DEMAND DRIVEN EDUCATION

Report on the Education Innovation Project
'Design in Land and Water Management in a
Demand Driven Learning Environment'

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Chapter 1. Introduction

1.1 Design in Land and Water Management

In the fifth period of the academic year 2008/2009 the chair groups Irrigation and Water Engineering (IWE) and Land Degradation and Development (LDD) organized a new course, i.e. Design in Land and Water Management 2 (IWE-21312). The course is part of the BSc program International Land and Water Management (BIL). The decision to develop the course can be seen as a measure to ensure that BIL-graduates understand, can analyze, and are able to engage in and to advise on typical design processes as part of their professional practice as irrigation and soil- and water conservation experts. Also based on recommendations 'from the field', the design processes for irrigation development and for soil- and water conservation should be considered in an integrated manner.

In line with the principle of concentric learning that underpins the BIL-program, the course was scheduled at the end of the fifth period of the second year. The course sought to engender a learning process of and among students in which they would apply and integrate the knowledge and skills acquired in the year's previous courses[1]. Inspired by semester/trimester-long design courses that featured in the Tropical Land and Water Management programs in the 1980s and 1990s, we opted to select a concrete case to facilitate the envisaged learning process.

Further, we figured the course should simulate reality as much as possible by confronting the students 'with typical demands for technical assistance for small scale irrigation development (up to 500 ha) and for soil- and water conservation (at field and small catchment levels), meant to contribute to poverty eradication/rural development' (Study Handbook 2009/2010). It was envisaged that one area needed to be selected where both soil- and water conservation and irrigation issues would be relevant. In practice this meant that we had to identify a small watershed. Moreover, the foregoing also implied that the notion of demand-driven learning activities was part and parcel of the initial ideas for the course.

1.2 Demand driven education … at course level

In April 2008, the project group that explored the possibilities of demand-driven education at Wageningen University published its report[2]. One of the recommendations was to start pilots to test the ideas of demand-driven education in practice. The OWI-call for Small Projects for Innovation of Education provided us the possibility to develop the course Design in Land and Water Management 2 in a demand-driven learning environment.

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[1] Similarly, the first year of the BIL-program is concluded with the course 'Design in Land and Water Management 1'(LDD-11806). The third year ends with the BSc-completion (currently with the courses LDD-80806 and IWE-80806; replaced in the academic year 2010/2011 by YRM-21306 and a 12 ECTS BSc-thesis).

[2] Faye-Visser, Saskia, Remmers, Marianne & de Vos, Bram (2008) Vraagsturing in het onderwijshuis van Wageningen UR – Professioneel, Persoonlijk, Prikkelend, WUR.

It is important to note that the report of the project group dealt with demand-driven education at the level of the study program of individual students: they choose courses and other learning activities to realize the competences as formulated for their specific study program (and, by doing so, they are expected to be optimally prepared for the demands of the labor market). This notion of demand-driven education is also found in higher professional education in the Netherlands[3].

While using the same term, we developed a single course wherein students:

a) learn to respond to typical demands for technical assistance (as a simulation of their professional practice) by analyzing these in technical, socio-economic and political terms and by designing appropriate interventions; and
b) learn to apply and integrate the knowledge and skills already acquired and to articulate their demands for new knowledge and skills (which are necessary to better respond to the demands for technical assistance).

In relation to the articulation of demands for new knowledge and skills it is important to mention that the professional practice in land and water management is typically characterized by contestation over access and control over land, water and other natural resources. In these kind of situations, it is difficult to apply standardized procedures. Indeed, these situations require flexibility, creativity, and an investigative mindset on the part of the land and water manager. Instead of posturing as the all-knowing expert, the land and water manager often needs new information and/or has to engage with relatively unfamiliar disciplines. Hence, the land and water manager is often demanding new information and knowledge, which he/she needs to integrate with already acquired competences. Indeed, the land and water manager needs to develop an interdisciplinary understanding of his/her domain.

Given further that existing information on land and water management is often outdated, biased or simply absent, it can be argued that land and water managers regularly work with incomplete information and data sets. On the short term, this triggers intellectual demands on how to deal with these situations of uncertainty. On the longer term, it reinforces the land and water managers' quest for better information and data (if only to monitor and evaluate the effectiveness of interventions).

Given the foregoing, we considered the enhancement of the students' capacities to develop an interdisciplinary understanding of the domain and to deal with uncertainties as the ultimate challenge of the course. Indeed, we

[3] See for an interesting practice-based account: Andrioli, Tony, de Jong, Kees & Langerak, Sanna (2007) Daar vraag je me wat – Competentiegericht Vraaggestuurd Onderwijs in de Praktijk, Bohn Stafleu van Loghum, Houten.

wanted them to develop their 'reflexive' skills[4] and to abandon the idea that 'the correct way' of doing things and 'the truth' exist.

The best indicator for the development of these capacities is that students are increasingly capable to pose 'clever questions'. These are questions that cannot be easily answered; in the search for answers teachers have to think along. Not so much to come up with joint answers, but to raise the awareness that answers are always temporary in nature and lead to new questions. Bruining (2008)[5] defines this as the emancipatory character of demand-driven education.

The key to success for a course like this is to facilitate the students' learning process by providing them with clear assignments (focusing on actual demands from real people with existing problems) and by timely and accurately responding to 'clever' questions that come up while carrying out the assignments[6]. It is because of the latter that demand-driven education can be seen as an effective organizational set-up to stimulate problem-based learning.

1.3 Demand-driven education at WUR – Objectives of the report

At the time that we started our endeavors, the Education Institute launched a call for innovation projects. In our project proposal we explained that the experiences and insights we would gain while designing and implementing the course, would be relevant for other teachers at the University. Especially in case they would be planning to develop their courses along the lines of demand-driven education. We assumed that our colleagues would specifically be interested in do's and don'ts and/or in tips and tricks.

Apart from this rather specific usefulness, we figured that the University as a whole could benefit from our experiences and insights, should the organization decide to stimulate demand-driven education as a general policy. In this context, our insights about the effectiveness and efficiency of demand-driven education would be relevant.

In this report, we will pay attention to both sets of interests. The report is, however, also meant for ourselves and geared towards an improvement plan for the course itself. In the past academic year (2009/2010) we wanted to improve the organization of the course and our performance in it[7].

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[4] See for a more elaborate description: Robbins, Peter T. (2007), The Reflexive Engineer: Perceptions of Integrated Development, Journal of International Development, Vol. 19, p. 99-110.

[5] Bruining, Ton (ed.) (2008), De logica van vraaggericht leren, Garant, Antwerpen/Apeldoorn.

[6] It is an important point of evaluation whether the didactic approach is suitable for all students, and whether all teachers are comfortable with this way of education

[7] Due to the delay in finalizing this report, some of the improvements have already been implemented. We will pay attention to these in the footnotes.

1.4 Reader's guide to the report

The report is presented in a chronological order. In chapter 2 we will present the steps taken in the preparation phase. Chapter 3 discusses the actual conduct of the course. Chapter 4 deals with examination, while Chapter 5 presents the main outcomes of the course evaluation, both from the perspectives of the students and from our own viewpoints. In Chapter 6 the conclusions are presented.

In the document different text boxes are used to highlight our experiences and insights for the different 'target groups' of the report:

☝ Do's, dont's, tips and tricks, especially meant for our colleagues

🏛 Insights and experiences, relevant for WUR-policy makers

☺ Our own plans for improvement

Chapter 2. Course Preparation

This chapter presents the steps we took in designing the course. First we will explain how the course fits in the BSc-program International Land and Water Management (section 2.1). Then we proceed (in 2.2) with a discussion on the teaching methods and learning activities. Finally, section 2.3 outlines what learning material was developed.

2.1 The course as part of the BIL-program

The course Design in Land and Water Management 2 (IWE-21312) is part of the BSc program International Land and Water Management (BIL), which focuses on the sound management of the natural resources land and water in view of safeguarding sustainable agricultural and equitable economic development in different eco-regions in the world. The integration of natural sciences and social sciences is at the forefront of the program (Study Handbook 2008/2009).

Concretely, on completion of the BIL-program the graduates are expected to:

a) be able to identify and analyze, at a basic level and under supervision, the various problems at play with regard to the use, distribution and management of land and water resources in the world;
b) be able to identify the various stakeholders and their interests in land and water in agriculture and rural development;
c) be able to, together with relevant stakeholders, develop, design and propose alternatives and improvements at a technical, policy or institutional level; and
d) have developed a problem oriented and interdisciplinary attitude (Study Handbook 2008/2009).

The course Design in Land and Water Management 2 (IWE-21312) should strongly contribute to the development of all four competences as shown by the learning outcomes. At the end of the course, the students should able to:

a) Analyze the demand for assistance in technical, socio-economic and political terms;
b) Design appropriate irrigation measures/systems and soil- and water conservation measures (including financial planning);
c) Assess the expected performance of the interventions (technically and socio-economically);
d) Present and defend the proposed interventions in a professional manner (report and Power Point) in front of an expert panel.

☝ Whereas the course developers are aware of the need to fit a course into a study program, it is important to share this information with students. Most of the course participants were unaware of the learning outcomes of the study program!

As stated in chapter 1, the purpose of the course was to engender a learning process of and among students in which they would apply and integrate the knowledge and skills acquired in the year's previous courses. Students attending this course were supposed to have at least completed the following courses: Irrigation and Water Management (IWE-10306), Erosion and Soil and Water Conservation (LDD-10306), Design in Land and Water Management 1 (LDD-11806) and Introduction to Hydraulics (HWM-21806)[8]. We took the learning outcomes of these courses as the assumed initial knowledge level for our course[9].

2.2 Teaching methods and learning activities

Before we started with the design of the course and with the selection of teaching methods we visited Van Hal Larenstein (VHL) in Velp to exchange ideas and experiences with demand-driven learning. At VHL use is made of concrete cases as learning environment. This matched well with our ideas to have the students work on a concrete case. We decided that the Rau River Basin (Kilimanjaro Region, Tanzania), that includes degraded uplands and the Lower Moshi Irrigation Scheme, as the course case.

One of the activities used at VHL is the writing of a personal development plan. This helps the students to think about their personal learning objectives. A self assessment is part of this plan. This contains questions about the student's strengths and weaknesses on knowledge and skills relevant for the practical. We did not yet include this activity in our course[10].

We designed the course as composed of two blocks. The first block of 4 ECTS (112 hours) had a focus on 'design preparations', while the second block of 8 ECTS (224 hours) focused on 'design processes and results'.

Block 1: Design Preparations

During the first block, students were expected to become able to:

a) Explain the different steps in design processes;
b) Analyze demands for technical assistance;
c) Know the design principles of irrigation and soil and water conservation design; and
d) Apply the design principles as mentioned above.

To reach these learning outcomes the students teamed up in pairs to analyze the demand for technical assistance, to acquire the knowledge on design principles and to come up with an appraisal report. The main inputs for the

[8] Students who did not meet these requirements were advised not to participate in the course.

[9] Meanwhile, it has been decided to develop the students' basic engineering knowledge and skills before the start of IWE-21312 (instead of doing this in the course). The basics of this subject is taught in the new course Land and Water Engineering (LDD-20306), which is another prerequisite course for the year 2010/2011.

[10] Given the experiences gained in the first two runs of the course, it is worthwhile to reconsider this decision.

report could be obtained from lectures and assignments, wherein students were also supposed to acquire new knowledge and skills.

As detailed in the course guide (see Annex 2) the first block was meant to provide the students with a solid basis for the second block. We assumed that students could develop their understanding of the basics of land and water engineering by attending lectures and doing assignments, and simultaneously could increase their understanding of the people in the project area and their problems. As will be shown later in the report, this turned out to be a design error: it is difficult to for students to acquire knowledge and skills and immediately apply these productively for the appraisal. Also the assumption that students would be able to formulate demands for additional lectures turned out to be too optimistic[11].

☝ It is quite hard for students to acquire knowledge and skills and to use these simultaneously in assignments for another purpose. It is better to separate the two learning activities.

Block 2: Design Processes and Results

The second block of the course of 8 ECTS (= 224 hours) focused on 'design processes and results'. At the end of the second block students are supposed to be able to:

a) Respond to demands for technical assistance in the form of technically well-founded designs (one for irrigation and one for soil and water conservation);
b) Explain the expected performance of the proposed interventions (technically and socio-economically);
c) Present and defend the proposed interventions in a professional manner (report and Power Point) in front of an expert panel;
d) Formulate the demands for knowledge and skills in a purposive manner; and
e) Cooperate productively in a team.

During this block larger groups (of about six to eight persons) would be formed, based on the degrees of similarity of the appraisal reports. This proved to be impossible. It was then decided to put the best performers of Block 1 in one team (the A-team). The rest of groups were formed more or less at random.

In the second part the students had to make a technical design consisting of a soil and water conservation plan for the upper part of the catchment focusing on the erosion problems and water shortages in the rain fed areas, and an irrigation plan for the irrigated land that deals with the problems identified in the first part.

[11] See footnote 9.

The students were provided with an invitation letter (with Terms of Reference) to develop their plans. They could demand for lectures and other inputs from staff. Further they could consult the experts from Tanzania and the two Chief Technical Advisers.

2.3 Learning material

Quite early in the process it was decided that the course would make use of Black Board as the digital learning environment. On Black Board the students could find modules dealing with the essential topics related to land and water engineering. The choice to develop modules was inspired by the idea of demand-driven education: they would offer the students the flexibility to engage with the course topics at any time and location, and repeat it (if necessary). All modules consisted of an introduction to the topic, one or two relevant papers, a recorded lecture, video clip/slide show, and a self test.

The video clip or slide show were made during a short mission of three of the involved staff to the Rau River catchment in Tanzania[12]. This area had been selected, because it offered nice opportunities for design efforts in both the domain of soil and water conservation as well as irrigation development. Quite some information was already available in Wageningen, but it was decided that it should be updated and expanded. Several contacts in the area were mobilized successfully. Essential stakeholders were interviewed (while being recorded on video). Essential data were gathered. All material was made available for the students on Black Board.

The staff members had limited experience with developing a digital learning environment in Black Board. The structure of the site turned out to be difficult to grasp for students. During the course, we also found out that digital learning environments are vulnerable: the site was down, exactly at the moment that students were preparing for the exam of Block 1.

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[12] It would have been very useful to organize a field trip to Tanzania with all the students. Since this was not possible, we decided to get as much 'live' information and other data from the area. Further, the presence of the two Tanzanian experts also helped to give the students first hand information.

Chapter 3. Teaching in a demand driven course

This chapter presents the experiences gained in the actual conduct of the course. Some have been discussed briefly in previous sections. Here, the essential issues will be dealt with (i.e. those related to the demand-driven nature of the course)..

3.1 Lectures on demand

The first four weeks of the course consisted of a combination of (1) an assignment on the analysis of the situation regarding water and land use in the case catchment and the writing of an appraisal report and (2) lectures on design principles as provision of essential knowledge needed for the design exercise in the second half of the course. In both elements 'lectures on demand' played a role, but in different meanings.

About half of the lectures on design principles were video-recorded before the start of the course and uploaded on Black Board for playback on demand. The other half of the lectures were given classically. The idea of the video-recorded lectures connects to an interpretation of demand-driven education where students are in the driving seat to determine which lectures they will 'attend', in which order, at which speed they will play them and when they will do that. The techniques available for this are more than adequate.


Once recorded the lectures can be used for several years, which after an initial investment could mean a significant time saving in consecutive years.


Video-recorded lectures have to be of a very high quality, as students are more critical when watching these from their computers, in their own pace and with the opportunity to freely comment while watching.

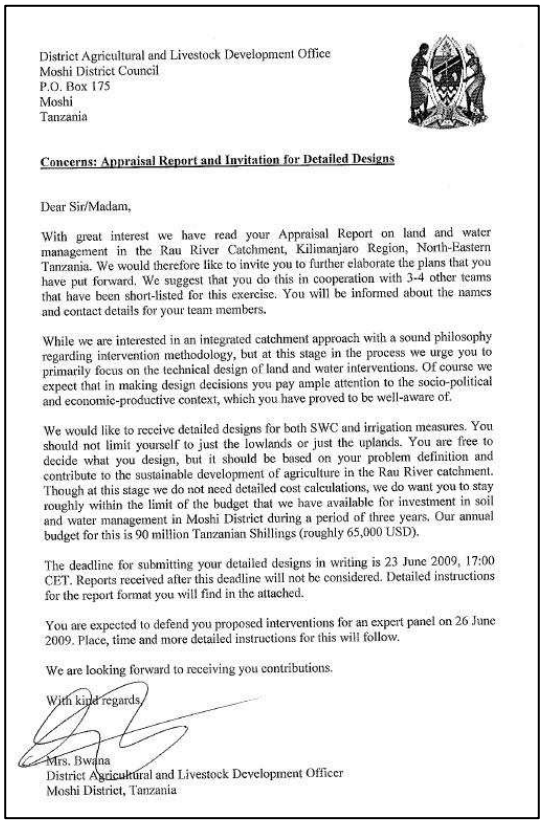
Also as part of analysis of the situation regarding water and land use 'lectures on-demand' were provided. However they were 'on-demand' in a different meaning, i.e. students could indicate their needs and interests for tailor-made lectures in addition to a variety of sources that were provided on Black Board. These other sources included a selection of academic literature, photo galleries on the case study area, video recorded interviews with stakeholders, scanned reports and various data sets on for instance climate and land use. Topics of interest were listed during weekly plenary evaluation and discussion meetings held on Thursdays. The Monday morning slot was reserved for the on-demand lectures. The room for such lectures continued into the second half of the course. In total five such lectures were arranged for; three by staff from WUR (external to the teaching team) and two by Tanzanian experts visiting (see section 4.4).

For some of these lectures it was difficult to arrange them at the last moment, while other requests could not be met at all.

☺ Some of the requested topics for on-demand lectures could have been foreseen. For these topics it seems more logical and effective to arrange such lectures in the coming years before the start of the course.

3.2 Group work

For the design exercise groups of six to eight students were formed on basis of the couples that had worked together on the analysis of the situation in the first four weeks of the course. The new groups formulated their own problem analysis and strategy to come to new design in land and water management. The assignment that they received for this consisted of a (fabricated) letter written to them by the District Agricultural and Livestock Development Officer of Moshi District (see figure)



District Agricultural and Livestock Development Office
Moshi District Council
P.O. Box 175
Moshi
Tanzania

Concerns: Appraisal Report and Invitation for Detailed Designs

Dear Sir/Madam,

With great interest we have read your Appraisal Report on land and water management in the Rau River Catchment, Kilimanjaro Region, North-Eastern Tanzania. We would therefore like to invite you to further elaborate the plans that you have put forward. We suggest that you do this in cooperation with 3-4 other teams that have been short-listed for this exercise. You will be informed about the names and contact details for your team members.

While we are interested in an integrated catchment approach with a sound philosophy regarding intervention methodology, but at this stage in the process we urge you to primarily focus on the technical design of land and water interventions. Of course we expect that in making design decisions you pay ample attention to the socio-political and economic-productive context, which you have proved to be well-aware of.

We would like to receive detailed designs for both SWC and irrigation measures. You should not limit yourself to just the lowlands or just the uplands. You are free to decide what you design, but it should be based on your problem definition and contribute to the sustainable development of agriculture in the Rau River catchment. Though at this stage we do not need detailed cost calculations, we do want you to stay roughly within the limit of the budget that we have available for investment in soil and water management in Moshi District during a period of three years. Our annual budget for this is 90 million Tanzanian Shillings (roughly 65,000 USD).

The deadline for submitting your detailed designs in writing is 23 June 2009, 17:00 CET. Reports received after this deadline will not be considered. Detailed instructions for the report format you will find in the attached.

You are expected to defend you proposed interventions for an expert panel on 26 June 2009. Place, time and more detailed instructions for this will follow.

We are looking forward to receiving you contributions.

With kind regards,

Mrs. Bwana
District Agricultural and Livestock Development Officer
Moshi District, Tanzania

The assignment was very open – within the limits of a provided budget basically any (technical) intervention in land and water management could be chosen as a design problem. This challenged students to think about the differences in defining problems between different stakeholders and the way in which infrastructure fits into existing patterns of agricultural production and resource use. Groups were stimulated to formulate their demands for the information on the existing situation as well as the necessary inputs for designing the actual interventions. The variety of directions in which solutions were sought were very broad and often surpassed the readily available knowledge among the teaching staff. We tried to respond to these demands with arranging on-demand lectures, pointing specific questions to colleagues that were not directly involved in this course, getting two Tanzanian experts to Wageningen for a week and by thinking along with students on how to get certain information, how to come to realistic estimates if data cold not be realistically be expected to be found easily or how to change procedures in order to avoid the problems of missing information.

3.3 Daily supervision

All six groups had a primary supervisor in the form of one of the six staff members from the teaching team. These supervisors provided guidance on

the groups process where necessary for progress on the content. All the groups had their weekly progress meetings on Thursday afternoon in which their primary supervisor would join. After finishing these group meetings the teaching team would meet to discuss on the needs for additional information, steering or adaptation as well as on requests for on-demand lectures.

Furthermore these six staff members were available during specific time slots in the week. It was organized in such a way that always one of the staff members was available for questions. The competencies and specializations varied widely between the six staff members and this was made clear to the students. Students were expected to keep their specific questions for the time slot that the fitting staff member would be present.

3.4 Collaboration with practitioners

Two Tanzanian experts were flown in to be available during one full week of the practical. They are an irrigation engineer and a engineer specialized in soil processes, both working since long in a NGO active in the case study area in land and water intervention programs. They gave on-demand lectures, relevant contextual information like prices, travel times and acceptable risks, as well as practical rules of thumb they use in designing their interventions. Furthermore, they were available for in depth groups discussions, in which they answered more specific questions that the individual groups encountered in their design.

Their visit was midway the design process so that the groups had already made some plans. The level of the many questions that the students formulated greatly surprised the Tanzanian experts and challenged them to rethink their work and how to get required information. It was an impressive sign of the curiosity and demand for information that was raised in the students in the weeks preceding the visit. Many students expressed that they learned very much from these experts and that they greatly helped them to accomplish their designs.

☺ The visit of the two Tanzanian experts towards the end of the practical proved to be very well timed, making visible that students developed a strong drive to learn about the case study area and how to develop fitting designs.

We hired two Chief Technical Advisors (CTAs), people who are highly experienced in designing interventions in land and water management in a development context. One CTA was an expert on land related designs, the other on water related designs. Each CTA was available for one relatively short meeting (1 hour) with each group to discuss their (preliminary) designs. The CTAs gave feedback on the plans (also as preparation for the final report and oral presentation). In the final stage of the course the two CTAs were also involved in assessing the designs and the defense thereof.

Chapter 4. Examination

The project group that explored the possibilities of demand-driven education at Wageningen University already concluded that standard written exams are not suitable when students can take different trajectories towards realizing the defined competences[13]. For this course, we also tried to identify valid, reliable and practical assessment methods.

4.1 General procedures

Since the course was divided into two blocks, and because a successful completion of the first block was a prerequisite for starting with the second block it seemed logical to split the examination into two separate blocks as well. We will discuss the examinations below.

The learning outcomes of Block 1 are related to the acquisition of theoretical knowledge on design processes and principles, the analysis of demands for technical assistance and to the application of the basic design principles.

We decided to test the obtained theoretical knowledge through an online individual multiple choice exam. The capacity of students to analyze the demand for technical assistance was assessed through the appraisal report that couples had to hand in at the end of Block 1. Further we decided that the learning outcome related to the application of basic design principles would not be assessed formally in block 1. Through the exercises that students had to hand in the involved teachers could observe whether the desired level was reached and all students did obtain feedback on their design exercises.

The learning goals of Block 2 are related to the development of technically well-founded designs including a clear explanation of their expected performance and the presentation and defense of the proposed interventions in a professional manner in front of an expert panel. In the process of developing the designs students would learn to articulate their demands for knowledge and skills in a purposive manner, and to cooperate productively in a team.

For the examination of Block 2 it was decided that the quality of the design and its oral presentation would be assessed through a mark for the report and the presentation of the group. The capacity of the individual group members to defend the proposed intervention was assessed through an oral defense in front of an expert panel. The other learning goals were not formally assessed in Block 2.

To arrive at the final course marks, we used the following weights of the different components:

[13] Faye-Visser, Saskia, Remmers, Marianne & de Vos, Bram (2008) Vraagsturing in het onderwijshuis van Wageningen UR – Professioneel, Persoonlijk, Prikkelend, WUR.

Block 1: Individual written exam, multiple choice (25%) Block 1: Report and work process of each couple (15%) Block 2: Report and work process of each team (35%) Block 2: Individual defense in front of the expert panel (25%) All marks should be > 5.5.

According to the examination regulations of Wageningen University students have the right to take 3 examination chances in one academic year. Since the successful completion of Block 1 was required to could start with Block 2, we decided that students could do a re-exam within one week after the multiple choice exam. If necessary, a third possibility would be offered in the form of an oral exam. Students that would have a mark below 5.5 for the appraisal report of Block 1 would have one chance to improve the report and bring it up to standards.

4.2 Individual multiple-choice exam

The main reason to organize an exam was to test whether the students had obtained the required level of knowledge and understanding of the offered theory. To test students on knowledge and understanding the multiple choice exam is a suitable method. Since we required a fast analysis of the results it was decided to use the software Question Mark Perception and have an online exam.

From the theory presented 10 essential main topics (see box below) were selected and formed the contents of the exam. The remaining topics were either refreshments from previous courses or new topics that could be examined in a later stage of the course. Training questions (multiple choice) and explanation on the theory were developed for some topics and made available on Black Board. For the other topics no training was available in the examination format but feedback was provided on the exercises that were made and handed in.

Topics for the multiple choice exam	
1) Design process and/or environmental scan 2) Erosion risk assessment 3) Discharge Assessment 4) Soil Management 5) Crop and vegetation management	6) Wind erosion control and dune fixation 7) Canal Design and structures 8) Head works 9) Canal structures 10) Drainage

It was decided to have 5 questions for each topic, 3 on the level of knowledge and 2 on the level of understanding. This resulted in an exam of 50 questions; with a maximum duration of 2 hours. The staff prepared a pool of questions from which the software would randomly pick questions (under the preconditions that for each topic 3 knowledge and 2 understanding type questions would be selected).

Students did have 1.5 days (+ weekend) without course activities to finalize the appraisal report and to study for the exam. Three days before the exam Black Board had an interruption and was not accessible for 2.5 days. During the weekend no ICT support was available and since all theory was offered

through online lectures, and pdf-files on Black Board it was decided to postpone the exam with 2 days.

From the 44 students, 37 passed the exam and 7 failed. The average mark was 6.1. One student wanted to increase his mark and therefore 8 students did the re-exam, which was held 5 days after the first exam. Six students passed and 2 students had to do an oral exam and passed this exam.

Since the exam was made worse than expected by the staff, it was decided to discuss a selection of the questions with the students. The main conclusions were that students were not prepared well for the type of questions, that quite some questions were subject to debate, that some students had problems doing a multiple choice exam and that some students had problems doing an exam on the computer. The failure of Black Board before the first exam caused quite some stress among the students.

☝ The EDU support course “tentamineren” provides insights in design of exams and gives training in the formulation of exam questions. Useful for lecturers who are willing to test and/or change the examination procedure of their courses.

☺ Provide extra training questions on blackboard

☺ Improve the question database through using the suggested improvements from the students and by cross-checking of the new questions by fellow lecturers and students.

🏛 A well working and accessible Black Board is a prerequisite for demand driven education. In case of ICT-failure, support should be available also during the weekend

4.3 Appraisal reports

During Block 1 students worked in couples on assignments and to write an appraisal report. The purpose of the appraisal report was to describe and analyze a number of key issues and/or parameters in relation to land and water management in the area of investigation. Through the appraisal report the staff wanted to assess whether the students are capable of analyzing the demands for technical assistance.

As described in the assignment students should gather information on most issues and/or parameters by doing the assignments provided on Black Board. Students could obtain feedback from staff on all the assignments. In the box below the assessment and grading procedure of appraisal reports is presented:

Contents (80%)
- Clear and concise description of the situation in the area (10%)
- Sound and justified use of the results of the assignments for the description of the situation and the problem analysis (30%)
- Clear and substantiated problem definition (see format!) (30%)
- Clear description of the envisioned ways of addressing the problem(s) (10%)

Form (20%)
- Well formatted document in correct English (15%)
- Correct referencing (5%)

The overview was made available only 4 days before the report was to be handed in. We decided that each report would first be graded separately by 2 teachers; one from the IWE and one from the LDD group. Then the teachers would together come to a final mark for the report. The students obtained a review report including the final mark, the marks for the separate sections and additional remarks on the overall report. Though the working process in couples was explicitly said to be part of the assessment, it was not included.

During the practical work students were more involved in finalizing their assignments and often forgot to merge the results in their reports. Further, students were uncertain about the required information and the format in which they should merge the assignments into the report. As a consequence students complained about the available time for report writing, for which only 1 day was explicitly reserved.
To help students merging the assignment results into the appraisal for some assignments it was explained what type of information was expected in the report. This was highly appreciated by the students. To overcome the time constraint students were given 1 additional day to finalize the report.

☺ Make the assessment and grading procedure available in an earlier stage.
☺Keep better notice on the work process; students should not only finish the assignments but work on the report as well.
☺ Make a decision whether the work process should, be assessed and if so how.

4.4 Report and Work Process

At the start of Block 2 the students received the request from DALDO office for a detailed design report including a design of soil and water conservation measures and suggested improvements of the irrigation system (see chapter 3). The students groups were asked to prepare a report and prepare a 12 minutes' oral presentation. A clear deadline (including time) was set for the submission of the report. It was announced that later submissions would result in a reduction of the mark at the rate of one point per hour. The report should follow the format instructions as presented on Black Board. These instructions were later used to set the assessment criteria (see box below).

Assessment and Grading of Design Reports		
Issue		**Weight**
Contents		
a.	Well formulated problem description, including the envisioned situation	5
b.	Well described justification of selection of intervention areas	10
c.	Well founded choice of measures (incl. financial justification)	15
d.	Technically well-founded design of SWC measures	20
e.	Technically well-founded design of irrigation measures	20
f.	Assessment of the expected performance of the intervention (technically and socio-economically)	10
Form		
a.	Well formatted document in correct English	5
b.	Correct referencing	5
c.	Clear presentation in correct English with efficient use of media in 12 minutes	10

During Block 2 the student groups had two formal moments to test and discuss their ideas and presentations. In the second week 2 local experts (from Tanzania) were present and students could have meetings with them both to obtain knowledge about the area and to discuss their proposed designs. In week 4 the student groups had 2 (1.5h) meetings with land &water management consultants. Students were asked to present their design, as far as it was finished, and obtained feedback on their ideas. The consultants asked questions on the propositions in order to prepare the students for the oral defense. They were further available for questions on their expertise.

Two expert panels were composed for the assessment of the reports and the presentations and to examine the students individually. Each expert panel consisted of 1 professor, 1 senior teacher of the other chair group than the professor, 2 teachers of the course, 1 consultant and 1 Tanzanian PhD student. The expert panel was asked to judge the report on the contents of their expertise and obtained the invitation of DALDO, the proposed table of contents and the assessment points.

The main reason to set a strict deadline was to teach students to work with deadlines. All reports were handed in before the deadline. The expert panel had 2 days to read the report and had a 3 h meeting to discuss the mark and prepare the oral examination. During the meeting it became clear that the different panel members judged the report quite differently (opinions diverged on the issue of respecting the maximum length of the report, on the explanations of the choices of design measures, on the relation to appraisal reports of block 1, on the budget, and on the interaction SWC measures and irrigation design).

☺Students should obtain better instruction on what to design.
☺The expert panel should get better/more detailed instructions on how to judge the designs.

Though good teamwork was essential to be able to complete the report the group processes were not assessed separately. During Block 2 the staff came up with ideas to give group members the option to weigh the contributions of individuals to the group process, and thereby, to the group's product (see box below). It was decided not to give this option this year since it was not introduced at the beginning of Block 2.

☺ **Suggestions for individual marking of group reports.**
The outputs the group are dependent on the inputs of the members and on the way the group has managed its work processes. In case groups (or group members) would like to do justice to the differences in performance of individual members of the group, the groups have the option to have this expressed in individual instead of group marks.

The following procedure will then be attended to:
Before the marks are given, each group discusses, in the presence of the group's coach, the performance of the team and its individual members. If there are persons who have performed above average, their contributions to the group's mark could be weighed accordingly. Given that the group mark cannot change, others will then have to settle for a lower weight, and thus for a lower mark.

Example: The expert panel have given a group a 7.3 for the report and the presentation. The group consists of seven persons.

Member	***Weight***	***Mark***
Group member A	*110%*	*8.0*
Group member B	*100%*	*7.3*
Group member C	*95%*	*6.9*
Group member D	*95%*	*6.9*
Group member E	*85%*	*6.2*
Group member F	*115%*	*8.4*
Group member G	*100%*	*7.3*
Total	*700%*	
Average	*100%*	*7.3*

Since you do not know the mark at the time of giving weights, be aware that marks could end up below 5.5 (which means that the group member cannot pass the course).

4.5 Individual defense in front of the expert panel

After the presentation of the intervention plans and designs, the individual members of the groups were questioned in English by the panel members. The students were informed that all team members should be able to answer all questions (the questions focused on items b, c, d and e of the content-issues, i.e. mainly the intervention plans and the designs were discussed). The course staff prepared questions for each group based on the report. The groups and the panels were divided into workable sizes and the 2 subgroups

of students were questioned by 2 panels simultaneously using the same basic questions.

The suggested procedure was that each student would be questioned during 12 minutes and that others would not have the possibility to complete the answers. Each panel member would give a mark for each student and the average of 3 marks would provide the final individual mark.

In practice some panels adhered strictly to the proposed protocol whereas others followed a much looser procedure. In this procedure the students in one session were questioned simultaneously and could complete the answers of colleagues.

☺ Make more clear appointments with all panel members.
☺ A chair of the panel should guard the procedure.

Chapter 5. Evaluation

5.1 The 'official' evaluation

The evaluation results of the course (as compiled by the Department of Education and Research)[14] showed that the students highly appreciated the course as a whole (average score: 4.2; deviation: 0.7). They valued the need to integrate their individual knowledge and skills, to combine these with the capacities of others in order to address, in self-defined way, 'real' problems. They were also quite positive on the individual performances of the involved staff (except for two who could improve their teaching in English, everybody was rated with a score of 4 and higher on the different aspects).

The students were less positive and less unanimous, though, on the clarity of the learning outcomes (average score: 3.6; deviation: 1.39), the written study materials (average score: 3.1; deviation: 1.21), the practical guide (average score: 2.83; deviation: 1.25), the kind of exam questions (average: 2.84; deviation: 1.57) and on relation between the exam and the form and contents of the course (average score: 3.25; deviation: 1.48). The relatively low scores can summarized as demands for more clarity on the learning outcomes (and their 'translation' into exam questions) and on the learning activities. To facilitate these, the written study materials should be improved.

5.2 Other monitoring and evaluation results

Apart from the above-cited 'official' evaluation, the staff conducted two evaluations with the students (on Block 1 on 20 May 2009; and on Block 2 on 26 June 2009). During the conduct of the course, both staff and students noted 'points for improvement', sometimes resulting in immediate action, and sometimes as ideas to be taken up later.

On Block 1

As explained in chapter 2 the first block was meant a) to enhance the students' engineering knowledge and skills and b) to apply the knowledge and skills and combine these with earlier acquired competencies while exploring the land and water management situation in the Kilimanjaro region (to be recorded in an appraisal report). An on-line exam closed Block 1.

The students enhanced their engineering knowledge and skills by attending lectures (on Black Board whenever they wanted, in line with the demand driven orientation of the course, and delivered live by staff) and by carrying out assignments. The students could ask for more lectures on specific topics, if felt necessary (again, in line with the demand driven orientation of the course). The students appreciated the possibilities offered, but they expressed to be in favor of having more clarity on what they should know (preferably in a kind engineering handbook) and to have the lectures

[14] The evaluation results are those of the first run of the course. For the second run (in the academic year 2009/2010) the scores were slightly lower. Hence, the issues for improvement still stand. They will be addressed in the current academic year (2010/2011).

delivered live. They also indicated that Black Board should be structured better.

☺ The efforts made to apply the principles of demand driven education in Block 1 did not really work out well. The main reason is that the staff still wanted/needed to teach students the basic engineering knowledge and skills. On the short term (in the academic year 2009/2010), the engineering knowledge and skills will be packaged separately in a better structured manner (on Black Board and, possibly, with a kind of handbook), but still remain part of IWE-21312. On the longer term (from the academic year 2010/2011 onwards, basic engineering will become part of a separate course (LDD-20306; to be scheduled in period 3). The learning outcomes will be specified for the engineering knowledge and skills.
From academic year 2011/2012 onwards, students will start with IWE-21312 in the afternoons of the new period 5, and work on the appraisal of the land and water management situation. To better prepare students for the work to be done in relation to the appraisal report, students will be trained in research design. This will most probably also enhance their capacity to demand knowledge and information (in other words, it will strengthen the demand driven nature of the course). In the first part of the new period 6 they can then apply and integrate their basic engineering knowledge and skills for the design processes of IWE-21312.

☝ Demand driven education only works when the basics are in place, i.e. when the students are ready for it. If there is still need to 'offer' knowledge and skills, then it is much more appropriate to define what people should know and be able to (i.e. to specify the learning outcomes), and to develop the course accordingly.

The assignments were meant to practice the knowledge and skills, and, by doing so, yield useful information for the appraisal report. Students explained that they had difficulties in linking the outcomes of the assignments to the appraisal study.

Also for the appraisal the students were offered the possibility to articulate their demands for specific inputs. Whereas this worked out to some extent, students suggested to present them a list of possibilities. Evidently, this is also helpful in terms of course organization. Furthermore, students expressed the need for clearer Terms of Reference for the appraisal report. They had difficulties in deciding what should be in the report (and with what degree of accuracy) and what could be left out. Students also indicated that the resource materials could be improved.

☺ Although the students have some experience with conducting an appraisal-type of study (e.g. in LDD-11806), the Terms of Reference will be further clarified. This will help them in carrying out the assignment and also articulating the demand for 'extra' knowledge and skills. By providing them with a list of possibilities, they will better know what to ask for (see remark above on developing research skills).

The appraisal was carried out in couples (which were formed at random). The idea that couples with similar ideas regarding the problem statement and intervention plans would be grouped together in Block 2, did not work well. There was too little overlap between the various couples to pursue this plan (see also group formation Block 2).

Many couples divided the work according to their preferences, without much exchange. This had a negative effect on supposed individual enhancement of knowledge and skills, as the students mostly developed their capacities on the issues they focused on.

Block 1 was concluded with an online exam. The idea was that the results of the exam would also be used to give a 'go' or 'no go' to students in terms of continuing the course. Efforts have been made, though, that all students could continue (see chapter 4).

As explained elsewhere the online examination did not work out smoothly. To many students the type of questions came as a surprise, indicating the need for more clarity on what they should know and be able to (i.e. clarifying the learning outcomes). Further, some issues in the exam should perhaps be taken out, since multiple choice questions were not the appropriate method of examination. Finally, some students indicated that they disliked the complete online character of the exam.

Also worth mentioning in this context is fact that students were a bit suspicious whether the exam administration functioned properly. The relatively weak results, also of very good students, fed this suspicion.

☺ The exam of Block 1 will cover only issues that can be covered by multiple choice questions. The questions will be a clear reflection of the learning outcomes of Block 1. Example questions will become available in the same electronic environment as the exam. The electronic system will be tested several times before actually using it during the examination.

On Block 2

As mentioned before, the groups for Block 2 could not be formed on the basis of similarities between the appraisal reports of the couples. The groups (of 6/8

persons) were established at random (but balancing gender and age/generation), although staff experimented by forming one group of 'top performers' in Block 1. This group become known as the A-team. The experiment had a stimulating effect on the members of the A-team, but also on the other groups (because they were triggered to show that could also do a very good job).

The groups were supposed to review the problem statements of the members (as all had defined different ones in the appraisal reports), but most groups did not take enough time for this activity and immediately rushed into the design questions.

☺ The Terms of Reference for Block 2 were not clear enough. It should be clarified what students have to do (to realize), why (to learn/develop), and in what sequence (work process). Ample time should be allotted to the different phases. Feedback on delivered outputs and on work process should be improved.

5.3 A final issue: 'self-direction'

A final issue to be discussed is related to the capacity of students to perform well in demand driven education. As mentioned above, it is envisaged to develop this capacity by including research skills development in the course. This might contribute to, but is perhaps not sufficient for the development of the competence 'self-direction'[15]: the capacity of students to assume responsibility for their own learning process. This implies an active, and even a pro-active, engagement of the students with the course. In this context the idea of including Personal Development Plans could be relevant.

[15] In Dutch this competence is referred to as 'zelfregie'. See for more information: Andrioli, Tony, de Jong, Kees & Langerak, Sanna (2007) Daar vraag je me wat – Competentiegericht Vraaggestuurd Onderwijs in de Praktijk, Bohn Stafleu van Loghum, Houten.

Chapter 6. Conclusions

Often the notion of demand-driven education is applied at the level of a study program. In this project we set out to develop a single course along the similar principles. In the course students are expected to respond to typical demands for technical assistance, by analyzing these in technical, socio-economic and political terms and by designing appropriate interventions. For the purpose they had to learn to apply and integrate the knowledge and skills already acquired and to articulate their demands for new knowledge and skills.(in order to better respond to the demands).

In the process, students were expected to develop an interdisciplinary understanding of land and water management issues. Further, it was envisaged that they would learn to deal with uncertainties (given that information was biased, limited or absent). We wanted them to develop their 'reflexive' skills and to abandon the idea that 'the correct way' of doing things and 'the truth' exist. We figured that we needed to help students to develop their capacity to pose 'clever questions'.

We realized that we could best facilitate the students' learning process by providing them with clear assignments (focusing on actual demands from real people with existing problems) and by timely and accurately responding to the 'clever' questions. Hence, we considered demand-driven education as an effective organizational set-up to stimulate problem-based learning.

The obvious question is whether we consider our efforts successful or not, and, related to that, whether we would advise the Education Institute to stimulate demand-driven education at course level.

6.1 Were we successful?

Given the evaluation results and the feedback from students it is justified to claim that, in general, the course engenders the envisaged learning processes leading to the realization of the learning outcomes. Essential elements for this success are:
- the 'real' demand for technical assistance, supported with up-to-date and live information (videos and pictures) from the study area;
- the scheduled availability of staff which facilitated quick responses to questions and demands (either by themselves or by referring to others);
- the availability of staff as group coaches, helping student groups to improve their working processes;
- the presence of Tanzanian experts which provided the students with insights from the area;
- the presence of Chief Technical Advisers which supported the students in making better informed choices; and
- the availability of recorded lectures and other relevant information on design processes and principles, which provided the students the possibility to consult at the required moment.

The comments of the students do show, however, that there are issues to be improved. The learning outcomes need further clarification, and with that, the assessment and marking procedures and methods. Also the instructions and the digital learning environment need improvement. These issues will be taken care in preparation for the conduct of the course in the academic year 2010/2011.

The decision to move the acquisition of basic land and water engineering knowledge and skills from Block 1 to a separate course (LDD-20306) will resolve the problem that students had to learn and apply knowledge and skills simultaneously (by doing so, supply-driven elements will be reduced as well). The space thus created will be used to develop the research skills of the students, which, in turn, is envisaged to contribute their capacity to pose ‘clever questions’.

The competence of ‘self-direction’ can, in combination, with the foregoing, be strengthened by paying attention to Personal Development Plans.

6.2 What do we advise?

The experiences in the course seem to merit a positive advise to the Education Institute to stimulate demand-driven education. However, before we really formulate such an advise, it is wise to exchange notes with colleagues who are involved in similar courses (or, who use similar teaching methods, e.g. the staff of the Academic Consultancy Training).

Besides, it would be interesting to have a better understanding of the different roles of staff in courses like this (switching from expert to coach, and vice versa). Staff might also need to be trained on this. Also it would be good to reflect on the question of appropriateness of the method for all students (given that they have different learning styles and preferences). Finally, the needs for facilities (rooms, PCs, etc.) would have to be explored further.

ANNEX 1. Financial Report

Project Budget and Realization

Item	Activities	OWI	IWE/LDD	Realization	Balance
Regular Staff	IWE staff: Course development (contents, teaching methods, quality assurance course evaluation) & Project evaluation and report writing (focus on instruments for teaching in demand driven environment)	7.000	7.500	14.000	500
	LDD staff: Course development (contents, teaching methods, quality assurance course evaluation) & Project evaluation and report writing (focus on instruments for teaching in demand driven environment)	7.000	7.500	14.000	500
	Sub-total	**14.000**	**15.000**	**28.500**	**1000**
Material	Report printing	400		0	400
	Consultancy & ICT support	6.600		0	6.600
	Travel, Boarding & Lodging*	0		6.800	-6.800
	Video (equipment rental & editing)	0		1.333	-1.333
	Sub-total	**7.000**		**8.133**	**-1.133**
	TOTAL	**21.000**	**15.000**	**36.633**	**-133****

* Mission to Tanzania by Bruins, Riksen and Veldwisch

** This deficit is covered by both chair groups.

ANNEX 2. Course Guide (2008/2009)

DESIGN IN LAND AND WATER MANAGEMENT 2 (IWE-21312)
Course Guide 2008/2009

Code of the course:	IWE-21312
Contact person:	Ir. Bert Bruins (bert.bruins@wur.nl)
Lecturers:	Ir. Bert Bruins, Ing. Drik Meindertsma, Dr. Michel Riksen, Dr. Henk Ritzema, Dr. Saskia Visser, Dr. Gert Jan Veldwisch, Ir. Gerrit van Vuren
Examiners:	Prof. Dr. Leo Stroosnijder, Prof. Dr. Linden Vincent
Period:	5
Exam Dates:	Block 1: 18 May 2009; Block 2: 26 June 2009
Compulsory for:	Second year students of BSc International Land and Water Management (BIL-2)
Assumed prerequisite knowledge:	Design in Land and Water Management 1 (ESW-11806), Irrigation and Water Management (IWE-10306), Erosion and Soil and Water Conservation (ESW-10306) and Introduction to Hydraulics (HWM-21806)

Profile of the course

The Design in Land and Water Management 2 course is an intermediate course in which you engage with typical demands for technical assistance in the context of small scale irrigation development and of soil and water conservation.

In the course you apply and integrate your knowledge and skills, as developed during preceding BIL-1 and BIL-2 courses. New planning and design elements will be added from 'old' engineering courses.

The design of the course is based on the principles of demand-steered education: by presenting demands for technical assistance from the 'real' world, and by being challenged to develop meaningful designs to respond to these demands, it is envisaged that you will learn to cooperate effectively, to increase your problem-solving capacities and be stimulated to actively demand for knowledge and skills.

Learning outcomes

The general learning outcomes of the course read that, at the end of the course, you are able to:

- Analyze the demand for assistance in technical, socio-economic and political terms;
- Design appropriate irrigation measures/systems and soil- and water conservation measures (including financial planning);

- Assess the expected performance of the interventions (technically and socio-economically); and
- Present and defend the proposed interventions in a professional manner (report and Power Point) in front of an expert panel.

The course is divided into two blocks. The first block of 4 ECTS (= 112 hours) runs from Monday 27 April till Monday 18 May 2009 and focuses on 'design preparations'. At the end of the first block you are able to:

- Explain the different steps in design processes;
- Analyze demands for technical assistance;
- Know the design principles of irrigation and of soil and water conservation design; and
- Apply the design principles as mentioned above.

The second block of 8 ECTS (= 224 hours) runs from Tuesday 28 April till 26 June 2009 and focuses on actual 'design processes and results'. At the end of the second block you are able to:

- Respond to demands for technical assistance in the form of technically well-founded designs (one for irrigation and one for soil and water conservation);
- Explain the expected performance of the proposed interventions (technically and socio-economically);
- Present and defend the proposed interventions in a professional manner (report and Power Point) in front of an expert panel;
- Formulate your demands for knowledge and skills in a purposive manner; and
- Cooperate productively in a team.

Educational activities

The general purpose of the first block is to provide you with a solid basis for the second block (where the 'real things' will happen). Through lectures, films and assignments you will develop your understanding of the basics of land and water management engineering. The assignments all deal with the Rau River Basin in Kilimanjaro Region, Tanzania. So, while doing the assignments you will simultaneously increase your understanding of the people in the area and their problems. This will help you to articulate your interpretation of the demands for technical assistance.

The results of the assignments are the building blocks for the report that each couple is expected to hand in at the end of the first block (see Black Board for the format of the report; deadline is 14 May 2009). Furthermore, you will be examined individually on 18 May 2009 to show that you mastered the contents of the first block. You have to pass the exam before you can proceed to the second block. In case you do not pass, there will be re-exam on 25 May 2009. The issues covered in the exam are: a) Analysis of demand for technical assistance; design process, b) Erosion risk assessment, c) Discharge Assessment, d) Soil Management, e) Crop and vegetation

management, f) Wind erosion control and dune fixation; g) Canal Design, h) Canal Structures, i) Head works, and j) Drainage.
All information related to the course is available on Black Board. For the schedule of the activities, see the Course Program.

During the second block of the course, you will be grouped in teams of seven or eight persons. Groups will be formed by staff on the basis of similarities in the understanding of the demands for technical assistance. Each team is expected to deliver two designs, one for irrigation and one for soil and water conservation. The team is responsible for the quality of the products and is also supposed to manage its own affairs. While it is possible that people will focus on one of the designs, all team members are supposed to be aware of and responsible for the quality of the team work and outputs.

Each group will be coached by a staff member. So, you will be assisted in planning your activities, in reviewing and evaluating the results, in articulating your lessons learned, and formulating your demands/requests for additional inputs from staff on issues related to the design processes. On each Thursday afternoon (13.30-15.00), the team and coach meet to discuss progress and to make an inventory of requests for additional knowledge and skills. On Monday mornings staff will respond to these by providing tailor-made lectures, information, assignments, etc.

Apart from coaching and supervision by staff, there will be external experts available as well. During the first part of block 2, two experts from the Kilimanjaro region will present as resource persons. The teams can consult these resource persons on realities in the field, on local government structures, on previously tried and tested technologies, etc. Furthermore, there will be two highly experienced experts available as ‘chief technical advisers’. Given their precious time, the teams are supposed to make efficient use of these consultancy hours.

The ‘chief technical advisers’ will also be member of the expert panel to which each team will have to present and defend its intervention plan and designs. The expert panel will further consist of the course staff, other senior staff of the IWE and LDD groups, as well as the two professors. The presentation will take place on 26 June in parallel sessions. Further details of the exact procedures and of the format for the report and the Power Point presentation will be announced later.

Assessment and Grades

Assessment is based on your performance in relation to the learning outcomes. The grades are calculated as follows:
Block 1: Individual written exam, mainly multiple choice (25%)
Block 1: Report and work process of each couple (15%)
Block 2: Report and work process of each team (35%)
Block 2: Individual defense in front of the expert panel (25%)
All marks should be > 5.5.

Evaluation

Apart from the standard on-line course evaluation, staff will, on a regular basis, ask for your experiences, ideas and suggestions to improve the course. Also unsolicited comments and suggestions are appreciated.

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