represented by activity targets (e.g. number of workshops and meetings conducted) which limit their usefulness. Tautological weaknesses were also apparent i.e. restating the same item (such as capacity building) over several levels of the logic hierarchy. To assist the present evaluation, modification and some retro-fitting of the logframe, including a review of the logical linkages, was necessary and further elaborated below.

III. ASSESSMENT OF PROJECT CONCEPT AND DESIGN

21. **General Assessment** When first conceived in the early 1990s, the Project was intended to help fill a gap in the information base needed for sound planning and management of natural resources in the region. The advantages and potentialities of remote sensing and GIS technology to the planning and management toolkit were even at that time already well anticipated, and the Africover project was both relevant and timely. It was however extremely ambitious in geographic scope and dependent on methodologies and technologies that, whilst conceptually sound, were still emerging at the time. The project design in phase I and its follow-on phase had thus under-estimated the complexities involved, and the time and resources needed, both to achieve the targeted outputs and for these to work through to attaining its higher objectives.

22. At the same time, although the overall thrust and orientation of the project were well conceived, the intervention logic and performance indicators of project outputs and objectives were less well articulated. Whilst not strictly a blue-print project design, lack of clarity on these aspects could weaken the basis of the project workplans at the outset and impact on project implementation and results. It also places greater reliance on the judgement and initiative of project staff , and render difficult monitoring and evaluation processes. Whilst these weaknesses could be overcome by a strong project management team, a more clearly articulated project intervention model would have been desirable, and provide a firmer basis to guide its planning and implementation.

Project Relevance

23. Project relevance can be seen from the perspective of: a) the participating countries in the region; b) the executing agency's global strategies and programme thrusts; and c) priorities and mission of the donor government. These are reviewed in turn below.

24. **Participating Countries** The ten countries covered by the Project occupy a land area of some 8.5m sq km, or a third of Africa. All except one (Egypt) were low income countries, some amongst the poorest in the world. Six of the countries had at some time within the last decade been affected by conflict and internal or external displacement of populations. Addressing the problems of food insecurity and inappropriate use of natural resources, and the attaining of sustainable development were real needs felt by most countries of the region. At the time Africover was mooted, countries in Africa and elsewhere were particularly concerned about the worsening trend in natural resource degradation linked to demographic factors, coping strategies of the poor and displaced, and the resultant human activities on the environment.

25. Efforts to combat this trend were manifest in national and regional projects and programmes aimed *inter alia* at rehabilitation or enhancement of the natural resource base, covering areas ranging from arid to riparian and tropical rain forest eco-systems. This included programmes and projects covering transboundary river basins such as the Nile (e.g. Nile Basin Initiative and the Italian funded FAO project GCP/INT/752/ITA)) and the Congo (e.g. WB/WWF Alliance for sustainable forest management, and REIMP). All these required reliable, up-to-date and location specific information on the status of the land cover, its composition and use, and temporal changes taking place. Remote sensing (RS) technology offered a relatively rapid and potentially cost effective way of accessing and geo-referencing such information. Phase I of GCP/RAF/287/ITA "Land cover mapping of East Africa based on satellite remote sensing" was both strategic and timely, and highly relevant to the context of the region.

26. Over the last ten years, a plethora of regional and global responses to development and environmental issues have emerged, within the ambit of the UNCED (UN Conference on Environment and Development, 1992), and more recently that of WSSD (World Summit on Sustainable Development, 2002)[7]. This period has witnessed enormous progress in information technology, including geographic/ spatial information management, and the way this is being used to help address sustainable development issues. UNCED's recommendation (Agenda 21 chapter 40) for development of user friendly information services, shared information sources, and strengthening of electronic networks had since taken root in many countries and regions.

27. In Africa overall, regional forums on geographic information systems, such as AFRICAGIS (now into its tenth year) and Africa-EIS (Environmental Information System) and country initiatives in creating national spatial data infrastructures (SDIs), evident in several of the Project countries, were part of this development.[8] In this regard, the strategy in phase II of the Project 'to finalise the normative aspects of the Africover methodology, whilst completing core activities relating to creation of individual project country databases for land cover and other environmental resources' were consistent with the technological milieu of the region, and with the global trend towards information access and e-governance. The Project had thus continued to remain highly relevant to the development needs and strategies of countries in the region.

28. **FAO Strategies and Programmes** The strategies and programmes of FAO had in recent years been strongly influenced by major inter-governmental events, including the World Food Summit: five years later, WSSD, and the United Nations Millennium Goals. FAO's Medium Term Plan for 2004 – 2009 contain a number of corporate strategies, of which "Improving decision-making through the provision of information and assessments and fostering of knowledge management for food and agriculture" features prominently. Subsumed in this is the key strategic objective of "An integrated information resource base, with current, relevant and reliable statistics, information and knowledge made accessible to all FAO clients". An ongoing regular programme activity "Environmental Geo-information and Infrastructure and Services" (under FAO's major programme thrust for research, natural resource management and technology transfer) provides services to users of geo-referenced data and environmental information, within and outside FAO, for a wide variety of applications[9].

29. Cutting across the above objectives are two Priority Areas for Inter-disciplinary Action (PAIAs), one dealing with Spatial Information Management and Decision Support Tools (SPAT)

[7] Amongst these were frameworks or conventions concerning on climate change, biodiversity, combatting desertification, and conservation of forests.

[8] Kenya, Uganda, Tanzania, Egypt. These are generally linked to the National Apatial Data Infrastructure Initiatives, supported by the GSDI.

[9] This covers formulation of norms and guidelines for spatial data handling, & methodologies for integrated environmental analysis & natural resources management, developments concerning GTOS (Global Terrestrial Observation System) & pilot development/ testing of geo-networking, amongst other remote sensing activities.

and the other with Definitions, Norms, Methodologies and Quality of Information. Both the Sustainable Development Department and Land and Water Development Division of FAO are members of SPAT. Although GCP/RAF/287/ITA was being operated and funded as a regional project, its normative elements were also of great relevance to FAO's strategic and regular programme areas. Application of the Project's normative products and services to planning and management by national and sub-national level users (i.e. administrators and technicians) underscores the critical importance of inter-disciplinarity and cooperation across departmental divides: this also accords well with the emphasis on enhancing multi-disciplinary approaches set out in FAO's Strategic Framework 2000 – 2015.

30. **Donor Government Priorities** Besides being a major donor to FAO programmes, the Italian government has strategic links to development funding by the EU, OECD and G8 countries. The project countries are important to Italy not only in geo-political terms but also because it sees peace and stability as prerequisites for socio-economic development, evident in Italy's participation in peace negotiations in Sudan. This goes go hand in hand with concern for food security and water resources development in the region, where it is funding another FAO project for capacity building in Nile basin countries. Italy has also been promoting environmentally sensitive approaches to development, which ambit Africover comes under. A special interest of Italy within the G8 Group is the promotion of computer technology and e-governance as fundamental to development, again key elements of the present project.

The Land Cover Concept

31. The concept of a land cover classification system that is applicable across land cover types in all the project countries was indeed innovative. Its practical value ought not be under-estimated, since a standardised approach that could deal simultaneously with the range and diversity of land cover types over a ten project countries (a third of the African continent) had never before been attempted. Africover's LCCS was uniquely to be both a project input as well as output. As the Project progressed, so too was it more fully defined, tested and technically refined, and eventually to become accepted as a normative standard within FAO and by other national and international organisations, including UNEP, FGDC, JRC/GLC2000, and GLUCC/ IGBP.

32. The capacity to accommodate user-defined land cover classes renders LCCS a flexible tool for a wide range of area-based natural resource and/ or development planning and management, including monitoring applications. But although an assessment of land cover characteristics (i.e. the observed bio-physical cover on the earth's surface) is necessary in such exercises, meaningful interpretation and use of the information in a decision support role often requires access to information on other social, economic and natural resource variables. Specific environmental or technical attributes (e.g. soil type, land form, crop type or floristic aspect) may need to be included for detailed definition of some land cover classes, bringing with it further data requirements. Time series information is moreover needed in monitoring change.

33. The practical utility of land cover information in planning and management would depend on: a) the availability and quality of other relevant ancillary data at the micro level; b) the ease of geo-referencing, integrating and analysing such data; and c) access to and affordability of data updates. How these issues could be addressed will vary according to the planning and management systems as well as human resource situations in each country. These lie largely outside the remit of land cover considerations, and beyond the control of the Project. Nonetheless, the LCCS concept, and accompanying computer software, provide a useful entry point as well as an organisational frame for information gathering, analysis, and management.

34. The LCCS concept did not seek to provide a stand alone land cover output (unlike soil classification and maps, for instance), but rather to facilitate interactive use of multiple datasets.

The LCCS software (based on MS-ACCESS) had been designed to be compatible with proprietary GIS packages (e.g. ARCVIEW, Idrisi) as well as custom software for photo/ image interpretation and processing to be developed by the Project (such as GEOVIS). This makes for seamless integration of various kinds planning/ monitoring data into the analytical system. It is thus an important addition to the planning toolkit of project countries and the region.

Project Scope and Timeframe

35. Project GCP/RAF/287/ITA was indeed an ambitious project from at least two main perspectives: a) geographic coverage of a third of the African continent, spanning countries with diverse administrative, planning, and mapping/ cartographic systems; and b) technical scope and complexity, in the creation of land cover databases and information management systems for each of these countries, using participatory hands-on approaches dependent on innovative methodologies and technologies. Moreover, the latter were at various stages of development, testing and refining. The original timeframe (36 months) of the first project phase, whose scope and technical orientation had changed early in its implementation, was to prove inadequate.

36. As set out in the 1994 PRODOC, the Project originally focused on production of satellite interpreted land cover maps for the participating countries, to be based on a standardised legend (see table 1). But these had, by the start of phase I (Jan 1997) been overtaken by developments relating to LCCS. The Project decided to capitalise on this and advances in computer hardware and software technology, including GIS and web applications.

37. The adoption of the LCCS was associated with creating for each country a multi-purpose environmental resources digital database, and developing a suite of software tools[10] in support (evident in the first available six-monthly Project Progress Report for the period March – Aug 1998). These core elements were largely retained in the phase II project design, where a major stated output was 'a fully operational methodology with relevant software, tools and normative components'. The second phase design also broadened the capacity building activities to include three specialised training courses for up to 60 technicians, experts and management personnel of the project countries, linking on-the-job training to database creation for each country.

38. Whilst the phase I design had originally not fully anticipated the advent of LCCS, which was still developing, phase II was inextricably linked to technological development requirements. Doing so in parallel with field programme delivery, generally involves a certain degree of risk taking[11]. But it could also present enormous opportunities for developing practical, normative tools that are field tested and robust to user needs in the region. It is the mission's view that the benefits in this instance well justified the risks involved. Hands-on exposure of country participants to various stages of the technology development process would moreover help shorten the learning cycle and convey a greater sense of ownership of Africover tools and datasets to the countries themselves. This way, results were likely to be sustained.

39. FAO and the donor, in supporting the widened scope and ambition of the second project phase, had shown foresight and acute awareness of the importance both of technology development and its effective transfer within project countries. Nonetheless, the timeframe (initial period of 24 months) and financial resources provided was to prove inadequate. As was the case in phase I, further extensions to the second phase (total of 12 months) and additional funding

[10] i.e. AIMS (interpretation and mapping system), ADG (Africover database gateway for browsing/ interrogation & rapid recombination of land cover polygons by classifiers), and AID (interactive database to guide photo interpretation and link field information of specific classes with ground truth and other ancillary data).

[11] An alternative approach would be to first complete technology development remotely, then field test and transfer this to the countries at a second stage.

became necessary. Overall, underestimation of both the time and financial resource requirements in design of the two project phases was evident. A possible consequence of this (and resultant trade-off) might have been curtailment of the specialised training component during the later stages of phase II. (Only two courses for twenty individuals were completed by March 2003, compared to the project target of up to 60 persons trained, further discussed below).

Review of Project Objectives and Intervention Logic

40. Following re-orientation of the project scope, phase I objectives and outputs were subsumed under those of phase II. The stated project outputs in phase II were on the whole relatively clear, and could be summarised as: 1) an operational methodology; 2) access to Africover information and methodology; 3) strengthened capacities of national institutions; and 4) case studies and Africover applications developed. In relation to the overall project objectives, these appear quite comprehensive. Including the operational methodology as a distinct output would, in particular, mean self-sufficiency in and project control over this vital normative element. With most critical outputs provided for, the project intervention model appears basically sound. But because the operational methodology hinges on technology generation, including various software components, various risks are involved. These must be factored into the project design, especially that from time and cost overruns. A critical project assumption should have been timely delivery of each essential component, an operational aspect which should be subject to close and systematic monitoring within the project management system.

41. A closer examination of the project objectives stated in the PRODOC and the project logframe (Annex 5) moreover revealed some inadequacies in the way these and the logical linkages had been articulated. Most apparent were tautological weaknesses, with the same item (e.g. capacity strengthening) being restated over different levels of the logical hierarchy (as output, immediate objective and again as development objective (illustrated by the words in italics in table 1). Objective as well as output statements were also not adequately succinct, each statement often containing several conjugated items or phrases (see the conjunctives highlighted in bold text in table 1). These pose difficulties when deciding on performance indicators for the project (reflected in part by the poorly defined objective verifiable indicators in the project logframe), and render more difficult both monitoring and subsequent evaluation of the project.

42. It is apparent that strengthening of national capacities in planning and management of sustainable development, including technology transfer, provides the main rationale for the project. The project logic should ideally indicate how, given the set of project outputs and assumptions, this might be achieved. For instance, would individuals trained by the project be expected to perpetuate their specialised skills and technical knowledge (as future trainers) through a project sponsored activity? Or is the assumption that this would be done at a later stage through national or locally sustained resources? How valid is this assumption? The logical linkages for this were not well articulated.

43. Central to the formulation of the present project is natural resource degradation in the region. Various regional and national responses would also come within the ambit of important international conventions and initiatives. What then are the linkages between project objectives and their potential long term impacts on the region and country's natural resource base and environment? Land cover information and skills in Africover and other RS/GIS methodologies and tools would not on their own be a sufficient condition for achieving such impacts. Although a long term issue which may lie well outside the limited timeframe of the project, a systematic way of articulating the logical links are highly desirable, if only not to lose sight of the project's ultimate objective or supergoal.

Table 2 Intervention Logic in the Reformulated Project Logframe: Main Elements

Intervention Logic	Assumptions & Conditions
Overall (Development) Objective: National capacities of Eastern African countries in planning and management of sustainable development are strengthened	From Development Objective to Super-Goal : National development and environmental policy framework and regional initiatives, such as NEPAD, and financial resources permit strategies & plans (regional, national, sub-national levels) to be translated into concrete local actions. Only then would the following 'supergoal' would be be attained: *The state of natural resources and the environment is enhanced in East African countries (with reference to sustainable development indicators e.g. for climate change, desertification, forests)*
Project Purpose (Immediate Objective): Africover methodologies, tools and data are widely utilised by institutions concerned with social, economic, and natural resources planning and management in Project countries	From purpose to development objective: 1) There is adequate & regular access to updated RS and other ancillary data; 2) Momentum of SDI (spatial data infrastructure) & other RS/GIS support initiatives in project countries is maintained 3) Social, economic and environmental dimensions are integrated in planning & management systems in project countries 4) Civil & military conflict in the region will abate over time
Results (Outputs): 1) A fully operational land cover assessment methodology, with normative components, database management system software & tools developed	From Outputs to Purpose: 1) There exists a clearly defined user audience of technicians, planners and managers for land cover data and databases and value added products in the project countries; 2) Africover methodologies & software tools meet user requirements for functionality/ quality, user-friendliness, & usefulness & learning curve not unduly steep; 3) Africover data & software are applicable to computer hardware & software environment in countries & region;
2) Access to AFRICOVER information on methodological approaches, tools and land cover data at regional and national level facilitated	1) Internet service providers & communications infrastructure provide reliable & regular service 2) National institutions have ready access to the internet 3) Countries adopt data dissemination policies 4) NFPIs able & willing to disseminate Africover data according to Custodianship Guidelines in non-discriminatory & timely manner
3) Physical and technical capacities of national institutions in the use of Africover methodologies, databases, and tools, and RS/GIS skills in general, are strengthened	1) GIS equipment & other computer facilities provided by Project are available to NFPI & non-NFPI personnel engaged in Africover applications 2) Adequate staffing and operations & maintenance procedures of RS/GIS laboratories are put in place by countries 3) No institutional or structural impediments to obtaining Africover tools & data based on MADE in project countries 4) RS/GIS skills of project participants are perpetuated to a wide enough range of institutions other than the NFPI
4) End user-oriented AFRICOVER applications and case studies developed at national and sub-national level	1) Case studies and methodologies used are clearly documented, peer reviewed, & widely disseminated

44. In view of the above observations, and to assist with the present evaluation, a reformulation of the project logframe (following the existing EC- format) was carried out. This focuses on the logical links between outputs, immediate objectives and development objectives, but leaving out details of project activities. This was done keeping as close as possible to the project's stated development objective, and in line with the overall scope of activities in the

project plan. To improve clarity, only one immediate objective (project purpose) is retained (the other being combined with the overall objective), to reflect the behavioural change that would result from achievement of project outputs. The main elements of the intervention logic, including the assumptions linking successive levels of the logic hierarchy are shown in table 2; further details, including objectively verifiable indicators and means/ sources of verification are shown in table 3. These will provide a structured approach to the rest of the evaluation.

Institutional and Management Arrangements

45. The first project phase had envisaged that the project would be managed in a Coordination Centre based in the regional remote sensing centre (RCMRD). Governments of the region were to assign a designated National Project Director to the centre as a project focal point, with involvement of National Remote Sensing Centres (as national counterparts). Financial and human resource difficulties at RCMRD however militated against this approach and led to project management responsibilities being placed largely on the CTA and the Project technical team. Operational support was to be provided by FAO HQ, with technical guidance from SDRN, the lead technical unit. In fact, SDRN was to assume the role of operational unit and budget holder from start of phase II. Although not specified in the first phase PRODOC, a system of national focal points institutions (NFPIs), tri-partite review (TPR) members, national coordinators meetings (NCMs), and national working groups (NWGs) had evolved during implementation.

46. For phase II, NCMs were replaced by the Project Steering Committee (PSC), with two members from each country, and two each from FAO and the donor government. Terms of reference were defined for the PSC, TPR, and National Coordinators (NCs). Information mechanisms covering generic and specific data management and exchange, and interactions/ partnerships with national and international stakeholders were also set out. Provision was made for a six-member TPR team from the countries, FAO and the donor to be responsible for monitoring the project. Joint governance of the project was to be achieved through preparation of overall project and individual national work plans for review and endorsement by the TPR. The project logframe (annex 4) was, in conjunction with the project workplan and six monthly progress reports, to be used in project monitoring and evaluation.

47. The above arrangements would appear at first glance to be adequate. However, in the course of project implementation, practical difficulties would arise to reveal some inherent weaknesses, particularly in the practical aspects of the reporting and monitoring arrangements, and the broader issues of stakeholder participation and inter-departmental cooperation. Discussion of these aspects is deferred to the assessment of project implementation in the following section.

Table 3 A Possible Reformulation of Logical Framework of GCP/RAF/287/ITA Phase II a/

	Intervention Logic	Objectively Verifiable Indicators	Means of Verification	Assumptions
Overall (Development) Objective	National capacities of East African countries in planning and management of sustainable development are strengthened	No. of East African countries and institutions at regional and national or sub-national levels showing improvement in natural resource planning and management processes, including quality & reliability of data used	Regional & country surveys & workshops	–
Project Purposes (Immediate Objectives)	Africover methodologies, tools and data are widely utilised by regional, national & sub-national institutions concerned with social, economic, and natural resources planning and management in the project countries	1) Type & number of institutions incorporating Africover concepts and methodologies into their planning and management system and procedures 2) Type & number of institutions utilising Africover generated databases (MADE) and available software in planning & monitoring functions 3) Type & number of planning and management applications utilising Africover methodologies, tools or datasets at various levels	* NFPI and NPC/ PSC reports on Africover utilisation per country * Formal & informal survey of institutions concerned with social, economic & natural resources planning & management in project countries * Africover Project & NFPI records of users & uses	1) There is adequate & regular access to updated RS and other ancillary data; 2) Momentum of SDI (spatial data infrastructure) & other RS/GIS support initiatives in project countries is maintained 3) Social, economic and environmental dimensions are integrated in planning & management systems in project countries
Results (Outputs)	1.A fully operational land cover assessment methodology, with normative components, database management system software & tools developed	1) Overall LCCS concepts, standards, and software field tested, peer reviewed & released 2) RS/ GIS software suite for database development (AIMS, GEOVIS) & database use (ADG, AID) field tested, peer reviewed, & released 3) Full set of Africover methodological guides and manuals finalised and released	* Software development sub-projects Gantt charts &, covering each phase of technology development; * Three & Six Monthly Progress Reports, including planned & actual cost per software	1) There is a clearly defined user audience of planners, technicians, and managers for land cover data and databases and value added products in project countries; 2) Africover methodologies & software tools meet user requirements for functionality/ quality, user-friendliness, usefulness & learning curve not unduly steep; 3) Africover data & software are applicable to computer hardware & software environment in countries & region
	2. Access to AFRICOVER information on methodological approaches, tools and land cover data at regional and national level facilitated	1) Africover Website operational, software & methodological guides uploaded, & mechanism for web maintenance and routine updating in place 2) Number of hits, & software/ data downloads registered on Website 3) Number & type of institutions within East African countries requesting Africover datasets and/or technical information 4) Number & type of institutions & individuals per country other than NFPIs had acquired basic knowledge (non-expert skills) on the application of Africover methodologies, tools and datasets **b/** 5) Custodianship guidelines for Africover data access prepared & agreed by all NFPIs and project country governments	* Six monthly Project Progress Reports * Terminal Report, covering cumulative outputs	1) Internet service providers/ communications infrastructure provide reliable & regular service 2) National institutions have ready access to the internet 3) Countries adopt data dissemination policies 4) NFPIs able & willing to disseminate Africover data according to Custodianship Guidelines in a non-discriminatory & timely manner
	3. Physical and technical capacities of national institutions in the use of Africover methodologies, databases, and tools, and RS/GIS skills in general, are strengthened	1) Number of countries and national institutions with fully equipped & functioning RS/GIS laboratories, including software, hardware & peripherals 2) Number of individuals and institutions in each country had acquired hands-on specialist skills in Africover & related RS/GIS methodologies for independent operations over the entire mapping cycle, including data manipulation & updating 3) Number of countries possess up to date multi-purpose databases (MADE) & skills in its utilisation for mapping, monitoring and other applications	* Six monthly Project Progress Reports * Terminal Report, covering cumulative outputs	1) GIS equipment & other computer facilities provided by Project are available to NFPI & non-NFPI personnel engaged in Africover applications 2) Adequate staffing and operations & maintenance procedures of RS/GIS laboratories are put in place by countries 3) No institutional or structural impediments to obtaining Africover tools & data based on MADE in project countries 4) RS/GIS skills of project participants are perpetuated to a wide enough range of institutions other than NFPI
	4. End user-oriented AFRICOVER applications and case studies developed at national and sub-national level	1) Type and number of applications/ case studies demonstrating Africover methodology completed by Project & partner institutions 2) Type and number of partner institutions/ end-users who participated (national/ regional/ international) in case studies	* Six monthly Project Progress Reports * Terminal Report, covering cumulative outputs	1) Case studies and methodologies used are clearly documented, peer reviewed, & disseminated

a/ Only Objectives and outputs are indicated here;

b/ No. of institutions and individuals who participated in NWG, technical, consultative, and dissemination workshops may, with caution, be used as proxy indicator.

Table 4 Summary of Project Implementation over Various Phases: Main Activities Completed, Important Events and Milestones

Activity Type	Advance Phase (1994 – 96)	Operational Phase I (Jan 1997 – Aug 2000)	Operational Phase II (Sep 2000 – Sep 2003)I
Project Administration & Management	• PRODOC officially endorsed by donor (July 94) • First country signatories to project (Egypt, Sudan, Uganda, by Nov 94) • Project Account opened (Jan 95) • Project declared operational (Jan 96)	• CTA & key staff in post, (Nairobi, Jan 1997) • First NC & TPR Meetings (Dec 1997); three todate • Resignation of CTA(March 1998); • Senior RS/GIS expert as OIC (April – Oct 1998) • Second CTA in post (from Nov 1998 – Oct 2002)	• Phase II approval (Sep 03) • Transfer of operations in FAO from TCOC to SDRN • First PSC Meeting (May 2001); three todate • Senior RS/ GIS expert as OIC (Nov 2002 to Sep 2003) • Project phase ends (NTE date Sep 2003)
International forums, advocacy, peer review	• AFRICOVER land cover classification concepts (LCCS) endorsed at International Working Group seminar on Legend and Land Cover Classification (Senegal, July 96) • Participatory process of evaluating geometric standards adopted in Workshop on Africover Standards for Geometry and Cartography (Ethiopia, Sep 96)	• Peer review of LCCS by UNEP, FDGC, IGBP • Project meetings with American & Canadian agencies (USGS, NASA, ESRI, CCRS, & others)	• LCCS reviewed positively at international workshop on harmonisation of land use and land cover classification (LUCC, Oct 2000) **a/** • JRC/ GLC2000 workshop recommendation to all partner agencies to adopt LCCS (Ispra, Nov 2000) • LCCS 2.0 (β version) tested by JRC (July 2003) • GISD Partnership Meeting (Asmara, April 2002) • Global Land Cover network launched, with IAO & UNEP (Artemino, May,2002)
Computer Software & Website Development & Applications	-	• AIMS factory tested (July 1998); training & testing in Nairobi (Sep 1998) • LCCS β version & field document released (1998/ 99); freeware distributed to countries & posted on website (Mar 2000) • Africover & LCCS websites created/ enhanced (2001/2) with data download facility (Jan2003)	• AIMS full release (2001) • GEOVIS 1.0 (β version Sep 2001; full release Sep 2002) • ARCView Extension posted on web (Mar 2002) • ADG & AID software only partially completed & decision taken (2002) for development to be deferred • LCCS 2.0 under test & review
RS Data acquisition, interpretation, digitisation & database development/ map representation	-	<u>National land cover dataset developed & digitised</u>: • Kenya (preliminary, 1998/99) • Somalia (with AgroScene, 1999/ 2000) • Tanzania (2000)	<u>National land cover dataset developed & digitised;</u> Egypt (redone after quality checks Jan 2001) Burundi & Rwanda (March 2001) Eritrea (May 2001); Sudan (Oct 2001) Kenya (with final revisions, Mar 2003) Uganda (March 2003); DRC (May 2003) <u>MADE databases & maps delivered to countries</u>: Egypt, Burundi, Rwanda, Eritrea, Tanzania, Kenya (April 2002); Kenya, with upgraded details &Uganda (Mar 2003); Sudan (May2003); DRC (by project end)
Capacity Building Activities	-	Hands-on training of national photo-interpreters: first group, Somalia (July 1997); Egypt & Kenya (1998); Tanzania (1998/99); Sudan (1999); Rwanda, Burundi, Eritrea (2000).	Specialised training for national photo-interpreters & GIS staff (first course Sep 2002, second course March 2003)
Case studies & applications partnerships		UNDOS/ FSAU(Somalia agricultural area sampling frame, Oct 1998); UNEP (Tanzania coastal/ marine zone atlas, Sep 1998); EAWLS (Mount Kenya forestry, Aug 1998); OIKOS/Insubria University (Tarangire National Park, Tanzania, 1999); EU Irrigation Information System Project (1999/2000); ILRI & WRI poverty mapping (Kenya, Uganda,2003)	

a/ Important suggestions were received at the workshop, including how LCCS could deal with temporal implications of land cover information (e.g. non-vegetated areas that were fallow fields within a crop-fallow land management system).

IV. ASSESSMENT OF PROJECT IMPLEMENTATION

Implementation Progress Todate

48. The Project had todate been operationally active for six and a half years. Project activities had been implemented in all ten project countries, at project headquarters in Nairobi, FAO in Rome, and the IAO in Florence. Computer software and database development and related normative activities had taken place in France, Italy, and in Nairobi. Project staff and consultants have, in collaboration with national technical staff (and IAO technical support for two countries) undertaken countrywide photo-interpretation of satellite imagery, digitisation of the information, and preparation of land cover and environmental databases, along with training of photo-interpreters and GIS specialists. Project personnel also participated in international meetings, advocacy, and peer review activities, as well as in direct support of case studies and applications under various partnership agreements. The main activities completed and important project events and milestones are summarised in table 4 above.

49. Whilst the main activities relating to land cover assessment and database establishment in the ten project countries have now been largely completed, only two of the three specialised training courses planned had been executed. Computer software development had gone on well; however, work on the Africa Database Gateway (ADG) and Africa Interactive Database (AID) were deferred, while additional interpretation software (GEOVIS), not initially planned for had been developed. An existing proprietary GIS package (Arcview) had also been adapted/ extended to perform some of the anticipated functions of ADG. Improved versions of the LCCS and GEOVIS software developed by the Project were meanwhile undergoing further testing and peer review. In-country activities for dissemination of Africover methodologies, data and tools have been planned, but were expected to be undertaken only towards the very end of the project.

50. There had been delays in project implementation over both phases. The timeframe for software development had proved over-optimistic. The work schedule linked to the land cover assessment production chain (from data access/ geo-rectification through to digitisation and final database preparation), was tight but could not always be adhered to. Difficulties appear to have arisen from inter-dependencies between capacity building and national land cover assessment activities, and from bureaucratic and logistical factors outside the control of project management, including a four-month delay to activities caused by burglary of Africover office equipment (Oct 2001). Also problematic had been: the time and effort required to acquire cloud-free satellite images; poor accessibility to the field due to internal conflicts; reaching agreement on national boundaries in the mapping; and the need for error corrections in some of the countries. But, as at end of phase II, most key project activities had been executed, whilst a number, such as technology dissemination, and software development and refinement remained to be completed.

Project Budgets and Expenditures

51. The original budgets of project phases I & II were $5.40m and $3.87m, respectively. Total funding over both phases, including transfer between phases and top-up in phase II amounted to $9.54m, approximately (details in table 5). These refer solely to contributions from the Italian government. Financial contributions from individual project country sources were not indicated nor budgeted for, beyond the PRODOC agreement on counterpart support in kind (such as provision of RCMRD premises for the Project office, assigning of national coordinators and photo-interpreters, provision of ancillary data, and logistics in-country).

52. Financial status records (on budgets and expenditures) for FAO trust fund projects equate each past year's budget with actual expenses of that year (i.e. leaving zero balance each year). This is largely an accounting procedure relating to successive budget revisions, and provide limited insight into project financial performance (variance between planned and actual

expenditures) on a year by year basis. Past project documentation alluded to financial constraints from time to time. But apart from the period between the two phases where there was some uncertainty about actual funding availability in the second phase, specific constraints to implementation of budgeted activities were not apparent.

53. What the project financial status reports do indicate is the actual expenditure against budget for the period since the last budget revision. Accordingly, with a budget for the year 2003 of $854,931, and expenditure of $422,501 as at July 2003, a positive balance of $432,430 for the remainder of the project duration is indicated. With forecast expenditure up to September 2003 of $429,906, this left an estimated final balance of $2523. This essentially indicates that the Project would have been able to utilise fully the financial contributions from the Italian government by the end of the Project.

Table 5 Summary of Project Funding Availability and Cumulative Expenditures a/

	Funds Available		Cumulative Expenditure	Balance at end of each phase
	Source	**Amount ($)**		
Phase I	Original Budget	5,404,790	5,255,511	149,279
Phase II	Transfer from Ph. I	149,124		
	Original Budget	3,876,635		
	Additional Budget	256,450		**c/**
	Total I	4,282,209	4,279,685 **b/**	2,523
Both phases		9,537,720	9,535,196	**c/** 2,524

a/ From figures in the Project Status Report provided by SDRN on 18 July 2003, including forecast to Sep 2003, but not further verified from other sources. These show each year's budget equal to expenditure, except for the most recent period (Jan – July 2003), which shows a positive balance as at July 2003.
b/ $3,849,779 cumulative to July 2003; $ 429,906 forecast to Sep 2003, and leaving positive balance of $2523.
c/ Small discrepancy due to rounding error.

54. A comparison of cumulative expenditures for specific items against the original project budgets would provide important insights concerning utilisation of project inputs over the project period as a whole. It could also indicate whether specific items had been over or under provided for in the original plan. But as budget codes had changed following the conversion to FAO's ORACLE system, not all expenditure items could readily be analysed in this way. Even so, it is apparent that for some important items there had been significant variance between budgets and expenditures, particularly for contracts, consultants and training.

55. Table 6 shows that expenditures on contracts and for fellowships and training were only around half of the amounts originally budgeted, whilst for consultants this exceeded the budget item by two-fold. These phenomena could be explained as follows: a) the last APO in the Project had left in March 2000, and the two APOs intended for phase II (24 person-months each, for remote sensing and GIS/ database management, respectively) were never appointed, necessitating the increased use of short term consultants to fill this gap; b) based on earlier experience, project management took a decision to undertake certain operations (including software development) using consultancy inputs (where there was apparently greater degree of quality control) rather than through lump sum contractual arrangements; and c) the cost of trainers used for hands-on technical support of the national photo-interpretation teams had been charged (in the Project accounts) to the consultancy budget rather than the training budget.

Table 6 Comparison between Original Budget and Actual Expenditures for Selected Items in Phase II a/

	Original Project Budget		Actual Expenditure		Variance ($)
	FINSYS code	Amount ($)	ORACLE component code	Amount ($)	
Professional Salaries	**b/**	855,000	5011	851,430	negligible
Consultants	BL 1152/ 53	210,000	5013	771,384	+561,384
Contracts	BL 3000	862,950	5014	486,388	- 374,562
Software Development	**c/**	390,000	**d/**	**d/**	**d/**
Fellowships & Training	BL 8001 **e/**	457,200	5023	233,734	- 223,466
Duty Travel	BL 2000	160,000	-	-	not comparable **
All travel **f/**	-	-	5021	550,521	

a/ Based on Phase II PRODOC and figures provided by SDRN on 18 July 2003, but not further verified from other sources.
b/ Includes BL 1101, 1102, 1154, 1155.
c/ The amount of $ 390,000 is sub-item of contractual service under BL 3000
d/ Information on total expenditure for this purpose is not available from the project accounts
e/ Amount budgeted for photo-interpreters was $48,800 and for training courses $308,400 (total for these being $357,200). Actual expenditure of $233,734 recorded under the ORACLE component code 5023 would include: fellowships (expenditure children code 5901), in-service training (code 5902), study tours (code 5903), group training (code 5905), and training budgets (5920). Travel for trainees is recorded under all travel (component code 5021).
f/ Includes duty travel (expenditure children code 5661), mission travel (code 5664), international consultants travel code 5684), and travel for training (5694).
** Further breakdown of the component 5021 expenditure into the ORACLE expenditure children codes would be necessary to make any comparisons between original budgets and recorded expenditures. Such a breakdown was however not available to the mission. It is understood that manual inspection of each individual record over the entire project period would be required, which was not feasible in the time available.

56. Some travel costs which formed part of the original training budget had, in the ORACLE system, also been charged under the overall travel cost component, thus obscuring the actual amount that went towards training. The mission was given to understand that disaggregating the latter was not practicable in the time available for this evaluation (this has important implications for project monitoring & evaluation systems, discussed below). But part of the explanation for the lower training expenditures would be associated with cancellation of one of three planned training courses indicated in the PRODOC.

Human Resource Inputs

57. An enormous amount of human resources had been involved in implementing Africover activities at Project headquarters in Nairobi and in the project countries. These included a large number of nationals in photo-interpretation, GIS and database preparation, and in-country coordination work. Substantial numbers of local technicians had also participated in the project in the host country, Kenya over the two operational phases. A large number of international consultants, including junior experts in photo-interpretation, also provided intensive technical and training inputs, on a country by country basis. These and other human resource inputs utilised in the project are summarised in table 7. In addition, technical support was provided by staff and consultants of IAO in Florence, FAO headquarters in Rome (backstopping and operations), and by the RCMRD in Nairobi.

58. Coordination and technical support of project activities, given the large numbers of individuals and range of institutions across project countries, was an enormous undertaking for the project team. It is apparent that there had been some important gaps in human resource deployment to the Project, both quantitatively and qualitatively. The APO inputs for the project amounted to less than 40% of the level required, while the CTA post was staffed only 80% of the total project duration. For 20% of the time, including the last 12 months of the project life, the Senior Remote Sensing/ GIS Expert acted as OIC, in addition to his own duties. Project management duties were split between this officer and FAO headquarters staff. This poses risks of diffusing decision making processes, whilst imposing undue work burden on the OIC.

Table 7 Human Resource Inputs to GCP/RAF/287/ITA over Two Project Phases

Human Resource Category	Number	Actual Tenure or Input
Project Office:		
Chief Technical Advisor	1	Post filled for 80% of project period *
Senior RS/ GIS Expert	1	In post full-time, but also OIC for 20% of project period
Associate Professional Officer	2	Posts filled for average of only 39% of project period
Local technical Staff **a/**	17	Includes replacements and resignations over entire project period; some former staff have joined RCMRD in Nairobi
Local support staff **b/**	8	
International Consultants c/:		
Photo-interpreters/ trainers **d/**	17	Total input of 258 person-months, excluding those directly recruited for work at FAO headquarters
GIS/ database & others **e/**	9	
Project Countries:		Not possible to estimate fully the human resource inputs over project countries. This includes substantive work in initial and final photo-interpretation, in-country fieldwork in ground truthing & ancillary data collection, contributions to NWG activities, NCM/ PSC meetings, and other Africover related technical & dissemination activities. Photo-interpretation/ production chain activities alone is probably of the order of one person-year per interpreter on average **g/**
National Coordinators **f/**	21	
National photo-interpreters	42	
National GIS specialists	10	

***** CTA in post: Jan 1997 – March 1998; and Nov 1998 – Oct 2002
a/ For GIS/image processing work (8); digitisation (4); photo-interpretation (2); web design & others (3).
b/ Administrative & secretarial.
c/ Excluding consultants hired directly for work at FAO headquarters
d/ Junior experts, mostly recent graduates in RS/ photo-interpretation from IAO, Florence.
e/ Includes computer programming, land systems assessment, and logistics
f/ Includes past & present incumbents from NFPIs; roles included membership of PSC from May 2002.
g/ Each country's NWG involved individuals from several national institutions/ government departments; a staff member of RCMRD also participated as geometry focal point.

59. Enhancing natural resource planning and management processes (and sustainable development in general) calls for a holistic approach, requiring a thorough understanding of institutional issues. These include a clear appreciation of stakeholder interests and power structures, as well as potential trade-offs in environmental, social and economic dimensions that each country must seek to resolve, nationally (sub-nationally) and in relation to its neighbours. But staff and consultancy inputs of the Project appear to have been targeted at a somewhat narrow range of physical science disciplines (primarily in RS/ GIS areas).

60. The objective of strengthening national capacities as well as optimising the application of Africover methodologies, data and tools, would have been better served by making a specific provision for specialist inputs in socio-economic and environmental areas and/ or in institutional analysis and development. This could enhance project efforts to support countries in stakeholder identification (in relation to access and utilisation issues); facilitation of participatory processes (in planning and management across sectoral lines); and devising effective strategies for in-country dissemination/ transfer of Africover information, knowledge and skills.

Implementation Efficiency and Adequacy

61. The Project had overall been effective in organising, coordinating and supporting Africover activities in the ten East African countries. It had interacted with an impressive list of external organisations and participated in important regional and international forums dealing with land cover related issues. In the process, networking and/or strategic partnerships had been established with a number of key institutions at the international level, particularly IGBP, UNEP, FGDC, GISD, and JRC of the EU.

62. Implementation strategies used had generally worked well, were relatively flexible, and proved resilient to logistical setbacks encountered in the operating environment (for instance the ability to recover vital information lost during the office burglary because of adherence to sound data backup procedures). Despite delays which arose, creation of the national land cover and environmental databases, including quality assurance, was competently managed, with national as well as international resources (including the partner organisation, IAO) efficiently utilised.

63. Country officials and technical staff met by the mission, and the questionnaire responses received, indicate that project countries were generally more than satisfied with the management of the project. Positive aspects cited include the close working relationships forged between project staff/ consultants and national staff and technicians; good lines of communication between the project headquarters and NFPIs; project responsiveness to issues raised by countries and the professionalism displayed. There were however criticisms by some countries concerning the timing and adequacy of equipment deliveries, the limited training provided, and inadequate financial resources and/or late arrival of field allocations for in-country activities. But these were problems related to design and implementation of specific activities, and to resource and logistical factors, rather than from systemic management weaknesses.

64. Feedback from the countries, and from the mission's own observations, indicate both positive features (strengths) as well some inadequacies (possible weaknesses) in project implementation processes adopted. This applied to operations in the field as well as at Project and FAO headquarters levels. Documenting these could provide lessons in implementing future projects of a similar nature. Mission findings on a number of implementation and management issues are as follows:

a) **Production chain arrangements** The integration of hands-on training in image interpretation with the substantive work on national land cover assessment and database preparation capitalised on both the technical skills of the international consultant-trainers and the field experience of the national photo-interpreters. Mutual learning and skill development appeared to have been achieved not only for the national staff involved but also the consultants, most of whom had little prior exposure to African situations. Besides creating a synergistic working environment, training and close technical support to the national staff were achieved at a modest cost (between $2000 - $3500 per person-month of consultancy). A minor issue, however was non-involvement of international consultants in country level field verification and ancillary data collection activities, which detracts somewhat from the otherwise comprehensive production chain arrangements.

b) **Software development** The initial approach to develop computer software in supporting the use of LCCS was from the ground up. This meant contracting out to major software companies (as for AIMS, to assist interpretation and mapping functions), which entailed enormous communication and contractual effort, and posed difficult user access and technical support issues. Unless upgraded routinely, this also stood the risk being superseded by newer products. The decision to implement software development based on adapting existing proprietary packages proved to be more practical, and led to the development of GEOVIS (a user friendly software with on-screen interpretation functionality, based on Terra Nova's TN-ShArc) and the extension of ESRI's Arcview package (to handle recombination functions originally to be provided by ADG).

The shift to adapting existing technologies to support project applications demonstrated the flexible and pragmatic approach adopted during implementation, which merits endorsement. On the other hand, given the wide range of technical options and opportunities for increasing functionality in the Africover software suite, striking a balance between the technological ideal and what was feasible within the project resource levels and timeframe was essential. One possible weakness here was the lack of a periodic strategic assessment process that took into consideration trade-offs between the normative and field components of the Project. A monitoring system to systematically track the stages (from conceptualisation to public release) and costs

(planned and actual) of each software development, and facilitate timely delivery and prevent cost overrun was also not apparent.

c) **National and regional participation** Sustained participation of NFPIs relating to planning and implementation of Africover activities was evident, both nationally and for the project as a whole. The Project Steering Committee, which had evolved from the earlier National Coordinators Meetings was regarded by the project countries as an extremely useful forum for communication and exchange of ideas, and in joint decision making, for instance when agreeing on custodianship guidelines for national land cover data. The RCMRD had also participated at all stages of the Project, including the PSC and the tripartite review meetings. However, the ability to meet only once a year (given the large number of countries) and the current absence of national budgetary provisions for Africover were important constraints. What shape the PSC or other collaborative mechanisms would take after the project closed was also unclear.

d) **National working groups** NWG operations within each country were left largely to the NFPI. The strength of this approach was it permitted national coordinator of each country to exercise his/ her own initiative in organising and coordinating group meetings and activities. This rested however on (implicitly optimistic) assumptions concerning NFPIs' human and financial resources, as also their priorities, visions and attitudes on stakeholder issues. Mission observations in the countries visited were that stakeholder participation in the NWGs varied considerably, with consequent implications for in-country outreach and the dissemination. In some instances, membership was more notional than substantive (e.g. participation by staff member from the domestic water supply department, rather than from the water resources management department of the ministry). Possible improvements to project operations would include: i) closer monitoring of and reporting by NFPIs on NWG activities (information on the composition of each country's NWGs for instance was not readily available to the mission); and ii) pro-active support to the countries in forging cross-sector participation and institutional linkages, based on sustainable development approaches to stakeholder and participation issues.

e) **Training delivery T**he hands-on training activity on photo-interpretation was well conceived. However, weaknesses in the specialised courses relating to management and updating of the Africover databases were apparent. Course participants interviewed generally felt the duration was too tight and, for some, did not permit adequate understanding of important topics. Problematic areas cited were using the translation module of LCCS (important for reclassifying historical land cover information according to the new system), creating & manipulating legends, geo-referencing of images and edge-matching. Combining participants with mixed basic backgrounds (especially in computer/ GIS skills) and language abilities (French and English) was said to be problematic. The fact that the GIS staff who participated in the course had not been previously exposed to the national photo-interpretation work was also thought to have affected their capacity to work with the land cover classes. Some participants also felt that the training covered only a segment of the land cover assessment process, whilst it was considered important to understand the whole mapping cycle. A further comment was that the course should have covered also the practical utilisation of the land cover data.

f) **Training design and evaluation** An end of course evaluation was undertaken by the Project for each course. This included an assessment of trainees' class performance on the pre-set course topics. But the formal feedback sought from the participants' was restricted largely to a few questions on the quality and usefulness of the topics taught. A more comprehensive training methodology would have been to include: i) a pre-assessment of participants' backgrounds and learning needs/ expectations at start of each course; and ii) obtaining participants' feedback as to gaps in the pre-set training objectives in relation to felt needs in the workplace, and also adequacy in time allocation and topic emphasis. The latter would help in re-designing subsequent training activities. Since a well designed training programme is an important component of capacity

building and institutional development, greater rigour in training methodology, including scope of participants' evaluation, would have been essential.

g) **Monitoring, evaluation and reporting** A TPR team, consisting of six members representing the donor, FAO and project countries, was meant to have specific responsibility for project monitoring and evaluation (M&E). A TPR terminal meeting was also supposed to review a project Terminal Report, to be submitted at least four months prior. Both arrangements failed to materialise. Despite the separation of functions, TPR meetings had in practice become blurred with the PSC meetings, and were too large in composition to focus on M&E roles. A team of six geographically separated individuals, with no clear working arrangements or lead member, was bound to find difficulty to convene regularly, let alone assemble and structure the information needed for M&E. Responsibility for the latter task thus defaulted to the project team and the six-monthly project progress reports, and NCMs/ PSC meeting reports, around once a year.

Project six monthly reports, whilst suited to tracking operational tasks, had not been designed to monitor and record project performance (timeliness, quantity and quality) in achieving specific outputs (e.g. cumulative number of countries with full set of equipment in place each year). The problem is related to inappropriate performance indicators in the project logframe discussed earlier (i.e. completing a task cannot equate with output achievement; nor does output delivery equate with higher objectives attained: these require separate indicators). This is compounded by the project's dependence on financial accounts under ORACLE. Expenditures were not readily relatable to the original budget purpose, output or project cost centre, needed for cost effectiveness analysis. Such problems could be obviated if a system of shadow accounts (albeit from time-lagged ORACLE data) was instituted at project operational headquarters in Nairobi from start of project life. (Because of these weaknesses, extra effort was required by the mission to retrieve basic information relating to planned and actual deliverables over the project life).

h) **FAO backstopping and operational support** The lead technical unit of FAO (SDRN) had provided active technical and (in phase II) operational support over the project life, which were much appreciated by the project team as also the NFPIs. The early stages of the project witnessed participation of other FAO divisions, such Land and Water (AGL), in the normative work, notably development of the LCCS concept. An FAO HQ working group on Africover also met formally or informally. Such arrangements had diminished in the later stages of the project: a formal working group or task force dedicated to Africover issues is currently lacking. Meanwhile, technical as well as operational support rested primarily with a single technical officer of SDRN, along with one support staff. The mission has several observations about these arrangements:

- First, is the current inadequate provision for ensuring inter-disciplinary inputs as well as inter-divisional/ service coordination on normative as well as field operations issues relating to Africover at FAO headquarters. Interaction between services on Africover related issues no doubt occurred at an informal, personal level, but an institutional mechanism was clearly lacking. One apparent outcome observed by the mission was the minimal substantive collaboration between this project and the Nile Basin Resources Project (GCP/INT/752/ITA), synergy between which had been anticipated at project conception. Such problems might well have been avoided had an in-house project task force been instituted as part of HQ management support to the Project. (Reference may be made here to TCOM Field Circular FPC 2002/02, Sep 2002 on Project Task Forces and functions, for guidance on this issue).

- Secondly, there appears to have been no specific financial resource provision within FAO's regular programme (with reference to its Strategic Objectives, MTP 2004 – 09 and current PWB) to support the normative elements of the Africover initiative in general, and for LCCS methodological outreach in particular. Functional roles of SDRN staff relating to

normative inputs to the Africover initiative, and in disseminating resultant methodological/ technological outputs on a more continental/ global scale were not explicitly articulated in FAO's major programme thrusts (such as that for Research, Natural Resource Management and Technology Transfer) or under the Priority Areas for Inter-Disciplinary Actions (such as SPAT) outlined earlier. Whilst individual donor aided projects could no doubt contribute to this important area of FAO's normative work, dependency on these sources could inadvertently delay outreach and lead to missed corporate opportunities in spearheading important sustainable development initiatives.

Table 8 Project Output Delivery Status and Objectively Verifiable Indicators

Project Output	Summary of Achievement
1) A fully operational land cover assessment methodology, with normative components, database management system software & tools developed	Delivery Status: • Methodology for land cover classification, photo-interpretation, & database development & utilisation, including essential suite of software finalised. • Planned ADG software not completed but replaced by Arcview Extension, with less functionality. • GEOVIS software produced as spinoff; additional tools (AID & MAP) under development Indicators: a) LCCS concepts & software fully field tested & peer reviewed (2000) b) Database development software released: AIMS (2001); GEOVIS (2002) c) Database utilisation software released: Arcview Extension (2002) d) Full set of Africover methodological guides and manuals finalised (2003)
2) Access to AFRICOVER information on methodological approaches, tools and land cover data at regional and national level facilitated	Delivery Status: • Website for on-line facility for communication & transfer of information, software & data to national & external users completed • In-country dissemination workshops scheduled but to be conducted • NWGs of 9 countries formed & functioning Indicators: a) Africover & LCCS websites fully operational, with data download facility installed (2002): b) Over 430 data downloads registered (cumulative to July 2003) c) Over 115 users have accessed Africover data (around 30 national or locally based, and 85 international or foreign institutions/ organisations) d) NWG formed, but participation & activities varied between countries; links to National Spatial Data Infrastructure initiatives apparent in at least 4 countries e) Custodianship guidelines for data access & distribution agreed by all countries at 2nd PSC meeting (May 2002) **1/**
3) Physical and technical capacities of national institutions in the use of Africover methodologies, databases, and tools, and RS/GIS skills in general, are strengthened	Delivery Status: • RS/ GIS computer equipment provided to all project countries • Multi-purpose Africover database (MADE), and additional datasets & maps provided to 9 countries; DRC under finalisation • On-the-job training in photo-interpretation provided to 10 countries, and specialised training on MADE provided to 9 countries Indicators: a) NFPIs of all project countries have fully equipped & functioning RS/ GIS units/ labs (2003) b) 9 countries possess up to date Multi-purpose land cover & spatially aggregated database, datasets on boundaries & physical features, scanned topographic data, thematic aggregation datasets, time series imagery and other additional data **1/** c) 42 national staff have acquired hands-on skills in photo-interpretation production chain (1997- 2003) d) 18 national GIS and photo-interpretation staff, including 8 from c) above, acquired skills in MADE updating, management & distribution (2002/2003)
4) End user-oriented AFRICOVER applications and case studies developed at national and sub-national level	Delivery Status: • Seven case studies & applications using Africover methodology & data in partnership with other institutions were completed or ongoing in Somalia, Eritrea, Kenya, Tanzania, & Uganda Indicators: a) Africover applications demonstrated in applications for: food security & vulnerability assessment (3); water resource & irrigation planning; (1), forestry (1); coastal/ marine zone mapping (1); wildlife & natural resource conservation & decision support systems (1); spatial analysis of ecological services b) Institutions in partnership with Project were: other donor-funded projects (2); international agencies (3); universities (1), NGOs (2) - see table 4.

1/ This includes data access through the NFPI,s RCMRD, FAO and the Italian Government (full resolution) and through the Africover website (partial resolution); **2/** Supplied up till Aug 2003. Thematic aggregations include agriculture, grassland, woody, geomorphology/ landform/ lithology , and bare areas (depending on country); additional data include dynamic warehouse, landsat Radex, Topomap Radex. Time series includes years 1970, 1990 & 2000.

V. ASSESSMENT OF RESULTS AND EFFECTIVENESS

65. Project performance was assessed in terms of output delivery and the progress towards achieving immediate and higher objectives. In line with the project's intervention logic discussed earlier, special attention was given to the linkages between outputs delivered and the responses and behavioural changes subsumed in the project immediate objectives. The likely sustainability of project results and cost effectiveness implications were also examined.

Project Output Delivery

66. **General Assessment** Four main outputs were anticipated in the second project phase (see tables 1 and 2). Notwithstanding delays carried over from the first phase, project performance in output delivery had todate been creditable (summary of delivery status in table 8). The land cover assessment methodology and the normative components therein have been operationalised for all ten project countries. Project results were generally considered to be satisfactory and greatly appreciated by senior officials of the project countries. This was corroborated by interactions with NFPI staff, national participants in project training and land cover assessment activities, and other key informants met by the mission during the country visits, and from the questionnaire responses.

67. Of the countries which responded to the written questionnaire, the overwhelming majority (six out of seven) rated the overall project outputs as good to excellent. Outputs considered to be highly useful by most countries include the specialised software developed (especially LCCS and GEOVIS, but also the Arcview Extension and macro language tools) as well as the national land cover databases (except for DRC, which was still awaiting finalisation at time of the questionnaire). Also mentioned as highly useful were: the skills gained (especially hands-on photo-interpretation), GIS tools and mapping/ cartography; cooperation and interaction amongst project countries; and the greater access to information facilitated.

68. **Specific Aspects** Further insights into specific project outputs in terms of their adequacy, quality and quantity, from the project country and regional perspective were gained during the country visits. Whilst there were some variations in perceptions and responses, there was wide agreement on many points. Below is a synthesis of mission findings concerning each output.

69. **Africover methodology and software** The methodology, based on LCCS, was found to be applicable to project country situations and was instrumental in producing good quality national land cover data and maps. The results were considered superior in terms of flexibility and dynamic capabilities than that originally envisaged for the first phase. Significantly, these results demonstrate the workability and quality of the normative components of the Africover methodology, and their overall compatibility across ten East African countries, which also indicate their wider replicability on a continental and global scale. This is further substantiated by peer review processes of other international agencies, including IGBP, which had undertaken a critical appraisal of LCCS. The upgraded LCCS 2.0 is being reviewed by project staff and undergoing β–testing at JRC, and being submitted for ISO accreditation.

70. Other software tools delivered by the Project were generally appreciated by the countries and considered relevant and of good functionality. GEOVIS in particular was found to be user-friendly and within the reach of non-expert users, whereas AIMS would require a higher level of GIS skills. But one country indicated problems of frequent computer crash when attempting to use GEOVIS in their own RS/ GIS unit. Another reported technical difficulties working with the databases developed, in relation to the mosaics (e.g. image files, edge and colour matching, and radiometric correction aspects). These might have been associated with remaining bugs or limited functionality in the software, users' misunderstanding of technical issues involved, or simply the computer equipment at hand being below specifications. Whichever the case is not the main issue.

More important is that these point to the need for monitoring and sustained technical/ help desk support, especially for new users of the Africover products and software supplied.

71. **Facilitating access to Africover** The Africover website was found to an extremely useful communication tool and countries were generally happy with its development, with links to some national sites already envisaged. The custodianship guidelines and procedures for national data access (through NFPIs, RCMRD, FAO and the Italian government) were considered an important innovation, and an important contribution to information exchange in the region. Also valued was the sharing of information between countries facilitated by Africover activities over the years.

72. There were however a number of issues regarding access to Africover information. One was the under-developed communication infrastructure in some countries, where internet services were extremely limited (one country NFPI for instance did even have email facilities within in its own offices). Another was the limited range of national stakeholders, other than NFPIs and a small number of other technical personnel, who were exposed to information on the availability and utility of Africover data and methodologies. There was consensus on the need for more concerted dissemination to decision makers in each country, including senior administrators, planners and policy makers, as well as politicians. National dissemination workshops prior to project closure were already planned; it was generally felt that technical and human resource support from the Project during the workshops would be essential to make them fully effective.

73. **Physical and technical capacities** All countries had been supported by the Project with RS/GIS equipment, software, the Africover national MADE databases inclusive of additional datasets, scanned topographic data, and time series satellite imagery datasets. National staff had been closely involved in their development, and there was a strong sense of ownership of the databases by the respective countries. (This was illustrated by one country's comment that names of the country teams were not adequately acknowledged and displayed in the Africover outputs distributed). National technical capacities had been enhanced. RCMRD would take over the Project's equipment when the latter closed, besides acting as a repository and one custodian of the Africover national databases and datasets. It had already taken on a number of experienced former staff of the Project. Its capacity would thus have been strengthened. But whilst these were considered useful contributions, they were nonetheless seen to meet only a part of requirements of individual countries and the region, quantitatively as well as qualitatively. The following observations are significant:

- **MADE databases and datasets** There was a felt need for adding value to the land cover data to serve land and other resource evaluation and planning purposes. Some countries have already started doing this through data enrichment of the Africover databases. While the Africover products constituted an important baseline, further data collection and integration, including temporal analysis were deemed essential. Associated with this was the need for further methodological development, including the use of digital elevation models (DEMs) in applications covering water as well as land resources. In two of the countries visited, the number of ground control points used in the photo-interpretation work were considered too few in relation to the complexities of the landscape and size of the country, which may require future upgrading of the process. (In the case of Sudan, successful outcome of the ongoing peace process would also mean the opportunity to fill data gaps in parts of the country which had previously been inaccessible for field work).

- **Physical capacity** Most countries have received the full set of project equipment only very recently. Assembly and commissioning were still being finalised in some cases, with one country indicating initial technical difficulties in this regard. Major problems are not considered likely, although it is too early to say whether future problems of servicing and maintenance will arise (a year's supply of some expensive expandibles like print cartridges, have been provided by the Project). Equipment provided by the Project is currently located

within premises of the NFPIs, which have various priorities and affinities, ranging from survey departments to research institutions. A question posed was their future access, and cost apportionment to NWG members and other non NFPI institutions undertaking future RS/ GIS applications. Whilst informal contacts could work in the short term, more permanent arrangements for physical access were considered necessary. Suggestions included formalising these through MOUs and financial arrangements for cost sharing, and also seeking external assistance for providing equipment to a wider range of users in the country.

- **Technical capacity and training** Countries expressed wide appreciation of the relevant and high quality training provided by the Project. Hands-on training for photo-interpreters was considered excellent. But the general feeling was that the numbers and scope of the specialised training in other areas were too limited. Only two persons per country (one photo-interpreter and one GIS specialist) received such training, which was considered too few to make a major impact to overall capacity, given attrition from retirements and job transfers. Plans to utilise these individuals in training other national staff were also unclear. Some of those trained were themselves not adequately confident of their own capabilities in some key topics, due to the short course duration and limited topic coverage (e.g. in use of the translation module in LCCS and in creating legends). For most of the project countries, there was a clear need for a more comprehensive training programme that would yield a critical mass of trained people than what the Project had provided todate.

- **Regional capacities** Besides national staff of project countries, two other organisations, RCMRD and ERSS (a private sector consultancy based in Cairo) had also been closely linked to Africover activities. RCMRD had, in addition to hosting the Project office, participated actively in its management, including the PSC and TPR deliberations over the entire project duration. Following its restructuring in 2000, it had improved its staff strength, including employing a number of former staff of the Project, experienced in Africover work. It currently has an active programme of technical support and training in the RS/ GIS, mapping and database development areas. ERSS has been participating in Africover through the NWG in Egypt and had rapidly acquired the capacity to undertake land cover assessment using Africover methodologies and tools. An important indicator of this was its successful completion of an assignment with FAO (Regional Office) to produce the national land cover database and maps for Yemen, including training of its national staff. It has an added advantage in being able to undertake training in Arabic and English.

74. **Africover case studies and applications** Various case studies and applications have been completed or were under implementation in a number of project countries (Somalia, Eritrea, Kenya, Uganda & Tanzania). These were conducted under partnership agreements/ MOUs between the Project and other institutions and project entities (see table 8). Those undertaken through web-based requests for access to Africover data, discussed below, are considered a different category since the Project has no direct technical input there. From documentation available to the mission, it is clear that some case studies (such as the one on food security/ vulnerability assessment in Eritrea) had been competently executed and a case report produced. However, the status of peer review and documentation of the various case studies overall is unclear. Access to their findings by the various countries appeared limited so far. Systematic collation of the available case study documents, along with synthesis of the findings for a broader audience of decision makers, and posting on the AFricover website could greatly add to the dissemination of Africover information and methodologies, and help stimulate their utilisation.

75. **Cost Effectiveness** A detailed cost analysis of specific components of the project was not possible during the mission, due to complexities of extracting historical data on specific items from FAO's accounting system. Nonetheless, looking at the broad orders of magnitude of project

costs, production of the main project outputs appear to have been achieved at a high level of cost effectiveness, as seen from box 1 below.

Box 1 Indication of Project Cost Effectiveness

Project cost over both phases from donor contribution totaled $9.54m. Though not entered into the financial accounts, costs were also incurred by project country governments, primarily in staff time utilised in the photo-interpretation and field work i.e. production chain activities. Each national photo-interpreter's input ranged in duration from some nine months for small countries to around 16 months for the larger countries. A rough average is around 12 person-months per photo-interpreter or a total input of around 42 person-years for all countries combined. Actual costs paid out by country governments are unknown But assuming cost per person-year is equivalent to that of the international junior consultants supporting the photo-interpretation work ($2000 - $2500 per month) this worked out roughly at between $1.0m and $1.3m. Adding this to the donor costs leaves a total of under $11.0m. Dividing this by the 8.5m sq km of land cover mapped in all countries gives a unit cost of less than $1.3 per sq km. This compares with commercial rates which may range from $2.5 and $6.0 per sq km. In addition to the land cover product, project outputs also included software, web facilities, trained individuals, methodologies and normative products, indicating a high level of cost effectiveness for the project overall.

Utiisation of Africover

76. Project outputs are generally meaningful only if these lead to achievement of the immediate and overall objectives of the project. Progress towards strengthening of national capacities is best gauged by the extent to which Africover methodologies or data are being utilised for natural resource and/ or social and economic planning and management. Such methodologies and data are currently accessed through FAO and the Africover website as well as from the NFPIs. An analysis of users and uses of Africover information from the Africover website and in-country NFPI sources indicates the following.

77. **Website Downloads** There has been an enormous response globally since data download facilities of the Africover website were installed in 2002. More than 400 dataset requests from around 115 different users from various parts of the world have so far been met through this site. Datasets accessed through the website include thematic aggregations and spatially aggregated land cover databases developed using LCCS, as well as full resolution datasets for roads, rivers, boundaries and towns. Uses to which these datasets were to be put were cited as: research and education (30%); agriculture and crop monitoring (20%); environmental management/ monitoring (17%); planning (9%); with planning, health, and others making up the rest.

78. The overwhelming majority of users (over 90%) were international agencies or foreign organisations. Most were academic institutions (40%), from as far afield as Finland, Scotland, and the United States, and UN and other international organisations (35%). Only nine of the users were wholly indigenous to the project countries, of which five were universities (Egypt, Eritrea, Kenya, Uganda, Tanzania), and the rest government institutions (three research and development institutions, one in remote sensing, and one a transport ministry). Users having an office base or a project activity within the project countries number around twenty. This gives a total of some 30 users that were either national or locally based external organisations. Thus, most of the beneficiaries of web access to Africover information had todate been those external organisations having a direct or indirect interest in development issues in the region.

79. **National Users and Uses** The country visits and questionnaire responses indicate that various national institutions/ organisations have, through their NFPI/ NWG, already commenced or were about to embark on using Africover methodologies or datasets in a range of sub-sectoral and cross-sectoral applications. Data enrichment of the Africover national databases has also started in a number of countries. It is not possible for the moment to document the extent to which various applications have been actually implemented (which is also true for users accessing data

from the Africover web-site). But it is clear that the NFPI/ NWG mechanism so far have had greater impact on utilisation of Africover methodologies and data by national institutions than the web-based option.

80. For the eight project countries where information was available, the type of applications (not mutually exclusive) indicated were:

Sector/ sub-sector	No. of countries	Type of application
Forestry	4	Forestry inventory; forest cover monitoring; assessment and management, reforestation planning
Agriculture (crops)	3	Land resource suitability and change monitoring; agricultural land use; land use planning,; cultivation in delta and reclamation areas; crop suitability research
Livestock and Fisheries (inland & marine)	3	Grazing and livestock distribution; identifying water bodies for inland fishery development; coastal land cover monitoring
Wildlife and Nature Reserves	2	Habitat monitoring; national park management (also linked to conflict resolution aspects)
Land Resource/ Settlements	5	Land management; settlement planning; agricultural land use planning/ zoning; physical planning
Water Resources	3	River basins management; wetlands and watershed management
Environment/ cultural	4	Environmental planning/ monitoring & protection; land cover monitoring; ecological monitoring; archeology

81. Over thirty different users involved in the above were identified. These consisted largely of government departments and agencies, but also include universities in five countries (Kenya, Uganda, Eritrea, Sudan and Rwanda). The user profile, grouped roughly by principle function of the institution, is shown below (additional details are given in annex 6):

Principal Function of User *	No. of users
Agriculture , Livestock & Inland Fisheries	6
Forestry / Watershed Management	5
Wildlife/ National Parks	2
Physical Planning/ Land Management/ Settlements	4
Environmental Management	5
Cartography/ Meteorology	2
Marine Fisheries Research	1
Public Works/ Mining/ Culture	3
University Research & Teaching	5

* See annex 6 for list of user organisations.

82. The above list requires some qualification. Of the six users under agriculture and livestock, three were from a single country. Only three countries had a user (current or imminent) whose principle function was in agriculture or livestock. One country where water resources planning and management relating to the Nile basin was an important national function was also not on the list. These suggest that working links between NFPIs/ NWGs and some key national institutions were still relatively weak in some countries. Africover users with mandates for food security were conspicuous by their absence in some countries, underscoring the need for greater attention on stakeholder participation issues mentioned earlier.

83. **Potential Users and Uses** Various countries also identified a range of potential users and uses to which Africover could be put. Potential users listed were national and sub-national government organisations, NGOs, academic institutions, environmental project units, and the private sector. Their principle functions included development planning, nature conservancy, environmental monitoring, agricultural research, and provision of technical and training services. Africover applications which could be discerned (not exhaustive) were: a) revision of old land

cover databases using the LCCS methodology to detect change; b) updating and improving base and natural resource maps (including geomorphology, soils and floristic aspects); c) developing sub-national databases, such as for provincial or district development and environmental planning; d) establishment environmental information and decision support systems; and e) identification of viable economic and investment zones. Despite the fairly comprehensive list, an element still lacking was specific reference to food production and security applications.

84. It is still too earlier to say what the outcomes of the above applications, ongoing or planned, would be. It is nonetheless abundantly clear from the foregoing that most project countries have made an important start towards utilising Africover methodologies and data, in moving *beyond the land cover database development to the technology implementation and application stage*. This is highly encouraging in relation to the overall project objectives. However, much will depend on how the East African countries, individually and as a regional entity, could build upon and sustain the results of the Project todate.

Sustainability Issues

85. All project countries were asked about their views concerning sustainability of the project results after its closure. The responses were resoundingly positive, with all countries indicating willingness and commitment to continue activities relating to Africover dissemination and utilisation. In particular, the NFPIs and NWGs were expected to continue operating, with the former undertaking the role of custodian of the mational databases. Not unexpectedly, funding constraints came out as an issue for most countries, but would affect some more than others. Conditions relating to human resource, communication, and technical support factors were also seen as critical to future sustainability.

86. **Funding** Some countries, like Egypt, had a longer history of RS/ GIS development and highly competent private sector services in this area. Here, mechanisms like the setting up of 'self support units' (financially autonomous bodies but government subsidised), linkages to other donor assisted programmes, and private sector commercial operations provide viable options for sustaining as well as enhancing use of Africover products and services. For a number of other countries, cost sharing/ recovery for services rendered by NFPIs to other national users were seen as possible future options. However, clear policies and modalities on this appear as yet lacking. Hence, for most of the project countries, sustaining Africover dissemination and utilisation will, in the near term, depend on government funding support and/ or donor assistance.

87. **Human resource development** Despite the project's training assistance, most countries had yet to achieve a critical mass in human resources within the RS/GIS area to be able to sustain activities needed for disseminating Africover methodologies, or for technical backstopping to other users. Even for the small number already trained, gaps in knowledge and skills needed for future application were also keenly felt in most countries. Future sustainability of Africover results was thus seen to require further human resource development, through deepening the skills relating to Africover methodologies, and increasing the numbers trained to well beyond the one or two persons currently available in each country.

88. **Technical support and communication** Because of inadequate human resources, continued external technical support was seen as essential by most countries. The main areas of support cited related to: in-country dissemination and outreach relating to Africover methodologies and databases; their utilisation in innovative and practical applications (thematic areas indicated varied from country to country); updating of satellite imagery and data on a regular basis; maintaining information sharing and networking among the project countries; direct assistance on specific technical areas; and for some countries further improvements to the available RS/ GIS equipment as well as basic equipment for internet access.

Possible Options

89. The issues raised above would need to be addressed in a timely manner if the momentum built up by the Project towards the later stages of phase II were not to be lost. There are a number of institutional options for continued support to East African countries, which could be explored. These include:

a) **The GLCN initiative**. This had at the time of the Artemino Meeting (May 2002) envisaged component activities covering normative and coordination issues, as well as one concerning 'Organisation of FAO/UNEP Land Cover Training Courses and Appraisal Workshops', which has a sub-objective '*application of land cover data* to sustainable development and management of land and water resources and environmental protection'. The latter could be an appropriate channel for addressing both the human resource and technical support issues above. But the current FAO proposal for donor support to GLCN, as far as the mission is aware, had not articulated a specific provision for this amongst its list of objectives and outputs. Moreover agreement to the proposal is still pending, hence possibilities of obtaining timely assistance through this source are unclear.

b) **RCMRD regional role** The Centre is part of the original exit strategy of the Project. Its present management of appear committed to continued involvement with Africover. This includes provision of training in RS/ GIS, help with updating of databases, and undertaking of pilot studies to demonstrate the use of generated land cover databases in different applications. External funding of such activities would however be required. One drawback is that not all the present project countries are member states of RCMRD, hence other options would be needed for the non-member countries.

c) **In-country training support** Conducting training and undertaking application studies in individual countries or a small group of countries has a number of practical advantages. There tends to be considerable savings in travel costs for trainees; larger numbers could be trained at one time; there is greater scope for tailoring training to participants' technical background; a single language of instruction is applicable to all trainees; and importantly sharper focus on contextual and practical issues in the training is possible. Here too external funding and technical support would generally be required. Such funding may be sought based on specific circumstances and opportunities that exist for the particular country. These include possibilities for accessing multi-lateral, bi-lateral as well as domestic funding resources, thereby providing greater flexibility on a country by country basis.

90. It is not possible for the evaluation mission to decide definitively which of the above present the best options. In practice, a combination of the above may prove feasible. But the most tangible option appears to be support in the conduct of in-country training courses through provision of external funding and short term technical assistance, drawing on the present as well as former experienced staff of the Project.

VI. CONCLUSIONS AND RECOMMENDATIONS

Main Conclusions

91. Based on the foregoing assessment, the main conclusions of the mission are set out in the paragraphs which follow.

92. **Overall Performance** GCP/RAF/287/ITA was a bold and imaginative project spanning ten countries in Eastern Africa. The mission considers it to have been highly successful and cost effective overall. It is a visible example of fruitful cooperation between East African countries, the Italian Government, FAO and partner institutions in the region and in Italy. Substantive results of a high quality had been achieved, which were much appreciated by the project countries. Besides updated land cover information, the normative component of the Project, along with methodological approaches and software tools developed, are an important addition to the planning and management toolkit for countries in the region, with potential for replication to other regions and countries. They are consonant with various national or regional initiatives aimed at enhancing environmental information systems, spatial data infrastructure development, and promoting e-governance. The Project's relevance had stood the test of time, due largely to the far sighted decision by the project to be at the forefront of new technology.

93. **Main Project Results** The most significant project results are related to the development of the methodological and normative components of Africover as well as the homogeneous multi-purpose environmental resources databases for ten East African countries, covering 8.5 million sq km or a third of Africa. The former, including essential software components (LCCS, AIMS and GEOVIS), had been made available to the project countries at the start of phase II. The national databases were available to most countries from early 2002, following the PSC Meeting in Massawa. Various national institutions, through their NFPIs/ NWGs, have started or are planning to start utilising the Africover products for a wide range of resource monitoring and planning applications.

94. Whilst still at an early stage, the transition from database development to technological implementation and application has commenced within the project countries. At the same time, the Africover website data download facility installed in late 2002 had elicited tremendous response, with requests for Africover datasets coming from well over 400 users, ranging from international agencies to universities and individuals, to meet various research, planning and monitoring purposes. Whilst these users were predominantly from outside the project countries, the methodologies and results, when shared, would add to those from the case applications already being undertaken by the Project collaboratively with end-users in five project countries.

95. **Intangible Benefits** National participation in the NCM/ PSC over the past six years had provided an important forum for information exchange among project countries, exposure to new technology, as well as technical cooperation across national boundaries. The NWG mechanism also provided an entry point for extending RS/ GIS technologies to national and sub-national stakeholders, and the initiation of cooperative effort in planning and management of sustainable development. These are important intangibles not be overlooked.

96. Additional benefits have also accrued from the normative component of the Project. The conceptual and practical aspects of LCCS had been well received globally, and led to strategic partnerships being forged between FAO and various key international and national institutions. This had led to the Artemino declaration of May 2002 to establish a Global Land Cover Network. Accreditation of LCCS by the ISO, currently underway, would help further with standardisation and harmonisation of land cover assessment approaches across continents and globally. All these present enormous opportunity for FAO as well as the donor government to further incorporate the project results into their regular programmes for international cooperation.

97. **Shortfalls and Weaknesses in Project Results** As at time of project closure, a number of planned project activities remained outstanding. There were also weaknesses and gaps in the project results which would merit future attention. These are:

a) **Training and Capacity Development** A large number of project country nationals had received hands-on training, whilst playing a major role, in photo-interpretation of the satellite data. But apart from this, the numbers subsequently provided specialised training (averaging some two persons per country) were too limited to form a critical mass, whilst the scope and depth of topic coverage was still inadequate. Besides maintaining and updating the national MADE databases, nationals would wish to be further exposed to skills associated with their initial development, and also their practical utilisation in integrating socio-economic and environmental data for planning or monitoring applications. Much of the Africover software, including LCCS, is still new, and there is need for further technical support in their use. The lack of institutional arrangements within each country for non-NFPI user access to RS/GIS equipment provided by the project and for cost recovery/ sharing is also an aspect of capacity development where attention is required.

b) **Software Development** Not all the planned software outputs were delivered, with ADG and AID awaiting completion. Adaptation of ESRI's Arcview was done partially to compensate for essential elements of ADG, but with reduced functionalities. The GEOVIS freeware, developed from collaboration with a small Italian software company had been done opportunistically (i.e. not in original plan). This had provided an extremely user-friendly software at low cost, benefiting the less expert-GIS users. But it had also rendered the AIMS software, developed at greater effort, of less immediate utility. Upgraded versions of LCCS and GEOVIS are at various stages of testing. There had been a continuing process of development, adaptation, testing, feedback and de-bugging, finalisation and release, followed by upgrading post-release.

Where the cut-off point for output delivery lies had not always been clear. But as the ADG and AID had not gone past the β- testing stage, the question remains as to what decisions to take on the future of these components. The mission's view is that the ADG is conceptually sound and its functionalities, especially interrogation capabilities, meet an important need with regard to utilisation of the MADE databases. The AID software is also a useful interactive tool to guide the interpretation processes. Both would require further development work, but consideration of future support would need to be linked to further peer review and a re-examination of logistical and cost implications.

c) **Dissemination and Stakeholder Participation** Channels which had been used for disseminating Africover information within project countries include the NFPI/ NWG mechanism, the Africover website, training and technical support activities of RCMRD, country visits by Project staff, and to a lesser degree formal and informal contacts between agencies and institutions. The most developed of these todate is the Africover website. However internet usage in many of the project countries is still in its infancy, with communication infrastructure relatively undeveloped. It make take some time before this channel for in-country dissemination becomes fully effective. Moreover, a facility for web access to the analysed results of case applications, in particular those undertaken through partnership arrangements by the Project (i.e. in Eritrea, Somalia, Kenya, Tanzania, and Uganda), is not yet available.

The NFPI/ NWG mechanism, which remains the main instrument for dissemination so far have had only limited outreach. In some instances, the NWGs had not been adequately inclusive in terms of national participation, and interactions with key stakeholders, such as those in food security or in water resource planning and management, as yet lacking. A national dissemination workshop had been scheduled for each country prior to project closure.

But stakeholder identification approaches and the communication tools to be used remained hazy. The fundamental weakness here is the inadequate project provision for in-country assistance in developing either a technological implementation plan or a product dissemination strategy. (The user survey undertaken at the start of the project had been limited in its scope, and by now outdated). The implicit project assumption that an audience of technicians, planners and managers exists for Africover products remained valid: but lacking was provision for systematic stakeholder identification, interaction, outreach and marketing beyond the NFPI/NWG environment.

98. **Sustainability Requirements** Project GCP/RAF/287/ITA is closing just as the project countries are moving to the utilisation stage for the Africover products. Yet, the various weaknesses and gaps in project results outlined above would need to be addressed if the development process initiated todate is to be sustained. A range of human resource, technical and communication issues, besides funding, would need to be addressed. These needs translate broadly as:

- Further training to ensure there is a critical mass of RS/ GIS personnel with requisite skills not only to manage, update and revise the Africover databases, but also to provide hands-on support on their utilisation in value-added applications.

- Continued technical support on the use of Africover products, inclusive of the software packages and databases.

- A systematically prepared in-country dissemination strategy and communication plan, based on a thorough identification and analysis of national stakeholders' requirements in the public and private sectors.

- Maintaining an Africover forum with a distinct East African identity and membership to sustain the structured information exchange and interaction facilitated by the PSC/ NCM over the project duration.

Recommendations

99. **Future Measures** The mission's broad recommendations on measures which should be considered for the near future are as follows:

1) <u>In-country training programme</u> Formulating and conducting an enhanced training programme for management and utilisation of Africover products for around 15 – 20 individuals for each country, to be conducted in-country to the extent possible. These should be supported by external experts, complemented by national experts. Participants should come from a range of national institutions, including those responsible for natural resource planning and management, agricultural production and food security, area development, and investment planning. Where appropriate, private sector professionals should also be included. Grouping of several countries in a mutually convenient venue may also be considered if courses within a given country are not logistically feasible. Training should be conducted in English, French or Arabic, depending on country. A systematic training needs assessment should be undertaken as part of the training course design, which should be tailored to specific country situations.

2) <u>Technical and normative support</u> A help-desk for Africover products should be established, dedicated initially to on-line technical support to the ten East African countries. This may be dovetailed into facilities to be established under GLCN, such as the proposed information infrastructure and e-governance component. But to obviate over-dependence on individual projects to support this important normative component, the mainstreaming of Africover product support services within the regular programmes

and strategies of FAO should be given priority attention. Possible synergies with the PAIA for Spatial Information Management and Decision Support Tools (SPAT) should also be explored. Possibilities for renewed partnership with IAO for provision of such support should also be examined.

3) Dissemination of Africover Products Project countries should formulate a clear dissemination strategy for technological implementation of Africover products. This would require systematic in-country analysis of stakeholders, including the role each could play in enhancing (conversely, impeding) Africover utilisation, both in the public and private sectors. Particular emphasis is required to ensure administrators, planners and policy decision makers, as well as politicians are included. Attention should also be given to identifying potential applications, the market for value added products based on Africover, and the resources, communication tools and routes needed for dissemination. (The EU's Guidelines on Technological Implementation Plan for Research and Technology Development provides a useful initial framework to assist such an exercise). Depending on the particular country's human resource situation, external support for this exercise may be considered.

4) Institutionalising a regional Africover forum A distinct identity for an Africover forum for the countries of East Africa should be retained, regardless of other regional or global land cover initiatives. Whilst the current PSC will cease to operate upon project closure, it represents institutional capital built up over the past six years. This should be retained through adaptation of the organisational form to provide a platform for continued interaction and sharing of knowledge and ideas. Besides web-based communication, the establishing of an Africover network for the East African region, with a permanent secretariat and current NFPIs as members is proposed. The network secretariat may be located within FAO, or in a partner organisation like IAO. To the extent that GLCN development proposals take shape, the secretariat may be a sub-set of its proposed Coordination Unit. Other options include forming more than one network, whereby RCMRD and other regional institutions may, according to their respective country memberships, be approached to act as secretariat. The network secretariat(s) could then act as the conduit by which interaction on future Africover related issues be facilitated.

100. **Follow-up Actions** The above measures will require a number of follow-up actions on the part of FAO, the Italian government, and the project countries. Mission recommendations are:

1) FAO and the Italian Directorate for Development Cooperation should jointly explore the future possibility of and options for funding support to the above measures. Based upon such possibility, and the available funds, a fresh proposal should be prepared to prioritise and operationalise such support, in consultation the countries and partner organisations. Special attention should be given to the requirements of the in-country training programme and national Africover dissemination strategies.

2) In the event that imminent donor funding is unlikely, FAO should, as an interim measure, consider hosting the East Africa network secretariat within the ambit of its regular programme structure, such as the major programme thrust for Research, Natural Resource Management and Technology Transfer or under the relevant PAIA.

3) Where still feasible, FAO might consider explicit inclusion of 'Land Cover Training Courses and Appraisal Workshops' when undertaking future GLCN initiatives, with special focus on practical application of the updated land cover data to sustainable development planning and management within the East Africa region. This would accord with deliberations at the Artemino Workshop.

4) Project countries should, as follow-up to the Project, undertake an initial assessment of overall national training requirements relating to Africover methodologies, tools, and databases. This should include a training needs assessment workshop with substantive involvement of participants in past training activities of the Project, moderated by a resource person with a background in training methodology and human resource development. Particular attention should be given to the type of basic computer skills required of future trainees, and the need for any prior preparatory training. The extent of technical and logistical inputs for the training which could be met from within the country should also be assessed. These should serve as a guide for external trainers when determining the design of future courses.

5) In formulating the Africover dissemination strategy, countries should involve national experts with skills in communication, marketing, development planning and/or other social sciences. How institutional linkages between the NFPIs and other national stakeholders, besides the present NWG members, could be further strengthened should also be explored. The need for external technical support should be identified and articulated at an early date.

VII. POSSIBLE LESSONS

101. GCP/RAF/287/ITA had been a relatively complex project due to the innovative technology involved, interdependencies between its normative and field delivery components, the wide geographic coverage, and the large number of countries participating. Its successful overall outcome demonstrates that such complexities can eventually be overcome provided the underlying concept is sound, project participants are committed, and the end product is relevant to the practical needs of the target group.

102. The Project underscores the importance of keeping abreast of technology change, and adopting a flexible approach to technology development in the light of this. This always carries some risks, not just in terms of time and cost over-runs, but also of non-delivery of the technology within a practical timeframe. These are risks common to many research and development endeavours. Potential risks involved ought to be factored into the project design. Thus, a realistic timeframe and project phasing, adequate contingencies for cost and time over-runs, and a stringent system of monitoring and review of each technology component would be predicated.

103. The risk of delays and/ or non-delivery of a planned technology takes on greater significance when field delivery performance (in this case linked to the expectations of ten countries) is dependent on that technology. A safer project design might have been to adopt a sequential approach of first finalising technology development remotely, and piloting or field testing in a few sites, before expanding or transferring this to a larger number of countries. But this is unlikely to have achieved anywhere near the same results in a similar time scale. One possible lesson here is risk taking may be justified under certain circumstances, including informed judgement concerning the odds.

104. An interesting aspect of project implementation in the latter stages of the project is the recourse to adaptation of existing proprietary software packages to meet pragmatic requirements. The positive results achieved suggest that an adaptive technology approach can have advantages over more ambitious ground-up approaches in technology development and utilisation. A more general lesson here is for projects to explore as wide a range of options as possible when making a technology choice.

105. It is nowadays widely accepted that a holistic and inter-disciplinary approach is requisite to sustainable development planning and management. The articulation of the Project's intervention logic and addressing of institutional and stakeholder participation issues could well have been enhanced by adhering to this precept. This would require active involvement of complementary skills, such as in social science, economics or development planning areas, both at formulation and implementation stages. This appears not to have been the case in the present project. In formulation of future technology-led projects, an important checklist should thus be whether all important perspectives other than the purely technical have been fully catered for.

106. The Project had contributed substantively to developing and field-testing of operational methodologies and technologies that have enormous normative significance for FAO as well as partner organisations and the Italian government. However, projects may not be the most reliable source of support for development of normative components (the ADG and AID software development being truncated at project closure, for instance). To the extent that such components have strategic value for the corporate entity, mainstreaming these within regular programmes rather than through the project vehicle should be an option to be vigourously explored.

ANNEXES

1. Mission's Terms of Reference

2. Itinerary

3. List of Persons Met

4. Questionnaire for Project Countries

5. Original Project Logframe

6. Partial List of Institutions Using or About to Commence Use of Africover Products

ANNEX 1

TERMS OF REFERENCE FOR PROJECT EVALUATION MISSION

Background

Project "Land Cover Mapping of East Africa Based on Satellite Remote Sensing (AFRICOVER)" is funded by the Italian Government and implemented by FAO and the National Focal Point Institutions (NFPIs) of the beneficiary Eastern African countries. It started in 1997 with Phase I, which ended in August 2000. The ongoing Phase II, which began immediately after, in September 2000, and will extend to June 2003, is building on the achievements reached during the first phase to (a) complete the Land cover database in all the participating countries; and (b) provide a comprehensive training programme.

The project is providing guidance, on behalf of the participating countries, through a Project Steering Committee, composed of government-designated members, that meets once a year, reviews progress and recommends further action.

The attained project outputs are:

- Establishment of a digital geo-referenced database on land cover and a geo-referenced database for 10 Eastern African countries (10 countries: Burundi, Democratic Republic of Congo, Egypt, Eritrea, Kenya, Rwanda, Somalia, Sudan, Tanzania, Uganda) at a 1:200,000 scale (1:100,000 for small countries and specific areas).
- Development of a land cover data set and digital database setup in the concerned countries
- Specific information on produced land cover databases
- Set up of the Multipurpose Africover Database for Environmental Resources (MADE)
- Training on methodological tools
- A variety of successful application programmes in each country using the Data Base.

Purpose of the Evaluation

The evaluation is intended, as the project draws to a close, to provide recommendations to the governments participating in the project, FAO and the donor on the further steps necessary to consolidate progress and ensure achievement of objectives. Any further need for external assistance will be identified.

Scope of the Evaluation

The mission will assess:

a) Relevance of the project to development priorities and needs in the context of GIS, Remote Sensing, land cover assessment;

b) Clarity and realism of the project's development and immediate objectives, including specification of targets and identification of beneficiaries and prospects for sustainability;

c) Quality, clarity and adequacy of project design including:

- clarity and logical consistency between, inputs, activities, outputs and progress towards achievement of objectives (quality, quantity and time-frame);
- realism and clarity in the specification of prior obligations and prerequisites (assumptions and risks);

- realism and clarity of external institutional relationships, and in the managerial and institutional framework for implementation and the work plan;
- likely cost-effectiveness of the project design;

d) Efficiency and adequacy of project implementation, including: availability of funds as compared with budget: the quality and timeliness of input delivery by both FAO and the Governments; managerial and work efficiency; implementation difficulties; adequacy of monitoring and reporting; the extent of national support and commitment and the quality and quantity of administrative and technical support by FAO;

e) Project results, including a full and systematic assessment of outputs produced to date (quantity and quality as compared with workplan and progress towards achieving the immediate objectives). The mission will specifically review the status and quality of work on monitoring networks, databases and capacity building (training);

f) The cost-effectiveness of the project (if possible);

g) Throughout its work the evaluation will give consideration to implications of the project for: food security; gender; and the environment.

Based on the above analysis, the mission will draw specific conclusions and make proposals for necessary further action by governments and/or FAO/donor to ensure sustainable development, including any need for additional assistance and activities of the project prior to its completion. The mission will draw attention to any lessons of general interest. Any proposal for further assistance should include precise specification of objectives and the major suggested outputs and inputs.

Composition of the Mission

The mission will comprise of 2 consultants, as follows:

- One internationally recruited expert Team Leader with broad experience in project evaluation – including an understanding of spatial data management.

- One representative of the Italian Government with expertise in project evaluation and spatial data management

Technical areas not included in the professional expertise of the team, will be covered by way of a peer review on the overall systems design concept, interpretational/ cartographic standards and software tools (such as LCCS, MADE, AIMS, ADG).

Mission members should be independent and thus have no previous direct involvement with the project either with regard to its formulation, implementation or backstopping. They should preferably have experience in evaluation.

Timetable and Itinerary of the Mission

The evaluation mission will assemble at FAO Rome for an initial briefing, and then visit the project headquarters in Nairobi. There, the team will be generally briefed on the project by the project and counterpart staff. In each country visited, the evaluation mission will meet the NFPI and other relevant institution if needed. The mission will have the following itinerary (to be adjusted according of the actual flight schedules):

- Nairobi 3 days (according to flight schedule); the mission will also meet, Regional Centre for Mapping for Resource Development, Wildlife Institute, UNEP (DOWA Section)
- Kampala 2 days (according to flight schedule)

- Khartoum, 3 days (according to flight schedule); the mission will also meet the National Remote Sensing Centre.
- Cairo, 3 days (according to flight schedule)

The evaluation team will be supported in each country by a national expert nominated by the respective Government. The evaluation team will organize in each country a debriefing meeting with the respective Governmental Institution. A debriefing meeting will be held in Nairobi, where a draft report or aide-memoire will be presented. A final debriefing will be held at FAO HQ in Rome.

Consultations

The mission will maintain close liaison with the Representatives of the Donor and FAO and the concerned national agencies, as well as with national and international project staff. Although the mission should feel free to discuss with the authorities concerned anything relevant to its assignment, it is not authorised to make any commitments on behalf of the Government, the donor and FAO.

Reporting

The mission is fully responsible for its independent report, which may not necessarily reflect the views of the Government, the donor or FAO. The report will be written in conformity with the following standard headings:

- Executive Summary
- Project Background and Context
- Project Objectives and Design
- Project Implementation, Efficiency and Management
- Project Results and Effectiveness, including effects, impact, sustainability of results and cost-effectiveness
- Findings and Recommendations
- Lessons Learned

The report will be completed at FAO Rome and the findings and recommendations fully discussed with all concerned parties and wherever possible consensus achieved. The Team Leader bears responsibility for finalisation of the report, which will be submitted to FAO within two weeks of mission completion. FAO will submit the report to Governments and the donor together with its comments.

Annex 2 Evaluation Mission Itinerary and Schedule of Country Visits

DATE	FLIGHT SCHEDULE	COUNTRY	INSTITUTIONS TO BE VISITED
20th July 03	**Rome – Nairobi**	**Kenya**	**Rome - Addis Ababa ET761 Dep 0125 Arr 0815** **Addis Ababa – Nairobi ET807 Dep 1240 Arr 1430**
21st July 03		Kenya	Briefing with Antonio Di Gregorio, OIC – FAO Africover Project
22nd July 03		Kenya	1. Department of Resource Surveys and Remote Sensing (DRSRS) - Ministry of Environment, Natural Resources and Wildlife 2. Survey of Kenya – Mr Haggai Nyapola (Director of Survey)
23rd July 03		Kenya	1. Regional Centre for Mapping of Resources for Development (RCMRD) – Dr Wilber Ottichilo (Director General) 2. Kenya Wildlife Service – Director
23rd July 03	**Nairobi-Entebbe**	**Uganda**	**Nbo-Ent KQ 414 Dep 1800Hrs Arr 1905Hrs**
24th July 03		Uganda	1. Surveys and Mapping Dept. – Dr Okia, National Coordinator 2. Ag. Commissioner – Mr Bwogi 3. Technical Lab – Mr John Kitaka 4. Ministry of Lands and Environment - Director of Lands and Environment – Mr Mubbala - Permanent Secretary – Eng. Kabanda - Minister – Hon. Baguma Isoke
25th July 03		Uganda	1. Directorate of water development - Commission for water resources - Lake Victoria Environment Management 2. BIOMAS (Forestry Department) – Mr. John Disii NEMA (National Environment Management Authority) – Mpabulungi
25th July 03	**Entebbe – Nairobi**	107. Kenya	**Ent-Nbo KQ 415 Dep 1950Hrs Arr 2055Hrs**
26th July 03		Kenya	Additional debriefing with the OIC – FAO Africover Project, if necessary.

28th July		Kenya	Kenya Wildlife Service – Mutero (GIS section)
29th July 03	**Nairobi-Khartoum**	**Sudan**	**Nbo-Khrt KQ 320 Dep1720Hrs Arr 2010Hrs**
30th July 03		Sudan	1. Forests National Corporation, NFPI - General Manager, Dr Abdel Agim Mirghani 2. National Remote Sensing Corporation – Director, Dr. Amna Ahmed 3. National Sudan Survey Corporation – Director
31th July 03		Sudan	1. Geological Survey – Director 2. Ministry of Agriculture and Forests – Minister – Ministerial Adviser, Dr. Abdel Razig El Bashir 3. Agricultural Research Corporation
31st July 03	**Khartoum-Cairo**	**Egypt**	**Khrt-Cairo KQ 320 Dep 2055Hrs Arr 2330Hrs**
2nd Aug 03		Egypt	1. The Soil, Water, and Environment Research Institute (SWERI) - Prof. Dr. Nabil El Mowelhy 2. The Egyptian Survey Authority (ESA) - General Hesham Nasr (Director) 3. The Desert Research Center - Dr. Ahmad Abdel Salam (Director)
3rd August 03		Egypt	ERSS - Dr. Hossam Fawzy & staff involved in Africover activities (Egypt, Yemen, Libya)
4th **August 03**	**Cairo-Rome**	**Italy**	CEDARE (The Center for Environment and Development for the Arab Region and Europe) - Mr. Ahmad Abdel Rahim (GIS & Remote Sensing Specialist) **Cairo-Rm AZ 897 Dep 1510Hrs Arr 1740Hrs**

Annex 3 List of Persons Met

(Persons listed were met by at least one member of the evaluation mission)

FAO

Rome

Dietrich E. Leihner (Director, Research, Extension and Training Division, SDRD)

Jeff Tschirley (Chief, Environment and Natural Resources Service, SDRN))

John Latham (Remote Sensing Officer, SDRN, Technical Backstopping Officer/ Project Budget Holder)

Simona Castelli (SDRN HQ Staff of GCP/ RAF/ 287/ITA)

Dominique Lantieri (former SDRN Coordinator, Africover Working Group)

Bernd Bultemeier (Evaluation Officer, PBEE)

Tullia Aiazzi (Evaluation Officer, PBEE)

Mohamed Saket (Forestry Officer, FORM)

Anne Brandhomme (Forestry Officer)

Jose Aguilar-Majarrez (Fishery Resource Officer/ Inland Fisheries GIS)

Luca Alinovi (Project Coordinator, GCP/RAF/360/EC; former CTA of GCP/ RAF/ 287/ITA)

Reto Florin (Director, AGLW)

Freddy Nachtergaele (Technical Officer, Land Classification, AGLL)

Hubert George (Technical Officer, Land and Environment Information System, AGLL)

Aleksander Zaremba (Senior Officer, TCAP)

Pietro Chiappini Carpena (Programme Officer, TCAP)

Emanuele Cuccillato (APO, Project GCP/TUN/028/ITA on Soil & Water Conservation, Kairoum, Silana, & Zahoun, Tunisia; former consultant of GCP/ RAF/ 287/ITA)

Kenya

Bruce Issacson (FAOR)

Antonio Di Gregorio (OIC, GCP/RAF/287/ITA: AFRICOVER)

Guido Santini (GIS/Photo Interpreter, AFRICOVER)

Victor Kimathi (Informatics expert, AFRICOVER)

Philip Kiarie (Administrative Assistant, AFRICOVER)

Beldina Owalla (Bi-lingual Secretary, AFRICOVER)

Nick Haan (Chief Technical Advisor, Food Security Unit, FSAU, Somalia)

Charles Rethman (Head of Information, FASU, Somalia)

Chris Print (Project Coordinator, Water & Land Information Management System for Somalia)

Uganda

Bart Hilhorst (Water Resources Expert, GCP/INT/752/ITA Nile Basin Water Resources Project)

Sudan

Abdulla Tahir Bin Yehia (FAOR)

World Food Program

Carlo Scaramella (Chief, OIP, Emergency Preparedness Response Unit)

Paolo Romano (Cartographer, VAM)

IFAD

Alessandro Meschinelli (Technical Adviser, Technical Advisory Division)

Italian Ministry of Foreign Affairs

Vincenza Russo (Multilateral Cooperation, General Directorate for Development Cooperation)

Alfredo Guillet (Environment Office, General Directorate for Development Cooperation)

Istituto Agronomico d'Oltremare

Alice Perlini (Director)

Paolo Sarfatti (Remote Sensing/ GIS)

Gianni Pinucci (Director, SVALTEC Srl Software)

Simone Maffei (Marketing Director, Terra Nova Software)

Regional and National Institutions

Kenya

Wilber K. Ottichilo (DG, Regional Centre for Mapping of Resources for Development)

Martins W. Chodota (Sen. Surveyor/OIC Administration, RCMRD)

Samuel N. Ng'anga (GIS Consultant/ Instructor)

Rachel A. Arungah (Permanent Secretary, Ministry of Environment, Natural Resources & Wildlife)

Fatuma S. Abdikadir (Office of the President, Arid Lands Resource Management Project)

Shaabani Salim (Drought Management Officer, ALRMP)

Jaswat Agatsiva (Director, DRSRS, National Coordinator, NFPI)

K. Mwero (Dep. Director of Surveys, Survey of Kenya)

E.F.N. Atcotsi (Chief Ecologist, DRSRS)

Mohammed Said (Ecologist, DRSRS)

Lucy W. Njino/Gitau (Systems Analyst, DRSRS; Participant in Africover training)

F.T. Otieno (Systems Analyst/GIS/Surveys, DRSRS; participant in Africover training)

Enoch N. Osoro (Ecologist/HGSD, DRSRS)

W. Mutero (Kenya Wildlife Service)

Uganda

K.S.B. Mubbala (Director, Lands and Environment, Ministry of Lands, Water, and Environment)

Baguma Isoke (Minister of State, Ministry of Lands, Water and Environment)

Nsubuga-Senfuma M.W (Commissioner, Water Resources Management Department)

Fred Kimaiti (Water Resources Management Department)

A. Kaiondo (Water Resources Department)

Yafesi Okia (Land Survey Department, AFRICOVER National Coordinator)

M.N. Kajombula (Asst. Commissioner, Land Survey Department)

John Kitaka (Land Survey Department, Trainee)

Firipo Mpabulungi (GIS/ Remote Sensing Officer, National Environmental Management Agency)

Mary Goretti Kitutu Kimono (Research Officer, NEMA)

John Diisi (Forest Officer/ GIS Analyst, National Biomas Study Project, MSC Environment)

John Begumana (Manager, Field Surveys, National Biomas Study Project, .MSC Environment)

Robert Sabiiti (Food Security Section, Agricultural Planning Department, Ministry of Agriculture, Animal Industry and Fisheries)

Sudan

Abdel Razig El Bashir (Ministerial Advisor, Ministry of Agriculture and Forests)

Abdelazim Mirghani Ibrahim (General Manager, Forests National Corporation, FNC)

Mohamed Izeldin Hussein (Inventory & Management Dept., FNC observer in specialised training course)

Fatah El Aleem Mohie El Deen (National Coordinator, Africover NFPI)

Mohamed Rahomtella (Soil & Water Research Center, participant in Africover training)

Hassan M. Fadul (Soil & Water Research Center; Al Medani Research Center)

Ahmed Ali Salih (FNC)

Osman A.R. Osman (National Research Center; Desert Research Center, participant in Africover training)

Amna Ahmed Hamid (Director, Remote Sensing Authority)

Mohamed Osman M. Elhassun (GIS Officer, Remote Sensing Authority)

Ismail Adam M. Zain (Hydrology & Remote Sensing, Remote Sensing Authority)

Egypt

Nabil El Mowelhy (Professor, Soil, Water and Environmental Research Institute, SWERI)

M. Hisham Nasr (Director, Egyptian Survey Authority)

Hossam Fawzy (Executive Vice President, Environmental & Remote Sensing Services Centre)

Mohamed Adel Yehia (Professor of remote Sensing, Ain Shams University, Cairo)

Hassan Saleh Soliman (Consultant, Remote Sensing Unit/GIS, Agriculture Research Centre, SWERI)

Ashraf Abdel Ghany Mohamed (Remote sensing & GIS Specialist, SWERI)

Afify Abbas Afify (SWERI)

Mohamed Ismail (Remote Sensing and GIS, SWERI)

Hussein Kamal (Soils, Remote Sensing and GIS, SWERI)

Ahmed Abdelrehim (GIS/Remote Sensing, CEDARE)

Diplomatic Missions

Italian Embassy in Kenya
Ambassador Calia
F. Zeni, Cooperation Attaché

Italian Embassy in Sudan
Ambassador Luigi Costa di Sanseverino

Italian Embassy in Egypt
Guido Benevento, Cooperation Attaché

Annex 4: Questionnaire to be sent to Project Member Countries.
Questionnaire pour les pays membres du projet:

Evaluation of the project: "Land cover mapping of Eastern Africa based on satellite remote sensing - Africover" (Project extension for the completion of core activities and building capacity)
Evaluation du projet: "Production de cartographie de l'occupation du sol de l'Afrique de l'Est, basée sur la télédetection satellataire - Africover"

Please answer the following questions:
S'il vous plait, respondez aux questions suivantes:

Country (*pays*): .....

Institution/ Organisation(*institution/organisation*): .....

1) Contribution of land cover mapping and other project services to development and natural resource planning and/ or management:
Contribution de la cartographie de l'occupation du sol et des autres services fournis par le projet au développement et à la planification et/ou à la géstion des resources naturelles:

a) To what extent did land cover mapping and/ or other services facilitated by the project contribute to development and natural resources planning/ management in your country?
comment et jusq' à quel point la cartographie de l'occupation du sol et les autres services fournis par le projet ont-t-ils contribués au développement, à la planification et à la géstion des ressources naturelles dans votre pays?

Significantly/ Somewhat/ Little (*circle or highlight one*)
Beaucoup /Suffisamment / Peu (marquez une reponse)

b) If significantly or somewhat, what were the contributions made:
Si beaucoup ou suffisamment, quelles sont-elles les contributions apportées?
.....
.....

c) How could the contribution be further improved?
Comment peut-on-amelioré cette contribution?
.....
.....

2) Public and private users of land cover mapping and other project services (actual and potential):
Utilisateurs publiques et privés (effectifs et potentiels) de la cartographie de l'occupation du sol et des autres services du projet:

a) List the public and private institutions/ organisations *actually* using land cover mapping or other services provided through this project:
Listez les institutions/organisations qui utilisent effectivement la cartographie de l'occupation du sol ou les autres services fournis par le projet:

Institution/ enterprise	Use/ purpose (*utilisation / but)*

b) List other institutions/ organisations that could *potentially* use land cover mapping or other services through this project:
listez les autres institutions/organisations qui potentiellement puissent utiliser la cartographie de l'occupation du sol et les autres services fournis par le projet

Institution/ enterprise	Use/ purpose (*utilisation / but)*

3) Project management (*géstion du projet):*

a) Level of satisfaction with the management of the project (*niveau de satisfaction avec la géstion du projet*):
Highly satisfied / moderately satisfied / not satisfied (*circle or highlight one*)

Bien satisfait / modérémentsatisait/ pas satisfait (marquez une réponse)

Please elaborate:
S'il vous plait, explicitez
.....
.....

b) Did you have good, regular communication with project management? (*yes/ no*):

Avez vous eu une communication bonne, régulière avec la direction du projet? (oui-non)

In/*à* Nairobi ? .....
In/*à* Rome ? .....

4) Steering Committee role:
a) Please comment on the role which the steering committee played over the duration of the project:
S'il vous plait, quel a été le role du Comité de gestion pendant la durée du projet?
.....

b) How could this role be enhanced?
Comment ce role peut-il etre étendu? ....
.....

5) Assessment of project results/ outputs:

a) What is your opinion concerning the overall project results (outputs)?
quelle est votre opinion concernant les resultats qualitatifs et quantitatifs, en general, du projet?
.....

b) List the main results achieved by the project under each category below, and indicate their usefulness :
listez les principaux résultats du projet selon les catégories ci-dessous, et indiquez leurs utilités

Category **catégorie**	**List of main results/ outputs** **Liste des principaux résultats**	**Usefulness** *(High/ Moderate/ Little)* *grand / modéré / faible*
GIS/ digital databases/ specialised software *Système informatique territoriale/ Bases de données numériques /Logiciels specialisés*		
Case studies and methodologies/ tools (in your or other country) *Etudes du cas & methodes/ Instruments (dans votre pays ou ailleurs)*		
Skills/ capacity developed *Formation technique / Développement des capacités*		
Networking & partnerships/ cooperation *Réseaux / collaborations/ /cooperations*		
Access by/ dissemination to other non NFPI institutions/ organisations *Disponibilité /Dissémination aux institutions "non-projet"*		
Other results/ outputs Autres résultats		

6) Financial resources available:
Ressources financières disponibles:

a) Was project budget adequate to cover planned project activities? Yes/ No (circle or highlight one)
L*e budget a-t-il adéquatement couvert les activités du projet? Oui / Non (marquez une réponse)*

b) What other sources of financial resources were available to support project activities?
Quelles autres sources de financèment etaient-elles disponibles pour les activités du projet?

.....

7) Implementation difficulties and constraints:
Limitations et difficultés d' execution:
What were the main difficulties faced, if any, during project implementation?
quelles sont les difficultés principale que vous avez rencontré durant la réalisation?

.....

b) With the benefit of hindsight, how could any difficulties or constraints faced been better addressed?
Avec l'esprit de l'escalier, comment les difficultés ou les limitations que vous avez confronté avec, pouvaient etre mieux addressees?
.....

8) Sustainability of project activities and results:

a) Are activities, results and services initiated by the project likely to be sustained beyond project closure, and why? *Les activités, resultats et services institués par le projet seront-ils soutenibles après la fin du projet et pourquoi?*

.....

b) What further actions are necessary to help ensure sustainability?
Quelles actions futures seront-ils necessaires pour assurer qu'ils restent soutenables?
.....

<u>avant la cloture du projet</u>, avez vous besoin d'assistence et d' activité specifiques pour assurer la durabilité du projet?

9) Future steps and recommended actions to achieve project immediate objectives:

a) What steps are needed to consolidate project progress so as to ensure achievement of project immediate objective
quelles sont vos recommendations pour des actions futures que vous envisagez etre necessaires pour consolider l'avancement du projet et atteindre ses objectifs?

#1 "Contribution to regional and national management and planning, including socio-economic and environmental analysis in support of sustainable development and environmental monitoring" ?
Contribution à la géstion et à la planification régional et national, avec analyse socio-économique et environnementale, pour un développement soutenable et un monitorage environnementale
.....

b) What steps are needed to consolidate project progress so as to ensure achievement of project immediate objective
quelles sont vos recommendations pour des actions futures que vous envisagez etre necessaries pour consolider l'avancement du projet et attendre ses objectifs?

#2 "supporting institutional development at national level", to also include actual utilisation of Africover database (MADE), software tools, case study results/ methodologies, and trained personnel for development and natural resources planning and/ or management by institutions/ NGOs/ private sector organisations in your country ?
.appui au développement institutionnel au niveau national, pour inclure l'utilisation effective de la banque.de données de Africover (MADE), logiciels, études du cas, methodologies et personnel formé au développement et à la planification des resources et/ou à la géstion par institutions /NGO/ organisations du secteur privé dans votre pays?
……

c) Is further external assistance necessary, after the end of the project?
envisagez-vous la necessité d' une assistence exterieure supplémentaire, <u>après la fin du projet?</u>
Yes/ No (*circle or highlight one*)

d) If yes to the above, what type of assistance is required?
si OUI, quelle type d'assistence sera- t-il necessaire?
.....
.....

10) Other comments and observations concerning the project and related Africover issues:

.....
.....
.....
.....
.....
.....
.....
.....

Annex 5: Africover Logical Framework (Original Version)

	Intervention Logic	OVI	SOV	Assumptions
Overall Objective	Strengthen the capacities of Eastern African countries for sound planning of natural resources development and their sustainable management and improve the national institutions capacities in the use of operational remote sensing applications.			
Project Purpose	1: To contribute to regional and national management and planning, including socioeconomic and environmental analysis in support of sustainable development and environmental monitoring related to international conventions and initiatives.	Implementing Indicators: software release, MADE transfer to country level, workshop training at national and regional level. Impact Indicators: Number and quality of applications, number of persons trained at the national and regional level, adoption by international institutes of the outputs of the project (methodological, software and databases).	Ø Project monitored by a six-member Tripartite Review (TPR) team with two representatives from each of the three parties: (i) two members representing the beneficiary countries, (ii) two members representing FAO, and (iii) two members representing the Donor. Ø Assessment and evaluation of delivery against key indicators – both Implementing and Impact Indicators Ø Progress reports, in accordance with FAO rules and procedures, will be prepared every six months by the CTA for transmission by FAO to the recipient and financing government.	Ø No restriction in the access of existing information (aerial and satellite photographs, maps, field samples, other ancillary data). Ø No limitation for the participating countries in accessing the results of the AFRICOVER project
	2: To support institutional development at national level, including capacity building and stakeholder involvement through the planning and implementation of operational activities, mainly at the sub-national level.			
Results (Outputs)	1.1: A fully operational methodology with relevant software, tools and normative components: the overall concept, the interpretation/cartographic standards and the database management, browsing and updating software tools, namely AIMs, ADG, LCCS and MADE.	Production of a database management system and the related digital database of land cover units based on interpreted 1:200 000 and 1:100 000 scale satellite imagery (MADE), including 4software: LCCS, AIMs, AID, ADG	Publication and distribution of the methodology and relevant tools	Ø NFPIs institutionalized within established structures, with clear mandates, staff, organizations and requisite resources, and located in the Departments responsible for maintaining and updating the outputs of the project. Ø NFPIs provide appropriate office accommodation for equipment and operations and adequate local capacities to support the thematic interpretation work. Ø Synergic cooperation with recognized entities involved in the area.
	1.2: Increased access to AFRICOVER information and methodological approach at regional and national level, enhanced through the development of an enabling environment which can facilitate, at regional level, a more effective participation in the implementation of the United Nations Conventions on environmental issues	Ø Development and management of the Africover website (http://www.africover.org) including a private discussion forum for the exchange of information between the members and the AFRICOVER project Ø 10 national workshops to promote AFRICOVER applications at national level Ø 3 workshops with collaborating international R&D institutions Ø 1 expert consultation meeting Ø 1 international conference on land cover mapping Ø Annual meetings of the Project Steering Committee and the Tripartite Review.	Reports from the National Focal Point Institutions involved / Surveys of Ministries involved in the participating countries (as per attached NFPIs list)	

(Results/ Outputs contd.)	2.1: National capacities in natural resources management strengthened in each participating country, through staff trained in database development and management, AFRICOVER database (MADE) made available, and training given on application of the AFRICOVER database	Ø AIMS regional training of 20 national land cover interpreters Ø ADG regional training of 10 national systems administrators Ø Regional training of NFPIs (20) to support national applications Ø Fellowship for the photo-interpreters of Sudan, Rwanda/Burundi and Uganda Ø Production of training material	Ø Minutes of Project Steering Committee and Tripartite Review Ø FAO HQ monitoring Ø Yearly project reports Ø Project Evalation Performance Reports Ø Mid-term technical expert consultation meeting (end 2001) Ø Project terminal report, presented at the last Tripartite Review Meeting.	
	2.2: Case studies and AFRICOVER applications developed in natural resources development activities at national and sub-national level, aimed to any potential user.	Ø Landform mapping of Burundi, Kenya, Rwanda, Somalia and Tanzania at 1:500,000 scale. Ø Area sampling frame development in Somalia Ø DSS for management of wildlife and national park (Tarangire) in Tanzania Ø Development of an atlas of the Tanzanian Coast Ø Development of irrigation system for Somalia	Partners reports: Ø USAID, UNDOS/UNDP, WFP, Italian Cooperation. Ø USAID, WWF-US. Ø UNEP. Ø European Commission	
Activities	1.1.1 Develop and distribute software and tools to manage data and applications. 1.1.2 Convene an International Expert Consultative Meeting to validate the overall methodology and the relevant tools. 1.1.3 Organize a conference on land data management and mapping to assess standards and normative issues at international level. 1.1.4 Provide maintenance and development of the AFRICOVER tools to respond to innovation in information technology and applications demands.			Basic structure and telecommunication facilities to smooth the information flow and allow a fast internet access (see 1.2.1 and 2.1.1). Need for the participating countries to reach a policy agreement on national, regional and international database distribution, pricing and cost recovery (see 1.2.2, and 2.1.3). Active participation of international centres of excellence, governmental institutions and international projects and organizations in the AFRICOVER methodology development and application (see 1.2.4, 2.1.7, 2.2.1, 2.2.5 and 2.2.6) The training of project staff in disciplines providing a high level career development will be retained in their responsible positions for not less than three years after completion of the project and perpetuate their knowledge through locally convened national capacity-building programmes (see 2.1.6 and 2.2.3). Availability of cloudless imagery for all the countries covered by the project (see 2.1.2). Acceptance by the parties involved of the principle of a “shared costs approach” (see 2.1.4 and 2.2.5).
	1.2.1 Develop, manage and maintain the AFRICOVER web site, aimed to provide all the information possible, to any potential user, about the AFRICOVER methodology and its applications 1.2.2 Homogenize and improve with NFPIs the policy and the mechanism of data dissemination 1.2.3 Convene an annual Project Steering Committee, to review overall Project results, achievements and problems. 1.2.4 Establish partnership programmes with centres of excellence to support the diffusion of the methodology at international, regional and national levels.			

(**Activities contd.**)	2.1.1 Complement existing computer and remote sensing and GIS facilities at NFPI level for improved communications and information management facilities 2.1.2 Production of a database management system and the related digital database of land cover units based on interpreted 1:200 000 and 1:100 000 scale satellite imagery (MADE) established under Phase I. 2.1.3 Transfer of MADE at national level and support to the diffusion of the AFRICOVER products. 2.1.4 Develop and design institutional arrangements, including mandates, organization and human resources, for management, operation and monitoring 2.1.5 Prepare national guidelines on principles, approaches and methodology for natural resources data bases development and management. 2.1.6 Three regional training-courses, supplemented with distance learning arrangements with international/regional specialized institutes or academic institutions. 2.1.7 Assess the requirement for, and establish a regional network of experts from each country experienced in issues of data, information management, etc.			
	2.2.1 Establish partnership programmes with centres of excellence to support the development of regional oriented applications and give scientific support to the development of cost-shared activities. 2.2.2 Test and apply tools and methodologies required to analyse alternative development options in relevant sectors and the socioeconomic and environmental impacts, and if applicable, transboundary and regional aspects. 2.2.3 Application and on-the-job training of thematic advanced spatial and tabular data analysis using GIS-based assessment 2.2.4 Organize a national workshop to promote applications of AFRICOVER methodologies and to reinforce inter-institutions cooperation. 2.2.5 Promote cost-shared applications to respond to the demand of local or national users for applications in the field of monitoring of the environment and the management of natural resources. 2.2.6 Promote the utilization of AFRICOVER databases by national and local planners and by international organization to achieve a more effective impact.			

Preconditions:	Ø Approval of organizational setup and timely disbursement of funds from the donors and FAO HQ. Ø The Participating Governments take all the necessary measures to facilitate the execution of the project and to assist the FAO staff in obtaining the services and facilities they may require to fulfill their tasks. Ø The Participating Governments provide the facilities, human resources and supplies foreseen by the Project Document. Ø Civil disturbances and conflicts on either an internal or external basis do not affect the implementation of project's activities.
Budget (US$):	**Human resources** 1,207,000 Ø Resident staff 121 m/m 922,000 Ø International Consultants 25 m/m 150,000 Ø Administrative Support Personnel 120m/m 135,000 . **Technical Coordination** 38,000 **Duty Travel and Missions Costs** 160,000 **Contractual services** 862,950 Ø Digitization (Output 2.1) 31,350 Ø CD printing(Output 2.1) 9,000 Ø Field Data Collection (Output 2.1) 29,000 Ø MADE structuring (Output 2.1) 258,600 Ø Networked R&D Inst. (Output 1.2/2.2) 85,000 Ø Software and tools development (1.1) 370,000 Ø Letters of Agreement (Output 2.1/2.2) 80,000 **Training and Meetings** 457,200 Ø AIMS (Output 2.1) 76,000 Ø ADG (Output 2.1) 44,000 Ø Reg. training of NFPIs (Output 2.1) 49,500 Ø 10 national workshops (Output 2.2) 49,500 Ø Training material (Output 2.2) 40,000 Ø Fellowship for photo-int. (2.1) 48,800 Ø 3 workshops with R&D inst. (1.2, 2.2) 38,400 Ø 1 expert consultation meeting (Output 1.1) 20,000 Ø 1 conference on land cover mapping (1.1) 50,000 Ø Annual meetings of the PSC and TPR (1.2) 60,000. **General Operating Expenses** 345,000 **Non-Expendable Equipment procured to NFPI** 188,000 Ø 3 PCs Ø 10 servers Ø 10 plotters Ø 12 CD writers **Expendable Equipment** 172,500 **FAO Administrative costs** (13%) 445,984.5 **TOTAL** 3,876,635

Annex 6 Partial List of Institutions Using or About to Commence Use of Africover Products, by Country

DRC	SPIAF(forestry assessment & management); METTELSAT (meteorology, hydrology, teledetection); IGC (cartography); BEAU (land management, urban development)
Egypt	Ministry of Agriculture/ Soil, Water and Environmental Research Institute; Ministry of Environment; Ministry of Public Works; Ministry of Culture; Environmental & Remote Sensing Services Centre
Eritrea	Ministry of Agriculture; Ministry of Land, Water & Environment; Ministry of Mines/ Energy; Asmara University
Kenya	Kenya Wildlife Service; University of Nairobi; OSS/ROSELT; Kenya Marine Fishery & Agricultural Research Institute; Kenya Forestry Department; National Environmental Management Authority; Regional Centre For Mapping For Development
Rwanda	Ministry of Lands, Resettlement & Environment (settlement planning); Ministry of Agriculture, Livestock and Forestry (watersheds/ swamps & reforestation); Office of National Parks; University GIS Center
Sudan	Forests National Corporation (forestry inventory/ policy); National Remote Sensing Authority/ University of Khartoum; Ministry of Agriculture and Forests (agricutural information management centre); Soil and Water Research Centre
Uganda	Ministry of Agriculture, Animal Industry & Fisheries; National Agricultural Research Organization; Kawanda Research Station; Physical Planning Department (land use zoning); Makerere University (Mwindi National Park); National Environment Management Authority, Forestry Department