



FisherMan

Analysis Report

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Project

Capacity building for sustainable Fisheries Management in the Southwest Indian Ocean region

Acronym

FisherMan

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INTRODUCTION

The project “Capacity building for sustainable Fisheries Management in the Southwest Indian Ocean” (FisherMan) is co-financed by the European Commission through the ACP Edulink programme. FisherMan aims at supporting higher education institutions in the region to create new training programmes in sustainable fisheries management. The general objective is to support Southwest Indian Ocean region universities to prepare a new generation of skilled professionals for a sustainable fisheries management in the region.

Working together on the project are two universities from the EU (Spain and Portugal) and five universities from the region (Comoro Islands, Madagascar, Mozambique, Seychelles and Tanzania).

The Universities from Europe are:

- University of Alicante (Spain) – Coordinator
- University of Algarve (Portugal)

The five universities from the region are:

- Université des Comores (Comoro Islands)
- Université de Toliara (Madagascar)
- Universidade Eduardo Mondlane (Mozambique)
- University of Seychelles (Seychelles)
- University of Dar es Salaam (Tanzania)

This analysis aims to identify potential and current capacities of the five universities from the South-western Indian Ocean for the development of a fisheries management programme. It draws on a questionnaire sent to all partners (see Annex). Overall, participation and feedback from partners have been strong. The analysis examines areas such as:

- General information
- Fisheries capacity
- Fisheries education
- Links with external stakeholders & other research initiatives

Each section provides an overall view of each university and concludes with observations on key points.



A. GENERAL INFORMATION ABOUT THE UNIVERSITIES

1. *UNIVERSITÉ DES COMORES (UDC), COMORO ISLANDS*

The *Université des Comores* (UDC) was established by presidential decree in 2003 as a public institution with a scientific and cultural character and with administrative and financial autonomy.

The UDC has a student population of 6,354 and 230 academic staff/teachers, offering 22 Bachelor programmes and 6 Postgraduate or Masters, with an academic calendar starting in October and ending in July.

UDC has a distance-learning programme – CUFOP – with the *Agence universitaire de la francophonie* (AUF).

Concerning internationalisation, UDC has no foreign students matriculated and no department dealing with issues regarding foreign students (International Relations Office – IRO). As such, there is neither a student exchange programme nor a joint degree programme. UDC has had teacher exchange programmes with other universities/countries.

No online education platform exists in UDC.

2. UNIVERSITÉ DE TOLIARA (UT), MADAGASCAR

The *Université de Toliara* (UT) was established in 1980. With a total of 6,000 students and 152 academic staff/teachers, the University of Toliara (UT) offers 15 Bachelor programmes and 13 post-graduate or Masters, an exchange programme through AUF – Bilateral Cooperation Interuniversity North-South. Moreover, the Marine Sciences and Fisheries Institute (I.H. SM) of UT has a joint degree ENSAR/France and La Reunion/France.

UT also has several teacher exchange programmes with universities in other countries (France, Belgium, Norway, Japan).

The academic calendar at University of Toliara (UT) starts in October and ends in July.

Concerning internationalisation, UT has foreign students matriculated and a department dealing with foreign students' issues – *Service des Relations Internationales Universitaire*.

No education distance-learning programme and no online platform exist.

3. UNIVERSIDADE EDUARDO MONDLANE (UEM), MOZAMBIQUE

The *Universidade Eduardo Mondlane* (UEM) was established in 1962 and today has a population of 24,000 students and 1,560 academic staff, offering over 102 Bachelor, postgraduate and Masters programmes. UEM has a distance-learning programme (BSc in Economics) but no online education platform exists.

The academic calendar at UEM starts in February and ends in December.

There are Foreign students matriculated and the university has a department which deals with foreign students' issues. UEM hosts a student exchange programme but offers no joint/international degree. UEM also has teacher exchange programmes with universities in other countries.

4. UNIVERSITY OF SEYCHELLES (UNISEY), SEYCHELLES

The University of Seychelles (UniSey) was established in 2009, the newest university of the present study. With a population of 321 students and 32 academic staff/teachers, UniSey offers 12 Bachelors programmes but no postgraduate programmes or Masters, no exchange or distance-learning programmes. No online education platform exists.

UniSey has two academic calendars: one starting in February and ending in December; and one specific for science programmes, starting in September and ending in June.

No foreign students are matriculated and therefore, the university has no department dealing with foreign students issues. However, UniSey has several joint degrees: BBA, BA English, BA French, BSc CIS, LLB Law, BSc Banking, accounting, economics and finances. UniSey also has teacher exchange programmes with universities in other countries.

5. UNIVERSITY OF DAR ES SALAAM (UDSM), TANZANIA

The University of Dar es Salaam (UDSM) was established in 1961, and currently has a population of 21,500 students and 1,127 academic staff. The UDSM offers over 65 Bachelors and Masters programmes with 2,605 students, an exchange programme - but has no joint degree -, and teacher exchange programmes with universities in other countries. An online education platform exists (the only one in this study). There are foreign students matriculated and the university has a department to deal with foreign students' issues.

The academic calendar at UDSM starts in October and ends in July.

OVERALL COMMENTS

Of the five universities in the project – UDC, UT, UEM, UniSey and UDSM – the youngest university is UniSey, only five years old, while the oldest is UDSM, with fifty-three years (Figure 1). This leads to significant differences in size and capacities of the universities in terms of students, staff and study programmes.

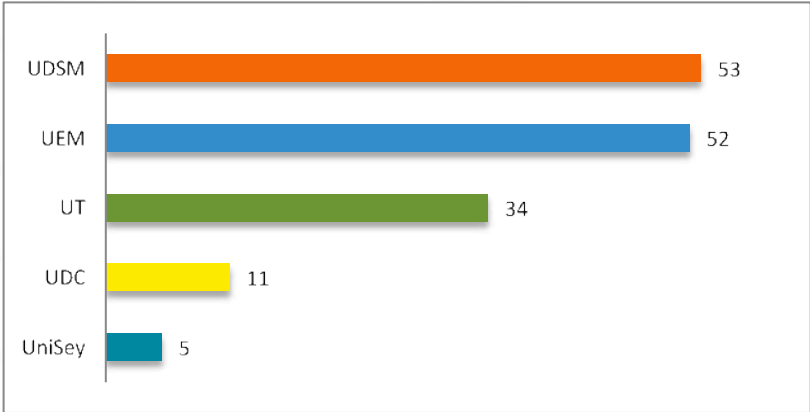


Figure 1. Age of the five universities in the project.

The academic calendars of all institutions involved are around 10 months and, with the exception of UEM, they all start in September/October to end in June/July. In UEM the academic year starts in February and ends in December (Figure 2).

Therefore, it seems that four of the institutions – UDC, UT, UniSey and UDSM – have similar academic calendars, starting in September/October and ending in June/July, with only UEM starting in February and ending in December.

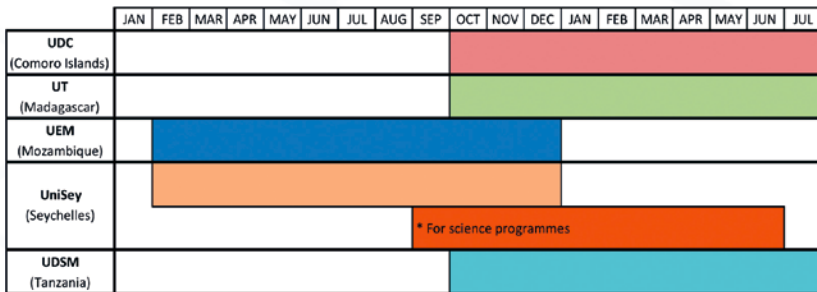


Figure 2. Academic calendar of the five universities in the project.

An important area for improvement in some universities is the lack of an international relations office to foster international cooperation initiatives, such as supporting foreign students and staff in mobility.

KEY POINTS

- **Very important differences in size between universities in terms of students, staff and study programmes**
- **Generally weak international relations support (student and staff mobility)**
- **Similar academic calendars**



B. FISHERIES CAPACITY AND RESEARCH

1. *UNIVERSITÉ DES COMORES (UDC), COMORO ISLANDS*

The University of Comoros (UDC) has the Faculty of Sciences and Technology (FST) related with Fisheries or Marine Sciences but the academic staff/teachers are not experts in fisheries.

The *École de Pêche* (“Fisheries School”) was created in 2008. It is a professional institution, not part of the higher education system. Today there are 35 people working there, of which 12 have MSc or PhD degrees, although none are fisheries experts.

Concerning fisheries research, UDC has no fisheries project, no participation in conferences nor publications on fisheries, but grey literature exists.

UDC seems keen on the possibility of some experts/academic staff to receive training on fisheries in other countries, in the form of in-depth training (1-2 months), giving the necessary authorisation for a professor to go abroad.

Concerning fisheries infrastructures and equipment, UDC shares premises and laboratory space and has no computers assigned to fisheries research, no statistical or GIS software and neither books nor any subscriptions to journals related to fisheries or marine sciences are available. A network and access to Internet is unreliable and with weak speed.

2. UNIVERSITÉ DE TOLIARA, MADAGASCAR

The University of Toliara (UT) established the *Institute Halieutique et des Sciences Marines– IH.SM* (Marine Sciences and Fisheries Institute, created in 1992) as the department related with Fisheries and Marine Sciences. In this department there are 53 people: 21 teachers/researchers, 15 associated researchers and 17 non-academic staff (managers of fishery enterprises and NGOs). Only 8 of them are fisheries experts, with PhD degrees.

The IH.SM works in close collaboration with the Fisheries Ministry since this ministry is the co-founder of the IH.SM, together with the Ministry of Higher Education and Research (*Ministère de l'Enseignement Supérieur et de la Recherche Scientifique*). IH.SM also hosts the National Oceanography Data Centre (IOC/UNESCO) through the IOC-UNESCO regional programme.

As for research, UT has several fisheries projects on marine reserves, aquaculture (holothurians, algae), stock assessment (octopus), fisheries techniques, and others, in cooperation with the Ministry of Fisheries, private fisheries companies, NGOs and other institutions from the country and abroad (France, Japan, etc.).The fisheries scientific production (reports, memoires, thesis and articles) is available in the university database www.ihsm.mg.

The University academic staff has attended fisheries conferences and workshops at national and regional levels, and feels it is necessary for some of their experts to receive training in other countries, specifically in the areas of stock assessment and management (1week); processing technology of fish products (1 month); and Molecular Barcode (3 months). Although UT is willing to authorise professors to go abroad to receive training, it cannot afford full financial support.

Concerning the IT network, UT has one in place and has access to Internet with a medium speed.

3. UNIVERSIDADE EDUARDO MONDLANE, MOZAMBIQUE

In 2005 the University Eduardo Mondlane (UEM) established the School of Marine and Coastal Sciences (*Escola de Ciências Marinhas e Costeiras*), where a total of 43 people work (26 teachers, 2 researchers and 15 non-academic staff), although only two are fisheries experts (a BSc full-time lecturer and a MSc part-time lecturer). Cooperation on teaching and research exists between the School and the Fisheries Ministry.

Concerning research, UEM has different research projects in the areas of aquaculture (Tilapia) and fisheries (prawn), mainly with the Ministry of Science and Technology and the Ministry of Fisheries (IDPPE). The scientific production is mainly grey literature and the university academic staff has attended several conferences and workshops on fisheries and aquaculture.

The University feels an urgent need for capacity building of the academic staff to a PhD level (3-4 years) and MSc level (1-2 years), especially in the areas of ecosystem approach to fisheries, sustainable fisheries, stock assessment, and others. UEM is willing to give the necessary authorisation for lecturers to go abroad to receive training courses (1-2 months) and post-graduate programmes (1 year), but cannot fully financially support this.

The UEM has no lab space or equipment (lab and computers), no statistical and GIS software (only available in Maputo) and has identified infrastructure upgrades as a major need, particularly a fish lab with specific equipment for fisheries research and training and a computer lab for specific training in fisheries programmes. Although UEM has a network in place, the Internet access is slow. UEM has books related with fisheries but no subscription to journals related to the subject.

4. UNIVERSITY OF SEYCHELLES, SEYCHELLES

Although the University of Seychelles (UniSey) has no department or experts related with Fisheries or Marine Sciences (only one person is involved in Marine Sciences, with a specialisation in Marine Toxicology),

the university has excellent links and the support of the Ministry of Fisheries.

At the moment, no research projects, publications or conference attendance on fisheries exist (only the project Edulink FisherMan) but UniSey is already developing a specialisation in “Marine and Fisheries Sciences” on the 3rd year of the BSc in Environmental Sciences (April 2014). Therefore, UniSey has identified the urgent need for academic staff training in the form of short courses (1 week) and/or depth training (1-2 months). Although willing to authorise the training courses mobility, UniSey has no possibility to fully finance it.

Concerning infrastructures and equipment, UniSey has no lab space but has a computer room for general use (not assigned to fisheries research). However, when practical lab work is needed UniSey has access to the labs of the Seychelles Fishing Authority (SFA), with whom it has excellent relations. On the availability of statistical software, UniSey uses those available free online and is working with another university to improve the GIS software by next year. In terms of library resources, UniSey has some books related to fisheries and marine sciences but no subscription to journals related to the subject.

UniSey has identified the major needs to be lab space and equipment, reading resources and software.

5. UNIVERSITY OF DAR ES SALAAM, TANZANIA

The University of Dar es Salaam (UDSM) has an Institute of Marine Sciences (IMS), created in 1978, and a Department of Aquatic Sciences and Fisheries (DASF), created in 2009. In both structures, there are 63 people working, of which only 6 are fisheries experts. Close collaborations exist between these structures and the Ministry of Fisheries.

Several research projects exist on Marine Sciences and Fisheries with public entities in the areas of coral reef and fisheries, and several articles, chapters and books, have been published, as well as grey literature, which

may be found in the university library and in several databases. The University academic staff has attended several conferences and workshops on the subject.

UDSM thinks it is important to train their academic staff on fisheries issues and they are willing to give the necessary permission to go abroad for short (1 week) or in depth (1-2 months) courses.

UDSM has premises and laboratories with some equipment (aquarium, hatchery, electronic balances, microscopes, etc.) and a few computers assigned to fisheries research. It also has a network in place and access to Internet with medium speed. Statistical software (SPSS) and GIS software (ArcMap) are available, and the library has significant bibliographic resources related to Marine Fisheries.

For major needs in infrastructures, UDSM lists the need of good bandwidth, software, space and genetic analysis equipment.

OVERALL COMMENTS

Although all partner universities show different levels of marine sciences and fisheries capacity, three are shown to already have some expertise – UT, UEM and UDSM. Some experts (although few), with BSc, MSc or PhD are already involved in the subject, although all feel that some short or medium-length training is essential. The need for longer training was also mentioned, mostly for MSc and PhD achievement as career progression.

In these three institutions, although some premises may exist, the need of exclusive laboratory space and basic resources (lab equipment, computer, software, internet access, bibliography) was highlighted. These are essential for research and teaching in the area of fisheries.

The other two partner universities – UDC and UniSey – the two youngest universities of the project, seem to be starting up, having no experts in fisheries, no laboratory space, equipment, computers, software, bibliography, etc. However, UniSey has an excellent collaboration with other institutions and has the necessary support for starting a specialisation in their BSc.

KEY POINTS

- In general, weak fisheries management expertise in the Universities (capacity & level of expertise) but with significant differences among them
- Staff require more training in fisheries management
- Poor infrastructures for fisheries management research
- Weak IT capacity



C. FISHERIES EDUCATION

On the existence of a subject on Fisheries in Bachelors programmes, only the University of Comoro (UDC) and the University of Eduardo Mondlane (UEM) don't have one. The University of Toliara (UT), through the IH.SM, which is responsible for the subject, has a specialisation in the 3rd year in Fisheries and Aquaculture and in January 2014 started a MSc degree in Fisheries Engineering (18 months). UniSey has recently started a specialisation in Marine and Fisheries Sciences in the 3rd year of the BSc in Environmental Sciences (April 2014).

The number of teachers involved in a Fisheries programme (or related studies) varies but, with the exception of UDSM, which has the highest number (20), all other universities seem to have none (UDC) or very few (UniSey-1; UT-8; UEM-2).

All Universities in this study seem to have Bachelor programmes in Biology or Marine Biology, and the disciplines related to fisheries seem to have a significant number of hours and credits, with the exception of UDC. UDC seems to lack most disciplines related to Marine Ecosystems, Fisheries, Aquaculture, Fish Biology, Conservation Genetics (also lacking for UEM and UDS) and Coastal and Marine Management. The University of Toliara (UT) has no Bachelor programmes in the areas of Economics, Fishing, Geography or Law and Policy, although non-experts teach these subjects (this is related to staff training needs).

Other subjects taught are related with quality of products and health safety, to oceanography, to aquaculture, to coastal management and to sustainable fisheries.

Participating universities were invited to rate skills (on a scale 1 to 5), which they think are relevant to the improvement of fisheries management capacity in their institutions.

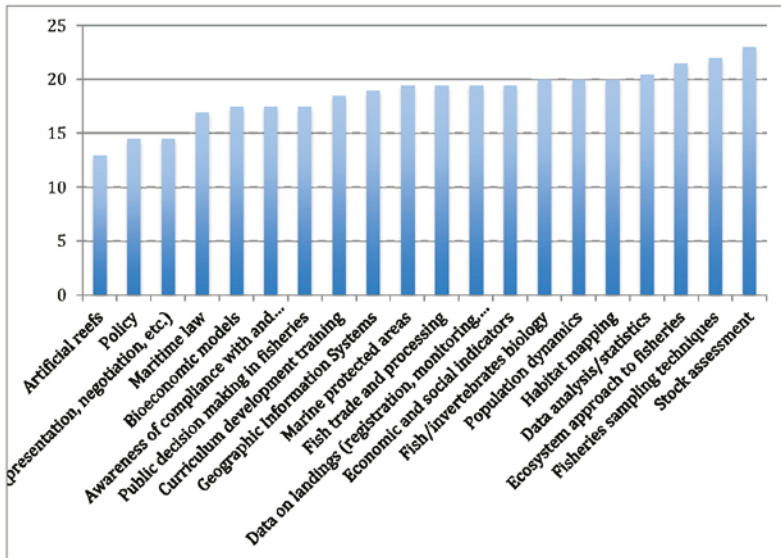


Figure 3. Relevance of subjects to the improvement of fisheries management.

As seen in Figure 3, the following subjects are consistently ranked high:

- Stock assessment
- Fisheries sampling techniques
- Ecosystem approach to fisheries
- Data analysis/statistics
- Habitat mapping
- Population dynamics
- Fish/invertebrates biology

While subjects such as reef ecology, fishing policy and law were ranked low (low priority).

TEACHING AND FISHERIES STUDENTS LANGUAGE ABILITIES

The language of teaching in the study programmes is the national language (UDC and UT – French; UniSey; UEM – Portuguese UDSM Swahili and English), with the exception of UEM, which also teaches in English.

The students' language abilities seem mostly to be limited to their national language and, in the case of non-English-speaking-students (UDC, UT, UEM), English may also be used but after proper preparation.

TUITION FEES AND FINANCIAL SUPPORT

The total tuition fees for a Bachelor programme are between 280\$ US (UDC) and 37,500\$ US (UniSey). For a Masters programme the fees are between 300\$ US (UDC) and 5,668\$ US (UEM). Note that UniSey, at the moment, has no Masters programmes.

Concerning student funding, most students get full national funding but always with some personal contribution. Scholarships from the state or supporting organisations exist, mostly to study abroad.

All universities in this study answered that their fishery graduates go to work in national fisheries administration, NGOs/International Agencies, business and industry and teaching. Only UT and UDSM answered that their graduates also go to work in international fisheries administration.

CURRICULUM DEVELOPMENT AND QUALITY

The internal process for a study programme approval varies between universities but in general it may take around 6 months.

In terms of external approval, it is only required in UT (Ministry of Higher Education) and UniSey (Seychelles Qualification Authority). In UEM, the

external approval is not necessary since the Government and Society are represented in the Academic Council and in the University Committee.

The formal prerequisites for students to be admitted to a Masters programme depend on the university but in all cases, a formal first level degree is required – Bachelor (UEM), *Licence* (UDC and UT), Lower Second Class Honours degree (UDSM). Each university may have other prerequisites in the form of exams or tests (UDC), minimum grades (UDC, UEM, UDSM), *curriculum vitae* and other relevant skills and motivation (UEM). UEM also requires confirmation of existing funds for tuition fees and research. Since UniSey has no formal Masters degrees yet, this question doesn't apply.

Concerning the quality assurance process, UT, UniSey and UDSM have formal internal and external processes. UniSey sometimes also gets quality assurance visits from universities abroad (University of London). UEM is now starting to build up the internal and external process for quality assurance. UDC gave no information on the subject.

KEY POINTS

- **Availability of fisheries related studies at Bachelor's level in most universities (except for UDC)**
- **Language differences across all partner universities**
- **National funding is essential for student enrolment**
- **Relatively uncomplicated *curriculum* development and quality processes**



D. OTHER FISHERIES INITIATIVES

No other university with expertise in marine sciences or fisheries exist in Comoro Islands, Mozambique, Seychelles and Tanzania, while in Madagascar there are two other universities – the University of Mahajanga and the University of Antananrivo, although they have no experience with marine fisheries. Therefore, fisheries management is a key area for development for all countries.

Concerning fisheries collaboration with other universities abroad, with the exception of UDC, all collaborate with several universities in Europe (France, Belgium, Norway, Ireland, Sweden, UK), in Africa (South Africa, Tanzania, Mozambique), Brazil, Australia and Japan.

Despite weak fisheries management presence in partner universities, it is clear that in all countries, government offices (in the form of a Ministry or Department) concerning fisheries management exist. There is therefore a strong interest in developing fisheries management capacity in all countries.

The presence of research institutions working on fisheries also indicates the need to build up fisheries management education in universities. With the exception of Comoro Islands, all countries have other fisheries institutions dealing with marine fisheries: Madagascar has the *École Nationale Maritime de Mahajanga* – ENEM (National Maritime School of Mahajanga), for marine officers training, and EASTA (*Etablissement d'Application Scienti-*

fique et Technique Agricole) for fishery technician training in Mahajanga; Mozambique has the Institute of Fisheries Research, the Institute of Small Fisheries Development, the Institute of Fish Quality Control, the National Fisheries Administration and the Institute of Aquaculture Development; Seychelles has the Seychelles Fishing Authority (SFA) and the Maritime Training Centre; and Tanzania has the Tanzania Fisheries Research Institute (TAFIRI) and the Mbegani Fisheries Development Centre (MFDC).

Fisheries related activities are important for the region. Periodic and non-periodic surveys exist in all countries, except Comoro Islands, mainly for lobster, shrimp, octopus, sea cucumber, demersal fishes.



E. SYNERGIES WITH ADMINISTRATION, INDUSTRY & STAKEHOLDERS

Positively, all partners have already had some collaborative experience with stakeholders in the fisheries management field and, with the exception of UDC, they all seem to have participated in activities organised by sub-regional or regional organisations (FAO, IOTC, SWIOFC, WIOMSA).

UT, UniSey and UDSM are collaborating with international as well as local collaborators, while UDC and UEM are not. With the exception of UniSey, none of the other universities have a memorandum of understanding or similar official framework for collaborating with industry/international fisheries programmes.

UDC has worked in developing work experience with students and, occasionally, in organising events. UniSey is expecting to involve external fisheries experts from the industry/international to teach in the new BSc specialisation. UT, UEM and UDSM have worked with stakeholders in most capacities.



SPECIFIC REMARKS

UNIVERSITY OF TOLIARA (UT)

The *Institute Halieutique et des Sciences Marines – IH.SM* (Institute of Halieutic and Marine Sciences) of the University of Toliara provides training for Senior Managers (Fisheries and Aquaculture Engineers) in close collaboration with the Ministry of Fisheries. However, Fisheries Economics remains a gap in the educational program. Therefore, UT would like to strengthen this discipline through the FISHERMAN Project and form a Malagasy economist.

Due to lack of funding, there are insufficient engineers trained in fisheries graduating from the university.

Pelagic fish provide quite a substantial income and protein to traditional fishing communities, so the establishment of a research programme on the evaluation of small pelagic stocks would be desirable under the FISHERMAN project, as the National Oceanographic Data Centre (NODC) could make oceanographic data (including primary production) from the different maritime regions of the Big Island available to the project.

UNIVERSITY EDUARDO MONDLANE (UEM)

For the development of the Department of Fisheries, the following themes have been identified as key necessities: more staff training, improved laboratories, library and computer lab, with software, and tools for teaching.

UNIVERSITY OF SEYCHELLES (UNISEY)

With increasing challenges facing the fishing industry in the Seychelles, more capacity building is required within institutions responsible for fisheries management. Involvement of stakeholders in decision-making process is also key, hence the importance of education and awareness, as well as capacity building of those stakeholders.

Given an increased focus on sustainable use, management of the extended continental shelf, different models of protected areas management and emerging marine resources, coupled with the development of the blue economy concept, it is imperative that the ministry is supported by people with expertise in marine science.

UNIVERSITY OF DAR ES SALAM (UDSM)

Community participation in fisheries management (co-management initiatives) is encouraged in Tanzania where 90% of the fisheries are artisanal. Furthermore, Marine Protected areas are key to fisheries management in Tanzania and there are no less than 7 Marine Protected areas which all need fisheries experts for better management and sustainable exploitation of the fisheries resources.



CONCLUSIONS

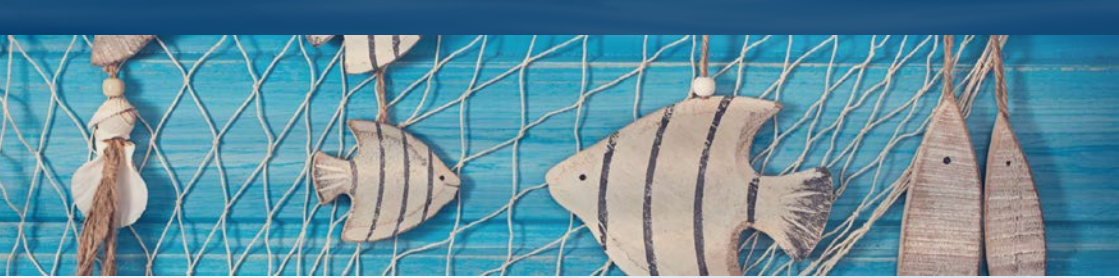
The importance of marine fisheries to the national economies and food security of Comoro Islands, Madagascar, Mozambique, Seychelles and Tanzania is increasing. Therefore, more trained practitioners will be needed in the region to meet this demand.

This needs analysis was based on a questionnaire sent to the five partner universities in the region – University of Comoros (UDC), University of Toliara (UT), University of Eduardo Mondlane (UEM), University of Seychelles (UniSey) and University of Dar es Salam (UDSM). The key findings are outlined below:

1. Universities in the region have an important role in training professionals in the field of fisheries sciences. Unanimously, the 5 universities have expressed a strong interest in building up capacity in order to provide students with key skills in fisheries management.
2. There is a strong heterogeneity among universities both in age, size, expertise and needs. To better achieve the goals of the FisherMan project, it should be adapted to the specific needs of each University.
3. There are insufficient trained personnel in the partner universities. There is therefore a need to address this through a structured training programme. However, it doesn't seem possible to develop a Masters programme on fisheries management at each University. It would be better to increase the presence of fisheries in the *curricula* of these

Universities in a more flexible way, according to the results of this assessment.

4. The universities have varying levels of infrastructures. There are insufficient structures and resources to support a common study programme. The present analysis revealed that, although some universities already have experience in running a Masters programme, others have less. The international relations capacity at the university and department levels also varies. As such, it would be a challenge to develop a common Masters programme for the universities.
5. Interestingly though, given the region's strategic location, there are many international and regional initiatives available addressing the challenges of fisheries resource management. As such, the universities could look into collaborating with such initiatives. The presence of various bilateral and multilateral projects on the exploitation of fisheries resources in the Region could be a great opportunity to build a platform for tripartite collaboration between different stakeholders including universities of contracting countries.
6. With these constraints in mind, universities should look into developing and reinforcing their capacities (teaching expertise, resources & pedagogy), while in parallel, finding synergies between themselves and international/regional initiatives.



FisherMan

