Final evaluation of the IUC partner programme with Mekelle University, Ethiopia

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SHARING MINDS, CHANGING LIVES

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Foreword

This report contains the findings, conclusions and recommendations of the external final evaluation of the Institutional University Cooperation (IUC) Partner Programme (2003 – 2012) with the Mekelle University in Mekelle, Ethiopia. The VLIR-UOS IUC programme is an interuniversity cooperation programme of Flemish universities that started in 1999. Based on a system of programme funding provided by the Belgian government, the IUC is directed at a limited number of partner universities in the South. Each partnership, covering two five-year periods, consists of a coherent set of policies and actions aiming at the improvement of research, teaching and service provision of the partner university as well as the strengthening of its institutional functioning.

The IUC programmes are evaluated mid-term and, after their finalization, by an external evaluation team consisting normally of an international and a local expert. The present evaluation was carried out by Mr Ben van Baren, international consultant and Mr Alemayehu Aseffa, national consultant. Guiding document for the evaluation were extensive terms of reference provided by VLIR-UOS. Self-assessments by both northern and southern programme management on the overall programme and by the mixed project teams on the different individual projects provided the basic information on the results and achievements of the programme on which the evaluation team could build further through analysis of programme and project documents like programme proposals and annual plans and reports and through interviews and field visits.

Prior to the field mission the evaluation team leader was briefed by VLIR-UOS in Brussels where he also interviewed all programme and project responsible persons from the Flemish side. The evaluation team members then joined in Mekelle and carried out a well-organized programme of interviews with Ethiopian programme and project responsible persons and stake holders and of intensive visits to relevant project sites.

The evaluation commission would like to express its appreciation to all of the individuals we met during the course of the evaluation and to thank them for the open dialogue we had. This allowed us to shape our insights into the programme's achievements and on ideas on the continuation of the excellent work.

We would like to extend our special gratitude to Ato Nahusenay Teamer for the excellent organization of our stay and visits.

Disclaimer

This report represents the views of the members of the commission that evaluated the IUC Programme with Mekelle University; it does not necessarily reflect the opinions of VLIR-UOS. The evaluation commission bears sole responsibility for the report in terms of its content, as well as its structure.

Cover picture: Luc Janssens de Bisthoven

Table of contents

Executive summary

The programme started in 2003 and was designed on the basis of a demand formulated by MU staff. The IUC programme had been preceded by other cooperation projects with Flemish universities and with the experience gathered a coherent programme was set up consisting of a core of six research driven projects and two support projects. Subjects of the research programmes were i) enhanced crop production, ii) socio-economic research, iii) hydrogeology for water resources management, iv) aquatic ecology, v) land management and vi) farm technology. The supporting projects addressed the enhancement and optimization of ICT usage and the upgrading of library services. The programme for the second phase was equal content wise but envisaged a shift in focus from discipline oriented to inter/multi-disciplinary research, more emphasis on extension and outreach and enhanced ownership by the Ethiopian partner.

Objectives of the programme were the strengthening of the capacity of Mekelle University as an institute of higher education, and a centre of excellence for research and academics (academic) and the contribution to social and economic development and improving the livelihood of the region on a sustainable basis (developmental). The programme has been successful in obtaining its objectives. It realized an ambitious research programme, including interdisciplinary research projects, which will generate 32 PhDs in total and an impressive output of more than 130 articles in international peer reviewed journals. Of the 32 PhDs 23 were financed through IUC, all of them MU staff. Five more MU staff members were financed from other sources. The remaining 4 PhDs were Belgian students. Of the 28 MU staff 13 are ongoing and expected to finish in 2013 or early 2014. This established a research culture in an institution that at programme's start was highly teaching driven. The teaching programme was strengthened with the introduction of new curricula and the integration of research findings in the programmes. Extension and outreach have had due attention and strong and effective links were established with relevant government authorities at Woreda and Regional level and with communities. The implementation of research results has been successful and the evaluation team could observe good examples like improved livelihood and income as a consequence of the introduction of apple trees in the Tigray highlands, the transfer of fishing techniques and support in marketing to an association of youngsters and the introduction of conservation agriculture. Very impressive was the experience to have a view where rejuvenation and successful agricultural development could be seen in a valley that had been barren before. More in general the MU-IUC programme has enabled communities to better use and manage ground and surface water resources and micro dams, to better manage land, to apply conservation agriculture, to cultivate apples and to catch fish and commercialize it, thus providing opportunities to improve their livelihood and to increase their income. The involvement of government institutions and NGOs in the work has created a good potential for increasing and spreading out impact.

Essential success factors for the programme were first of all the enthusiasm and dedication of both Ethiopian and Flemish staff and furthermore the coherent set up of the programme with a high potential for synergies, the presence of a Cluster Support Services unit with competent staff, experienced in research, to support the PhD students in setting their first steps in research and carrying them through and the vision and push of programme management to further the programme.

The weaker points of the programme were related to activities implying non-academic staff. High staff turnover has hampered the optimal development of the ICT and Library initiatives and strengthening of laboratory infrastructure and management has not been optimal in some cases.

With the expertise that has been built, the relations that have been established, the capacity to attract funds for continued research, the good embedding of the initiatives in the region and the commitment of MU to further its development the programme's results have a high probability to sustain.

The evaluation team recommends materializing the intention of participants in the programme to continue their collaboration. For VLIR-UOS the evaluation team recommends continuing the application of the successful IUC concept and suggests some minor possible improvements. MU is recommended to address the challenge of staff retention, to boost research by making it a condition for career development and to organize and strengthen acquisition capacity at MU level.

1 Introduction

1.1 The VLIR-UOS Institutional University Cooperation programme

The Inter University Cooperation programme (IUC) that is financed by the Belgian State Secretary for Development Cooperation is managed by the Flemish Interuniversity Council – University Development Cooperation (VLIR-UOS). The overall objective of the IUC programme is “to empower the local university as an institution to better fulfill its role as development actor in society”. The realization of this objective is being strived for by implementing partnership programs between Flemish universities and carefully selected universities in the South. Currently, 19 IUC programmes are ongoing: 5 in Latin America, 13 in Africa and 1 in Asia. Each partnership consists of a coherent set of interventions geared towards the development of the teaching and research capacity of the university and to the strengthening of its organizational functioning.

Core characteristics of the partnership programs are:

- Arrangements are made for long term cooperation covering a period of at least 10 years in order to create real opportunities for the development of successful and sustainable initiatives;
- Initiatives are directed at the needs and priorities of the partner universities in the South and fitting into their local policy and strategic environment;
- There is a striving for ownership for the southern partner through all stages of the programme, from identification through formulation to implementation of the programmed activities;
- The programme is concentrating its efforts to a limited number of well selected partner institutions in order to create synergies between the different projects within the programme, to enhance efficiency in programme management and to broaden the impact of the intervention on the partner institution;
- There is attention for donor coordination with a view to prevent duplication and to enhance effectiveness.

Programmes are set up in the following way. VLIR-UOS is responsible for the programming, monitoring and evaluation of the overall programme and it delegates the overall responsibility for the implementation of a partner programme with a specific university to one of the Flemish universities – KU Leuven in the present programme - that takes part in the programme and has a coordinating function. The cooperation is formalized in an agreement between VLIR-UOS, KU Leuven and the partner university, Mekelle University. Programme implementation overall is being coordinated by a programme coordinator at both the Ethiopian and the Flemish side. The coordinators are supported by a Programme Support Unit (PSU) at the Ethiopian side and the Institutional Coordinator for Development Cooperation (ICOS) of KU Leuven at the Flemish side. Each of the separate projects, together composing the cooperation programme, has a Project Leader (PL), both at the Ethiopian and the Flemish side. At the level of the partner university, a full time professional manager is appointed in order to support the local coordinator. Programme coordinator and PLs constitute a coordinating steering committee for each partner. The two steering committees come together in a yearly organized Joint Steering Committee Meeting.

As for all fully fledged programmes in the initial stage of the IUC programme, the annual budget has been €745.000 for the first seven years and it then decreased to €635.000, €560.000 and €375.000 for the years eight, nine and ten respectively. This to prepare the partner university for takeover. After the ten year period the partner university has access to ex-post VLIR-UOS funds that are available on a competitive basis. It can also participate in transversal activities organized at the overall IUC programme level. Lower budgets are availed to programmes that have started more recently.

1.2 The Terms of Reference for the evaluation

The objective of the final evaluation is to generate conclusions that will allow:

- the measurement of the actual results of the IUC programme;
- the formulation of recommendations for on-going and future IUC programmes in terms of the content and management of the programme, including the overall policy framework;
- the identification of strengths and weaknesses of each specific IUC collaboration in particular;
- the identification by VLIR-UOS of departments and/or research groups that have received substantial support from the IUC programme in Phase II and thus can present proposals for the post IUC programme tools;
- the formulation of recommendations to all stakeholders in terms of the follow up plan that has been elaborated by the Northern and Southern project leaders;
- the identification of possible themes and partnerships for possible NETWORK programmes in the respective countries and their regions, as also other venues for the future of the involved projects in view of establishing sustainability.

The scope of the evaluation includes the following items at the level of the overall programme and the separate projects:

a. the present implementation of the programme

- evaluating the **global state of implementation** of the programme, both at the level of the overall programme and the constituent projects;
- evaluating whether the **activities**, per project, have generated **the intermediate results**, meeting the **objectives**, that had been defined by the actors involved, within the given timeframe and with the given means, articulated in the logframe;

b. the nature of the programme

- evaluating the **quality, efficiency, efficacy, impact, development relevance** and **sustainability** of the programme in the light of the overall goal of the IUC Programme, being institutional capacity building of the local university, as situated in the context of the needs of the local society;

c. the position of the IUC programme within the international cooperation activities of the partner university (bench marking)

- evaluating the **added value of the IUC Programme** for the partner university, in comparison to other on-going donor cooperation programmes;

d. evaluating the **management** of the programme, both in Flanders and locally, and formulating, if necessary, recommendations for improvement;

e. evaluating the **cooperation** between all parties involved, and formulating, if necessary, recommendations for improvement

f. Evaluating the follow-up plan of the programme in view of achieving sustainability as an institution and as involved research groups, but also assessing hereby the embedment and impact of the university on development processes in the surrounding community, province and eventually in the country.

1.3 The evaluation methodology

The evaluation team gathered information through:

- analysis of documentation like the initial programme and project documents, the mid-term evaluation, the self-assessments reports (see annex 1 for the references);
- interviews with VLIR-UOS staff members and the Flemish programme coordinator, ICOS and project leaders (PL) in Brussels, interviews with Mekelle University (MU) programme manager, PLs and stake holders in Mekelle (see annex 2 for the programme of the evaluation);
- visits to projects sites. The programme of the visits in fact covered all relevant project activities: i) at the MU Endayesus campus: Mu ICT and Library facilities, the apple nursery and research site and the Farm technology project, ii) in Kalamino: the Farm mechanization facilities, iii) in Adigudem: Conservation agriculture, iv) in Emba- Aradom: wind energy, v) in Tekeze: the Fish cooperatives, vi) in Hagereselam: apple and conservation agriculture,vii) in Abrha Atsbiha: hydrology and watershed management projects and viii) at MU IUC: the Biology Laboratory. This gave the evaluators an opportunity to see the actual work and the changes they have brought about in the lives of the community/region and it also gave an opportunity to see whether they were replicated and scaled up in the region and in the country. The visits to project sites also revealed the work environment of the researchers.
- a debriefing meeting with the MU programme team where the preliminary findings were discussed, thus providing an additional opportunity for information gathering.

The Evaluation Team (ET) used the evaluation criteria quality, efficiency, effectiveness, impact, development relevance and sustainability as prescribed by the ToR. It furthermore applied the seven Key Result Areas (KRA's) - research, teaching, extension and outreach, management tools, human resource development, infrastructure, mobilization of additional resources/ opportunities as applied by VLIR-UOS for their assessment. For scoring the evaluation criteria and the KRAs the ET used a five point evaluation scale (1 = (very) poor, 2 = insufficient/low, 3 = sufficient, 4 = good/high, and 5 = excellent/very high), to judge the results in quantitative terms, and in evaluating the performance of projects.

The development of case stories/testimonies was used as a powerful tool along with the other components of the evaluation methodology. This tool mainly helped to explore exemplary achievements that can be scaled up, the process through which those were achieved, impacts realized in the lives of communities etc. Case stories that mainly indicate the success and achievements of the program/ projects over the years were accordingly produced.

To achieve a reasonable level of quality and reliability of data, the following mechanisms were used:

- Evaluation commission members have properly discussed on the methodologies to be pursued,
- Routine discussions on the data collection and problems encountered conducted regularly involving post event discussions and reflections within the evaluating commission,
- During data collection all members of the evaluating commission were engaged in the Focused Group Discussions (FGD) and key informant interviews in order to minimize variability while summarizing findings at later stage,
- The evaluation commission in addition to facilitating FGDs, interviewed individual informants,
- ET debriefed the MU-IUC local steering committee to find out their opinion on the preliminary findings of the evaluation,

- Cleaning the data using triangulation of data sources was done. Inconsistent and superficial responses were discarded during data analysis.

The Terms of Reference for the evaluation were clear and the ET received much cooperation from MU IUC program management, the research coordinators, the respective project leaders, researchers and other officials contacted. In spite of this the ET faced constraints in carrying out their work.

- Time shortage was a serious challenge to conduct in-depth interviews and discussions with MU management, project leaders, PhD and MSc students, ICT, library service users and communities to identify the real impact of the program.
- For some of the projects coherent data and information on (part of) the KRAs was not available. Sorting out information was time consuming. High turnover of project leaders has affected the quality of information that the evaluating team could obtain.
- Unavailability of important stakeholders for interviews. It was not possible to speak to officials of Relief Society of Tigray (REST) and the Tigray Youth Association leader and the rector a.i. of MU could only be met during an informal encounter.

1.4 The structure of the evaluation report

Chapter 2 provides contextual information about Ethiopia, its education system, Mekelle University and the programme at Mekelle University.

Chapter 3 describes the findings of the ET on the individual projects.

Chapter 4 gives the findings of the programme overall.

Recommendations are given at the end of the subchapter on the separate projects and of the programme.

2 Background

2.1 Ethiopia

Ethiopia, one of the world's oldest countries, has had a long, varied and troubled history. Unique among African countries, during its three millennia of existence, Ethiopia was never colonised, with the exception of a short-lived Italian occupation, from 1936 until 1941. However, in spite of a relatively peaceful history the country has known lengthy periods of socio-economic and political stagnation.

After centuries of feudal monarchical rule, prolonged civil war, and subsequent rule by the military regime, the Ethiopian People's Revolutionary Democratic Front (EPRDF) seized power in 1991. Since assuming office, the EPRDF has introduced a federal political system and a market-oriented economy.

The federal political system was introduced by the 1994 Constitution consisting of a federal government and nine regional states. The country's federalism has, however, sometimes been criticised for "*essentialising"* ethnic identities, "*privileging*" them over other identity types thus heightening ethnic tension and conflict.

Ethiopia has witnessed a wide range of policy reforms in the economic sphere. In the context of these economic reform and poverty reduction programs the government's primary macroeconomic objective has been to promote rapid, broad-based and sustainable private sector led growth that is adequate to reduce poverty. To this end, the country has successfully put in place development strategies and policies that brought about strong economic growth, e.g. 11.6 % in 2007/8, as well as poverty reduction. This productive development cooperation partnership led to positive results. The PASDEP (Plan for Accelerated and Sustained Development to end Poverty 2005/06 -2009/2010), has achieved important progress in reducing infrastructure gaps, accelerating income growth and reducing poverty and this has resulted in progress on human and social indicators as well. This is also the result of an increase in the share of poverty-targeted expenditures in Government expenditure, which moved from 40% in 2001/2 to 60% in 2008, one of the highest shares among Sub-Saharan countries. The implementation of the next Poverty Strategy for the period 2010/11 – 2014/15, the 'Growth and Transformation Plan' (GTP), will continue to focus on strengthening human capital and on expanding key infrastructure in the road, energy and telecom sectors. Agriculture will remain the main driver of growth but greater emphasis will be placed on expanding the industrial sector with a view to boosting growth and employment jointly with the private sector. Assured and timely available aid will remain a high priority for Government in financing the GTP. However, greater financial efforts are required to speed up progress in some Millennium Development Goals (MDG) especially in relation to infant and maternal mortality, access to water and most importantly in terms of access to and quality of service provision.

In the social sphere, Ethiopian population was estimated to reach 81.3 million in 2009/10. Inhabitants below the age of 15 account for 45% of the population. The majority of the population (85 %) has been dependent upon rain–fed subsistence agriculture which accounts for 41% of the GDP and is vulnerable to climate change (GTP, MoFED, 2010).

2.2 Higher education in Ethiopia

Higher Education in Ethiopia includes institutions that offer three, four, five or six years undergraduate programs, as well as institutions offering two years Masters and four years PhD programs. In 2013 there were 36 government higher Education institutions, including the Ethiopian Civil Service University, Defence University college, Telecommunication and Information Technology College and Kotebe Teachers Education College and 64 accredited private higher education institutions.

In 2010 enrolment in all programs of the higher education institutions, regular, evening and distance, was 434,659 of which 77,140 were enrolled in private higher education institutions (Education Statistics Annual Abstract 2009/10).This accounts for 18% of the enrolments. In addition, 420,387 (96.7%) of the enrolments comprise the undergraduate degree program (ibid). There is a rapid increase in enrolment in undergraduate degree programs and female participation increased from 24.8% in 2005/06 to 27 in 2009/10(ibid). Postgraduate enrolment includes all programs after the first degree, mostly at Masters and PhD levels. Even though there is an increase in postgraduate enrolment in the past few years, the number is still small. In addition, the percentage of female students is about 12% which is very small when compared to other levels of education.

The Government of Ethiopia has been committed to the provision of better education for the whole society. This is demonstrated, in part, through the more than doubling of the commitment to education as part of the total government budget. The government budget document indicates that both the absolute funding of education and funding as a percentage of total spending over the past five years has increased, reaching 25.4% in 2009/2010. The cost per pupil in higher education is 32 times higher than at primary school level, which required government to introduce some type of cost sharing (Teshome2005).

Expansion of Higher Education, diversification of programs, effort for equitable distribution of higher education institutions, higher education proclamation and cost sharing, affirmative action, quality assurance, ICT, etc are positive steps for the sector. However, although expansion is positive in widening opportunity and equity of access it is also considered negative if it neglects quality and focuses only on quantitative expansion. Although commendable achievements and results have been recorded, the Ethiopian Higher Education system still faces multiple challenges. These challenges are the governance structure and management tradition, quality and relevance, research, access and equity ; pace of expansion, financing the system; staff stability and staff quality, establishing a solid and relevant research agenda which feeds into Ethiopia's economic and social development agenda and which at the same time allows for innovations; dealing with issues of internationalization, brain drain; guaranteeing effectiveness and efficiency in the system; critical shortages of teaching staff, laboratory, workshops and books; accommodating and stimulating private sector involvement in the HE system; balancing the appropriate level between a relevant supply and future demand for higher education with a clear link to the country's Growth and Transformation Plan (GTP); ensuring a smooth student flow from primary education up to degree programs and matching individual career perspectives of prospective students with the present and future labour market demands in Ethiopia. (Mieke Vogels 2008).

Needless to say that Ethiopia needs to scale-up the production of quality human capital to ensure rapid development and to alleviate poverty. The need for expansion is a direct result and response to the anticipated demand of the growing economy, the push from the expanding lower level of education (TVET, secondary and primary) that require a large number of teachers, leaders and education experts, and the need for teaching and research staff from the expanding higher education institutions,

both public and private. While opening new universities and strengthening the existing ones, serious attention should also be given to maintaining and upgrading quality of teaching and learning as well as research. To the worry of many the expansion seems to focus on increasing access and neglect quality. The critical situation in the expansion of Higher Education in Ethiopia that has a great bearing on quality is the adequacy and capacity of academic faculty. The issue here is not only the shortage but also the poor calibre and ability of those employed by the institutions. Many institutions including the private providers are staffed largely with junior faculty with little experience and preparation. Recent graduates of several programs are assigned to teach classes immediately upon graduation.

The figures clearly show the critical shortage of senior faculty in the public universities of Ethiopia, particularly in institutions of expanding graduate programs in many universities. The situation would be worse when only statistics for Ethiopian faculty are considered.

Also the Ethiopian Higher Education Proclamation states that undertaking research is one the major objectives of higher education institutions in the country. This indicates that universities in Ethiopia are increasingly expected to undertake and disseminate research and studies based on national priority challenges (articles 14 and 15). However, most Ethiopian higher education institutions are not as much engaged in research as is required of them. Indeed it is difficult to see measurable progress in research or its contributions.

Currently, most universities are grappling with problems of coping with high student population and the faculty is mainly focusing on teaching and not on research. There is a lack of earmarked budget for research, linkages with community and industry/business. Most students and faculty are not involved in relevant research due to a lack of budget and also a lack of a clear strategy of interventions and capacity. For example the research publications produced and cited in international journals by Ethiopian university researchers is negligible compared to the Sub Saharan Africa average (Teshome, 2005). Although several government documents and strategies indicate a significant commitment to research the amount of budget allocated to universities is very low and negligible due to shortage of resources. Also contribution of research to teaching and learning is a problem in many Ethiopian universities.

Recognizing all these shortcomings and acknowledging the clear importance of investment in higher education for overall development of the country, various measures have been taken. A number of policy, strategy and proclamation documents for revitalizing higher education in Ethiopia have been developed and ratified. They have further been translated into strategic and operational plans and have been implemented. In the last ten years the capital budget allocated for the construction of buildings and facilities in the newly established universities represented a significant share in government treasury. The bulk of the budget allocated has been used for construction, such as classrooms, workshops, dormitories, offices, equipment and furniture etc, and this has constrained investment on academic related activities such as books, library, laboratory, equipment and faculty (Teshome 2005). The increasing trend in the education expenditure share of higher education shows the explicit commitment of the government to the sector.

2.3 The national and institutional context of the programme

The Agricultural Development Led Industrialization (ADLI) strategy of the Ethiopian Government emphasizes agricultural and rural development as a basis for industrial development. The focus of the strategy among others is improved food security through intensification of agriculture; increasing food and water productivity; introduction of high yield variety, increased use of mechanization and enhancing rural micro-finance and cooperatives.

In this regard, Higher Education institutions are considered as important instruments and main actors in realizing ADLI through the development of skilled manpower committed to work and develop the country; enhancing research in spectrum areas; generating and disseminating appropriate technologies to rural areas and providing community outreach services.

The Ethiopian Government has also formulated the Growth and Transformation Plan (GTP) and invited all stakeholders to be involved in the poverty alleviation movement. Being one among the stakeholders, Higher Education Institutions have a tremendous role to play in this regard as they are very close to science and innovation. To this end, MU has forged a partnership program with Flemish universities with the key aim of realizing the ADLI strategy of the Ethiopian Government and of improving the livelihood of rural communities in Tigray. The program started in 2003 fostering scientific collaboration between Flemish universities and Mekelle universities. The aim was to strengthen the capacity of Mekelle University as an institute of higher education and a centre of excellence for research with the objective of contributing to sustainable livelihood in Tigray. The program consists of two clusters i) institutional capacity building in the area of ICT and library and ii) collaboration research in the areas of water use in agriculture, socio-economy, aquatic ecology, geo-hydrology, land management and farm technology. These projects are in line with government's ADLI and GTP strategies, with Tigray's thrust for poverty alleviation and sustainable livelihood development as well as MU's policy to enhance research, teaching and community service provision.

2.4 Mekelle University

Mekelle University is located in the town of Mekelle in the Tigray region of Northern Ethiopia, at a distance of 783 kilometres from the Ethiopian capital. By merging two former colleges, Mekelle Business College and Mekelle University College, the Government of Ethiopia established the University in May 2000.

The university offers 51 Bachelors Degree and more than 26 Masters Degree programs in its 4 Campuses through i) seven colleges that constitute, Colleges of Dry Land Agriculture and Natural Resources; Health Science; Veterinary, Social Sciences and Languages (CSSL) Natural and Computational Sciences, Business and Economics, ii) 6 institutes comprising Ethiopian Institute of Technology – Mekelle (EiT-M), Institute of Paleo-environment and Heritage and Conservation, Pedagogical Sciences (IPS), Geo-information and Earth Observation Sciences and Climate and Society (ICS) .

At present MU hosts over 23,000 students in its different programmes at both undergraduate and graduate level: regular, continuing education, summer and evening courses, distance education and in-service programs. The MU has more than 1,400 academic staff and 1,700 administrative staff.

The vision of MU is “to be acknowledged as an outstanding university of academic excellence with a community of scholars and centres for learning where individuals can develop their intellectual capability throughout their lives in an environment that promotes academic achievements and research excellence.” The university has been working hard to forge cooperation agreements with various donors, to realize its vision and it has been successful in developing its institutional and human capacity to undertake practice oriented research, to provide quality teaching and to realize community outreach services.

2.5 The VLIR-IUC programme at Mekelle University

Links between Mekelle University and Flemish universities were established prior to the coming into existence of the IUC programme through a number of cooperation projects: a project financed through the Fund for Scientific Research (FWO) between 1998 and 2001 and three Own Initiative Programme (OI) projects: i) the project "Strengthening training and research capabilities of the Land Resources Management and Environmental Protection Department of Mekelle University with the UGent, ii) Forest rehabilitation through natural regeneration in Tigray Collaborators with the KU Leuven (KUL) and iii) the Zala-Daget Project with KU Leuven. These links have supported the selection of MU as a IUC partner but as the identification report states "*Main motivation* (for the selection) *is the fact that it is a dynamic institution, located in a poverty-stricken area, where it contributes greatly to solving the problems of the rural poor. "*

Important consequence of the earlier cooperation were the insights gathered during research and the building up of excellent relationships between Ethiopian and Flemish scientists. These enhanced the making of a good diagnosis on which the proposal for a coherent set of projects was based. In phase I the programme was composed as follows (see annex 3 for the specific objectives of the respective projects in phase I and phase II):

1.	ICT	Enhancement and optimization of ICT usage
2.	Library	Upgrading of library services
3.	IPMD	Institutional Policy and Management Development
4.	CSS	Cluster Support Service
5.	More crop per drop	Enhanced crop production through improved irrigation water management and water-saving techniques
6.	Socio-economy	Socio-economic research for sustainable rural livelihoods
7.	Geo-hydrology	Hydrogeology for water resources management
8.	Aquatic ecology	Ecological integrity and sustainable management of standing waters
9.	Land management	Land degradation and rehabilitation at the scale of the Geba Catchment
10.	Farm technology	Appropriate farm technology for Vertisol management
11.	PSU	Programme Support Unit

Core of the programme are the research/teaching projects 5 through 10 with project 4, CSS as their support unit. Projects 1 and 2 are crosscutting and meant to create adequate basic conditions for research and education and the project 3 and 11 are for programme support.

The programme was evaluated in September 2006 resulting in the recommendation to have the programme to prepare its second phase. Among the recommendations was the advice to abolish the Institutional Management and Policy Capacity Development Project. This project that had institutional strengthening as its objective, more in particular through training of technical (labs) and administrative staff, had failed to sufficiently deliver and there was also an overlap with the CSS project.

For the programme overall a shift of the focus of the collaboration was expected as follows:

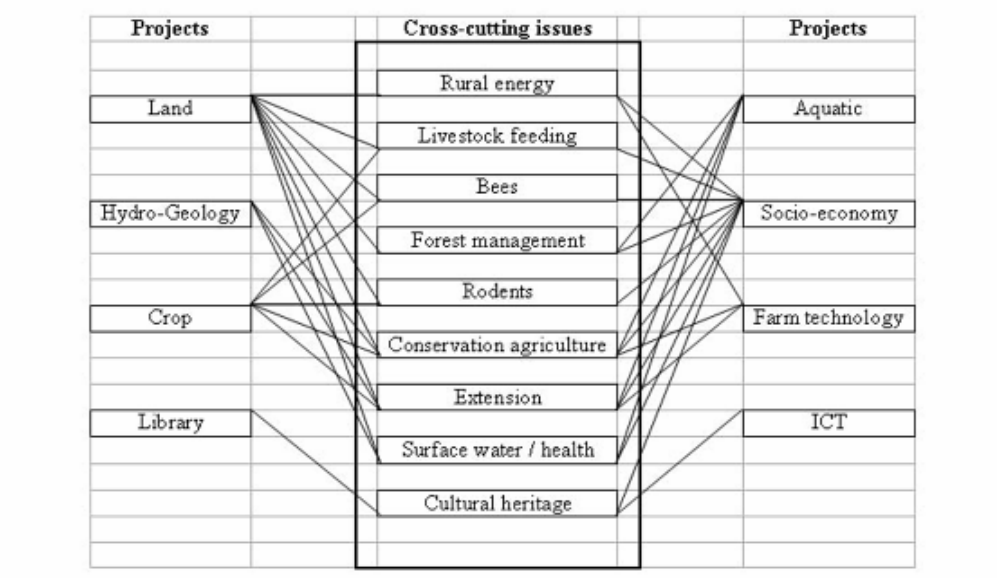
- *Research approach*: Shift from discipline oriented to inter/multi-disciplinary research approach
- *Extension:* Venture beyond the gate of the university, enhance outreach and extension system
- *Impact on teaching learning process*: Use research findings and achievements as case studies in the teaching learning process
- *Capacity Building*: Capacity building will continue but emphasis will be laid on capacity utilization
- *Programme ownership*: Enhance programme ownership at different levels

In order to foster interdisciplinary research the programme defined 9 cross-cutting themes to which the individual projects could contribute:

- Conservation agriculture (CA)
- Rural energy
- Forestry
- Crop-livestock interactions
- Bees
- Rodents
- Cultural heritage
- Extension
- Surface water and human health

The underneath comprehensive overview table presents the themes of cross-cutting issues and projects involved in it. We refer to annex 4 for an explanation of the scheme.

Table 1: Table cross-cutting issues



Source: Phase II Main document

The budget for the programme is € 745.000 per year for the first 7 years and it then decreases; € 635.000 in year 8, € 560.000 in year 9 and € 375.000 in year 10.

The table below gives the distribution of the budgets for phase I and II over the different projects, excluding the administration costs in the North and the South.

Table 2 Distribution of programme budget over the projects

Budget (%)		
	Phase I	Phase II
ICT	13.9	8
Library	7.6	6.2
IMPCD	1.3	0
CSS	8.0	13.4
Crop	8.9	10.8
Socio	7.5	8.6
Hydro	8.3	6.2
Aquatic	8.1	8.8
Land	9.7	10.6
Farm	7.2	9.6
PSU	19.5	17.8

3 Evaluation findings: the projects

3.1 Project 1. Enhancement and optimization of ICT usage

The project “Enhancement and optimization of ICT usage” is, along with the project “Library”, a cross cutting project of the cluster “Institution building”, that is directed at improved service provision for the overall MU organization. As the self-assessment for the ICT project says “the project aims to maximize the effectiveness and impact of ICT across all aspects of University life, both by enhancing different aspects of ICT service delivery to lecturers and students, and by strengthening the ICT function through different areas of capacity building.”

The project has been very significant for the development of the backbone for ICT provision and for the facilities that are available presently at the four campuses of MU and by and large it has provided the infrastructure and services that were foreseen in the project documents for the two phases. It thus created impact on teaching, research and administration. Software, hardware and consumables were purchased to support the implementation and maintenance of the wide area network and staff has been intensively trained by the project to implement and maintain services in a wide range using open source software. Services provided include internet and intranet, access to the web, e-mail, anti-virus provisions, video conferencing and maintenance services. E-administration is operational through computerized university registrar and finance systems. Network capacity has been increased from 256 Kb to 1 Mb during the first phase and to 100 Mb during the second phase. During the second phase seven servers have been provided and installed, creating a huge capacity for data storage and handling. In the initial stage the changes in ICT availability were most observed. In that period the project has been leading for both investments and professional development, later MU took over with regard to investments. Staff training remained the core contribution of the project.

Although project results have been positive overall, effectiveness and efficiency have been negatively influenced by a number of factors, and consequently outputs and outcome over the ten years project life could have been considerably better.

- Most important hampering factor in the opinion of the ET has been the lack of a strong and competent leader of the ICT/Library Department with a solid ICT background, a vision on ICT development and the quality to properly manage the ICT team and to bring up ICT issues convincingly at MU management level. Reportedly ICT/Library directors did not have the required qualifications and they have been frequently changed; the present director is said to be the eighth since the project started.
- Not only the director was frequently changed, also ICT staff turnover, including PLs, was high and the transfer of acquired knowledge to colleagues was poorly arranged for. This reduced the effectiveness of the training given. Staff retention is a problem as the ambition of part of the staff is to study for a MSc and it has also to be acknowledged that ICT skills are marketable, providing opportunities for trained staff to find better paid jobs or to have their own activities outside, rendering them less effective for the MU. MU has recently improved ICT staff remuneration and reportedly the collaboration with the Jimma IUC programme since three years has had a positive effect on staff’s interest.
- The bandwidth is not always completely available for the support of the network with presently about 3000 computers, leading to an often slow and inefficient service. This is largely attributed to failings of Ethiopian Telecommunications Corp (ETC). Along with this part of the capacity is

reported not to be used for the research, teaching and learning functions but for social media. The ICT policy that could be instrumental to suppress misuse is available but not yet approved for application. An adequate back-up for the frequent power cuts is not available. Reportedly there is a generator available, but without the automatic switch to take over simultaneously. The non-continuation of an anti-virus software subscription also hampers system's reliability.

- The server room is not adequately constructed and there is no air conditioning. Consequently the server environment is dusty and hot, thus jeopardizing valuable equipment's lifetime.

Assessment of KRAs project 1

Key result areas	**Indicators (quantitative and full descriptive data**	**Score**
KRA1: Research	The project is not directly involved in research. However, indirectly it provides the infrastructure that is indispensable for contemporary research.	3
KRA2: Teaching	The project has not addressed the issue of ICT as support for teaching as such, but facilities allow ICT supported teaching.	2
KRA3: Extension and outreach	The project has not provided some services to the municipality of Mekelle.	2
KRA4: Management	The project has not given direct support to management strengthening. However, support to E-administration (computerized university registrar and finance systems) has enhanced MU management.	3
KRA5: HRD	1 MSc was trained and started working on a PhD, which was interrupted. He left MU. A huge variety of short term training has been provided in Belgium and Cuba for individuals and in Mekelle for groups with a Belgian expert as trainer. About 20 staff members were trained in the application of software in areas like internet services, data management and hardware maintenance. About 20 staff members participated in a wide range of training activities. The effect of the training was considerably diminished by staff turnover.	3
KRA6: Infrastructure	Essential equipment and software for ICT infrastructure were delivered.	4

KRA7:Mobilization additional resources	Over project life MU has increased the budget allocated to ICT considerably. Thus additional resources are available. One could argue that the project has indirectly stimulated the additional budget allocation	3

Qualitative evaluation project 1

Criteria	Comment	Score
Effectiveness	The project has provided MU with the backbone for its ICT infrastructure and services and especially in the initial stage the support has been crucial to get MU's ICT off the ground. The project objectives have been met by and large and the envisaged ICT services are available for positively impacting teaching, research and administration. Unfortunately effectiveness has been and still is negatively affected by a limited availability of the installed band width (due to the external provider) and unreliable power provision (also external but with a remedy within MU's control). The lack of an operational user policy also diminishes facilities' availability for its application for research and teaching.	3
Efficiency	Efficiency of the project has been negatively affected by high management and staff turnover, inadequate transfer of acquired knowledge during training provided, lengthy procedures for hardware acquisition and insufficient push by ICT/Library direction at MU management level.	3
Development relevance	Development relevance is high as the project results are crucial to enhance university's functioning (teaching/learning, research, communication, administration) and are thus contributing to MU's role as an actor in development.	5
Quality	Although the quality of the ICT infrastructure and its functioning are good, it is negatively affected by the incomplete availability of the installed bandwidth and unreliable power supply. Although this can only partly be attributed to the MU/project quality as such is diminished.	3
Impact	The ICT project has a positive impact on research, teaching and administrative processes. It has created awareness for the possibilities of the use of new technology at MU.	4

Sustainability	MU management has expressed strong commitment for ICT as a key component for future development and the thrust from MU staff to keep ICT at an adequate level are in favour of its sustainability. Keeping up with standards requires continuous training of staff and attention for hardware and software updates. This is the responsibility of ICT/Library management whose record has not been strong in the past. The fact that the server room is not adequately constructed and has no air conditioning jeopardizes technical sustainability.	3

Overall assessment of project 1

The project has played an important role for the development of ICT at MU when this was in an embryonic stage. It has created the backbone for MU's ICT infrastructure and services and developed the required skills with ICT department's staff.

The impact in the initial period was high because the availability of services like internet, intranet and a web were novel at MU and were a very positive experience. Also other services became available like the introduction computerized university registrar and finance systems.

The quality of the ICT system is negatively affected because the installed bandwidth is often not completely available and because the power provision is not reliable and consequently the system experiences frequent power cuts. Both the limited bandwidth availability and the frequent power cuts are caused by external service providers and not MU's responsibility. With regard to the power provision UM could have taken measures to solve the problem.

Although results are there, much more could have been accomplished during the ten years life of the project. Frequent replacements of ICT/Library directors and an inadequate profile of the persons nominated on the position are said to have contributed to that to a considerable extent.

The installed servers need a dust free and air-conditioned room.

Recommendations for project 1

1. There is no ICT policy in the use of internet and this has encouraged using the internet for social networks which is not for educational purpose. Therefore, it is time for the leadership of the university to issue a policy on the use of internet and university data.
2. Management of MU should avail an automatic back–up generator in order to curb frequent power cuts thus enabling the provision of effective and efficient ICT services.
3. A visionary and professional person with relevant expertise should be assigned to lead the unit and create a stable working environment.
4. The server room is dusty and hot. Provisions should be made that room will be dust free and air conditioned as is the standard for this type of equipment.
5. The ICT unit is affected by high staff turnover. MU management has to identify the cause of the de-motivation and create an enabling environment.
6. Continuous capacity building of the IT staff should be planned and implemented so as to cope with the fast changing ICT environment and high staff turnover.
7. There is a potential to more effectively use the ICT infrastructure. MU management can consider stimulating the use of ICT in teaching and learning and to give the ICT department an explicit role to attain this goal. Another option, maybe on a longer term, is to take initiatives for the introduction of distance education.

3.2 Project 2. Upgrading of library services

The library project envisaged to i) increase teaching and research performance by allowing the university community to access a wider literature set of resources more efficiently and delivering information services on demand, ii) provide proactive library and information services and iii) deliver library and information services to the wider surrounding community.

During the first phase computers were purchased, taking long due to lengthy purchasing procedures, and an integrated library software was selected (available free from FAO and UNESCO) and installed early in the second phase. However only the modules for cataloguing and end-user searching (OPAC) were fully implemented. The self-assessment report states that the high-visibility implementation of the Circulation module (EmpWeb) has been delayed up to now due to the unavailability of a users-database and an insecure power supply. Also staff positions are mentioned to be instable. Due to reshuffling staff members are not sure of their positions, which leads to severe demotivation.

During the second phase an electronic repository was installed and the conversion of printed sources to the digital library system is in progress. Users now have access to the catalogue, e-journals, digitalized PhD and MSc theses, teaching modules and material in other libraries.

Training has been extensive and 8 staff members took short term training in Belgium and reportedly 125 were locally trained during 18 training workshops. Three persons obtained a BSc degree and presently there is one staff member working on his PhD. This was not foreseen in the initial project and included on request of MU. Costs for the PhD absorb the major part of the budget and little is left for other activities, which does not stimulate motivation. Interesting initiative related to the PhD study is the scanning and translation of two old Geez books into Tigrinya and the English language.

A visit to the library showed that library space is intensively used by students and reportedly e-facilities, in as far as available, are utilized. There is however, no insight in the degree of usage as this is not measured. Insight could help to better understand the wishes of the clients in view of improving service.

The library is collaborating with other libraries in the region: collaboration with Jimma University is ongoing and a digital library interface has been adopted, teacher colleges in the region and a nursing college are using the opportunities to borrow books and staff of the public library of Mekelle has been trained by MU staff.

Although achievements have been realized in the past period, the results have been far from optimal when related to the length of the period and the opportunities provided. The library project has, like the ICT project, suffered from frequent changes of the ICT/Library director and insufficient leadership at that position. Library staff turnover has also been very high. Internal reshuffling of personnel, low salary levels (no increase given as was the case for the ICT department), uncertainty about career development and opportunities outside MU, especially after training, are the major causes. Reportedly the fact that expectations did not come true has led to frustration and disinterest. Project's objective to drastically reduce manual routine work and to provide proactive library and information services, thus enriching the job content, has not been realized.

Assessment of KRAs project 2

Key result areas	Indicators (quantitative and full descriptive data	Score
KRA1:Research	2 Articles have been published in international journals. PhD training is ongoing and more publications can be expected. Research is not a core activity of this project. However, the facilities provided by the project enhance research effectiveness and efficiency at MU.	3
KRA2:Teaching	Library and Information Science BSc programme has started albeit with little input from the project. Four training programmes for librarians have been developed and are available.	3
KRA3: Extension and outreach	Some initiatives were developed with university and college libraries in the region and with the Mekelle public library.	3
KRA4:Management	The potential of the available circulation module for library's lending function for improving library management is considerable. MU could not capitalize on this so far.	2
KRA5:HRD	A PhD (ongoing), three BScs, 8 staff trained through short term training abroad and a large number of staff trained through local workshops have boosted expertise in the library. High staff turnover and frequent reshuffling of personnel have had a negative effect on training's effectiveness.	3
KRA6:Infrastructure	The project has provided 2 servers, books and computers to the library. In the initial stage these investments made a difference. As MU budgets for the library have increased considerably since then they are observed less presently.	3
KRA7:Mobilization additional resources	The project has not mobilized additional resources.	2

Qualitative evaluation project 2

Criteria	Comment	Score
Effectiveness	The project has accomplished much of the intended activities and has enhanced the environment for increased teaching and learning performance. It has also established links of cooperation with other institutions in the region. The fact that installed capacity is not completely operational up to now, as well as the high staff turnover have affected effectiveness negatively.	3
Efficiency	Efficiency has been hindered by high staff turnover, delays in procurement, a decreasing level of motivation of staff and insufficient push by ICT/Library direction at MU management level.	3
Development relevance	Library performance strengthening is in line with the aim to make MU a strong research university in support of development, which requires a good library.	5
Quality	As compared to the situation at project's start the library has considerably improved its content and service level. The introduction of the open source system and the establishment of links to sources of content that are free of charge have been the right choices. The fact that the potential of the system is not completely used (lending system) and system's reduced reliability do negatively affect quality.	3
Impact	The availed systems are being used and appreciated and the impact on teaching and research can be assumed to be significant. Unfortunately there is no insight in the actual impact as the system to monitor usage and client satisfaction that was foreseen in the project has not been provided.	4
Sustainability	Given the commitment of government to build a strong academic capacity and government's actual funding in the past years, the probability of financial sustainability of the results is high. Crucial for actual sustainability are the strengthening of library management and an adequate retention scheme for library's staff.	3

Overall assessment of project 2

During the first phase the library project has created a library environment where computerized services could be provided in principle. Modules for cataloguing and end-user searching and a circulation module in support of lending out books were installed but the latter is not operational until now, the unavailability of a users-database and an insecure power supply being the causes.

With the installation of an electronic repository and the conversion of printed sources to the digital library system library services improved tremendously for users, having now on line access to the catalogue, digitalized PhD and MSc theses, teaching module, material in other libraries and E-journals, thus enhancing the environment for support to research and teaching. There is no insight in the actual use of the services as no tracking systems have been installed.

Much has been invested in capacity development of staff through short term trainings in Belgium and Ethiopia. Training has led to the presence of the required competencies in the library for adequate functioning however, effectiveness and efficiency of the capacity building process has been considerably hampered by high staff turnover.

During the last few years of the project the major share of available funds was invested in the PhD study of a staff member, which is still ongoing and the level of activities went down. This and frequent staff reshuffling as a consequence of an ongoing reorganization process have led to unmotivated staff.

Projects like the ICT project and the library project are highly relevant to create an environment where research and teaching can flourish and they do thus perfectly fit in a IUC programme. Problem is that required investments are relatively high for the budgets available in the programme. The character of the work is furthermore very technical, with often no clear science component. Consequently there is no perspective of long term professional growth as is the case with research driven projects. Thus an important factor for staff retention is missing. Add to this the fact that trained technicians in the respective areas have many and often better job opportunities and the challenges for these projects are clear. Within the present programme the ICT and library project have been the weaker performers.

Recommendations for project 2

1. The management of the university has to make sure that the library is managed and staffed by trained librarians and not a dumping place where anyone who has no job could be assigned.
2. When new positions are opened the management should give priority to library staff rather than to external applicants.
3. Users data base should be availed to speed up the implementation of the Circulation Module
4. The management of the university should design motivation strategies with career development (diploma, degree in library science) and salary adjustment so as to curb high staff turnover.
5. The library management in cooperation with the ICT unit should design a tracking system so as to track the use of the library for research, teaching and learning process and to create a better insight in clients' needs.
6. Managing high staff turnover requires among others the designing of a continuous training program.

3.3 Project 3. Cluster Support Services (CSS)

The objective of the Cluster Support Services project was to create the capability of MU staff of developing research methodologies and coordination capacity and of developing sustainable research and publication experience. CSS is a small unit composed of a full time international expert 1,0 fte (0,5 fte international expert, 0,5 fte local expert in the second phase), seconded by the Ethiopian and Belgian programme coordinators, the Ethiopian project manager and some other experts with an advisory role.

CSS has achieved its objective by intensive support of researchers and supporting staff. In the initial stage of the project this meant support in research protocol development, in setting up field experiments and in data collection, practices that were completely new for MU researchers at the time. Care was taken that contacts with communities and local authorities were established and maintained. Coordination of field work of the different research activities that were going on was another focus point, leading to the effective and efficient use of resources. In a later stage CSS has supported researchers' publication efforts and it has developed a publication protocol. Research protocols and publication policies reduce disputes and enhance effectiveness and efficiency.

CSS's promotion of interdisciplinary research brought separate groups together to tackle complex rural problems, which is quite an achievement when one considers that in spite of good intentions actual multidisciplinary research is not common to be realized. Nine research themes have been identified to facilitate joint research by the different projects. During the second phase CSS's attention shifted to stimulating, coordinating and supporting extension and outsourcing work and to preparing monitoring tools to assess the impact of the development interventions on sustainable livelihood.

The programme has provided opportunities to 48 Belgian students to do field work for their masters' thesis in Ethiopia. CSS has supported them by reviewing and following up research proposals, by giving logistic support for sample handling and by following up on data analysis and report write up. The effective integration of Belgian students has given an important added value to the programme as it has stimulated cooperation and peer learning between Ethiopian and Belgian students and enhanced internationalization.

CSS has furthermore been instrumental in organizing three successful local international congresses (Forestry 2004, Land 2006 and Water 2011), which has helped to advance MU's international status, to enhance international networking and to acquire spin-off projects. A fourth international congress, LIVELIHOOD, is being organized to take place in September 2013. The CSS project has also shown researchers how to acquire funds for research and outreach, an essential skill to continue these activities after programme's closure.

In the opinion of the ET the CSS has more than achieved its objective and it has played a very important role in making the IUC Mekelle programme into a success:

- It has boosted quality, effectiveness, efficiency of research through the supervision of research set up, the support of field work, write up and publications) of the research:
- It has enhanced the embedding of the research in the institutions and communities of the region;
- It has been an important factor for the realization of the interdisciplinary research;
- It has enhanced the efficient use of resources (human and material) and
- It has helped to internationalize MU and to make research results sustainable.

Assessment of KRAs project 3

Key result areas	Indicators (quantitative and full descriptive data)	Score
KRA1:Research	The first objective of CSS was to stimulate research and to realize quality research. CSS has convincingly contributed to boost quality and quantity of research of the different research projects and over project life more than 120 publications in international peer reviewed journals have been realized and many more can be seen to follow. The first international expert has also been the lead author of more than ten articles in international peer reviewed journals and conference abstracts.	5
KRA2:Teaching	The project has developed four excursion guides based on research findings	3
KRA3:Extension and outreach	The project has had and is in fact still having an important influence on extension and outreach activities of the different projects. It has produced three policy advice papers and two training modules for external use.	4
KRA4:Management	CSS has developed an essential format for research protocols and supported the elaboration of actual protocols, it has developed a publication policy and a scholarship attribution policy that has helped to make scholarships more effective and it has provided a climate data base for the Geba catchment, the intervention area of the programme.	4
KRA5:HRD	Although training of its own PhDs was not project's objective, it has been very important for HRD. Apart from having been very instrumental in the support of Ethiopian PhD students on their way to a successful promotion, CSS has also accompanied Flemish students in finalizing their MSc and one PhD theses.	5
KRA6:Infrastructure	It was not CSS's task to provide infrastructure.	NA
KRA7:Mobilization additional resources	CSS has succeeded in acquiring access to a number of conferences. As a consequence of the international conferences organized at MU the programme has received financing for spin-off projects.	4

Qualitative evaluation project 3

Criteria	Comment	Score
Effectiveness	The unit has achieved its intended results and in fact more than that in successfully supporting Flemish students and establishing fruitful close links with regional authorities and communities.	5
Efficiency	With relatively limited resources the unit has created impressive output and outcome. It has furthermore contributed to efficient functioning of the research activities of the different projects, thus having important impact on projects' efficiency.	5
Development relevance	Development relevance of the projects supported by the CSS has been high and CSS has contributed to that, the more as it has played an important role for extension and outreach.	5
Quality	Good quality products have been produced, reflected in the quality of the research work and publications.	4
Impact	Impact is good and is reflected in the huge number of publications and extension activities to which CSS gave an important contribution. Results are positively impacting regional development.	4
Sustainability	CSS as such is not meant to be sustainable, but the sustainability of other research projects results is also a consequence of CSS's efforts. Experience with the Mekelle CSS may be a lesson for future programmes.	4

Overall assessment of project 3

The CSS project does clearly have an added value and has more than recovered the investment in personnel costs for the permanent expert.

- It has boosted quality, effectiveness, efficiency of research through the supervision of research set up, the support of field work, write up and publications) of the research;
- It has enhanced the embedding of the research in the institutions and communities of the region;
- It has been an important factor for the realization of the interdisciplinary research;
- It has enhanced the efficient use of resources (human and material) and
- It has helped to internationalize MU and to make research results sustainable.

The ET has experience in a comparable programme where the CSS coordinator did not have the scientific qualifications to boost research quality. It is important that the person on the permanent position has a clear research background in order to create the envisaged added value.

Recommendation

VLIR-UOS should propagate the establishment of a CSS for programmes with a high research content.

3.4 Project 4. More crop per drop

Along with the academic objective to increase the capacity of research and academic staff the project had as its specific development objective to improve crop and livestock productivity in the northern dry region of Ethiopia through integrated crop management and water saving techniques. Technical bulletins and guidelines for layout of the irrigation schemes and irrigation scheduling and for water saving techniques (conservation agriculture) and a management manual for temperate fruits (apple) had to be developed, in particular for the application by extension agents.

The project has known a difficult start in the first phase due to a lack of harmony in the initial team. At the start of the second phase a rigorous reshuffle was carried through and the new team has come back with a very strong performance. Three PhDs finalized their training and two more are foreseen to finish their study soon. A total of 20 MSc students did their thesis work in the framework of project's research (7 Ethiopians of whom 3 MU staff members and 13 Belgian students) and visits of Belgian PhD supervisors, post docs and PhDs enhanced the quality of the field work and research and established strong North-South interaction and links. Staff have also been trained through short term courses like apple management, the application of software and scientific writing.

So far 15 articles have been published in international peer reviewed journals and four chapters in peer reviewed books among which the FAO Irrigation and Drainage Paper Nr. 66 (Crop Yield response to water), Rome, Italy (2012)) which is regarded as a benchmark publication of the Food and Agriculture Organisation of the United Nations. Furthermore a considerable number of other quality publications have been produced.

Although project's title refers to the optimal use of water, the work covers a wider range of areas of interest. Along with the development of a calibrated model to study crop water productivity for tef and barley under the region's conditions, research has been carried out in support of the introduction of apple growing under highland conditions as a source for additional income for the farmers. A third area of research was on conservation agriculture (CA) where techniques were developed to reduce run off and soil loss, to conserve water in ridges and to increase yield and biomass. Another subject in CA was the research on rodents, both as crop pest and as potential reservoirs for human pathogens. As a spin-off activity students took the initiative to improve beekeeping.

The results of the research have been very positive with for instance gains in yield and biomass in CA of 55% for wheat, 35% for grass pea and 30% for barley, an improved chemical and biological composition of the soil and a reduction in run off by 50% and soil loss by 75%. The ET could verify the positive results during field trips to research plots and extension areas where they spoke to beneficiaries. The less intensive ploughing regime of CA (once per year instead of three times), does not only produce higher yields and better water conservation, it also makes single women less dependent as they depend on men for ploughing. CA requires quite a change for farmers as they have to leave more than 30% of the crop residue in the field for soil coverage, crop residue that is traditionally used. They should furthermore adhere to zero grazing for their cattle, which requires additional work and organization. The good results that can be observed in the testing areas help to convince farmers to gradually abandon their traditional cultivating techniques.

The project has produced 2 training manuals and trained all agricultural experts in the region to familiarize with the new technology and the regional government is trying to scale up the technique to the rest of the country. The project has distributed thousands of apple tree seedlings and trained farmers in grafting and tree management. During the visit, farmers reported additional income between € 40 and € 400 per year, the availability of water being the key factor for productivity. A bee keeping

association that was visited reported a rapid extension of the number of bee colonies from 2 to 15 thanks to a bee grafting technique that a project expert had introduced.

Assessment of KRAs project 4

Key result areas	Indicators (quantitative and full descriptive data)	Score
KRA1:Research	Research has been carried out in different fields (crop water productivity, apple, conservation agriculture, rodents) and has produced good and applicable results. A considerable number of articles has been published in international peer reviewed journals and books with southern partners as leading authors. A research environment and culture have been established that can be sustained.	5
KRA2:Teaching	Knowledge and expertise acquired during PhD and MSc studies have been applied for teaching purposes. Post graduate courses have been taught, curricula have been revised and a new curriculum has been developed, teaching materials have been developed and MSc students have been supervised.	4
KRA3:Extension and outreach	The project has given much attention to extension and outreach in the different areas of research with emphasis shifting to the introduction of apple as a cash crop. Training manuals have been developed and seedlings have been distributed.	4
KRA4:Management	During the first phase manuals on techniques for irrigation, soils and apple have been developed.	4
KRA5:HRD	The project has strengthened the Department of Dryland Crop and Horticultural Science's capacity with 5 PhDs and 3 MScs.	5
KRA6:Infrastructure	Lab equipment, ICT. Lacking information	?
KRA7:Mobilization additional resources	Additional resources were mobilized in order to allow Belgian experts to support PhD students (about 7)	4

Qualitative evaluation project 4

Criteria	Comment	Score
Effectiveness	The project has attained its objectives even in spite of a slow start. The research and teaching capacity have been improved considerably and substantial research output has been produced and translated into extension and outreach activities that improve livelihood of communities.	5
Efficiency	Funds have been used efficiently and much has been realized with a relatively limited amount of money. Field work has been properly organized with an eye on efficiency. Efficiency has suffered due to a lack of harmony in the initial stage and to some extent because of slowness of the purchasing process.	4
Development relevance	The areas in which research has been carried out are highly relevant for the target groups and results have a high potential to improve livelihood. Project objectives are aligned with MU and government food security policy.	5
Quality	Quality of work has been proven by acceptance of articles by international peer reviewed journals and acknowledged organizations as FAO. Acceptance by target group is another indicator for quality.	4
Impact	The research and teaching capacity at MU have considerably increased. Project's outputs and outcomes have proven to be accepted by the target group, they have contributed to increased income and have the perspective to have the same quality in the future. Proper embedding of the results in governmental institutions gives a high potential that results will be spread out in the future.	4
Sustainability	Research is apparently embedded in the department. Good results have a self propagating force and they are fully accepted by government instances. The team has proven that they have the capacity to acquire new research assignments.	4

Overall assessment of project 4

The more crop per drop project has been active in different areas with successful results. Through the research solid capacity has been built up and a sustainable nucleus for research has been built up around 5 PhDs. The increased capacity has been transferred into new and adapted curricula.

Major results of the project intervention are:

- improved plantation and irrigation approaches have been developed with the potential to increase yields considerably. Results have been published in a leading FAO publication but follow up in extension and outsourcing has not been shaped yet;
- apple has been introduced in the highlands as a successful cash crop. Dependent on the availability of water additional income earned can be considerable;
- research on conservation agriculture has indicated the potential for considerable gains in yield and biomass for different crops and an improved chemical and biological composition of the soil and a reduction in runoff and soil loss due to erosion.

Due attention has been given to the extension of the results of conservation agriculture and the introduction of apple by training and distribution of apple tree seedlings.

Interesting side result are the improved bee keeping techniques that have been introduced as an initiative of Flemish MSc students.

Recommendations

1. The very positive research results on conservation agriculture have to be widely disseminated to relevant stakeholders and policy makers.
2. There is a need to scale up the experiments of improved bee keeping techniques to wider areas of the region and the country.
3. To make conservation agriculture research outputs more effective there should be increased cooperation between research teams to further improve farm tools and to study socio-economic dynamics of small scale farming.
4. Apple growers seem to be attracted by Anna variety which gives yield two times a year and may neglect the variety that was introduced by the MU-IUC project. Continuous research may be required to further improve the varieties and introduce other highland fruit trees.
5. Further training should be organized on fruit disease prevention for farmers and Development Agents.

3.5 Project 5. Socio-economic research for sustainable rural livelihoods

The academic objective of the project in its second phase is to consolidate and extend the existing research capacity. With regard to its contribution to development the project aims at support for the creation of a sustainable livelihood in the region through deepening insights and propose intervention alternatives and support mechanisms for i) poverty alleviation, ii) effective micro-credit provision, iii) novel marketing arrangements, iv) income diversification through efficient extension systems and v) improved management of exclosures for forestry.

Four PhD studies have been realized in the respective areas and one is ongoing. With this research capacity more than 15 articles have been published in international peer reviewed journals and more than 30 papers have been published and presented in international proceedings. Insights have been used to analyze and develop proposals for policies and guidelines and to disseminate them through seminars to relevant institutions like the Dedebit Micro Finance Institution that has used the advice to identify potentially successful investments. Another example is the study of the dairy products value chain that has been used for the marketing of dairy products in the region. An example of direct collaboration within the programme is the study “Fish Market Potential and Livelihood Effect to Fishing Households” and the direct involvement of the project in marketing the catch of fishing associations at the Tekeze Dam. The aquatic project had successfully improved associations’ capacity to catch fish but considerable problems were encountered in marketing their product. The Tekeze Dam is located in a very harsh and difficult to reach area. Fish is furthermore not part of the menu of the local population and quite an effort is required to introduce it as such. A successful campaign has solved the marketing problem. The project has also sparked off a successful lobby to construct a road to the dam in view of developing its potential, among others for tourism.

The project has also considerably strengthened the teaching capacity at the faculty of Business and Economics. A post graduate programme has been set up and the quality of the staff that trains undergraduate students has improved due to their involvement in the research programme when studying for their MSc. Experience has been gained in the acquisition of research funding.

Assessment of KRAs project 5

Key result areas	Indicators (quantitative and full descriptive data)	Score
KRA1:Research	The project has created a research capacity and environment in the faculty of Business and Economics. Expertise has been acquired in a relevant range of subjects like poverty alleviation, marketing and forest management. A considerable number of publications in international peer reviewed journals and papers for international proceedings have been produced.	5

KRA2:Teaching	The PhDs have enabled the faculty to establish a post graduate programme. Integration of MSc students in the research programme has enhanced the quality of their thesis work. MSc staff members are better prepared to teach the undergraduate courses.	4
KRA3:Extension and outreach	Research results have been translated into policy advice and transferred to relevant institutions. Although extension and outreach have been realized they are not at the level of the other research driven projects.	3
KRA4:Management	Management issues were not integrated in the project. No research related procedures were developed.	2
KRA5:HRD	The project trained five PhDs. One PhD left MU and is no longer available for the Ethiopian Higher Education sector.	4
KRA6:Infrastructure	No investment in infrastructure was reported.	2
KRA7:Mobilization additional resources	No additional resources were reported.	2

Qualitative evaluation project 5

Criteria	**Comment**	**Score**
Effectiveness	The project has achieved its objectives in terms of staff training and the research produced good and relevant results. Loss of one PhD for the MU and the Ethiopian HE sector affects effectiveness negatively.	4
Efficiency	Significant results were obtained with a relatively moderate budget. The PhDs took an average of 4 years for their study, which is good for a sandwich programme. This enhances efficiency of the project as the lion's share of the budget was allocated for this training.	4

Development relevance	All of the subjects covered are very relevant for the region and in line with government's policies.	5
Quality	The quality of the research is good given the standards required for international peer reviewed publishing. Although the visible results of the extension activities (fish and road) are not so much related to scientific standards, the effect has been positive without any doubt.	4
Impact	The impact of the project at faculty level is high. Apart from the programme related interventions (fish, road) it is difficult for the ET to assess impact of the policy advice although the potential is good.	4
Sustainability	Sustainability of the results is highly dependent on the degree in which staff remains attached to the Higher Education sector in Ethiopia. Although the thinking is that the creation of a research culture and environment has enhanced possibilities for staff retention, the record of the faculty is less positive. It was mentioned that in one department 10 PhDs had left in the last three to four years.	3

Overall assessment of project 5

The project has created adequate socio-economic research capacity at the faculty of Business and Economics. 5 PhDs have resulted from the project of which 4 are still available for the faculty.

Expertise has been developed in a range of adequate areas in view of support to de regional and national development process.

Teaching has been strengthened by the introduction of a post graduate programme.

Researchers have been active to translate and transfer the results of their studies to government institutions.

Recommendations for project 5

1. The research findings of the project has to be disseminated to policy makers
2. The research team has to work hard to mobilize additional resources for continuing the socio-economy research
3. The management of the university has to find ways and means to curb the high turnover of staff in the marketable professions

3.6 Project 6. Hydrogeology for water resources management

After having concentrated during the first phase on data collecting on the geological, hydrological and hydro geological properties of the central, southern and south-western part of the Geba catchment, the project had the academic objective to make Mekelle University the leading center in water resources management studies in Ethiopia at the end of phase II. Research oriented graduate study programs and acquired and consolidated research capacity in relevant areas would have to be present to that end of the project period. The development objective was that the local community would be able to properly utilize and manage water resources, both surface and subsurface. Guidelines for sustainable water resources utilization and management techniques for various beneficiaries (water for domestic use, irrigation, and small-scale hydropower) would be available.

The research programme that was carried out in the Geba catchment with a surface of more than 5000 km2 has trained two PhDs. A total of 22 MSc students, 13 local and 9 Belgian, have been integrated in the research to do their thesis work. Field equipment, laboratory equipment and office facilities have been acquired by the project and four laboratory staff had short term training in Belgium. With 14 articles in international peer reviewed journals, 2 articles in national journals and 21 full papers in conference proceedings scientific output has been considerable. The project has furthermore produced very valuable information on the Geba catchment with a hydro-geological map, databases on wells and springs, meteorological and river discharge data and geochemical, hydro-chemical and geophysical data. An assessment was made of regional water resources and detailed studies were carried out of selected sub basins. This wealth of information has been distributed to stakeholders like Bureaus of Agriculture and relevant NGOs.

Activities in the area of teaching have been relatively limited and are confined to the elaboration of 4 excursion guides. No curricula were developed or adapted.

In relation to extension and outsourcing the project has realized a number of consultancies. The objective that the local community would be able to properly utilize and manage water resources has not been reached yet and work is still being carried out. Guidelines and manuals on water resources management (groundwater exploitation, stream water utilization, rainwater harvesting, groundwater recharging) are still being developed as is the work on methods to decrease water related conflict among local communities. The field visit to Abreha Atsbeha showed an interesting intervention. Farmers had been digging inadequate wells that were not properly protected, that occupied a considerable part of their small plots and that caused relatively high evaporation. The project introduced a properly constructed well with a pump for joint use by a number of farmers with plots in the vicinity, thus increasing effectiveness and efficiency dramatically.

Challenges for the project were the high staff turnover as young staff members look for opportunities to continue their study and leave service when they succeed. Quality of lab personnel is also a limiting factor. As in other projects the hydrogeology project was confronted with lengthy procurement procedures, especially in the initial stage of the project.

Initially support from the Belgian side has been at a rather slow pace but PL’s substitution has boosted the inputs from the northern partner, which is reflected in the outputs that have very predominantly been produced during the second phase.

Assessment of KRAs project 6

Key result areas	Indicators (quantitative and full descriptive data)	Score
KRA1:Research	The project has created a research friendly environment and created capacity to develop and implement research proposals. A substantial number of articles in international peer reviewed journals and papers in international conference proceedings have been published. Very relevant hydro-geologic information has been collected and made accessible in maps and data bases.	5
KRA2:Teaching	The project has developed three new MSc programmes for the Department of Earth Sciences (Environmental Geo-sciences, Geophysics and Structural Geology), one PhD programme in hydrogeology (yet to be approved) and revised an MSc curriculum (Hydrogeology). The teaching and learning process has been enhanced by the use of research papers and PhD and MSc theses and by the availability of laboratory and field equipment and of demonstration sites such as the pan evaporation, water level data loggers, automatic ranges.	4
KRA3:Extension and outreach	Interesting extension work has been carried out on the improvement of wells. However, guidelines and manuals on water resources management are still being worked out.	3
KRA4:Management	Management issues were not integrated in the project. No research related procedures were developed.	2
KRA5:HRD	The project trained two PhDs as foreseen and trained 12 researchers and assistant researchers.	4
KRA6:Infrastructure	The project has provided essential equipment to facilitate research: - field equipment (divers, rainfall recorders, flow instruments, pH-EC-temperature sensors) - lab equipment (permea meters, pH meters) and chemicals and standards and -office facilities (PC's, laptops, printer, scanner)	4

KRA7:Mobilization additional resources	Several local grants for further investigation and development of water resources have been acquired. Among them: 1. Sheba leather industry (140,000 Eth. Birr) 2. Groundwater resources assessment of the Norther Geba basin (409,000 Eth. birr) 3. Groundwater recharge enhancement for Mekelle water supply (231,000 Eth. Birr). The Bureau of Finance of UGent is financing the PhD study of a MU staff member.	4

Qualitative evaluation project 6

Criteria	**Comment**	**Score**
Effectiveness	The project has partly achieved its objectives. Good research capacity has been established albeit that the aim to become the leading center in water resources management studies in Ethiopia has not been attained according to a staff member who positioned the department as second. Extension and outsourcing targets have not been completely realized yet.	3
Efficiency	The project has supplied the Geba catchment with very relevant and valuable maps and data bases. This and the training of staff (study time 4 years) have been realized with relatively moderate budgets. With the support of CSS field work has been carried out with efficient use of resources	4
Development relevance	The project is very relevant, especially given the water shortages in the region.	5
Quality	The quality of the research is good given the standards required for international peer reviewed publishing. Maps and data bases are very relevant and of good quality. Quality and effects of the extension activities has still to be shown.	4

Impact	The impact of the creation of the research capacity is high. The potential for impact by the use of maps and data bases is high provided that they will be properly used by the relevant institutions. Also the techniques for improved water resources management by the population have a high potential for impact but they still need to be proven.	3
Sustainability	There is the conviction with staff that the created research capacity will be sustained because of the conducive environment that has been created for scientific work. Staff members have developed the skills to acquire funds for research and there is a genuine interest from the Flemish side to continue collaboration	4

Overall assessment of project 6

The project has created a research capacity with 2 PhDs who finished their study successful and an adequate laboratory infrastructure.

Focus of the activities has been on the collection of relevant data on the Geba catchment and the project has supplied the region with very relevant and valuable maps and data bases.

Attention for extension and outsource activities has been limited and guidelines and manuals on water resources management are still being worked out.

Recommendations for project 6

1. Water resource management guidelines and manuals development should be completed and disseminated timely to relevant stakeholders.
2. In spite of the advice given by the project not to dig congested wells in small plots and around the starting point of the river, farmers in Abraha Atsbeha are still digging more wells in their small plots. It would be interesting for the university to study why they are digging these despite the research findings.
3. Extension has been concentrated on exemplary farmers. Ways and means should be sought to working with more local farmers and development agents who have more touch to the real situation.

3.7 Project 7. Aquatic ecology

During its first phase the aquatic ecology project documented the abiotic conditions and chemical water quality of 30 micro-dams and it produced guidelines that suggest methods to prevent the occurrence of toxic cyanobacteria blooms. It also documented the risk associated with the occurrence of parasites in the micro-dams and it studied the possibilities to grow fish in the micro-dams and the impact of fish culture on chemical quality, the occurrence of algal blooms and health risks.

For the second phase the project formulated the academic objective that “at the end of the project, Mekelle University is a leading centre in aquatic ecology of reservoirs and other standing waters; this includes expertise and capacity to study abiotic conditions, the biota and ecological relationships, parasite occurrence and nature value in standing waters as well as to assess the impact of management practices on the ecological structure and functioning of standing waters.” The development objective read: “Tools (guidelines, recommendations; ready for extension) to decrease health risks associated with the use of water from the micro dams and to increase the capacity for sustainable management of the micro dams are provided.”

The core of the research programme is organized around the systematic sampling and analyzing of standing waters of 32 reservoirs in the Geba catchment and around experiments carried out in the reservoirs. Since 7 years data have been collected and this will continue. This allows research on dynamics in water quality and reservoir ecology across a long period. Databases are being developed on different issues like i) morphometry, physical and chemical characteristics, ii) plankton densities and taxon composition, iii) fecal contamination, iv) the occurrence of parasites and parasite vectors. Another area of investigation is the possibility to grow fish in the microdams and its potential feedback to water quality in the microdams. Along with this expertise on fisheries and aquaculture in standing waters has been built up.

In the framework of the research programme 4 PhDs have been trained and delivered their dissertations, 5 articles have been published in international peer reviewed journals, 3 have been submitted or are in revision, 4 articles have been published in national/regional journals. 15 MSc students (8 Ethiopian and 7 Belgian) participated in the research team and delivered their theses. The project strengthened laboratory skills through 3 trainings for 3 months each on water analysis and a training in Belgium on phytoplankton sampling and analysis.

The project introduced the subject aquatic ecology at MU and consequently both human capacity and laboratory infrastructure had to be created from scratch. It has provided a full-fledged aquatic ecology laboratory that can be used by PhD and MSc students as well as equipment and tools to engage in aquatic ecology research. The project also installed an environmental chemistry laboratory.

Extension and outsourcing have had due attention. The research results have been applied to elaborate guidelines for the management of reservoirs and aquatic habitats on i) improving water quality in reservoirs in Tigray (cf. increasing vegetation in catchment; avoiding direct cattle access; limiting fish population densities), ii) fishery development in earthern ponds and micro-reservoirs in Tigray and iii) discerning warning signals for toxic cyanobacteria blooms development. The project has furthermore used the data to develop the “Ecological atlas of reservoirs in Tigray”. The project has taken a very interesting initiative with a direct positive impact on the livelihood of the population by introducing larger scale fishing near the Tekeze dam. Boats and fishing gear and training on their application were provided to youth groups and they were supported in the treatment and commercialization of their catch. As fish is not common on population’s menu attention is needed for its introduction. Along with other promotional activities a brochure on fish feeding habit and fish

nutritional value has been prepared and disseminated to the community to create awareness on the high nutrition values of fish meat during the 2011 fish week Festivities in Mekelle and Yechila. See the box for the case description.

From Vulnerability to Mastering Own Destiny

Haleka Tekelemariam Negussie, 30, is one of the members of the Tekeze Fish Cooperatives organized by Abergele Woreda Small and Medium Enterprise (SME) and Abergele Woreda Youth Association, years before. “I was helpless, and depended on my poor family,” said Tekelemariam remembering the situation he was in, before 2009. ”The news of SME‘s decision to organize and support jobless youth groups came as a blessing for me in my desperate situation, as it came for other youths. Unfortunately the cooperative with its 83 members did not last long because members owning land were hesitant to focus on fishing. Furthermore, catches in Tekeze Dam were small and this in combination with marketing problems led to the disintegration of the cooperative.

Later Mekelle University investigated whether fishing and related activities were a job opportunity and they introduced fishing. With the past experience in mind MU decided to reorganize the group and selected 33 proactive and willing youths. We received continuous practical fishing skill training. Fish eating and harvesting was new for us, but the project provided us with skills, a motor boat and fishing nets. It also solved the marketing problem by organizing fish eating festivities in Mekelle. This has increased production and boosted demand.

Presently Tekelemariam and his friends harvest about 3 quintals per day and sell it in Mekelle and Addis Ababa and are thus earning a substantial monthly income. Says Tekelemariam, “all 33 of us are now making our own bread, thanks to the MU-IUC project. The initial capital of the cooperative has increased and we have been able to buy two additional boats. On my part I have bought land and built a house. I get a monthly income of not less than 2000 birr. My other friends are doing equally well. Some have bought land and saved 15,000 to 20,000 birr. I have now everything I need for life. Above all, I have the dignity and social pride to feel important for my society and to be a model to jobless youths. My destiny is now in my own hands!!”

Assessment of KRAs project 7

Key result areas	**Indicators (quantitative and full descriptive data)**	**Score**
KRA1:Research	The project has created the human and physical capacity to carry out research on aquatic ecology at MU starting from scratch. Four PhD theses, 5 published articles in international peer reviewed journals and 3 submitted or under review, 8 abstracts for international conferences and 9 MSc theses have been produced so far. The set up of the research programme creates favourable conditions for its continuation.	5

KRA2:Teaching	The project has established a new MSc programme at the department of biology. Course materials have been developed for: 1) Aquatic Ecology for MSc students; 2) Applied and Environmental Microbiology for MSc students; 3) Aquatic Science and Wetland Management for BSc students.	4
KRA3:Extension and outreach	3 Guidelines on different subjects related to management of reservoirs and aquatic habitats in Tigray have been developed and distributed. Training and technical support has been given to a youth association, which has a considerable impact on their income and future perspectives.	5
KRA4:Management	The project has produced 4 protocols for research and sampling. The guidelines mentioned under KRA3 are meant to support populations in the management of reservoirs and aquatic habitats and are thus also part of KRA 4.	4
KRA5:HRD	4 MU staff members have successfully carried out their PhD study at KU Leuven and staff has been trained on water analysis and phytoplankton sampling and analysis. It is not clear how many of the 8 local MSc students were staff and can be attributed to HRD. Participation of the other local and Belgian MSc's has enlarged MU staff experience in accompanying students.	4
KRA6:Infrastructure	The project has provided a full-fledged aquatic ecology laboratory. An environmental chemistry laboratory has been established with the support of the project. Equipment and tools to engage in aquatic ecology research have been provided	4
KRA7:Mobilization additional resources	2 post-doctoral researchers got funded for a stay at KU Leuven for 3 months each The Aquatic Ecology team has received grants from the MU-UMB institutional collaboration to carry out investigations on Tekeze reservoir	4

Qualitative evaluation project 7

Criteria	Comment	Score
Effectiveness	The project has more than achieved its objectives. Good research capacity has been built up with 4 PHD's trained and a research infrastructure created. MU has become one of the leading centers in aquatic ecology of reservoirs and other standing waters, scientific papers have been published and relevant aspects of standing water management have been developed and disseminated to stakeholders. Links have been established to embed the results in institutions and the population.	5
Efficiency	The funds have been used to a maximum and this project has efficiently absorbed funds that other projects could not exhaust timely. The project succeeded to attract additional funding from other sources. Scholarships were also used efficiently as PhD studies were successfully finished in 4 years. With the support of CSS field work has been carried out with efficient use of resources	5
Development relevance	The project is very relevant with the results that have a high potential to contribute to population's wellbeing through improved health and higher income.	5
Quality	The quality of the research is good given the standards required for international peer reviewed publishing and the lab facilities are up to standards for the planned research. The quality of the guidelines is good and the results of the fishing intervention are excellent. There is a high degree of stakeholders' satisfaction for outreach activities of the project.	4
Impact	The potential for impact is high. The positive impact on income of the fishery intervention has been proven already, the options that have been developed for good water management have a high potential to provide good quality water and thus to decreased health risks associated with the use of water from micro dams. There is an increased availability of protein.	4
Sustainability	Staff is motivated to sustain the acquired results and to build on them. The environment is conducive to carry on with the research programme. One would not expect staff to switch to another institution as comparable conditions cannot easily be found. Staff members have developed the	4

	skills to acquire funds for research and there is a genuine interest from the Flemish side to continue collaboration. Maintenance of the sophisticated equipment needs continued attention.	

Overall assessment of project 7

The project has, starting from scratch, created a strong and stable research capacity with well trained staff and an adequate infrastructure. A research culture has been established in an environment where field based research was non-existent.

The way in which the research programme has been set up with prolonged data collection and analysis allows the continuation of the activities and the deepening of the expertise and insights.

The project has been very dynamic and results in terms of research, extension and HRD are better than originally planned.

The project has found a good balance between research, the extension of its results and the strengthening of teaching based on knowledge and insights acquired with research.

The potential for impact on wellbeing of the population is considerable and has already proven itself in as far as income generation is concerned.

Recommendations

1. Sustainability of the intervention depends on avoiding of direct cattle access to aquatic ecology of reservoirs and other standing waters. This requires close monitoring and working with local authorities.
2. The sustainability and effectiveness of the Tekeze Fishery cooperatives requires experience exchange with Hawassa, Langano and Behar-Dar fisheries. The team has to mobilize additional resources to undertake this important task
3. In the opinion of Tekeze fisheries, the quality of Hawassa, Berhardar and Arbaminch fish is much better than theirs. The university can execute a study to see in how far this is true and if so study the possibility of introducing better quality fish in Tekeze.
4. The team has to prepare and distribute leaflets on the benefits of fish to the community.

3.8 Project 8. Land management

The academic objective of the project was to develop expertise and capacity that leads to the centre of excellence in Sustainable Land Resource Management (SLRM) at MU. Areas of expertise would be the assessment of land degradation processes, the development of integrated soil fertility management, sustainable management practices for forest resources and the development of spatially explicit land use scenarios. The development objective was to provide stakeholders with tools in the respective areas.

The results of the four research areas are all positive but those for the assessment of land degradation processes through the assessment of river discharge, sediment yield and sediment-fixed nutrient export are outstanding. Publications, teaching, support materials; all are largely exceeding the planned output. This is related to the PhD in this area who finished his study in the first phase period and apparently has remained very productive. The other PhDs finished their studies recently or have to finish yet. Results have been produced and it is foreseen that the set targets will be attained in due time. 4 PhDs will be trained, 16 articles have been published in international peer reviewed journals so far and more that 30 international conference abstracts have been delivered. 35 MSc students (22 Ethiopian and 13 Belgian) participated in the research team and delivered their theses. The project strengthened the laboratory through the provision of equipment and chemicals.

The project supported the establishment of capacity for PhD training (soil science) and 4 MSc programmes: i) Natural Resources Management, ii) Climate and society with two specializations: a) Climate Affairs b) Applied Climate Science, iii) Integrated River Basin Management and iv) Agro-ecology and sustainable development.

Extension has been shaped through a number of consultancies, the elaboration of 2 manuals and training in GIS and remote sensing. This is far less than what had been planned (7 manuals, an atlas and 4 demonstration sites). This is to an important extent related to the late stage in which 3 PhDs finished their study. Catching up is planned.

The project has been very active in networking and it established partnerships with a number of international institutions and universities in Ethiopia and abroad. It furthermore attracted considerable funding for additional projects for MU. Around US$ 500,000from Open Society Foundation (2011 – 2016) and € 2.4 MM from European Intra-ACP Academic mobility schemes and the Caribbean and Pacific for human capacity building, to be shared with 5 African universities. Furthermore, funding for the continuation of some of the project activities has been secured already and attraction of more funding is in the pipeline.

Assessment of KRAs project 8

Key result areas	Indicators (quantitative and full descriptive data)	Score
KRA1:Research	The project has created the human and physical capacity to carry out research in the respective areas and a good research culture has been established. With 16 articles in international peer reviewed journals and more that 30 international conference abstracts and other materials research output has been very high.	5

KRA2:Teaching	With the establishment of the capacity for PhD training and 4 MSc programmes impact on teaching capacity has been very important.	5
KRA3:Extension and outreach	Extension activities covered consultancies, provision of training and elaboration of 2 manuals. Considerably more had been planned (7 manuals, an atlas and 4 demonstration sites). The delay is related to the timing of the PhD studies and will be recovered.	3
KRA4:Management	Management of the laboratory has been strengthened through the preparation of guidelines and a manual for lab work and maintenance.	3
KRA5:HRD	4 MU staff members have successfully carried out their PhD study. 6 Short term trainings were provided in Belgium A very high number of MSc students (35, 22 Ethiopian and 13 Belgian) were integrated in the research. Although the MScs are not additional MU staff, their participation has contributed to MU staff development in accompanying students and enriching their experience.	4
KRA6:Infrastructure	Equipment for field work and access bridges have been provided. Lab equipment and materials have been provided	4
KRA7:Mobilization additional resources	Additional research funding was attracted around US$ 500,000 from Open Society Foundation (2011 – 2016) and € 2.4 MM from European Intra-ACP Academic mobility schemes and the Caribbean and Pacific for human capacity building, to be shared with 5 African universities.	5

Qualitative evaluation project 8

Criteria	Comment	Score
Effectiveness	The project has achieved more than its objectives overall and produced a very high output for research and teaching. A huge number of MSc and BSc students have participated in the research programme.	5
Efficiency	Overall highly efficient. Much realized with relatively moderate budget. Some inefficiency due to delay in study and non-realization of atlas and demonstration sites.	4
Development relevance	Very relevant given the important relationship among soil, water and land productivity.	5
Quality	The quality of the research is good given the standards required for international peer reviewed publishing, quality MSc and PhD programmes have been developed.	4
Impact	The additional staff capacity and the new programmes impact on MU teaching, research results are visibly impacting the prevention of soil erosion and the ecological restoration of the Geba catchment. There is a high potential for the proliferation of the techniques in the country.	5
Sustainability	Staff is motivated to sustain the acquired results and to build on them. The MSc and Phd programmes have been integrated in the MU teaching package Findings are being integrated in knowledge body of relevant government institutions There is a proven capacity to acquire funding for future research and funding is already available.	4

Overall assessment of project 8

Project performance overall has been very positive and targets have been surpassed.

The project has established a good research and teaching capacity in the Land Resources Management and Environmental Protection department, with 4 additional PhDs and close involvement of staff and students in the research activities during project life.

With a PhD training and 4 new MSc programmes the possibilities for students' training have been enlarged considerably.

The number of MSc of 35 students, (22 Ethiopian and 13 Belgian) that have been involved in the research is impressive and has, apart from a direct contribution to the research results, enhanced internationalization and established many valuable contacts.

Through close collaboration during project life the project results are properly embedded within the relevant institutions in the region.

The project staff has developed an excellent, proven capacity for the acquisition of funding. This is shown through high value projects that were acquired in the past and in available funding for future projects.

For some of the areas covered by the project additional work has to be done on extension and outsourcing. This is related to the timing of the PhD studies and the work is planned to be finished in the coming period.

Recommendations

1. The department has to continue to attract Belgian or other African students
2. Preparation of an Atlas and demonstration sites has to be completed within the planned period.
3. Since researchers are working in dangerous situations during data collection, appropriate safety precautions should be taken in advance
4. The training of lab equipment maintenance specialist at higher level is essential to properly run, manage and utilize the scientific equipment.

3.9 Project 9. Farm technology

The academic objective of the project was that the capacity of Mekelle University to undertake interdisciplinary research on cultivation tools and management, harvest and post-harvest treatment, and rural energy would be improved. This was connected to the development objective that the appropriate cultivation tools for different types of soils and soil conditions, which could be adapted by farmers, would be developed and that appropriate harvest and post-harvest technologies and technologies for enhancing utilization of renewable energy would be developed.

PhD research on two subjects is being carried out and will briefly be finished; subjects are soil tillage operation and solar energy. So far three articles have been published in international peer reviewed journals where 12 were foreseen. Articles are also published in national journals. There were also 5 contributions to international congresses. Differently from the other research projects no PhD studies were finished in the initial stage of the project, which could have enhanced publications. Along with the PhD training 9 short term trainings in Belgium were provided.

In the area of teaching the project supported the adaptation of the mechanical engineering curriculum and introduced a new stream "*Agro-Machinery and Processing*". Furthermore teaching materials, lab manuals and excursion guides were developed.

The project has invested in the soil physics laboratory and a soil bin test system has been provided for measuring characteristics of soils. During the first phase a lab technician has been trained and support has been given to the improvement of lab management. The trained technician left and lab operation and management remains a challenge.

A total of 80 students were involved in research and the development of course materials and a variety of activities ranging from involvement the construction of own designed wind masts, different activities of reverse engineering of agricultural equipment and a windmill, activities related to renewable energy and the installation of a cold room. Many of these subjects are embedded in plans for further future development like for instance cold room technology. 6 MScs (2 Ethiopian and 4 Belgian) did their thesis work in the framework of ongoing research.

The project is very active in networking and has established many contacts. One to be mentioned is the close cooperation with the Metal and Engineering Corporation (MeTec), an institution created by government to implement the Growth and Transformation Plan. Introduction of machinery and equipment for the introduction of socially equitable mechanization technology in agriculture is one of their major activities and the project is involved and applies reverse engineering of equipment and adapts it for use under Ethiopian conditions. The project is also intensely involved in the dissemination of the concept of socially equitable mechanization technology and of equipment fitting in the concept, like the two wheel tractor. Although this is not the classic extension work of disseminating findings of own research, it is certainly important for the development of mechanization in agriculture. The faculty has been selected as a center of excellence in wind energy in Ethiopia and it has together with the Adama Science and Technology University submitted a proposal to the Ethiopian Electric Corporation to work as an adviser on a big wind energy project.

Assessment of KRAs project 9

Key result areas	Indicators (quantitative and full descriptive data)	Score
KRA1:Research	Research in the framework of PhD studies has been seriously taken up in a late stage of the project and is still being finalized presently. With 3 articles in international peer reviewed journals as compared to 12 articles planned output has been low. Research work on solar energy is hampered by grave equipment damage. Many activities are being carried out in the framework of research protocols for different areas. It is unclear how well structured this is.	3
KRA2:Teaching	The mechanical engineering curriculum has been adapted and a new stream introduced. Teaching materials, lab manuals and excursion guides were developed. A high number of students were involved in research activities.	3
KRA3:Extension and outreach	The project has been very active in the dissemination of the concept of socially equitable mechanization technology and of equipment fitting in the concept, like the two wheel tractor. Reportedly there is a high acceptance. Dissemination of results of own research work is not visible.	4
KRA4:Management	The project put an effort in strengthening laboratory management but has not been successful. 8 research protocols have been worked out and a business plan has been developed.	3
KRA5:HRD	2 PhDs are ongoing.	3
KRA6:Infrastructure	The project has invested in the soil physics laboratory and a soil bin test system has been provided. The Farm Technology office has been installed.	4
KRA7:Mobilization additional resources	No additional funding was reported	2

Qualitative evaluation project 9

Criteria	Comment	Score
Effectiveness	The project did only partly attain its objectives. There is no link between research – extension – teaching visible yet.	3
Efficiency	Resources are used with care and many activities have been undertaken. However, the proliferation of activities and the lack of focus are negatively affecting efficiency. The poorly functioning laboratory is another cause of loss of efficiency.	3
Development relevance	Very relevant, contribution to boosting effectiveness and efficiency of agriculture	5
Quality	The quality of the project is in its dynamics. Contacts are established and many activities are carried out, the areas of intervention have been proliferating. The approach is practical and very much hands on. The other side of the coin is that there is little focus and little thoroughness. Academic quality has not been proven yet.	3
Impact	The impact on the research and teaching capacity has been relatively limited. Impact of extension activities, more in particular those related to the two-wheel tractor, is reported to be very good. Impact on renewable energy has still to be proven.	3
Sustainability	The created academic capacity with the two ongoing PhDs has not had the possibility to become embedded in the MU environment yet. The supporting laboratory capacity remains insufficiently developed. The horizon for extension and service delivery of socially equitable mechanization technology with the MeTec link is bright. Thus the perspective for sustainability is mixed.	3

Overall assessment of project 9

The Farm Technology project is very dynamic and it involves many faculties and departments. During its lifetime the project has taken many initiatives and produced many outputs.

As compared to the other research focused projects of the programme performance on research and entailing extension and feedback to teaching has been moderate so far and the perspective for academic sustainability is judged to be lower than for the other projects.

The dynamism, drive and outgoing character of the team have spread out the intervention areas and established many contacts with development relevant institutions. The project team is appreciated as is for instance expressed in the nomination as centre of excellence in wind energy and reportedly results in the area of socially equitable mechanization technology (two-wheel tractor) are excellent.

For the ET there are some doubts as to whether Farm Technology's approach properly responds to the IUC programme intentions. In their opinion focus, thoroughness and a clear link between research/extension/teaching is not sufficiently developed in the project. However, development relevant results are there and the future will reveal which of the approaches is preferable.

Recommendations

1. There is a need to focus on few intervention areas so as to be effective, efficient and result oriented in its undertakings.
2. Strong effort is required to adequately disseminate and convince farmers and private producers to adopt the different cultivation tools , which are developed by the project.
3. The work of the project has to be institutionalized within the department /university rather than depending on individuals for future sustainability and developing organizational capital (the knowledge they own and how it should be managed).
4. In the future, there is a need to establish strong links with *extension* for customizing and technology transfer.
5. The staff of the department seem to be outward looking in terms of motivation and benefits. However, there is a need to balance between the interest of the individual and the organization.

3.10 Project 10. Programme Support Unit

Core for the daily work of the Project Support Unit are, in Ethiopia, the project manager and bookkeeper and, in Belgium, the ICOS and financial assistant. The two programme coordinators are also part of the unit.

The PSU offers a set of necessary administrative and logistic support services to the implementation of the MU-IUC Programme that would be required regardless of the scale of the operation. The unit provides financial, administrative, and technical reports, and it organises workshops, meetings, and events such as evaluations and international conferences that were held at MU. It is also its task to order equipment and consumables, to monitor results of projects, and co-ordinate between VLIR-UOS the university management and programme stakeholders.

After some tuning problems in the initial period and frequent changes of the programme manager the unit has been run efficiently over the last years.

In the initial period purchasing of equipment and consumables was very time consuming. Authorisation to the MU IUC Programme Office to shortcut MU procedures for purchases to a certain extent has facilitated all the projects in the programme considerably.

Communication between different parties has been very smooth and reporting caused only minor problems every now and then. Through good communication and timely action budget under spending as a consequence of the prohibition to transfer budget from one fiscal year to the next, has been kept to a minimum. (95-100% spent in the different years). Transfers between projects within the existing rules and regulations prevented the loss of resources for the programme.

MU is convinced of the effectiveness of a unit like PSU and has decided to continue its functioning.

In order to facilitate the work of PSUs in the future the MU PSU proposes the following to VLIR:

- Allocating a small budget for project leaders as incentive for their commitment in taking the responsibility of leading the project as well as their involvement in planning and reporting
- Minimizing the registration of all invoices in the model ID item by item which is a cumbersome activity
- Using standard accounting software like peachtree or others rather than using the ID model.

4 Qualitative evaluation of the programme as a whole

In the qualitative evaluation of the programme as a whole we will build on the insights from the individual project evaluations and look for overarching issues that have made the individual projects to a programme and thus have given the programme its added value.

4.1 Effectiveness

Scores for effectiveness

Criteria	**Scores of the different projects**								
	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**
Effectiveness	3	3	5	5	4	3	5	5	3

The programme defined as academic, respectively development objectives to strengthen the capacity of Mekelle University as an institute of higher education, and a centre of excellence for research and academics (academic) and to contribute to social and economic development and improve the livelihood of the region on a sustainable basis (developmental). This was in line with MU's objectives to provide high-quality undergraduate as well as post graduate programs in different disciplines/fields and to engage in research that can support the development endeavours of the country (academic) and to conduct research and studies in different fields that will help in solving societies' problems and disseminate fruitful results thereof (developmental).

Effectiveness of the individual projects has been rated between sufficient and very high. This is confirmed at programme level when we look at the capacity that has been created at MU level; 32 PhDs and more than 130 articles in international peer reviewed journals. True, only part of the articles, about 40%, had an Ethiopian lead author but production remains very high and co-authorship also contributes to building up experience and capacity. It would be interesting to compare this result to other IUC programmes, because publishing at international level is often a bottleneck.

In the opinion of the ET the realization of multidisciplinary research is a real added value at programme level. Is it difficult to get research as such off the ground in an environment that is not used to it, multidisciplinary research is an extra challenge. We think that some factors underlie the success in research. First of all, the 10 years length of the programme gives room to long term perspectives and allows building capacity that can be applied for research in later stages of the programme. Another very important factor is that CSS, with a real capacity for research, provided the critical mass to get research started. Support in the initial stage with protocols, field work preparation, data collection, data analysis, follow up and later on write up, has been very important. One should bear in mind that for most of the Ethiopian staff field based research was new. As one of the Flemish professors told that Ethiopian researchers presented themselves in collar and tie for the first field trip. The design of the programme has been the key factor for the realization of multidisciplinary research, as disciplines were joined that properly represented the complex character of the development

challenges at stake. Good knowledge of the situation, a vision on the right approach, good collaboration between the Ethiopian and Flemish programme initiators and dedication have resulted in a fertile basis for multidisciplinary research. Pushing to get the interdisciplinary initiatives started has finally led up to successful results. The formulation of the interdisciplinary research themes at the start of the second phase also expresses the drive to continue and expand initiatives.

So far we have looked at effectiveness from the programme perspective. The reasoning is that the programme had as its objective to realize research and thus it was effective because it has in fact done research and created research capacity. And, when we are more ambitious, we want to realize multidisciplinary research and the programme is effective when multidisciplinary research has been carried out. When we take some more distance and look at the effectiveness of the research itself when research results are implemented, then there is an interesting observation to be made. Multidisciplinary research is of importance because its results can be expected to be more effective, they have the potential to create more impact. Because different disciplines are integrated, the complexity of the researched problem can be better tackled. Thus the fact that the programme managed to realize multidisciplinary research boosts it effectiveness. This added value can only be attained at programme level and when there is a push for interdisciplinary research.

In favour of effectiveness is also the fact that all 28 PhDs with the exception of one person have continued their engagement with MU or the higher education sector in Ethiopia. From the encounters it was clear that a good research environment has been created where people want to continue their career. Interesting areas of research can be further explored and capacity to acquire financing has been developed. The CSS has also been instrumental in this respect. Furthermore, the relations that have been created through the collaboration and the interesting and motivating circumstances foster the intention at the Flemish side to continue cooperation.

Another aspect of the programme that enhances its effectiveness is the sandwich construction for the PhDs. It directs the subject of study to needs of the country, which enhances relevance for the country. Students furthermore keep in touch with their own environment and the project creates the working conditions necessary for the research. These factors increase the chance of continuation of the work after finishing the study. The available time in Belgium, 16 months over the whole 4 year period was considered short, at least for some specializations and in practice it has been necessary to extend the fellowship with additional financing. This issue has been discussed with VLIR and the number of months in Belgium was increased to 24. The programme adhered to the 16 months due to budget constraints.

Has effectiveness at academic level been very high and has the capacity created there turned out to be very stable, less positive is the result in the more technical areas. Support to the laboratories has in some cases not given the expected results and frequent were the remarks that the professional level of staff was not sufficient and that maintenance was a matter of concern. The North self-assessment mentioned a different approach for capacity building for laboratory capacity as one of the points that would have been done otherwise were one to start again. The point is very relevant and can in fact be linked to ITC and library support to some extent. Differently from the research driven projects there is no clear longer perspective for staff in these cases. Research has a perspective of prolonged study, improved career perspectives and an enriched professional development path. In combination with a good professional environment this is what professionally interested people can attract sufficiently to stay within the university environment. For technicians there is often the ambition to continue their studies and they will use opportunities when they are there. Because for many people study opportunities have been limited during their school career there is in fact a real chance that they have

a higher potential than required for their present job. Indeed, levels of remuneration are considerably lower and the drive for change is understandable. Furthermore, for their type of work they can often get better conditions in the private sector when they receive some level of training. Offering more competitive conditions by the university may help, but stability will remain delicate in the opinion of the ET. The situation for ITC and library is comparable to the laboratories. In the chosen set up of the projects training has for the major part, been addressing the level of technicians. Here is the possibility to scale up the level of training to at least MSc in order to retain trained staff.

In spite of this it is thought a good idea that in a comparable programme with a number of laboratories that need strengthening an initiative would be created around the development of technical capacity in laboratories.

A last point that enhanced effectiveness of the programme was the massive integration of MSc and BSc students in the programme, far over 100 Ethiopian students roughly estimated and 44 Belgian. Apart from their contribution to the research results their participation in the programme has had an important additional effect in that it has enhanced internationalisation, peer learning and the strengthening of networks.

4.2 Efficiency

Scores for efficiency

Criteria	Scores of the different projects								
	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**
Efficiency	3	3	5	4	4	4	5	4	3

The scores for efficiency range from sufficient to very high. The first thing to mention here is that the programme has produced very good results, quantitatively and qualitatively, for a relatively low price. Six ongoing research programmes that have already produced very valuable and applicable results with proven positive impact on the livelihood of the population and the potential to produce much more, the human capacity and infrastructure to continue the initiatives and a considerably improved teaching capacity for the training of the future generations for about 6.5 MM Euro, value for money. Strong from the efficiency perspective for the programme overall has been its concentration on a single, be it very big, catchment and the availability of clear programme rules and regulations for programme's management and operation. Also the availability of research and publishing protocols has certainly prevented a lot of unnecessary discussion and thus inefficiency. CSS and also the teams themselves have played an important role in coordinating the field work, keeping the efficient use of resources in mind. When talking to programme participants a sense of proper use of resources and efficiency could be observed.

The North collective self-assessment gives an interesting estimate of the contributions of other parties to the programme. According to this estimate the Flemish universities (through e.g. time of their staff, contributions for Flemish students' practical work in Mekelle, scholarships), Mekelle University (staff time, accommodation, etc) and other support (e.g. donations) have considerably contributed and it breaks down the total investment as follows: VLIR-UOS 40 %, Flemish universities 35%, Mekelle University 20% and Other supporting institutions 5%. Purely seen from the perspective of the programme this can be seen as an enormous boost of the efficiency of VLIR-UOS's investment. For the Flemish universities it is a considerable contribution which is not *a fonds perdu* but with a yield in terms of PhD students and publications.

Although in the initial stage the selection of PhD candidates has not been optimal, leading to prolonged study and drop out, total inefficiency due to these effects has been relatively limited. The ET has no exact information but estimates that 3 students have dropped out. There have furthermore been some candidates who did not pass their pre-doc. However, with an average study time of around 4 years and a drop out of 10 to 15%, efficiency of the PhD programme has been good.

The high degree of budget depletion (95 – 100%) is also a positive sign of efficiency for the programme overall. By timely and flexible intervening programme management has been able to transfer budgets between projects (obeying VLIR's rules) that would not have been used and lost for the programme due to the prohibition of budget transfer to following years. The other side of the coin is of course that some projects must have been inefficient with regard to budget spending. Explanations are for example candidates who did not pass the selection for their study, thus leaving planned budget unspent, or lengthy purchasing processes for equipment.

The main factors that had a negative effect on efficiency have been high staff turnover, lengthy procedures for purchases, poor organization/management, inadequate functioning of provided installations and the non-realization of foreseen activities.

4.3 Development relevance

Scores for development relevance

Criteria	**Scores of the different projects**								
	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**
Development relevance	5	5	5	5	5	5	5	5	5

The development relevance of the programme can be considered on different levels. There is first of all the embedding of the programme in its wider context, on university, regional and national level. The programme with its objective "to contribute to social and economic development and improve the livelihood of the region on a sustainable basis" fits very well in the policies of the university, the region and the national Growth and Transformation Plan that do all have comparable objectives.

During the selection process of the programme the first steps were taken by MU by proposing the elements of the programme, thus making sure that it would fit with its own needs. The developmental relevance of the proposal apparently convinced VLIR-UOS as it stated in the justification for MU's selection: "*Main motivation* (for the selection) *is the fact that it is a dynamic institution, located in a poverty-stricken area, where it contributes greatly to solving the problems of the rural poor.*"

After getting to know the contents of the programme and its results it is clear that the programme and its constituting components are all very development relevant.

All these positive elements contribute in fact to the potential of the programme to make a difference for the region and its population. The potential has been partly transferred in real impact but the extent to which the research findings will contribute to agenda setting, opinion forming and decision-making in relation to agriculture and rural development issues will have to be maximized by a continuous dialogue with authorities.

4.4 Quality

Scores for quality

Criteria	Scores of the different projects								
	P1	P2	P3	P4	P5	P6	P7	P8	P9
Quality	3	3	4	4	4	4	4	4	3

Scores for quality at project level range between sufficient and high. It is in itself difficult for the ET to thoroughly assess quality of all the different components of the programme and of the programme itself. It would require expert knowledge in a wide range of fields and loads of time. However, we can have a broader look and see how quality of the programme and its components is influenced and judged.

First of all we can look for drivers that will intrinsically aim for quality, thus enhancing it. The Flemish universities and staff involved in the programme are ranking between good quality institutions/scientists and they thus are able to provide good quality work. One can expect that they will strive for attaining quality, consequently bringing quality into the programme. Another driver for programme's quality is the motivation of Ethiopian staff participating in it. The programme is demand-driven which means that the content of the programme has been proposed by MU staff and one can therefore assume that there is a genuine interest from their side to participate and get the best out of it. They are the owners of the programme and will strive for quality results.

Apart from drivers we can look for mechanisms that have been built in to realize and improve quality. The programme is monitored regularly and the steering committee has had a close eye on progress and also quality, which implies that they have stimulated participants to deliver quality work. Another mechanism that enhances quality in the longer run is the close link between research and extension. Extension gives an extra dimension to the field experiments in that it adds user-related insights. Thus lessons are learned from implementation that will be rechanneled in the system and thus improve quality. Finally, the midterm evaluation has been an opportunity for the programme to have external experts look at their work. The programme management has used this opportunity and seriously considered the recommendations and integrated them in the second phase programme, in favour of its quality. By the way, the fact that this has been done so consciously shows programme management's interest in attaining quality.

There are finally the indicators provided by external entities that in some way or another judge quality. As the highest and most reliable standard for quality in the context of the programme there is the peer review for the international journals where the appropriateness of the research methods and evaluation techniques is being judged by experts. The fact that in the framework of the programme more than 130 articles have been published in international peer reviewed journals is a convincing indicator for good quality. A second indicator of a completely different character is the judgment by the clients, the users of the results of the research. The fact that many results are being implemented and are accepted by users is an indication that research findings work and are of interest. Government institutions and NGOs have shown their consent by integrating research results in their package, farmers and other beneficiaries are using results with satisfaction. The awards won by projects and the

nomination as centre of excellence can be seen as a third indicator. Finally, as a fourth indicator there are the project proposals (some of them representing high investments) prepared by MU staff that have been selected to be implemented.

The main factors that have negatively influenced quality are a limited reliability and/or incomplete applicability of project's results and poor management.

4.5 Impact

Scores for impact

Criteria	Scores of the different projects								
	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**
Impact	4	4	4	4	4	3	4	5	3

Impact at personal level was well phrased by a graduated PhD student saying “the program has helped us to develop specific scientific knowledge**,** develop academic, professional and development skills, to do better research and change our attitude towards applied research. Before the program we were not doing action oriented research. Now, we are better skilled and confident”. More broadly we can say that trained staff have an enhanced capacity (i) to conduct research independently, (ii) to teach classes and to develop course material confidently (iii) to publish research results in international journals and present them at national and international conferences, workshops etc. (iv) to extend their international network and acquire funding.

The programme has had an impact at the MU institution level in different ways. The ICT and library functions have been strengthened; these were the only interventions in the programme with a clearly defined objective at MU level. In spite of this the results of the other projects have also contributed to improved functioning of MU as a whole.

- The production of 32 PhDs and many MSC holders, the high level scientific publications, the provision of laboratory and field equipment, the provision of training for technical staff, all have contributed to the nurturing of a research culture at MU which also has an exemplary function for faculties not directly involved in the programme.
- The colleges of Dry Land Agriculture, of Health Sciences, of Education (Biology & Chemistry departments), of Science &Technology (Farm Technology department, Hydrogeology) and of Business and Economics (Department of Economics) have been working together on interdisciplinary projects and this has strengthened interdepartmental and college relations within the university.
- The integration of research results and insights in the teaching programme creates increased relevance of teaching at the MU and the students will be better prepared to contribute to the development of the country.
- The systematic integration of extension and outsourcing both creates a strong link between research and the application of its results and it has provided the opportunity to embed MU in its development environment. This has been certainly realized and strong links have been established with relevant government institutions and communities.
- By organizing international conferences MU has realized recognition among other universities, strengthened its network in the regional and international scientific environment and developed a capacity to sustain this acquirement.
- Through the programme at project level an increased capacity for resource mobilization has been developed. Clear proof has been given that MU can compete for projects in an international environment.

- The programme has introduced PCM at MU. This has been transferred to other departments and faculties within MU and thus contributed to strengthened project management.
- All these achievements have been realized at project and programme level. The programme has had an exemplary role for the MU and because of the weight of the programme with its eight projects a critical mass has been created to further develop the capacities, to support other faculties and departments of MU in acquiring the competencies and thus sustain and extend programme's results.

The ET had the opportunity through visits to the field and conversations with community representatives and officials and administrators in the Tekeze, Hagereselam, and Adigudem project areas to sense the impact of the programme at community level. Examples of this impact are testimonials, for instance of Haleka Geday Fishatesion and Prist Wolderufial Haftu, two beneficiaries of the More Crop Per Drop project: "Before we started growing apple we were working as farmers, earning a very low annual income. With the introduction of apple in Hagreselam we have got hope that we can challenge our poverty. Growers who have a higher number of apple trees and who have access to water are getting a good income up to 4500 (€190) birr per annum and yet others like Haleka Gebrekidan who lives in the vicinity of Hgreselam gets up to 10,000 birr per annum. Farmer Hagos Gebremicheal who is participating in conservation agriculture in the Adigudem area said: "the introduction of conservation agriculture in our area has helped us to minimize run off, reduce soil loss and to save labour. Now the soil is getting better, water is contained and row ploughing introduced. This new method has helped us to increase productivity per hectare which also increased our income by nearly 40%". The box in chapter 3.6 gives another example.

The ET got a very good example of the impact of the programme with regard to control of degradation as well as rejuvenation when from a high point two valleys could be observed, one being the area of the Land project and one where no intervention had taken place. Comparison very clearly showed that rejuvenation and successful agricultural development had been realized in the intervention valley that had been like the barren one.

More in general we can say that the MU-IUC programme has changed the socio-economic conditions of the participating communities. The interventions have enabled communities to better use and manage ground and surface water resources and micro dams, to better manage land, to apply conservation agriculture, to cultivate apples and to catch fish and commercialize it, thus providing opportunities to improve their livelihood and to increase their income. Involvement of government institutions and NGOs in the work has created a good potential for increased impact.

Better qualified graduates will in the longer run have their impact on regional and national level. The close cooperation with regional government institutions enhances the potential that research results will be applied at that level albeit that continuous advocacy will be required to keep focus. In this respect it is interesting to observe that the state minister of higher education is very much aware of the programme and its qualities and that, during the interview, he expressed his appreciation for the approach of linking research, extension and teaching. In his words it could be seen as *"yeast that can be used for fermentation to be implemented in other universities".* He furthermore stated that "*the quality research papers produced can be inputs for policy makers and what is remaining on our side is to implement the research findings and recommendations* ".

4.6 Sustainability

Scores for sustainability

Criteria	Scores of the different projects								
	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**
Sustainability	3	3	4	4	3	4	4	4	3

The scores for sustainability range between sufficient and high. The programme has allowed the building up of a considerable research and teaching capacity of 28 PhDs, completed with a number of MScs that could be consolidated because of the long running time of the programme. Not only qualitatively but also quantitatively a good basis has been laid and a critical mass of researchers who have been trained with a common approach has been created. Moreover, researchers are used to working together. Thanks to the sandwich construction researchers are well embedded in the Mekelle context with the infrastructure they need for the continuation of their work. The links established with the Flemish partners are good and there is a common interest in maintaining contacts and collaboration when there are opportunities. Networks are not only limited to Flemish contacts, persons involved in the programme have used the opportunities provided to extend their network and through the good work done and the conferences that were organized MU has obtained a position in the scientific world.

With regard to the potential to generate funds for research one can say that there is an adequate capacity for the acquisition of funds and that between the staff there are some persons with an excellent record.

Over the last years the funds availed by MU for ICT and Library have exceeded programme's investments, meaning that there is the capacity to financially take over. All these elements point to a positive perspective from the point of view of sustainability.

Retention of staff, essential for sustainability, is a factor of concern in some cases. This is contributing to the lower scores. Generally speaking the conditions described above provide an environment that for the great majority of academic staff is sufficiently attractive to see their career perspective within MU. The ET has discussed the issue at different occasions and in all cases the trained PhDs stressed their interest to continue their career at the MU. And it is true, there is only one trained PhD who left MU, coming from the Faculty of Business and Economics. This and the fact that in other departments of this faculty very high staff turnover has been reported has led to the lower score for project 5. Retention of technical staff is a matter of concern in general. We have elaborated on this in chapter 4.1, on effectiveness.

Another point of concern from the point of view of technical sustainability is the management and maintenance of part of the laboratories. In spite of the attention given to this aspect by the programme it remains problematic.

4.7 Management

The management set up of the programme was clear: i) a programme coordinator, a programme manager and a research coordinator with their supporting staff at the Ethiopian side and the programme coordinator with ICOS and financial and administrative support at the Flemish side, ii) for coordination steering committees at both sides in which all project leaders are represented, iii) clear job descriptions for all positions involved and iv) a defined set of rules and regulations, which are understood and applied. Formats and a schedule for planning and reporting are available. It should be said that these formats were assessed to be a bit bulky and that their application was time consuming. The operation manual with e.g. the rules for finance, mileage and per diems, was a good support in day to day management and has enhanced efficiency. It was interesting to hear that the VLIR methods had served to adapt the NORAD management system. As mentioned in chapter 3.10 on the PSU the MU purchasing procedures were time consuming but a solution was found to attenuate the problem considerably.

The North self-evaluation mentions the Business Programme Re-engineering intervention and the posting by the Ministry of Education of a German Rector and staff at key positions to carry through a big institutional reform and that may have intervened with the programme. Little information could be obtained by the ET on this issue.

The total budget of € 6,785,000 excluding administration costs (K1 + K2) are distributed over the different projects as demonstrated in the table below.

	Budget (%)		Expenditures (%)	
	Phase I	Phase II	Phase I	Phase II[1]
ICT	13.9	8	14.3	8.4
Library	7.6	6.2	6.2	5.6
IMPCD	1.3	0	0.9	0
CSS	8.0	13.4	13.2	14.6
Crop	8.9	10.8	7.3	12.3
Socio	7.5	8.6	5.7	7.3
Hydro	8.3	6.2	6.9	4.9
Aquatic	8.1	8.8	9.1	11.2
Land	9.7	10.6	8.8	12.5
Farm	7.2	9.6	7.6	7.8
PSU	19.5	17.8	20.0	16.1

The deviations from the overall budget have been marginal with the exception of the years 2005 and 2008, when they still were not considerable: 5.7% and 2.4% under-spending respectively. Alert

[1] Year 2008, 2009 and 2010. Consolidated data on 2011 and 2012 not available

financial management has prevented budget being lost by shifting budgets between projects within the margins allowed by VLIR-UOS. We can see that by comparing in the table the budgets for the respective projects with the expenditures. When having a close look at the table we can observe the following.

- Budget distribution between the projects changed between phase I and phase II: the relative share for CSS, Crop, Socio, Aquatic, Land and Farm went up, sometimes considerably (CSS, Farm), the others went down (Hydro considerably).
- Part of the projects got additional funding through budget shifts, which is shown in the superior expenditure as compared to budget.
    - For phase I ICT, CSS, Aquatic, Farm, PSU (of which CSS considerably)
    - For phase II ICT, CSS, Crop, Aquatic and Land
- When we consider the budget shares and expenditure shares over the programme's period of 10 years we see that CSS and Aquatic have been the best spenders; they took a bigger budget share in the second phase and over both phases they had higher expenditures than were budgeted. Crop and Land had relatively high expenditures as compared to the budget in the second phase. For Crop we see the recovery after the weak first phase.

4.8 Comparison of the IUC programme with other programmes at MU

The information that the ET could collect with regard to other programmes at MU was limited. An overview of the budgets for the different projects was provided and the ET had the opportunity to talk about the institutional collaboration programme financed by NORAD with the programme coordinator.

The table below gives the overview of the present projects with the respective budgets (in Euros).

Country	Project name	Annual budget (€)	Remarks
Netherlands	Integrated seed sector development	213.000	4 Universities, 2 enterprises participating
Norway	Women Food Science	25.000	
Norway	Local seed business	50.000	
Norway	RuFarm	20.000	
Norway	Norwegian Research Council	20.000	
Canada	Institute for Develpmnt. Research Centre	270.000	
Norway	MU UMB Institutional Cooperation		For 5 years
Belgium	MU IUC	6.540.000	For 10 years

Of these projects the only one that is comparable to a certain extent is the MU UMB Institutional Cooperation. The programme provides 3 types of grants for initiatives:

- Multidisciplinary € 17.000 Integrated level
- Medium scale € 8.500 College level
- Small scale € 1.600 – 4.200 Department level

There is a yearly round where candidates can submit proposals. Subjects can be broad; management related proposals can also be submitted for instance.

Our interlocutor who is also involved in the MU IUC programme mentions the following issues that are relevant for a comparison:

- as compared to IUC the NORAD programme is open. Many different subjects, no inter-relation, yearly proposals;
- the Norwegian programme also work in a sandwich approach, however, the Norwegian professor is not involved in Ethiopia. In the case of VLIR professors visit at least once per year;
- The VLIR programme has a tight follow up system as compared to the Norwegians;

- Strength of the VLIR programme is that it also provides infrastructure for research, this allows the researcher to root in his/her own environment;
- The conferences IUC organized are a good tool for internationalization;
- The IUC programme brings clearness from the beginning. This is cost effective
- The NORAD programme also invests in infrastructure
- The IUC programme implies a lot of paperwork.

4.9 Overall conclusions

The programme has been successful in obtaining its objectives of strengthening the capacity of Mekelle University as an institute of higher education, and a centre of excellence for research and academics (academic) and the contribution to social and economic development and improving the livelihood of the region on a sustainable basis (developmental).

It realized an ambitious research programme, including interdisciplinary research projects, with 28 PhDs added to MUs staff and an impressive output of more than 130 articles in international peer reviewed journals.

This has established a research culture in an institution that at programme's start was highly teaching driven. The teaching programme was strengthened with the introduction of new curricula and the integration of research findings in the programmes.

Extension and outreach have had due attention and strong and effective links were established with relevant government authorities at Woreda and Regional level and with communities.

The implementation of research results has been successful and the evaluation team could observe good examples like improved livelihood and income as a consequence of the introduction of apple trees in the Tigray highlands, the transfer of fishing techniques and support in marketing to an association of youngsters and the introduction of conservation agriculture. Rejuvenation of ecology and successful agricultural development could be observed. The MU-IUC programme has enabled communities to better use and manage ground and surface water resources and micro dams, to better manage land, to apply conservation agriculture, to cultivate apples and to catch fish and commercialize it, thus providing opportunities to improve their livelihood and to increase their income.

The involvement of government institutions and NGOs in the work has created a good potential for increasing and spreading out impact.

Essential success factors for the programme were first of all the enthusiasm and dedication of both Ethiopian and Flemish staff and furthermore the coherent set up of the programme with a high potential for synergies, the presence of a Cluster Support Services unit with competent staff, experienced in research, to support the PhD students in setting their first steps in research and carrying them through and the vision and push of programme management to further the programme.

The weaker points of the programme were related to activities implying non-academic staff. High staff turnover has hampered the optimal development of the ICT and Library initiatives and strengthening of laboratory infrastructure and management has not been optimal in some cases.

With the expertise that has been built, the relations that have been established, the capacity to attract funds for continued research, the good embedding of the initiatives in the region and the commitment of MU to further its development the programme's results have a high probability to sustain.

4.10 Overall recommendations

Recommendations for the VLIR

The evaluation shows that the present IUC approach is very effective and can generate excellent results. The 10 years duration, the linkage of research – extension – teaching, training of PhDs in a sandwich construction, the possibility to create a programme of coherent elements, they are all essential elements that lead to success. The ET strongly recommends maintaining the model and has some suggestions to consider:

- The CSS has been very instrumental in boosting output, outcome, quality and inter-disciplinarity of the programme. Favour the integration of a CSS in programmes with a heavy research component and make sure that the selected permanent expert has a good research profile;
- The demand driven approach of the programme is good. However, a good diagnosis is essential for mounting a good coherent programme. The fact that an institution searching for support does often not have the capacity to make a good diagnosis is a weak point of the IUC preparatory process. Expertise comes in at the moment that the basis for the programme has been laid. The MU-IUC programme shows the solution. Own initiative projects can create the fertile basis for an IUC programme as own initiative experts have the opportunity to profoundly get to know the environment for the potential IUC programme. Look for possibilities to stimulate the formulation of IUC programmes that are an extended continuation of own initiative projects;
- Strengthening laboratories has turned out to be a problem and the importance of a focused intervention is apparently underestimated. One of the points that the Flemish programme coordinator would have approached differently were there another opportunity was exactly this. Keep this point in mind when programmes are proposed with laboratory strengthening;
- The integration of Belgian students in the programme has been highly successful and has interesting and important side effects. Stimulate integration of Belgian students in future projects.

Recommendations for the programme

Valuable results have been produced by the programme, also for application for policy making. There should be created mechanisms for continuous and prolonged advocacy with the relevant authorities for the integration of results into policies.

Recommendations for Mekelle University

Staff retention, in particular for technical staff below MSc level is a challenge. Staff turnover at that level has negatively affected programme's results. Serious thought should be given to possibilities to create conditions that persuade technical staff to continue their engagement with MU.

Fund raising for research is essential to continue and build out the results that have been attained with the programme. Capacity for fund raising has been built up but MU could look for ways to strengthen its acquisition capacity and bring talent together. To this end MU could consider to create a unit for acquisition purposes. Talents could be linked to this unit on a non-permanent basis. With such a capacity MU could also go beyond government and donor support opportunities to diversify its research financial base. Examples of options are funding from corporations & private donors, NGOs,

competitive grants for farm technology innovation and the creation of for-profit-businesses as spin-offs of research initiatives.

Research is still weakly developed at MU with the majority of staff considers that teaching is core. Mechanisms for stimulating research should be developed where publications and the acquisition of funding should be rewarded.

An idea to keep in mind may be the option of creating centre of excellence to promote and strengthen research, innovation and knowledge generation and adaptation. MU has the strategic advantage and potential to establish a centre of excellence in drought-prone, poverty stricken dry lands research that could attract assistance from organizations that are interested in changing lives of poor people living in these areas. Strategic alliances could be created with donors and other universities for future joint undertakings, staff exchange as well as training.

Annex 1 References

VLIR, IUC Mekelle Activity Programmes and budgets 2003 – 2007

VLIR, IUC Mekelle Annual and Financial reports 2003 – 2007

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VLIR, Self-assessment reports for all projects jointly prepared by the project leaders on both sides

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David Acker and Aregay Waktola, Report of the Mid-term Evaluation Commission on The Institutional University Co-operation with Mekelle University, Ethiopia

Teshome Yizengaw , The Ethiopian Higher Education; Creating Space for reform, St.Mary's Printing Press,2007,

Mieke Vogels, Higher Education in Ethiopia: Future Challenges, paper produced for wrap up conference on LMDP project, Addis Ababa ,2007

Education Statistics Annual Abstract 2009/10

Annex 2 Evaluation Programme

Date/time	Meeting	Venue
May 14th		
10.00 – 12.00	Mr Peter de Lanoy, Mr Wannes Verbeek VLIR	VLIR-UOS office
13.00 – 14.00	Ms. Martine Dekoninck, ICOS, Ms. Viviane Crabbé, Financial officer	VLIR-UOS office
15.00 – 16.00	Mr Erik Matthijs PL Socio - economic	VLIR-UOS office
16.00 – 17.00	Mr Egbert de Smet PL Library	VLIR-UOS office
17.00 – 18.00	Ms Kristine Walraeven PL Geohydrology	VLIR-UOS office
18.00 – 19.00	Mr Luc De Meester PL Aquatic	VLIR-UOS office
May 15th		
08.00 – 09.00	Mr Jean Poesen PL Land	VLIR-UOS office, telephone
11.00 – 12.00	Mr Dirk Raes PL Crop for Drop	VLIR-UOS office
12.30 – 14.00	Mr Luc Janssen Former VLIR programme coordinator	VLIR-UOS office
May 16th		
11.00 – 12.00	Mr Jan Nyssen Former PL CSS	Skype
13.00 – 14.00	Mr Josse De Baerdemaeker PL Farm	Skype
14.00 – 15.00	Mr Rudy Gevaert PL ICT	Skype

S.N	Day	Time	Activities	Place	Responsible Person
1	May 26	Flight schedule	Arrival of evaluation team	Mekelle Airport	Haile (driver)
2	May 27	9:00-12:00	Overview meeting with MU IUC local steering committee • Each project leader is expected to present 15 minutes power point presentation focusing on the 10 years plan, performance, achievement , challenges and future plans to ensure sustainability of the project initiatives (10 minutes for questions and answers from evaluators)	MU senate hall	MU IUC Project leaders (ICT, Library, CSS, Crop, Socio-economy, Hydrology, Aquatic ecology, Land management and Farm Technology)
		14:00-14:30	Field visit- MU IUC ICT project	MU Endayesus Campus	Ato Amanuel and Ato Girmay
		14:30-15:00	Field visit -MU IUC Library project	MU Endayesus Campus	Ato Gebremedhin
		15:00-16:00	Field visit -MU IUC More Crop Per Drop project	MU Endayesus Campus	Dr. Alemtsehay Tsegay and Ato Negash Aregay
		16:00-17:00	Field visit MU IUC Farm Technology project	MU Endayesus Campus	Ato Petros Gebray
3	May 28	8:00-9:00	Kalamino -Farm mechanization	Kelamino	Ato Peteros gebray
		9:00-12:30	Adigudem -Conservation agriculture (visiting project site+ discussion with beneficiaries+ Discussion with Woreda Office of Agriculture and Rural Development)	Adigudem	Dr. Tesfay Araya and Ato Negash Aregay
		14:00-17:30	Emba-aradom -wind energy (visiting project site+ discussion with beneficiaries)	Emba- aradom	Ato Peteros gebray

4	May 29	7:00-13:00	Tekeze- Fish cooperatives (visiting project site+ discussion with beneficiaries and woreda administration)	Tekeze	Dr. Kassa Amare Ato Peteros gebray
		14:00-17:30	Field to Hagereselam- (visiting apple and conservation agriculture sites + discussion with beneficiaries and woreda administration)	Hagere selam	Ato Negash Aregay Dr. Kassa Amare
5	May 30	8:00-17:00	Tsinkanet and Arbha Atsbiha (visiting Hydrology and watershed management site)	Tsinkanet and Abrha Astbiha	Dr. Kassa Amare Dr. Amanuel/Dr Kassa Dr. Tesfamicael
6	May 31	8:30-10:00	MU IUC visit- Biology Laboratory	MU Campus	Dr. Tsehaye Amelash and Dr. Tadesse Dejene
		10:00-12:30	Discussion with MU IUC management and staff	MU IUC office	Dr. Kindeya Gebrehiwot Dr. Kassa Amare Ato Nahusenay Teamer Ato Mulugeta Hagos
		14:00-17:00	Discussion with Regional Bureau of Agriculture and Rural Development, Relief Society of Tigray , GIZ and Tigray Youth Association	Respective Offices	Dr. Tesfay Araya Dr. Kassa Amare Ato Negash Aregay

Annex 3 Specific project objectives Phase I and Phase II

Project title	Specific Objectives Phase I	Specific Objectives Phase II
ICT	The ICT usage in all domains of the functioning of the university has been enhanced and optimized in a sustainable manner and relative to the growth of the faculty and student community.	Optimize network and internet connection; enhance network-based services; increase the number of PC's and pools and ICT support empowered in all campuses; improve ICT technical and management skills; establish an integrated university wide automated system; establish a profitable ICT competence centre; refine ICT policies and increase awareness of end-users
Library	MU Library is providing quality information services using modern software and technology and tailor-made information services for an increasing number of faculties and students	The MU library is capable of providing proactive library and information services using both its own library materials and the relevant part of the virtual stock of knowledge available worldwide; the MU library becomes an interesting place for users to read and research; the MU library becomes an attractive place for the library staff to work and also attracts qualified personnel; the MU library copes with the special challenge of the very high growth of student population at MU; the MU library is appreciated as a valuable agent in the preservation of regional and national cultural heritages.
IMPCD	MU will have trained laboratory technicians, financial and administrative personnel	-
CSS	At the end of the project life, the MU local staff will be capable of developing research methodologies and coordination capacity. The MU research staff will develop research and publication experiences that can be sustainable in the future	At the end of the project life, local academic staff will be capable of developing research methodologies, co-ordination capacity and skills in organising international conferences and special issues of international journals; the MU research staff will develop experience that can be sustainable in the future; new extension approaches are developed
Crop	At the end of the project MU is well-qualified in running field experiments under a controlled environment and on farmers field, and it is a centre for processing of climatic, soil, crop and irrigation data for predicting crop yield under different water supply and agro climatic conditions; irrigated crop production in the northern region of Ethiopia is improved by taking into account the limited water resources.	Research and academic capacity on improvement of crop productivity under rain-fed and irrigated conditions of Mekelle University has increased; crop and livestock productivity in the northern dry region of Ethiopia is improved through integrated crop management and water saving techniques by taking into account the limited water resources
Socio	To enhance the capacity of teaching and research in socio-economics. This includes development of a rural development centre to enhance research activities in rural development; new ways of financial product delivery systems, ways of strengthening local institutions that promote growth in the rural	To enhance the capacity for teaching, consultancy and research in socio economics. This includes one major publication per year for the five years, consultancy service in the area of socio economics and strengthening of the rural development center to enhance research activities in rural development. Research outputs and practical

	areas and market orientation and diversification of income generating means of the rural poor identified, analyzed and promoted.	information obtained from field work will be used to supplement the teaching learning process. The different courses that deal with development matters- especially with rural development, Marketing and Credit management will use the practical information to support the theories taught. This will make the curricula of the University in general and the faculty in particular a practice oriented one; Dissemination of research findings and intervention proposals; promoting policy dialogue with policy makers; documenting success stories and promoting dissemination of best practices to promote innovation; and providing tailor made trainings so as to enhance rural income.
Hydro	At the end of the project MU will be one of the leading centres in surface and groundwater assessment and management studies. This includes capacity building, understanding the surface and subsurface water harvesting techniques, surface water and sub-surface water modelling; improving the water resource problem of the catchment by outlining areas of surface and sub-surface water that can provide adequate water for various development activities	To increase the research and teaching capacity in the field of surface and subsurface water resources. This is at the heart of the project to elevate the teaching and research capacity of the university through different scholarship opportunities (PhDs, MScs, and short visits and trainings), experience sharing with the north partners, upgrading laboratory and field equipment, and through using research output and experience as teaching materials and case studies
Aquatic	At the end of the project MU will be one of the leading centres in Aquatic Ecology assessment and management studies; develop guidelines on the structure and functioning of the micro-dams as well as on the sustainable management of standing waters in the region.	At the end of the project, Mekelle University is a leading centre in aquatic ecology of reservoirs and other standing waters; this includes expertise and capacity to study abiotic conditions, the biota and ecological relationships, parasites and vectors, fish, water quality and health in standing waters as well as to assess the impact of management practices on the ecological structure and functioning of standing waters; Tools (guidelines, recommendations; extension) to decrease health risks associated with the use of water from the microdams and to increase the added value (fish protein, good quality water for harvesting, biodiversity) and capacity for sustainable management of the microdams are provided.
Land	At the end of the project MU is a leading centre of excellence in sustainable land resource management; this includes capacity building in the assessment of different land degradation processes and controlling factors leading to sediment production, transport and delivery as well as to sediment-fixed nutrient movement within the catchment; develop and provide tools and guidelines to stakeholders to increase capacity in mitigating land degradation and sustainable land management at catchment level	At the end of the project MU is a leading centre of excellence in sustainable land resource management; this includes expertise and capacity to assess the importance of the different land degradation processes and controlling factors leading to runoff, sediment production, transport and delivery as well as to sediment-fixed nutrient movement (sources and sinks) within the Geba catchment; to understand the nutrient cycling under different land management practices and thereby develop integrated soil fertility management technologies. The main aim of the forest management activities within the Land project is to design sustainable management practices for forest resources in Geba catchment with a focus on exclosures and high forests. The development of spatially explicit land

		use scenarios for the time period 2010-2030 for a number of representative catchments within Geba River basin will be used as an input to quantify the effects on various environmental problems; Tools (guidelines, recommendations, participatory methodologies, atlas of Geba catchment) developed and provided to the stakeholders which increase capacity in mitigating land degradation and sustainable land management at catchment level.
Farm	The capacity of MU to undertake interdisciplinary research in farm technology for Vertisol management will be improved; develop appropriate cultivation tools for Vertisol that could be adopted by farmers.	If Mekelle University attained enhanced research culture and academic excellence, this should be reflected in international publications and overall quality of the work. There will be 2 PhD (on tillage operation and rural energy), 3 local MSc, and 6 short-term trainings; and it is expected to have 12 publications at international peer-reviewed known journals; The scientific findings will help in deriving recommendations on Vertisol management that leads to significant productivity increment of Vertisol. Appropriately designed cultivation tools and tested two-wheeled tractors and supplementary equipment will be ready for demonstration. The technologies are then ready to be disseminated with financial support of Bureau of Agriculture, NGOs, and rural promotion centres...via extension agents; Prototypes of alternative energy resources will be developed and installed, and then the technology will be ready for dissemination via governmental and non-governmental sectors; Appropriate post harvest technology practices and technologies will be developed and introduced.
PSU	Technical and financial reports (quarter and annual) are prepared and submitted; Procurement of consumable and non-consumable items are facilitated; Programme implementation is properly monitored and evaluated; important events, meetings and workshops and seminars are organized	Technical and financial reports (quarter and annual) are prepared and submitted; Procurement of consumable and non-consumable items are facilitated; Programme implementation is properly monitored and evaluated; important events, meetings and workshops and seminars are organized,

Annex 4 Clarification of table 1

Rural Energy: hybrid solar/wind power generation, supported by the Socio team for economic assessment of the developed technology

Livestock feeding: a spin-off project. The project focuses on quality of dairy products from peri-urban o-grazing livestock

Bees: The platform for this project is the spin-off project Ma'ar. The Socio-economics project is looking at quality and value chains of honey. Also the Crop project apple research is involved in view of the pollination of apple flowers

Forest Management: Three multidisciplinary PhD' s involved: forest management (including economics), access and agency of community-based natural resources management, hyena's

Rodents: PhD supported by the Land, Crop and socio-economics projects

Conservation agriculture: Bridging the Crop, the Land and the Farm technology project.

Extension: Although extension is part and parcel of all MU-IUC projects, right from the research stage, we also had as of Phase II an explicit project on rural extension, which was headed by Dr. Kassa, the local Research Coordinator. This project has been spearheading extension and up-scaling of technologies such as apple, bee keeping, fishery development on Tekeze reservoir. Projects implicated are: Crop, Farm, Geo-hydrology, Socio, Aquatic ecology and Land

Surface water-health: indirectly in place through MU-IUC mediated linkage of MU Reference Hospital and (1) Thomas More University College of Geel and KU Leuven Gasthuisberg

Cultural Heritage: PhD theme.

List of abbreviations

ADLI	Agricultural Development Led Industrialization
CSS	Cluster Support Services
EPRDF	Ethiopian People's Revolutionary Democratic Front
ET	Evaluation Team
ETC	Ethiopian Telecommunications Corp
FBE	Faculty of Business and Economics
FGD	Focused Group Discussions
GTP	Growth and Transformation Plan
HRD	Human Resources Development
ICOS	Institutional Coordinator for Development Cooperation
ICT	Information and Communication Technology
IUC	Institutional University Co-operation
KRA	Key Results Area
MDG	Millennium Development Goals
MoE	Ministry of Education
MoFED	Ministry of Finance and Economic Development
MU	Mekelle University
NGO	Non-Governmental Organisation
NORAD	Norwegian Agency for Development Co-operation
PASDEP	Plan for Accelerated and Sustained Development to end Poverty
PCM	Programme/Project Cycle Management
PL	Project Leader
PRA	Participatory Rural Appraisal
REST	Relief Society of Tigray
SDPRP	Sustainable Development and Poverty Reduction Programme
TOR	Terms of Reference
VLIR-UOS	Flemish Interuniversity Council – University Development Cooperation

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