Workplace learning in the horti/floriculture sector in East-Africa

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This chapter discusses the relevance of and possibilities for developing work-oriented curricula in East-African countries for the purpose of increasing the competitive strengths of businesses, economic value of the country and the value of graduates for the work field in this rapid changing and global society. To this end, this chapter discusses a case study dealing with developing a curriculum for horti/floriculture in Ethiopia grounded in the ideas of competence-based education with a strong focus on workplace learning or, at least, workplace-oriented learning.

Towards competence-based and workplace learning in Africa

Since two or three decades, Western countries increasingly recognize that society is changing towards a learning society in which new requirements are placed on learners and workers. Globalization, increased technological possibilities, the information age characterized by infinite, dynamic, and rapid changing mass information, and free market ideology that requires a demand-drives and competitive attitude, makes the world a global and fast changing, competitive economy (Dochy, 2001). The labour market changes along with the new developments and employers need to become flexible workers that can adapt to new job tasks or roles. It gets more widely recognized that modern economy requires new skills for employers and that current education is not fit for filling the skills gap. In response to this, The British National Skills Task Force (1999), for example, defined six skills crucial for all professionals: communicative skills, numeracy skills, information literacy and skills, problem-solving skills, collaboration skills and (life-long)learning skills. Moreover, not only initial and formal education, but also post-initial and in-service training focus on helping students or employees develop these skills and keep up with the skills levels required by society. Obviously, professionals cannot get by anymore with simply being an knowledge expert and education should be ongoing, life long, and always in close correspondence with what the workfield requires.

The learning society led to an increase of training in industries and businesses to support adult learners in their professional development and to help them keep up with labour market developments. Thus, learning or training on-the-job while working. This is where many workplace learning literature focuses on (e.g., Cheetham & Chivers, 2001; Mulder et al., 2007; Poell et al., 2004). However, also initial education (vocational, professional, and academic), in which learning and not working is the main focus, should focus more on the workfield and on what the labour market asks from graduates. In this vein, the paradigm of competence-based education (CBE) is increasingly gaining attention in various countries (Mulder & Wiegel, 2007) as it promises to bridge the gap between educational trajectories and working life (e.g., Biemans et al. 2004; Wesselink et al., 2007). CBE is a type of education that focuses on requirements of the workfield (i.e., job contexts, job tasks, job roles and professional competences needed for these jobs) and on societal needs in a more general sense (being flexible, self-responsible, learning oriented etc.), as the starting point for curriculum development. Students should be educated to handle the complex world of work, an array of job tasks, and flexibly adapt to work-related or societal situations. This requires *competences*, that is, integrative wholes of knowledge, skills and attitudes needed to perform a certain job task or role (Mulder, 2001). CBE aims to stimulate competency development in students.

In essence, workplace learning deals with learning in the workplace. However, many studies show that the workplace is not automatically an effective learning environment (Smith, 2003). The review on workplace learning of Smith (2003) for example showed that learners have a preference for a more structured learning environment than the complex workplace. Competence-based education aims to incorporate elements from workplace learning into more formal educational trajectories for example by developing learning tasks that reflect professional tasks or allowing students to practice in authentic work contexts (Wesselink et al., 2007). In other words, competence-based education aims to bring the workplace into the school and the school, or formal learning, into the workplace (Smith, 2003).

In African or, more general, in developing countries there is still a strong focus on routine-based jobs and many people are lacking any education at all. However, with the globalization of the world, many of these countries could be strong competitors in many fields, for example in horticulture and floriculture. Unfortunately, many countries fail to do so, because of the lack of competence to effectively and efficiently use their resources for international markets and for long-term, economic or competitive purposes. The skills gap of workers is becoming more and more clear in these countries and the need to change education and to develop better employable and competent workers at all levels is becoming more pressing. In response, some countries, also in the case of Ethiopia as described in this chapter, develop small scale, on-demand practical courses. While these are relevant and to-the-point, they are also curative, isolated, focusing at routine-based skills needed for short-term production purposes, but lack the link with the whole business development which is needed for becoming a global competitor. On the other hand, higher educational programs are often criticized by the industry for being only academic and knowledge oriented, also not paying attention to labour market requirements and the generic skills required from professionals (e.g., communication or collaboration skills).

Workplace learning and competence-based learning are expected to offer fruitful opportunities for this situation. Competence-based education allows for setting up coherent curricula that focus on bridging the gap between learning and working and developing learning programs that incorporate many forms of learning from and in practice. Workplace learning theories and experiences with learning in the workplace (e.g., Cheetham & Chivers, 2001) can help to effectively incorporate workplace learning, or at least workplace-oriented learning, into competence-based programs and make practical trainings-on-the-job more effective and oriented towards not only training a isolated skill, but towards increasing the flexibility of workers. This way, the competitive value of African countries can be increased.

This chapter describes the process, opportunities and difficulties of developing a competence-based Master (Msc) curriculum, incorporating as much workplace learning and workplace-oriented learning as possible, for horticulture and floriculture in higher education in Ethiopia. Ethiopia found itself confronted with a major skills deficit for the Ethiopian and international economy. A NUFFIC project (Netherlands Organisation for International Cooperation in Higher Education), lasting for four years, was set up aiming at making Ethiopian education more workplace oriented and aligned with the requirements of the labour market. By describing this case, this chapter aims to shed a light on the possibilities and difficulties for developing workplace-oriented programmes in developing countries.

Contextualisation: horti/floriculture in Ethiopia and the need for education

East-Africa is a region in which the horticulture sector in general, and the floriculture sector more specifically, has been booming during the last decade. Local, Indian and Dutch entrepreneurs have created new production and export businesses, such as for chrysanthemums and roses. In Kenya, Ethiopia and Uganda, the flower industry has become one of the most important export sectors. The flowers are being sent to major flower auctions (of which Aalsmeer in the Netherlands is the biggest) or to large retailers (such as large US or European supermarket chains). The competition is fierce, and other regions such as China or Dubai may conquer a considerable market share, both from production and from trade (including the auctions). The sector is working on a global scale.

Flower farms have been created in East-Africa obviously because of the business opportunities: from the production perspective, there are good climate conditions. Flowers are grown in high altitudes were the soil is very fertile and good for growing certain species and varieties. Labour is also cheap and there are sufficient workers wanting a job in the flower industry for making a living. Large farms occupy hundreds of hectares and employ thousands of workers. In Ethiopia alone, there are 70,000 persons working in the flower industry and the government wants to enlarge the sector and employment in it, since during the last five years the whole horticulture sector has grown so fast that its percentage of national foreign currency income of the total economy increased from 0% to 8%.

As in all agriculture sectors, sustainability is a major concern, because of the emissions and water management problems. In the floriculture sector, most flowers are

being transported by plane to the auction, and from there to flower shops, which can again be in another country.

Human resources in a flower farm generally consists of investors, general managers, managers, supervisors and workers. Thus, in the horticulture and floricultural sector rely on workers from *different levels*. Education within Ethiopia should differentiate all these different levels of employees. Up to this point, there is a general lack of education in horticulture and floriculture in Ethiopia. Some initiatives for lower level practical trainings, often workplace learning trainings, are starting up mostly initiated by national, foreign or international stakeholders. At the managerial level, many workers are recruited from abroad (mostly from India or Kenya), or they come from Ethiopia but did their BSc or MSc in countries like Germany, the United Kingdom or the Netherlands. These countries have an active policy regarding grants for students from low GDP countries. These higher level workers (e.g. managers, supervisors) are not educated at all in Ethiopia or are educated in too academically oriented programs focusing mainly on research. Practical trainings focus on short-term solutions and survival within a region, instead of on long-term economic or globally oriented goals and sustainable development of the horticulture and floriculture sector in Ethiopia. This situation necessitated the NUFFIC capacity building project.

Partners and stakeholders in the NUFFIC project

The development project in Ethiopia mentioned is in fact a capacity development project in horticulture, in which the floriculture sector is the newest and most prominent. The project is part of the Dutch Development Cooperation. The Dutch Government invests 0,8% of its Gross National Product on Development Cooperation. Around half of this money goes to Africa. The project comprises the professional development of the staff involved, the development of new curricula, teaching guides and students materials, the construction of a greenhouse, pump house, store house and classroom, work on community development, research policy development, and work on health and working conditions. It is a broad project in which many partners are involved. From the Ethiopian side those are the Jimma University College of Agriculture and Veterinarian Medicine (JUCAVM) and the Ethiopia Flower Producers and Exporters Association (EPHEA). From the Dutch side, as said, the NUFFIC is funding the project; the Agricultural Economics Institute of Wageningen University and Research Centre is directing the project, and the Practical Training Center (PTC+) and the Department of Education and Competence Studies (ECS) of Wageningen University are involved. There is a Project Management Committee, existing of representatives of the partner organizations, and there are Working Packages (for instance: curriculum development is one of these) which have a WP-coordination team consisting of representatives from the Ethiopian and Dutch partner organizations.

The stakeholders are a much wider group. They include the Dutch and Ethiopian floriculture industry (including the auction and the EPHEA), the Netherlands Ministry of Economic Affairs (the Minister and Directorate of Development Cooperation is part of this Ministry), the Dutch Embassy in Ethiopia, the Ministry of Agriculture, Nature and Food Quality, the Agriculture Council in Ethiopia, the Ministry of Education in Ethiopia (the Department of Higher Education, and the Department of Technical-Vocational

Education and Training), the Ministry of Agriculture and Rural Development (the Rural Capacity Development Program, RCDP, and the sector of Agricultural Technical-Vocational Education and Training, ATVET), the Ministry of Trade and Industry (under which the floriculture sector is placed until now), the Horticulture Development Agency and the horticulture research institutes.

Of course, the administrations of the communities in which the flower production and transportation is taking place are also stakeholders, as these activities add significantly to employment and income generation of many poor workers.

Workplace learning in the floriculture sector

As stated, there are various levels of workers in flower farms. Higher level workers (e.g. manager and supervisors) are either not educated or educated in academic tracks, with little practical training, let alone, workplace learning. Lower level workers are being trained at the farm, either taking non-formal training or getting workplace instructions from more experienced personnel. Farm managers can organize and support learning in their own greenhouses, pump houses, pack houses, and cold rooms, which they do, but they can also hire external training organizations.

Farm managers and supervisors have a lot of interest in workplace learning for three reasons. First of all, because the whole production process is very sensitive to problems and loss of profit they want their employees to be very professional, punctual, and up-to-date with new developments, but on the other hand, they cannot afford to let them leave the worksite for educational purposes. Second, the kinds of tasks for farm workers are very context dependent and require the ability to work under pressure. These tasks set high standards on knowledge and skills, but also strongly depend on professional attitudes, for example for accuracy. For example, flower farm workers conduct trails to test varieties of plants or flowers as to whether they are promising in the local situation. This is a sensitive job, since big opportunities may be lost if workers in the trial for instance mess with nutrition or chemicals. The same holds for the regular production beds where the handling and cutting of the stems is essential, because all pressure on the stem (or worse: the flower) causes (some) damage. This is even more crucial in the post harvest handling process, during which the flowers are transported to the pack house, where they are defoliated, sorted, packed in bundles, cut at exact length, stored in boxes and put in the cold room. Every detail, such as 100% clean buckets, has influence on the end result and the final price the farmer makes for the product. Another example of the context dependency and accuracy of the job tasks is that various countries have different product immigration rules. Japan, for instance, is quite strict and has immigration rules that state if residuals of chemicals, dead insects, or eggs are found on the flowers or the stems, they will not be imported. Being able to deal with all these pressing and varying variables in the farm context cannot be learned in isolation from the workfield (eg. Smith, 2003) and therefore, workplace learning should be an important element in educational trajectories in horti/floriculture.

A third reason for farm managers' interest in workplace learning results from the job tasks of farm workers that are often characterized by a clear causal relationship (e.g., using this amount of fluid, will have this effect on the plant). This offers opportunities for

concrete practical training at the workplace. For example, business owners and employees can engage in various learning activities, like direct instruction on the workplace (about cutting, cleaning, record keeping, disease control, nutrition, water quality, etc.), knowledge sharing (when an insight in a problem and an effective solution is found), or learning by doing and getting feedback. Some of these initiatives are indeed used in farms. These workplace learning initiatives are mostly very practical, relevant, to-the-point, and effective, but also of a curative nature and lacking the link with the whole business development. Also, at micro-economic level there are some reservations regarding the sustainability of this approach, because employers are afraid of the poaching behaviour of the competitors, not only in the flower trade, but also in other sectors like vegetables, fruits or coffee, and even in totally other sectors, including governmental organizations.

In order to more systematically respond to the needs of the labour market and to upgrade the economical value of the Ethiopian horti- / floricultural industry, the EHPEA decided to step in and implement a sector-oriented system of short practical courses, most of which are workplace learning courses. The core of this system consists of a quality assurance and improvement system. This system is focused on a Code-of-Practice, which is a set of standards with which a flower farm needs to comply. From an association point of view this code warrants minimum levels of quality on all aspects of flower production and handling realized by the farms, maintaining (and increasing) quality levels of work and production by training farm workers. Ideally, this prevents flower farms who cheat with (international) regulations on health and safety (for instance for spraying) to produce at lower cost (for instance at the cost of the health of the workers).

The EHPEA conducts training for workers on various topics to prepare the farm for an internal audit regarding the Code-of-Practice. When the farm managers think their farm is ready for an external audit, they can request that. The external audit is being conducted by big independent global auditing firms.

Members of the EHPEA can send workers to the courses which are offered by the association. The first batches of training were aimed at issues regarding safety and working conditions. Staff of nearly all (of the around eighty) flower farms have been participating in these courses. The next training programs were aimed at all kinds of other topics which are part of the Code-of-Practice. Even though most courses focus on very practical topics and mainly on skills, the degree of workplace learning varies between courses. While some courses mainly involve workplace learning, other courses are taught mainly in class.

Thus, several actions are undertaken in Ethiopia to respond to the skills gap of workers. However, to increase the economic value and survival of Ethiopian horticulture and floriculture industry, there is a need for more integrated learning programs for training people at *different levels* of the horti/floriculture industry. Also higher education should respond to the needs of the labour market and train people to be more practical as well as economical and entrepreneurial oriented, instead of mainly focusing on research. Also generic competences like communication, collaboration, entrepreneurship, presenting and convincing etc., should have a important place in the learning trajectories, because these make graduates better employable in a broader range of jobs. The NUFFIC capacity building project for sustainable development of horticulture in Ethiopia started with the development of a MSc curriculum that lifts up the educational level of the

Ethiopian students, and better prepares for their future jobs in a dynamic and global horticulture and floriculture market.

The methodology used to introduce workplace learning in floriculture education

As stated, he whole capacity building project for sustainable development of horticulture in Ethiopia consisted of a series of working packages: staff development, curriculum development, course development, strengthening research, upgrading facilities, community projects, and institutional development. In this chapter we further report on the methodology for the inclusion of workplace learning in the curriculum of the MSC horticulture and address the needs for the staff development required..

Competence-based education is used in this case study to make the horticultural curricula in Ethiopia more workplace oriented. The methodology used in this project is based on a series of studies on competence development that show the relevance of starting at the workplace and what the workplace wants, when developing a curriculum that should prepare students for the field of work. For example, Brinkman, et al. (2007) have investigated the changing competence needs of agricultural consultants in Sub-Saharan Africa. This study revealed the importance of social competence, empathy, subtle personal and group interaction, understanding of cultural sensitivities and embarrassment and ways in which the consultants can handle these in practice. Mulder, Lans, Verstegen, Biemans and Meijer (2007) studied the way in which entrepreneurs in innovative horticulture develop their competence. They showed that the most important competence of an entrepreneur seemed to be 'having a learning orientation'. In addition, the three most important learning activities for innovative entrepreneurs were reflection (about lessons learned and (practical) experiences), observation (and imitation) and experimentation (with all kind of new products, services, production processes and management). These activities support the value of learning in and from the workplace and workplace experiences or observations. Mulder (2008) has reviewed the competence literature, and placed this in the context of higher education. The main conclusion of this study was that more emphasis on practical and work-related competencies is needed. However, this is often missing and the academic preferences of professors dominate in many cases.

Next to the importance of workplace learning or workplace-oriented learning, a major finding from all these studies was that competence is an opaque concept with many meanings. This is also one of the main conclusions of review studies on competence-based learning and education in vocational education and training (Biemas et al., 2004) and internationally (Mulder et al., 2007; Wiegel et al., 2007). Consequently, calling an educational program 'competence-based' can be misleading, because various practices can hide behind that label. Furthermore, educational institutions can also use the concept for pure marketing reasons, as is widely being done by a large series of industries (see Mulder, 2007).

Because of this Wesselink and colleagues (2007) developed a matrix describing eight principles of competence-based vocational education (in which workplace learning plays an important role). This matrix has the nature of a quality improvement instrument, and comprises four levels of implementation of the eight principles of competence-based education. Program teams, such as the WP team on curriculum development for the MSC

on horticulture at JUCAVM, can analyze their current curriculum and conclude were they are in the matrix, and where they want to go in the future. It helps them with more precisely describing how competence-based the program is and to get their quality development priorities straight. Next to being an instrument for internal discussion and decisions about the curriculum, describing a curriculum and future plans in this matrix for competence-based education also creates a transparent description of the curriculum for external reviewers or assessors

As this matrix is used in the capacity building project in Ethiopia and can be a valuable instrument for other comparable initiatives, below we will describe the eight principles in this matrix in a bit more detail. We have distinguished eight principles which characterize good competence-based (or in general: workplace-oriented) education.

1. The occupational profiles and competencies that are basis for the curriculum are defined.

This principle means that an occupational profile is put together with participation of actors in the sector and occupation, and that this profile is frequently aligned with regional and local actors in practice, including and reviewed against the major trends. This profile has to be used during the (re)design of the curriculum. In an academic program one may have to deal with various occupational fields, from research and management, to engineering, teaching and extension. Then the program has to accommodate the variety of these occupational fields by internal differentiation based on interests of students in the program.

2. Vocational core problems are the organising unit for (re)designing the curriculum

This principle means that core professional problems or essential responsibilities and tasks in the occupations have been specified and that these are leading for the (re)design of the whole curriculum of a training program.

3. Competence-development of students is assessed frequently (before, during and after the learning process).

This principle implies that assessment of the experiences of students is done before they enter a program or even a course, during the courses, and at the end of the courses or at the end of a semester, year or program. Assessment at the entrance of a program can help to accommodate the study trajectory or even learning tasks for the individual student. Assessment during the courses is taking place all the time, and helps the teacher to fine-tune feedback and next learning steps for the students. Assessment after the course is also taking place already, because those are the exams. Competence-based assessments however may be of a different nature than the traditional paper-and-pencil exams.

4. Learning activities take place in several authentic situations.

This principle means that learning activities take place in a diversity of authentic settings (which means: in practice) as much as possible. These learning activities should be clearly related with the theoretical learning activities in the classrooms. This kind of practical learning increases the practical experience of students which can increase their motivation significantly.

5. In learning and assessment processes knowledge, skills and attitudes are integrated.

This principle means that graduates will perform learning tasks in which they will develop theoretical knowledge, practical skills and working attitudes together. These three aspects of competence will have to come back in the curriculum design process, in the learning process and during the assessment.

6. Self-responsibility and (self)reflection of students are stimulated.

This principle means that students are responsible for their own learning process based on their own learning needs. Approaching students in this way, as self-responsible adults, will increase their ownership of the educational program and their motivation.

7. Teachers both in schools and practice fulfil their roles as coach and expert in balance.

This principle means that teachers stimulate students to formulate learning needs and to manage their own learning processes based on careful self reflection. For many teachers this is not easy, since they are trained as stand-up deliverers of knowledge. Much research has shown that plenary instruction for large groups is not always very effective. How to change this, to act as coach, within programs with limited resources, is not easy, but certainly feasible in my opinion.

8. A basis is realised for a lifelong learning attitude for students.

This principle means that during the educational program learning skills and (labour) identity are developed, that reflection on the future career of the students has taken place, and the willingness for further professional development is a natural given. The diploma of an MSc, or BSc should not be perceived as the license to perform for a life-time, but that it is just the entry point for a further life-time learning itinerary.

Basically, we are thus distinguishing four elements of competence-based education, which all belong together:

a. The Curriculum element about what to teach and learn? What to teach and learn should be relevant.

b. The Learning and Instruction element on how to support the learning of the students. Here we need activating and argumentative teaching approaches and Learner-centred education.
c. The Organisation element of the learning, mainly about giving students opportunities for self-responsibility and cooperation with the sector about the practical part of the program, which will enable good internship places, practicals, community-oriented projects, site visits, guest lectures, etcetera.
d. The fourth and last cornerstone: the Competence Assessment element, which needs to answer the question to what extend students master the core competencies of the program?

Basic steps in the development of workplace learning in the MSc Horticulture

A determining factor in setting up a competence-based curriculum that focuses on what the workplace wants and aims to incorporate as much workplace learning as possible, is the active involvement of and collaboration with stakeholders from the workfield in all steps of the curriculum development and use. This is strongly lacking in many countries and this is no different in Ethiopia.
In our curriculum development and capacity building project in Ethiopia, two starting points were crucial:

1. The workplace, job tasks and job roles, should always remain the starting point and frame of reference for the MSc curriculum
2. Representative stakeholders from the Ethiopian workfield should be involved in all steps of the curriculum development process.

In Ethiopian horticulture and floriculture, the most obvious field of work is the farms. Farms mainly focus on practical skills, because these are needed for the various activities that have to be carried out on the farm. However, competence-based education with workplace learning can, and should, also contribute to regional socio-economic development and the competitive position of the Ethiopian flower market. Therefore, workplace learning should not only focus on practical skills like cutting and storing flowers or plants, but also on running a farm, managing workers, writing business plans for the national and international market etc. Certainly for a MSc educational program that aims at education farm managers and supervisors should pay a lot of attention to these more higher-order competencies both in school and at the workplace. In addition, a MSc program should have a research component that also should have a clear link with research done and needed in the horticulture or floricultural tribal, regional, national and global market. Analysis of the needs for a MSc curriculum should consider this more broader perspective on the hortficultural and floricultural workfield and should select representative stakeholders (i.e., not only farm workers, but also supervisors, researchers, entrepreneurs etc.)

With these assumptions in mind, the development of the MSc program on Horticulture is conducted using the following steps (based on Mulder, 1992).

a. First of all we conducted an informal curriculum evaluation with key representatives of the horticulture program of the program JUCAVM has been teaching. The previously described Matrix for CBE with its eight principles was used to review the curriculum and determine future plans. Several points of attention and suggestions for improvement were identified and documented.
b. Stakeholders were identified, such as producers, farm owners, the EHPEA, research institutes, universities, governmental bodies and NGOs.
c. Various representatives of these stakeholder categories were identified and selected for site visits and interviews. We called this the *needs assessment*. Essentially, this is the inventory of future tasks and competencies of MSc alumni in the organizations these persons represent. This led to the identification of representative *job roles* with *occupational profiles* and belonging *job tasks* with *competence lists*. A labour market analysis was incorporated in this study.
d. Opinions of expert were collected via interviews and literature study, and model practices were detected.
e. A further literature analysis of scientific as well as policy documents was done to see what is going on in the field of horticulture training and development and the Ethiopian horticulture/floriculture market.
f. Based on the final occupational profiles (including job roles, tasks and competencies) courses were developed through filling in course formats developed for the purpose of this project. The process is an iterative, collaborative and ongoing process between the teaching staff of JUCAVM and all other project partners, all bringing in their own expertise.
g. The next step in the methodology was to have an invited curriculum deliberation about the proposals (of the curriculum as a whole, and the courses described in the course formats in detail) , with sector and education quality issues as background information; this was called a national curriculum workshop, and around seventy representatives of various stakeholder organizations participated in it.
h. Lastly continuous interactive alignment with stakeholder needs and preferences is envisaged. This will be established by the staff of JUCAVM.

Of course, many variations are possible on this model. We have tested many of them. If the results would have been disappointing, we would not have engaged in this strategy. The next paragraphs will elaborate on the main steps described above and concretize their function in the curriculum development process in the Ethiopia project

Occupational and competence profiles

Around twenty-five stakeholders in the horticultural sector have been visited in Ethiopia. Many of these stakeholders are potential employers of MSc graduates in Horticulture. Among the stakeholders were heads of research institutes, researchers, trainers, and farm managers. They have been interviewed about possible MSc-level occupations in the field of Horticulture in their organizations, the core tasks belonging to these occupations, and the core competencies that are needed for the occupations. Based on these interviews various occupational profiles were composed. For each occupation a short description

and a list of core tasks and core competencies, that are necessary to take along in the curriculum redesign process, were developed.

In total eight different occupations were identified. These are researcher, trainers/teacher, consultant, extension officer, private investor/entrepreneur, manager, development worker, and policy maker. These occupations have been aggregated in three groups; many of the tasks and competencies of these occupations were overlapping.

1. Group 1 are researchers, working in a variety of research institutes.
2. Group 2 consists of occupations that focus on sharing, spreading and co-constructing knowledge and/or innovative policies and practices. These are trainers/teachers, extension agents, development workers, policy makers, and consultants.
3. Group 3 represents the occupations that strongly relate to managing a business. Identified occupations in this group are managers and private investors/entrepreneurs.

The occupational profiles have been used to redesign the curriculum of the MSc Horticulture program at JUCAVM. It helped to align the MSc qualification with the needs of the various occupations. And it helped to identify the present gap between the current MSc-curriculum and the reality of work.

By visiting and interviewing the horticultural stakeholders and thus involving them in the curriculum redesign process, their commitment with the new MSc in Horticulture will hopefully increase. Future involvement will enhance quality improvement of and trust in the MSc program and the respective graduates. Additionally, teachers of JUCAVM experienced the stakeholders' input as valuable for identifying the lacks in their current curriculum and giving them new insight with respect to the requirements for their graduates.

Below an example is given of the occupation and competence profiles which have been developed. The example is taken from the group of managers/entrepreneurs/investors. Of course these are three distinct occupations, but in this context they could be taken together.

Occupational Group: Managers and Private investors/entrepreneurs	
Core learning task – Finance and lead a business and human resources, and handle technical issues	
Subtasks - Make production (physical/technical) planning - Select optimal locations (elevation, climate, etc.) - Manage disasters e.g. during a hail storm - Control production process - Control resources - Oversee farm activities - Write a business plan - Coordinate, monitor and evaluate every division (is progress according to plan)	Core competencies - Technical knowledge and skills on the crop (how to produce, how to spray, how to control the weed, etc.), on fertilization, chemical application, post-harvest, crop protection, pests and disease management, resistance management, etc. - Knowledge on farm design / engineering knowledge - Be able to execute a trial e.g. on chemicals or variety selection

- Set up and develop agribusiness and/or organization - Promote products - Lead subordinates / labour management - Divide labour and link jobs to the right employees within an organization - Meet external stakeholders (clients, colleagues, competitors, policy makers, etc.) - Make financial planning / budget - Manage finances - Keep actively up to date with new developments (e.g. technological, governmental, procedural, customer/export requirements) in the field and take them into account when planning or developing marketing plans - Search pro-actively for both market and technical possibilities and information - Identify and analyse potential market opportunities to establish corresponding business - Check product and market price, and adapt price accordingly - Analyse market and production opportunities - Perform cost-benefit ratio analysis - Conduct risk assessment - Arrange the right support for specialist tasks	- Be able to write practical reports and action plans, directly usable for users - Presentation skills (both written and oral) - Knowledge of project planning and management - Be able to prepare, monitor, and evaluate action plans - Be multitasking and multi-dynamic - Be able to handle stress situations - Be creative - Be able to manage labourers, motivate and develop them - Be able to keep discipline - Be able to deal with tribal differences / intercultural communication skills - Leadership skills; (a manager should be able to act as a boss ánd as a friend) - Be able to work in a group - Be able to work with and communicate effectively with employees, subordinates, stakeholders, clients, farmers, bosses - Be open-minded - Be aware of own capabilities and knows own strengths and weaknesses - Knowledge of financial administration / financial management - Be able to do market analysis for variety selection - Be able to react on market developments - Be able to react to new scientific developments - Be able to commercialize ideas, products, and research findings - Be able to recognize market potentials - Be able to set up and develop production or marketing plans and conduct marketing strategies for specific crops - Be able to translate new developments and consumer trends into production and management plans

Composition of the MSc curriculum on horticulture

The MSc program on Horticulture which resulted from the redesign process comprises two years of two semesters. The first semester is a comprehensive semester for all students. The second semester is aimed at four specialisations: flowers, fruits, vegetables or coffee. All courses explicitly address job tasks, roles and competences described in the occupational profiles and should include as much workplace learning (or at least workplace-oriented) learning as possible.

An additional link with the occupational profiles, and thus with the workplace component, is established by covering projects aiming at the three occupational groups. Each student should do three projects from the perspective of the three respective groups in the first year. In the second year all students specialize in one of the three roles. The major part of the second year is allocated to the thesis that focuses on performing the chosen occupational role in a realistic and large project conducted in or in collaboration with the workfield. For example, setting up and delivering a training for farm workers on an innovative technique in the field (role: trainer/extensionalist).

For all courses, a fixed course format was introduced that was developed for the purpose of this project. Important components of this format that define the workplace component of the program are 'tasks', 'competencies', and 'assessment'. Also a variety of teaching methods, like practicals (practical assignments in the college setting, for instance in the greenhouse), and the field attachment (internship) give full opportunity for workplace learning.

This course format 'forced' teachers to explicitly link their courses and course contents to the identified occupational roles, job tasks and competencies. Moreover, it required them to specify the kind of teaching methods they are going to use including the kind and amount of workplace learning or workplace-oriented learning. The workplace component is integrated to varying extents, ranging from using cases from real practice, collaborating with the workfield, doing projects in the workfield, doing field attachments or short apprenticeships, excursions to the workplace etc. In addition, the course format includes the assessment used to evaluate to what extent students satisfied the competences identified for the course. This again requires a close connection with the workfield to actually assess students' capability to perform the specified competences and job tasks in the real working world.

Even though most teachers of JUCAVM were very enthusiastic about the course format and were highly in favour of creating close links between the courses and the workfield, explicitly linking their courses, teaching methods, learning outcomes and assessment to the competencies and job tasks described in the occupational profiles turned out to be difficult. This required ongoing support from Dutch project members with expertise in competence-based education.

Below, an example of the course format is given from the course 'Entrepreneurship and Agribusiness Development.

Entrepreneurship and Agribusiness Development

Lecturer(s)	
Examiner(s)	

Contact person		
Mandatory prerequisite courses	Introduction to economics (at undergraduate level)	
Course description	This course wants to stimulate an entrepreneurial attitude among students through confronting them with crucial aspects relevant for setting up their own horticultural business or selling innovative ideas, research findings, or products.	
Core tasks performed in occupational reality, covered by this course:	▪ Write a business plan ▪ Identify and analyse potential market opportunities to establish corresponding business ▪ Set up and run an agribusiness ▪ Check product and market price, and adapt price accordingly ▪ Undertake market research ▪ Promote products ▪ Search pro-actively to possibilities and information	
Competencies necessary to be able to perform effectively, covered by this course:	▪ Be able to work with customers, colleague entrepreneurs, and subordinates in any (agri)business ▪ Be able to commercialize ideas, products, and research findings ▪ Using knowledge of financial requirements and control ▪ Decision making skills ▪ Leadership skills ▪ Being able to recognize market potentials	
Contact hours	Lectures	18 hrs
	Group paper	2 hrs
	Guided working class	2 hrs
	Problem-based learning	6 hrs
	Excursion	3 hrs
	Project education	3 hrs
	Exam-Assessment	3 hrs
Weight of practical component in the course		45 %

Outcomes	Course components	Specification of content	Summative Assessment method
At the end of the course, the student should be able to: ▪ Work with customers, colleague entrepreneurs, and subordinates in any (agri)business; ▪ Commercialize ideas, products, and research findings; ▪ Estimate financial	1. Introduction to entrepreneurship	Entrepreneurs; entrepreneurship; economics and entrepreneurship; push and pull factors (lecture)	Continuous assessment Business Plan for a real farm and Presentation to workfield representatives (50%) Test (10%) Final exam: Test containing open questions and realistic cases (example question: discuss on the distinctive traits of entrepreneurs) (40%)
	2. Introduction to (agri)businesses	Success, growth and failure; importance of business for economy; political, social, and environmental aspects of business; advantages and disadvantages in Ethiopia (lecture)	
	3. Forms of business ownership	Sole proprietorship; partnership; corporation; cooperatives (2 taking different forms of businesses and identifying their adv. & disadv. and discuss in group on differentiating them from each other)	

requirements and control finances; ▪ Steer and supervise subordinates; ▪ Recognize market potentials and ability to make related decisions.	4. Marketing in business	Product, price, promotion, place; market segments; market research; marketing strategies(3 hour for writing marketing strategy for some new product)	
	5. Develop a business plan	Do market research; choose purpose, business and format; write business plan (6 hours for collecting information and writing a business plan & I hour presentation)	
	6. Financing a business	Requirements; sources (2 lecture + 1case analysis)	
	7. Business ethics and social and environmental responsibilities	Concern about consumer safety, care for environmental pollution in business (all time for lecture)	
	8. Risks and insurance	Definition; risk management; insurance forms (all time for lecture)	

Conditions and challenges for workplace learning in horti/floriculture in Ethiopia

When it comes to workplace learning in an academic program like this MSc program, various changes need to take place. In the past, practically all these kinds of programs were purely theoretical. Large classes were taught in plenary classrooms, and written tests were conducted to determine the mastery level of the course content. Practical training was sometimes impossible because of lack of materials such as soil, plants, chemicals, measurement instruments, greenhouses, irrigations systems, or even electrical power, computers, printers or water. One of the features of this capacity building project is that these materials are being provided, although the long term viability problems related to operations and maintenance are known.

Moreover, changing towards competence-based and workplace-oriented education, requires a conceptual change in all involved stakeholders (i.e, teachers, students and employers). Everybody is used to a long tradition of traditional academic education, in which instruction focuses on transmission of knowledge, learning is based on rote memorization and assessment was done through standardized, often closed answer, tests (Birenbaum, 2003). The teachers in Ethiopia, and as a result also students and employers, were unfamiliar with more activating teaching methods that allow interactive participation or questioning by students. Learning in and out of the workplace was even more unknown territory. These traditional conceptions and experiences should certainly be addressed in a capacity building project as described in this chapter. Professional development of the teaching staff is therefore a crucial element in this project.

For this professional development of the Ethiopian staff involved, two Training of Trainer (ToT) groups (representatives of JUCAVM and the EPHEA) received an intensive training in the Netherlands. Components of the ToTs were technical training in horti/floriculture, management training, training in competence-based curriculum design, excursions to the auction, companies and flower farms, and interactive teaching skills.

The training itself was designed and implemented as a way of competence-based education, so that it could serve as an example and the staff could get experience with it as learners. Actually, this ToT was kind of workplace-oriented learning for the ToT JUVACM and EPHEA staff. We modelled competence-based education and activating teaching methods. ToT participants practiced job relevant tasks in Dutch greenhouses, they visited and interviewed representatives of the workfield and we discussed the relevance and possibilities of transferring these learning activities to their Ethiopian curriculum. This directly confronted their (traditional) learning conceptions and discussed creative solutions for practical or resource problems in Ethiopia. The ToTs were evaluated very positively by the participants. The authenticity of the competence-based curriculum design approach was also regarded as valuable.

An additional aspect of teacher professionalization of the project was that various Ethiopian teachers were provided the opportunity to do a MSc or PhD in the Netherlands. Coming back to the workplace learning of the students, this needs careful further thought. JUCAVM alumni reported that farms did not allow students to practice and conduct various activities at their farms. Mostly students were only given the opportunity to observe and students accepted this. On the employer side, a general manager of a flower farm who is also active in the EPHEA observed that she never saw a teacher at her farm. Students also come unprepared, and there has not been any communication about the topics the students need to address. She also stated that during the last couple of interviews for vacancies she selected graduates from other universities because their workplace preparation was superior.

Obviously, all parties (teachers, students, and employers) need to change their thinking about educating and learning. Setting up good communication channels and actively involving all parties in the development and implementation of the curriculum is crucial for changing the curriculum from a traditional one to a competence-based, workplace-oriented one. The college needs to develop and maintain strong relationships with farms and research institutes; teaching staff should visit them regularly. For example, communication about thesis projects with practical supervisors (farm managers, research institute personnel) should be established before the thesis starts. It is important to note that, counter intuitively, for flower farms this cannot simply be done by speaking with the members of the EHPEA (i.e., directors of the companies), because they are not on the farm on a daily or weekly basis. The EPHEA is only an indirect channel (their consent of strong cooperation between the educational institution and the farm is of course essential en instrumental). The teaching staff should talk with the farm managers instead. Teaching staff should also evaluate the workplace learning affordances in the thesis or apprenticeship organizations (Billett, 2001). Organisations should offer students valuable learning environments to practice and develop their competencies. Employers may regard this as counter intuitive in that they feel that teachers and students should be very glad that students are welcome in the first place, irrespective of what they can do. However, when students and graduates have added value in the organizations they are studying in and working for, the educational institution may expect more of the internship organizations. Employers and teachers should except mutual responsibilities for providing students with valuable workplace learning opportunities. Teaching staff should

be in contact with organizations during thesis work, and monitor the project of the student to see if it is conducted as described.

Other important possibilities for increasing the collaboration and cooperation between the university and the workfield are for example that representatives of companies, research institutes, or NGOs. are invited as guest lecturers and assessors. These ways of cooperation allow all parties to learn to know each other better, and more facilities can be used to enhance the workplace learning of the students.

A critical question or remark can be heard as always when it comes to any innovation in education: the question about resources. Our answer to this question is as simple as difficult. Also in Western societies educational institutions complain about resources. And many of them are right of course; also in the Ethiopian context, the question about resources is fully justified. But rather than worrying about lacking resources we propose to use creativity in exploiting the existing resources. In many cases, more can be done with less if the vision behind the innovation is clear and priorities are set right.

This project illuminates an additional issue for implementing workplace learning: the battle between a research/academic orientation and the workplace orientation. This project focuses on developing a MSc curriculum, which obviously needs to incorporate research. Actually, research is one of the identified occupational profiles. A pitfall is to blow up research or academic oriented courses in the program and using this as an argument for diminishing the workplace oriented learning components. Although this is legitimate to some extent, and perfectly understandable, decision makers also have to realize that the social science and commercial components, regarding entrepreneurship, business development, business management, marketing, human resource management and development and communication are essential for MSc students. Given the differences of interest, proponents of the research track and the workplace track will have a conflict. In that sense, a combat for workplace-oriented learning and learning at the workplace is needed, also for the better of the research-oriented faculty. As in current research practice, more workplace-oriented competencies also become important. Research institutes are becoming more and more independent business units, and their managers are actually academic entrepreneurs, who can benefit a lot from high quality workplace preparation during their academic education. Moreover, workplace experience in the BSc and MSc programs is an asset in the résumé of the graduate.

To wrap up, this chapter described a NUFFIC project on capacity building in Ethiopian horticulture and floriculture education. This is done through (1) developing a competence-based Master trajectory that incorporates workplace learning and workplace-oriented learning activities were possible. Characteristic of this development is the ongoing interaction and collaboration with all stakeholders in the project and in Ethiopia, including many representatives from the workfield. (2) professional development of the teaching staff of JUVACM and EPHEA.

This chapter discussed the relevance of workplace learning in Ethiopia, describes how the workplace-oriented curriculum and staff development were taken up in this project, the hurdles that were experienced and the possibilities for increasing workplace learning and workplace-oriented activities in the context of developing countries like Ethiopia.

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