End review of the second grant agreement of the Norwegian support to the structured engineers' apprenticeship program (SEAP)

KPMG

Norad Collected Reviews 02/2021

www.norad.no
ISBN 978-82-8369-121-4
ISSN 1894-518X

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Norad
Case no. 2100516

Final

January 2021

www.kpmg.no

Contents

Acknowledgements

This end- review has been prepared by KPMG Norway International Development Advisory Services for Norad.

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The review team would like to thank the Tanzania Engineers Registration Board, the Royal Norwegian Embassy in Tanzania, and all the other interviewed stakeholders for their participation and for making data available for our review. [1]

The report is the product of its authors, and responsibility for the accuracy of data included in this report rests with the authors. The findings, interpretations, and conclusions presented in this report do not necessarily reflect the views of Norad.

[1] The full list of stakeholders interviewed can be found in Annex I

Abbreviations

AEQSRB	Architects, Engineers and Quantity Surveyor's Registration Board
ATE	Association of Tanzania Employers
CPD	Continuing Professional Development
DUTP	Dar es Salaam Urban Transport Improvement Project
EDF	Engineers Development Facility
ERB	Engineers Registration Board
ESPJ	Education and Skills for Productive Jobs Program
FKE	Federation Of Kenya Employers
GoT	Government of Tanzania
IDC	Innovation and Industrial Development Centre
IET	Institute of Engineers Tanzania
IETWC	Institute of Engineers Tanzania Women Chapter
MOEST	Ministry of Education, Science and Technology
MoWT	Ministry of Works and Transport
NHO	Næringslivets Hovedorganisasjon/ Confederation of Norwegian Enterprise
NITO	Norges Ingeniør- og Teknologorganisasjon
NSDS	National Skills Development Strategy
PDA	Professional Development Affairs
PE	Professional Engineer
PforR	Program for Results
RNE	Royal Norwegian Embassy in Tanzania
SDF	Skills Development Fund
SEAP	Structured Engineers Apprenticeship Program
SLS	Skills Levy System
SWOT	Strengths, Weaknesses, Opportunities, Threats
VETA	Vocational Education And Training Authority

Executive summary

1.1 Objective

The Structured Engineers Apprenticeship Program (SEAP) is a three-year long structured program where recently graduated engineering students gain work experience and practice to qualify for registration as Professional Engineer (PE). In order to improve the gender balance in the Tanzanian engineering profession, Norway, through the Royal Norwegian Embassy in Tanzania (RNE), has been supporting female SEAP trainees since 2010. Norwegian support included direct funding for trainees' allowances, support to female professional associations, funding for trainees' mentors and strengthening of the ERB.

The Norwegian funding has resulted in 288 female SEAP trainees registering as PEs in the first phase, and a projected 150 (now 200) in the second phase. 80% of the Norwegian funding goes directly to allowances for the trainees while the remaining 20% cover other program expenses.

With the end of the second phase (2016 – 2021) of funding in 2021, RNE has requested an end-review of the program. The scope of the assignment is two-fold, including:

1. An **end review** which assesses the extent to which the objectives and outcomes of the project have been achieved, and
2. A **forward-looking assessment** that evaluates the rationale for possible future support beyond 2022.

1.2 Key findings

1.2.1 The review

Using the OECD DAC criteria, the review has assessed the performance of phase 2 of the Norwegian funding: 2016-2021. The table below summarizes the findings:

Criteria	Rating	Evidence	Key findings
Relevance **Is the project doing the right things?**	★★★★☆☆	Strong	The program is in line with Norwegian development policy, but the gender focus is to a low degree reflected in ERB policies and Tanzanian sector policies in general. The program focus on allowances is good for increasing the share of female engineers, but the theory of change does not address the issue of female engineers obtaining engineering jobs after completion.
Coherence **Is the project fit for purpose?**	★★★★★☆	Medium	The program is complementary to other Norwegian aided programs, which rely (or should rely) on Tanzanian engineers. The Norwegian funding has paved the way for similar funding for SEAP by the World Bank.
Effectiveness **Is the project achieving its objectives?**	★★★★★☆	Strong	The program has not yet achieved its main output objective of graduating 200 female trainees, but this is likely to happen later. Outputs have been achieved largely in line with the plan. The results framework could use some clarification.
Efficiency **Are resources well used?**	★★★★★☆	Strong	The program resources have been spent efficiently, as it builds on the already existing government SEAP. Activities have been implemented largely in line with the plan, with the exception of delays in traineeships. Collaboration between ERB and RNE has been very good. However, communication with the wider government and the Institution of Engineers Women Chapter has been lacking.
Impact **What difference does the project make?**	★★★☆☆☆	Weak	The impact of the program is limited because registered female engineers do not necessarily get engineering jobs. There are also indications that the Norwegian funding has substituted GoT funding, which reduces the additionality of funding.
Sustainability **Will the benefits last?**	★★★☆☆☆	Weak	The impacts of the program are likely to go beyond the trainees supported, through increasing representation among female trainees. However, the future of SEAP allowances is uncertain as it is very dependent on donor funding. The Norwegian program has provided lessons learned for the World Bank which has effectively mobilized more external funding.

1.2.2 Forward-looking assessment

1. **Some recommendations from the previous reviews have been addressed:**

    a. ERB capacity has been strengthened through the second phase of the program. ERB has hired more staff for SEAP and has provided training for their staff. Trainees, mentors, RNE and the World Bank have all reported satisfaction with ERB.

2. **Some recommendations have been addressed to some extent but are still not fully resolved:**

    a. Delays in trainees' submissions of reports, leading to delays in completing their traineeships have been reduced, but there are a still many trainees struggling to complete their traineeships on time. Report writing workshops hosted by ERB under the Norwegian program has helped, but is not a scalable solution. Changes could be made to the structure of the quarterly reports and/or the final reports to rationalize the process.

    b. There are still issues with insufficient placements for trainees. This is partly caused by a lack of activity in the engineering sector, in particular with uncertain demand among private sector companies, and partly by a lack of outreach by ERB.

    c. Some entrepreneurship training for female trainees has been implemented. However, there are difficulties with promoting entrepreneurship for recent graduates, as regulations mandate a minimum experience required to establish engineering companies. There is also limited evidence in the literature that training in itself leads to improved performance and growth of women led/ owned SMEs and ERB might not eb the best placed to provide extended support.

3. **Some recommendations have not yet been addressed:**

    a. The sustainability of funding for SEAP is still uncertain. The allowance component of the program, which has been proven to be effective at reducing dropouts and increase completion on time, is now fully funded by donor-supported programs. Norway should join other donors, in particular the World Bank, to agree with GoT on a sustainable financing model for SEAP.

4. **ERB has designed a concept note for future funding, but this does not to a large extent address issues found in reviews and analyses.** The concept note includes funding for constructing new ERB buildings, which we assess to not be crucial, and is light on solutions for the major problems – sustainability of funding and gender mainstreaming. The concept note does include provisions for increasing training on soft skills and attracting more placement firms, which should be reinforced.

5. **The ERB equivalent on Zanzibar (AEQSRB) has been proposed as an opportunity to expand the program, but we assess their capacity to be low, and a potential expansion there should make sure to carry over lessons learned from the ERB funding program.** AEQSRB's capacity is low and no equivalent program to SEAP is in place, which would make duplicating the program there more difficult. There is however a demand for funded structured traineeships on Zanzibar, so solutions should be looked into, but they should include the support of ERB, whose capacity is already strong.

6. **There could be some room for involving Norwegian institutions to a larger extent, and some are already doing activities that are related to the Norwegian program.** For example, NHO is already implementing the Girls and Technology program in Kenya, which seeks to replicate Norwegian success stories in mainstreaming science and technology education for girls. Equivalent programs could be supported in Tanzania. NHO also has experience from sharing policy dialogue lessons with sister organizations which could be relevant such as the Norwegian public-private dialogue experience on making sure that education and skills training provided through schools and training match the current and future needs of the private sector.

1.3 Key recommendations

Based on the review findings, the following recommendations for areas that should be addressed for future phases of funding to improve the program are:

1.3.1 Policy level

1. **RNE should include a broader set of stakeholders, in particular the Ministry of Works and Transport (MoWT) and Ministry of Education, Science and Technology (MoEST) to build a comprehensive policy response to the issue of gender equality in the engineering profession**. The first two phases have proved that funding allowances for female trainees is an effective method of promoting female engineers. However, the small scale of the program compared to the increasing number of graduate engineers combined with the reliance on external financing means that larger scale solutions need to be found. RNE should work with GoT to ensure financial sustainability of funding for SEAP, and to mainstream gender into SEAP and provide for gender equality in the selection criteria for all trainees regardless of funding source. Working with the World Bank, who already has a policy dialogue with GoT based on their Sustainability Report would be a good way forward.

2. **RNE should consider the implication of the general economic and social situation, which limits the impact of funding SEAP**. Female trainees completing SEAP often fail to find jobs as engineers because (i) there is insufficient demand for Tanzanian engineers, and (ii) discrimination against women in hiring engineers means that it is even more difficult for women to find the engineering jobs available. This means that the importance of improving gender equality in PEs is reduced.

1.3.2 Implementation level

1. **ERB should take steps to reduce delays in reporting and completion of traineeships**. First, the structure of the quarterly reports and/or the final reports could be revised to make the process simpler. Secondly, with the newly implemented online reporting system, ERB should have access to more information which could allow them to monitor and follow up on delays more closely

2. **ERB should consider strengthening its outreach to potential host companies in order to ensure sufficient available placements for trainees.** This includes improving its dialogue with public companies, expanding the list of private sector companies contacted as well as reaching out to companies and branches outside of the main urban areas. Dialogue with the private sector could also be beneficial in terms of mapping what skills and training are required from private sector employers.

3. **The Institution of Engineer Tanzania Women Chapter (IETWC) should be involved more in discussions**. The objective of increasing the membership of the organization has not been met. This is because of a myriad of reasons, but fundamentally the underlying issue is that the organization has not been party to discussions and meetings between RNE and ERB.

4. **ERB should change the selection formula to include a gender component**. As a quick win, this would mainstream gender into the program, and could be done with approval of the ERB board.

5. **The results framework should be clarified to clearly separate outputs from outcomes and spell out assumptions**. While the data is currently being collected and reported on, there is some confusion in the results framework. Outputs should be activities and actions done by ERB, for example “allowances paid” or “mentor training activities organized”. Outcomes should be the result of those activities, for example “female trainees enrolled” or “number of mentors trained”.

6. **As a part of this, impact indicators should be integrated into the results framework**. To stay focused on the ultimate goal of the program, the results framework should be adjusted to include impact indicators such as number of women engineers working as engineers, starting their own businesses and working in managerial roles. This data is already collected by ERB so it should not impose much of a burden.

1.4 Way forward

Based on the above recommendations, we have summarized some tangible steps to take going forward:

Timing	Activity	Who
Before next phase	Discuss with WB on financial sustainability and coordination in donor-government relations	RNE
	Agree with GoT on financial sustainability issues	RNE
	Make plan with GoT on macro-scale obstacles to female engineers (demand for engineers, hiring of female engineers, gender indicator in SEAP formula, etc.)	RNE
Planning for next phase	Incorporate co-funding from GoT into the program to ensure financial sustainability of SEAP	RNE
	Consider the suitability of involving Norwegian institutions such as NHO for knowledge-sharing if it has a comparative advantage	RNE
	Revise reporting structure to streamline reporting requirements for trainees	ERB
	Create plan for increasing outreach to host companies (public and private)	ERB
	Incorporate communication with IETWC formally in the next program document	RNE
	Revise selection criteria to SEAP to include gender component to mainstream gender in SEAP	ERB
	Revise results framework, including adding indicators to track PEs after completion	ERB/ RNE
During next phase	Use data from electronic reporting system to monitor trainees falling behind on reporting requirements	ERB
	Collect data on registered PEs to track impacts	ERB

1. Introduction

1.1 Background

The Structured Engineers Apprenticeship Program (SEAP) is a three year long structured program where recently graduated engineering students gain work experience and practice in order to qualify for registration as Professional Engineer (PE). The program is organized by the Tanzanian Engineers Registration Board (ERB) and has been run since 2002.

Enrolment in SEAP has historically seen an under-representation of women. In 2002, only 5% of SEAP trainees were women. There are also large dropout rates among women, which has meant that the number of women graduating from SEAP and registering as PEs has been low. Outside of SEAP, the share of women registering as PE has been even lower. Estimates show that in 2009 only 2-3% of PEs were women.

In order to improve the gender balance in the Tanzanian engineering profession, Norway, through the Royal Norwegian Embassy in Tanzania (RNE), started supporting SEAP in 2010 with earmarked funding for women trainees. Since 2010, two phases of program support have been carried out.

- Phase 1 between 2010-2015 (NOK 11,500,000)
- Phase 2 between 2016-2021 (NOK 16,400,000)

Norwegian support included direct funding for trainees' allowances, support to female professional associations, funding for trainees' mentors and strengthening of the ERB. As a result of the gender-focused funding, over the years 2016/17-2019/20 around 25% of SEAP trainees have been women.

1.1.1 ERB

The Engineers Registration Board is a statutory body established with the 1997 Engineers Registration Act, No 15. The ERB is responsible for "monitoring and regulating engineering activities and the conduct of the engineers and engineering consulting firms in Tanzania". It has four major responsibilities:

1) Registration of engineers, technicians, engineering firms and consulting firms
2) Professional development for engineers and engineering firms
3) Operationalization of engineering practice (such as the code of conduct)
4) Accrediting engineering universities and programs

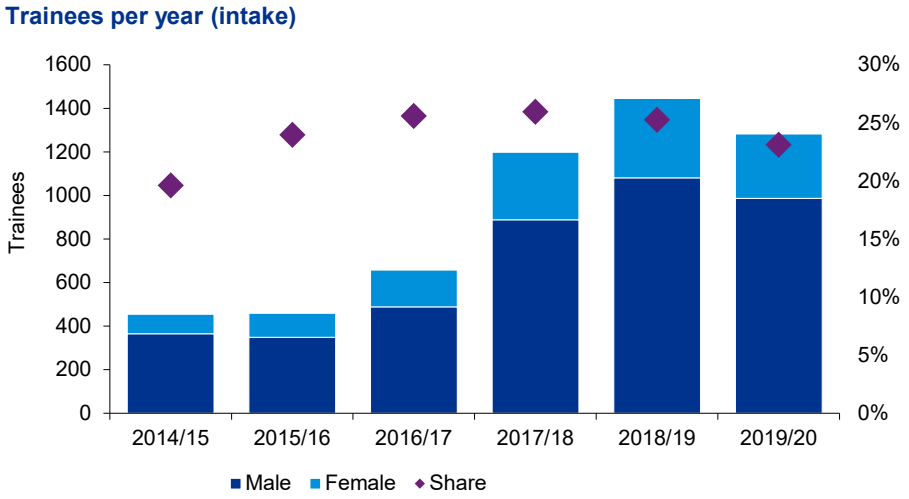
To register as a licensed engineer (PE), the applicant must have done at least three years of engineer traineeship and submit a final report. This can take the form of an unstructured traineeship where the applicant is in charge of providing their own support and writes the report independently, or a structured traineeship. The structured traineeship operated by the ERB is the Structured Engineers Apprenticeship Programme (SEAP). The mandatory requirement of certification of engineers only came into place in 1998.

As a statutory body, ERB is funded by the government and governed by a governing board appointed by the minister of works. The Ministry of Works and Transport does not oversee ERB per se, but is responsible for appointing the board, through which it exercises some control. ERB collects registration fees and annual fees from registered engineers, but most of this is remitted back to the central government. In return, ERB receives funding from the government to run its operations. As of 2021, ERB has a total of 39 staff, 6 of which are only involved in SEAP.

1.1.2 SEAP

SEAP is a three year long structured program where recently graduated engineering students gain work experience and practice to qualify for registration as a PE. SEAP has been operated by ERB since 2002. Under SEAP, trainees are provided work experience and mentorship from working under an already licensed engineers in either a government organization or private company.

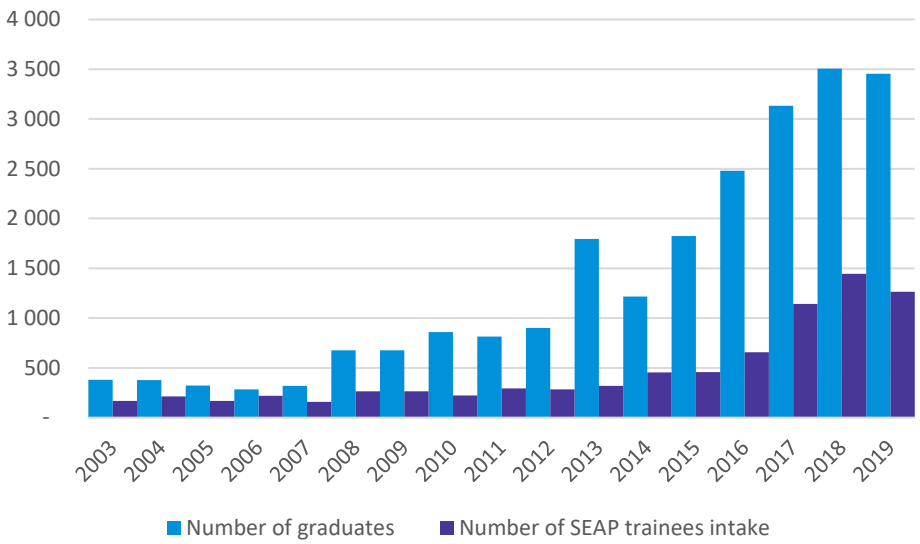
As of 2020, the program has hosted 8,117 trainees, of which 3,820 (47%) have graduated and 3,331 are still in the program[2]. The remainder have postponed or absconded. As of 2020, one third of trainees are given financial support in the form of a monthly allowance, while the remainder are self-financed or receive a salary or other compensation from their host organization/ company.



Despite the rapid growth in SEAP trainees, this has not kept up with the increase in annual graduates in engineering, which has grown even more rapidly. SEAP has seen rapid growth since its inception, from an annual intake of 120 in 2002/ 03 to 1,264 in 2019/ 20. However, the number of engineering graduates has in the same period increased from 379 to 3,500[3]. The implication is that many engineering graduates do not opt to join SEAP and has to certify as PE in the unstructured program if they want to pursue a career in engineering.

[2] Tanzania Ministry of Works, Transport and Communication (2020) Consultancy Services on the Sustainability of the Structured Engineers Apprenticeship Programme on Graduate Engineers.

[3] Ibid.



The limiting factors for taking in more graduates are (i) a lack of available placements and (ii) lack of allowance funding. Despite efforts by ERB to increase the number of placements by contacting relevant potential host firms, the number of placements are inadequate. This is covered in more detail in the review section below.

Around one quarter of trainees accepted each year are women. This is the result of a concerted effort from SEAP in attracting female trainees, including through the Norwegian funding for female engineers. Since 2002/ 03, the share of female trainees accepted annual has increased from 6% to 23%. In absolute terms the progress is more obvious; the average intake in the first five years was around 20 female engineers per year, while for the past five years it has been around 320.

There are two main categories of spending under SEAP: (a) program costs, and (b) trainee allowances. The program costs are covered by ERB and include training materials, monitoring (e.g. inspection visits, review of reports), induction and training, training equipment, and other costs. Allowances are the largest expenses under the SEAP program. Most of the allowance funding comes from private sources, including self-financing by trainees and from host companies. The ERB has historically provided allowances from its own budgets (from Ministry of Works and Transport), but this has in recent years been substituted by external sources of funding for allowances, including:

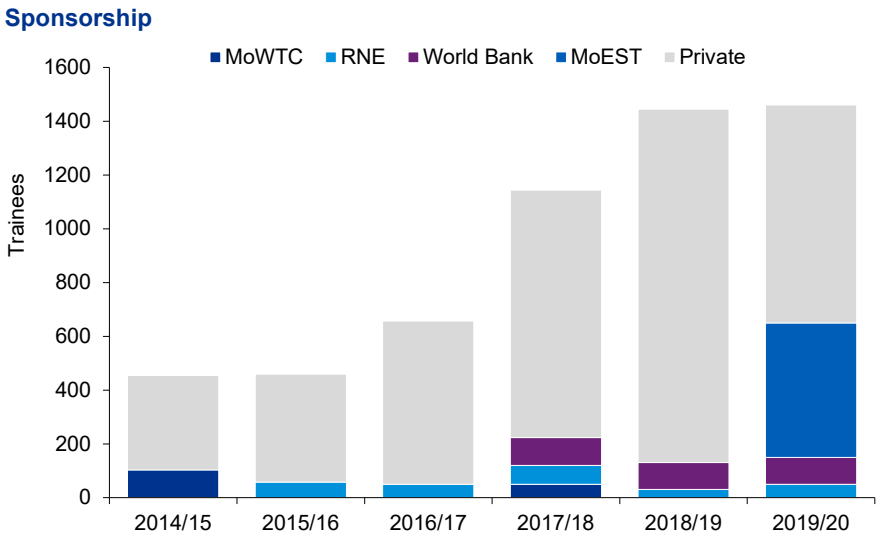
- World Bank – US$2.2 million for four years 2018-2021 under the Dar Es Salaam Urban Transport Improvement Project
- Ministry of Education, Science and Technology (MoEST) – backed by funding from the World Bank under the Tanzania Education and Skills for Productive Jobs Program (ESPJ), starting from 2019/20
- Royal Embassy of Norway – US$3.7 million between 2010-2021 in two phases, specifically targeted at women

Studies have found that the lack of financial support is among the main reasons trainees drop out of the program[4, 5, 6], and the funding for the program is not sufficient to cover all applicants.

[4] NIRAS (2018) Combined End and Mid-term review of the Norwegian support to the Structured Engineers Apprenticeship Program (SEAP)

[5] ERB (2019) Report by the Task Team on the Proposal for Sustainability of Female SEAP Training

[6] Ministry of Works, Transport and Communication (2020) Consultancy Services on the Sustainability of the Structured Engineers Apprenticeship Programme on Graduate Engineers



1.1.3 Norwegian contribution

Since 2010, Norway has been providing financial support to SEAP. Two phases of program support have been carried out:

- Phase 1 between 2010-2015
- Phase 2 between 2016-2021.

The Norwegian support has included direct funding for trainees' allowances, support to female professional associations, funding for trainees' mentors and strengthening the ERB. Female engineers supported by the Norwegian funding receive a monthly allowance of US$ 200 per month, as opposed to the US$ 100 per month from the GoT financial support.

The Norwegian funding has resulted in 288 female SEAP trainees registering as PEs in the first phase, and a projected 150 (now 200) in the second phase. Partly because of the gender-focused funding from Norway, 25% of SEAP trainees are now women. This is up from 5% in 2002. The increase in female trainees was especially marked in the early years of the program, but the Norwegian funding has since been overtaken by the growth in the program as a whole. In 2019-2020, RNE funding covered less than 20% of the female trainees. In absolute terms, the number of female trainees has increased from less than 50 per year to around 300 per year.

The objectives under the second phase of Norwegian SEAP funding are fourfold:

1) To support training of graduate female engineers through SEAP
2) To strengthen professional forums for female engineers
3) To strengthen SEAP through training supervisors and mentors
4) To strengthen the capacity of the ERB to support female engineers.

The details can be found in the results framework below.

Table 1 - Results framework

Specific Objectives	Planned Activity	Expected Outcome	Means of verification
Support professional training of graduate women engineers in Tanzania through the Structures Engineers Apprenticeship Programme (SEAP) of ERB	▪ Recruit in the SEAP programme 50 graduate female engineers in 2016; 50 in 2017 and 50 in 2018 to make a total of 150 trainees from higher engineering institutions through advertisement, visitations to learning institutions ▪ Look for training placement from various providers ▪ Identify mentors for the trainees ▪ Pay allowance and provide them with safety gear	▪ 150 graduate female engineers enrolled in the Structured Engineers Apprenticeship Programme (SEAP) trained and registered as Professional Engineers within a period of 5 years beginning 2016. ▪ More females enrolling for engineering courses at higher learning institutions as they will see many role models registered in the engineering profession	▪ Number of female engineers enrolled in SEAP ▪ Number of female engineers registered as Professional Engineers ▪ Number of female engineering students enrolled in higher learning institutions
Strengthen professional associations and advocacy forums of women engineers in Tanzania	▪ Support female Professional Associations e.g. IET Women Chapter	▪ Increased number and participation of female engineers in the Women Chapter of IET.	▪ Number of female engineers registered with Women Chapter of IET
Develop national capacity to effectively supervise and mentor SEAP trainees through comprehensive mentorship training of SEAP supervisors	▪ Conduct training ▪ Conduct 2 mentor workshops yearly in 5 years in all 5 zones ▪ Support mentors who are supervising female trainees to attend Continuing Professional Development (CPD) courses	▪ 2 mentor workshops yearly ▪ 150 new mentors/ supervisors trained ▪ Strengthened mentor capacity to effectively supervise and mentor SEAP trainees	▪ Number of training workshops proceedings/ reports produced ▪ Number of trainings/ workshops done ▪ Number of mentors trained
Strengthen capacity of ERB to promote initial and continuing professional development of women engineers through technical assistance to the Board's department of Professional Development Affairs (PDA)	▪ To train ERB staff on gender issues, monitoring and evaluation, project management ▪ Procure SEAP program facilities ▪ Procure external gender specialist	▪ 5 ERB staff responsible to overseeing SEAP trained ▪ Two desktop computers, 1 overhead projector, 1 printer and 1 camera procured ▪ Increased gender awareness and gender mainstreaming in ERB and SEAP following the assistance of an external gender expert	▪ Number of staff trained ▪ Number of computers, overhead projector, printer and camera procured

80% of the Norwegian funding goes directly to allowances for the trainees while the remaining 20% cover other program expenses. The other program expenses include training workshops for mentors, support to female professional associations (i.e. the Institute of Engineers Tanzania Women Chapter (IETWC), capacity building for the ERB, and other recurrent expenses related to the traineeship such as training materials, safety gear, reviews of reports and field visits. Thus, most of the costs of the female trainees are covered by RNE, and the program imposes few additional costs on ERB. The only costs covered by ERB are administrative costs such as salary for SEAP officers and motor vehicle maintenance.

1.2 Objective and Scope of the assignment

With the end of the second phase of funding in 2021, RNE has requested an end review of the program. The scope of the assignment is two-fold, including:

3. An **end review** which assesses the extent to which the objectives and outcomes of the project have been achieved, and
4. A **forward-looking assessment** that evaluates the rationale for possible future support beyond 2022.

The end review assesses phase 2 of the program using the OECD DAC evaluation criteria: relevance, coherence, effectiveness, efficiency, sustainability, impact. The review is based on a multi-method approach, focusing mainly on literature reviews, a survey and key informant interviews. The review considers inputs from a broad range of stakeholders, including trainees, mentors (from both public and private companies), host organizations, the ERB, industry associations, the World Bank, and technical institutions.

The forward-looking assessment builds on the findings from the review. Based on the findings of the review, the report makes recommendations for future RNE support for SEAP and collaboration with RNE. This takes into consideration what has and has not worked in the previous two phases, how the recommendations from previous reviews have been addressed and changes to ERB and SEAP beyond the project, including new development partners and the establishment of the Engineers Development Facility (EDF).

The review builds on previous reviews of the funding and of the program as a whole. Norad reviewed phase 1 in 2015, and in 2018, NIRAS carried out a combined end-term review of phase 1 and mid-term review of phase 2. In addition, ERB and the Government of Tanzania has conducted various reviews of SEAP, but without specific focus on the RNE funding.

2. Approach and methodology

2.1 Approach

The review builds on a combination of a literature and document review, interviews with key stakeholders, focus group interviews, and a survey of trainees. This multi-method approach provides both broad and deep qualitative data from a wide range of relevant stakeholders, from trainees and mentors to ERB officials, development partners and engineering training institutes. A complete description of the methodology is found below.

In order to build counterpart ownership, relevant stakeholders were included throughout the process, particularly Government of Tanzania officials, including the ERB. These were included in the inception phase for inputs. A stakeholder workshop will be held in the final phase to discuss the report and its findings and recommendations.

The data was collected partly online as a desk-based research and partly through interviews during a field visit to Tanzania. During the field visit, the team met with various stakeholders and conducted in-person interviews. See Annex I for a complete list of stakeholder interviews.

The review uses the OECD DAC criteria to assess the program on five areas:

1) Relevance – Is the program in line with the overarching Norwegian development cooperation strategy, the Norwegian strategy for Tanzania and the thematic strategy for energy, and for women's empowerment? The review will also assess the extent to which the program is in line with Tanzania's development strategies.

2) Coherence – Is the program complementary to other programs administered by Norway, Norad and the RNE? Is the program in line with ERB activities or in conflict with the host organizations priorities? How does the program fit within the universe of other similar programs by other development partners?

3) Effectiveness – To what extent has the program achieved its objectives and targets? The review will also assess the results framework to assess the extent to which the frameworks are fit-for-purpose.

4) Efficiency – Have resources been used in the most efficient way possible? The review will look at the extent to which the program was implemented within budget and on time. Are there potential improvements in terms of using the resources more efficiently?

5) Sustainability – Will the program's effects last after the program is completed? What are the impacts of a higher number of female engineers, and will those impacts have longer-reaching consequences after the end of the program, for example through motivating more women to pursue careers in engineering? The review will also examine what exit strategies have been put in place, including the potential for future funding from other actors, including the Government of Tanzania.

6) Impact – What benefits has the program brought? The review will assess positive and negative impacts of the program, both direct and indirect.

The review also looks at specific areas of concern for Norad, including risk management and anti-corruption measures. There will also be a specific review of how recommendations from the previous reviews have been addressed.

In addition to an assessment of the recently concluded phase 2 of the program, the report includes a forward-looking assessment. Based on the findings of the review, the report makes recommendations for future RNE support for SEAP and collaboration with RNE. The assessment assesses the need for RNE funding, and the rationale for continued support. This takes into considerations what has and has not worked in the previous two phases, how the recommendations from previous reviews have been addressed, and exogenous changes to ERB and SEAP, including new development partners support and the establishment of the Engineers Development Facility (EDF). It also considers the need for new partners, including broadening the scope to include the

Tanzanian Architects, Engineers and Quantity Surveyor's Registration Board (AEQSRB) or Norwegian institutions for technical cooperation and capacity building.

The forward-looking assessment also answers specific questions and issues raised in the terms of reference. These include:

- Assessing the draft proposal from ERB for a third phase of funding
- Reviewing the existing SEAP Program Document and recommending updates for the new program documents for phase three
- Assessing the strengths and weaknesses of the ERB through a SWOT analysis, including recommendations for mitigating challenges
- Recommending solutions to specific issues raised in previous reviews, such as enhancing the relationship between supervisors and trainees, supporting female engineer entrepreneurship, and ensuring sufficient trainee positions.

2.2 Methodology

The review team gathered data from three main sources:

2.2.1 Literature and documentation review

The review process started with a literature review. A rich body of existing reviews and strategy papers for SEAP, both from ERB and GoT in addition to independent reviews, made up central pieces of evidence.

Relevant documents that were reviewed:

- ERB documentation
    - Two SEAP program documents – phase 1 and phase 2
    - Two grant agreements – phase 1 and phase 2
    - The ERB application documents for phase 3
    - ERB report by the Task Team on the Proposal for Sustainability of Female SEAP Training
    - ERB EDF report on Stimulation and Promotion of Innovativeness and Entrepreneurship of Young Female Engineers
    - Annual reports to RNE
    - Minutes from annual meetings
- Independent reviews
    - NIRAS 2018 Combined End and Mid-term review of the Norwegian support to the Structured Engineers Apprenticeship Program (SEAP)
    - Norad 2015 Review of support to female engineers through the Structured Engineers Apprenticeship Program (SEAP) implemented by Engineers Registration Board (ERB)
- Government of Tanzania
    - National Five-Year Development Plan 2016/17 – 2020/21
    - National Five-Year Development Plan 2021/22 - 2025/26
    - The Tanzania Development Vision 2025

- Ministry of Works, Transport and Communication: Consultancy Services on the Sustainability of The Structured Engineers Apprenticeship Programme On Graduate Engineers

2.2.2 Survey

Two online surveys, one of trainees and one of mentors, were sent out to provide a broad data base for the review. The online surveys were distributed by email, using lists of trainees and mentors received from the ERB. The trainee survey had 690 respondents, while the mentor survey had 469 respondents (see table 2)below. It is impossible to ascertain to what extent the survey respondents amount to a representative sample of trainees and mentors. As the survey was a voluntary exercise, it can be assumed that only trainees and mentors with a particular opinion (either good or bad) of the RNE funding and/or SEAP took the time to respond.

Table 2 - Survey respondents

	Trainees	Mentors
Total sent	2298	469
Total responded	690 (30%)	85 (18%)
o/w Male	422	72
o/w Female	268	13
o/w RNE funded	72	

2.2.3 Focus groups

The survey was be followed up with focus groups interviews with selected participants. Two focus groups were held in person in Dar es Salaam during the field visit, one for trainees and one for mentors.

2.2.4 Interviews

Semi-structured key informant interviews were held with a wide range of stakeholders. The interviews were held with a combination of actors in administrative roles such as ERB staff and GoT officials, actors actively involved participating in the program, including trainees, mentors and representatives for host organizations and private companies, and relevant affiliated stakeholders such as representatives of industry associations, RNE and Norad, and the World Bank.

The full list of interviewees can be found in Annex I.

3.End review findings

3.1 Summary

Criteria	Rating	Evidence	Key findings
Relevance **Is the project doing the right things?**	★★★★☆☆	Strong	The program is in line with Norwegian development policy, but the gender focus is to a low degree reflected in ERB policies and Tanzanian sector policies in general. The program focus on allowances is good for increasing the share of female engineers, but the theory of change does not address the issue of female engineers obtaining engineering jobs after completion.
Coherence **Is the project fit for purpose?**	★★★★★☆	Medium	The program is complementary to other Norwegian aided programs, which rely (or should rely) on Tanzanian engineers. The Norwegian funding has paved the way for similar funding for SEAP by the World Bank.
Effectiveness **Is the project achieving its objectives?**	★★★★★☆	Strong	The program has not yet achieved its main output objective of graduating 200 female trainees, but this is likely to happen later. Outputs have been achieved largely in line with the plan. The results framework could use some clarification.
Efficiency **Are resources well used?**	★★★★★☆	Strong	The program resources have been spent efficiently, as it builds on the already existing government SEAP. Activities have been implemented largely in line with the plan, with the exception of delays in traineeships. Collaboration between ERB and RNE has been very good. However, communication with the wider government and the Institution of Engineers Women Chapter has been lacking.
Impact **What difference does the project make?**	★★★☆☆☆	Weak	The impact of the program is limited because registered female engineers do not necessarily get engineering jobs. There are also indications that the Norwegian funding has substituted GoT funding, which reduces the additionality of funding.
Sustainability **Will the benefits last?**	★★★☆☆☆	Weak	The impacts of the program are likely to go beyond the trainees supported, through increasing representation among female trainees. However, the future of SEAP allowances is uncertain as it is very dependent on donor funding. The Norwegian program has provided lessons learned for the World Bank which has effectively mobilized more external funding.

3.2 Relevance

	Is the program doing the right things?
Relevance	The extent to which the program objectives and design respond to beneficiaries', global, country, and partner/ institution needs, policies, and priorities, and continue to do so if circumstances change?

3.2.1 Relevance for Norwegian and Tanzanian policy

The program is highly relevant across multiple Norwegian priority development policy areas. The main objectives of the program correspond to Norwegian goals of improving gender equality and empower women, which are set out in the government white paper *Freedom, empowerment and opportunities Action Plan for Women's Rights and Gender Equality in Foreign and Development Policy 2016-2020*. Two of the main objectives in the policy are to improve gender equality in education and in the labor market, both of which are areas covered under SEAP. The program is also in line with other Norwegian foreign policy and development policy areas such as private sector development[7].

Tanzania is a long-standing partner country for Norwegian development cooperation. As one of 10 long-term development partner countries, Norway has developed a country-specific strategy for its cooperation with Tanzania. The 2021-2023 Tanzania strategy highlights six strategic objectives, including women's rights, private sector development and renewable energy, which are all areas covered by the program[8].

The relevance to Tanzanian official development strategies can be assessed in two ways; on the one hand the impact on industrialization and skills training, where the program is highly relevant, and on the other the aspect of gender equality, where the Tanzanian strategy is less salient. One of the core themes of the 2016/17-2020/21 National Five-Year Development Plan is "embracing the symbiotic link between industrialization and human resources development" (page 37), which SEAP embodies. The strategy further envisions moving from a low skill to high skill labor force through, inter alia, apprenticeships and on-the-job industrial training. However, the program's emphasis on gender balance in skills training is only to some extent reflected in Tanzanian strategy documents. While the five-year development plans do mention gender equality, it is mainly in a passing manner.

The program is to a low degree focused on the poorest and most marginalized, as the immediate beneficiaries of the program are university-educated women. This limits the potential impact of the program on poverty reduction, which is an overarching goal for Norwegian development cooperation. Future rounds of funding could consider how to better target populations in more need of official development assistance. At the same time, the program's aim to increase gender equality in the engineering profession necessitates this focus. The assumption behind the program is also that more women will be inspired to become engineers, which would have a broader impact.

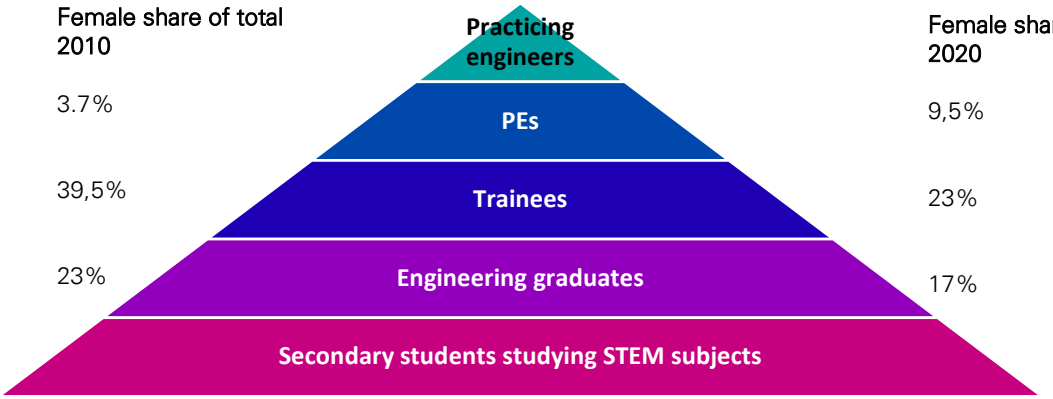
3.2.2 Relevance to the needs of the beneficiaries

The program is to some extent in line with the needs of the ERB. The ERB has a government mandate to increase the number of trainees, and at least nominally to improve gender equality in the profession. ERB also stated in interviews that the program was highly relevant to their work. However, it is not clear that the gender equality focus would continue without Norwegian funding. The allocation formula for calculating who receives GoT funding for allowances does not take gender equality into account, and outside of Norwegian funding there is no ERB or GoT spending on other gender equality related activities.

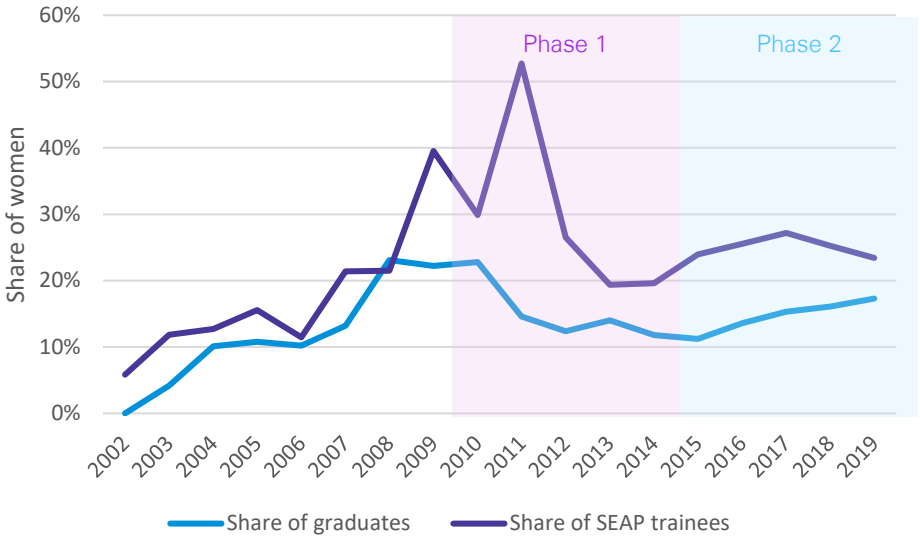
The program's focus on gender equality in the engineering profession is based on evidence that suggests this is indeed a large problem. Women participation in the engineering profession has historically been low. This is reflected in the education chain leading to female engineers:

[7] Meld. St. 35 (2014–2015) Working together: Private sector development in Norwegian development cooperation

[8] Country strategy



In 2010, before the start of the first phase of the program, only 3.7% of registered PEs were women, 39.5% of SEAP trainees were women, and 23% of the engineering graduates were women. This suggests that the bottleneck in terms of women engineers historically has been at the traineeship level, but it also suggests that intakes to the traineeship was not the main issue. In fact, the share of women in the intake to SEAP was higher than the share of women graduates. Over the course the following 10 years, the number of male graduate engineers grew faster than the number of female graduate engineers, causing the share of women to decrease. As of 2020, these numbers were 9,5% of registered PEs, 23% of SEAP trainees and 17% of graduate engineers. Seeing as the share of female trainees is higher than the share of female graduates, this suggests the bottleneck is not necessarily at the level of SEAP intake, and that RNE should consider looking at the gender disparity further down and higher up in the pyramid, for example through incentivizing female students to study engineering.

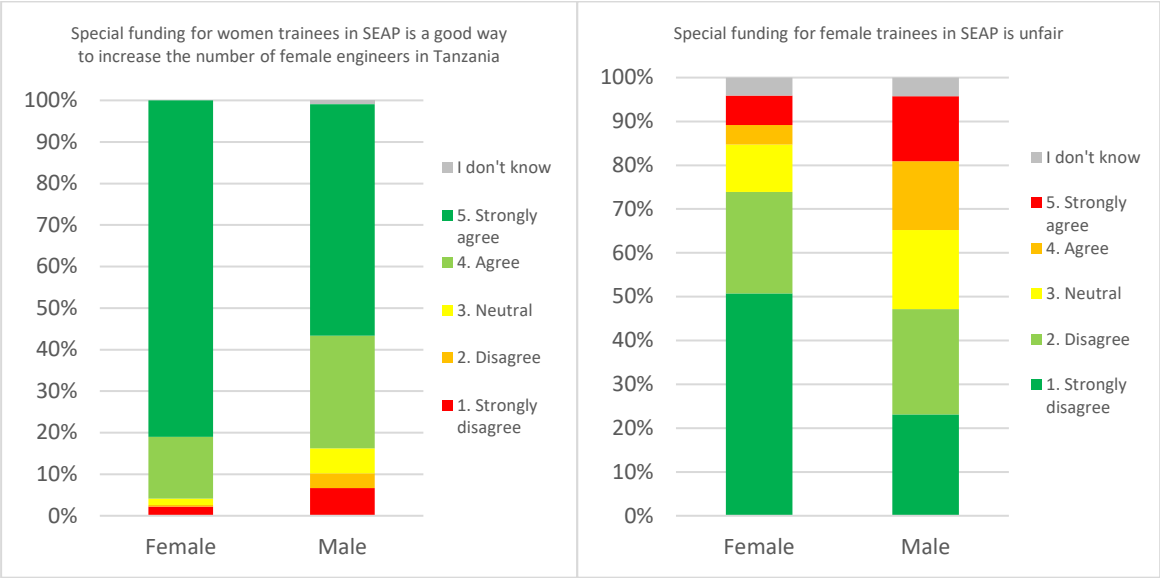


With the relatively high share of women trainees before the program, it is not clear that the focus should have been on increasing the share of women trainees. In fact, the program started at an historically high level of share of women trainees. In this regard, the relevance is thus higher now, as a smaller share of trainees are women.

The program's main focus – providing allowances to trainees – is in line with what trainees themselves want. Both our analysis and previous studies[9] have shown that the number one aspect they want improved with SEAP is increased allowance funding. Data analysis has also shown that providing (higher) allowances is beneficial to completion rates and the share of trainees who finish the program on time (see Box 1 on allowances below). A minority of trainees surveyed (30% of male respondents) respond that they view the gender-based funding as unfair. However, very few respondents disagree with the

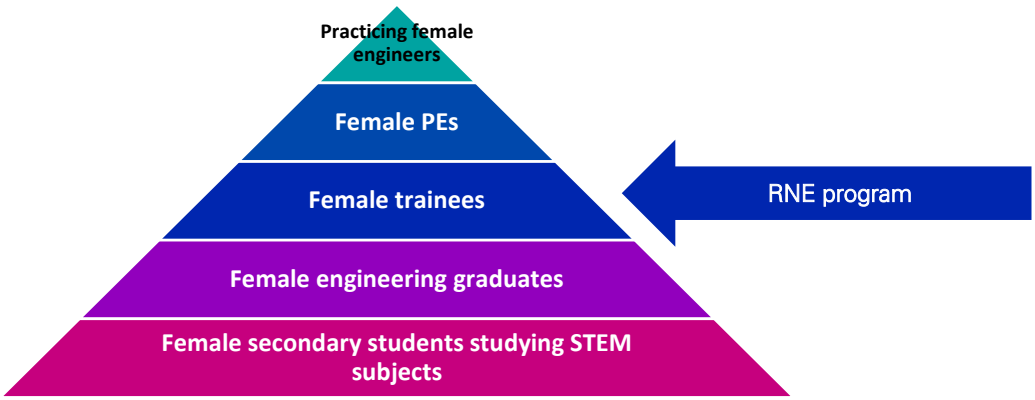
[9] Sustainability report, NIRAS review

statement “Special funding for women trainees in SEAP is a good way to increase the number of female engineers in Tanzania”.



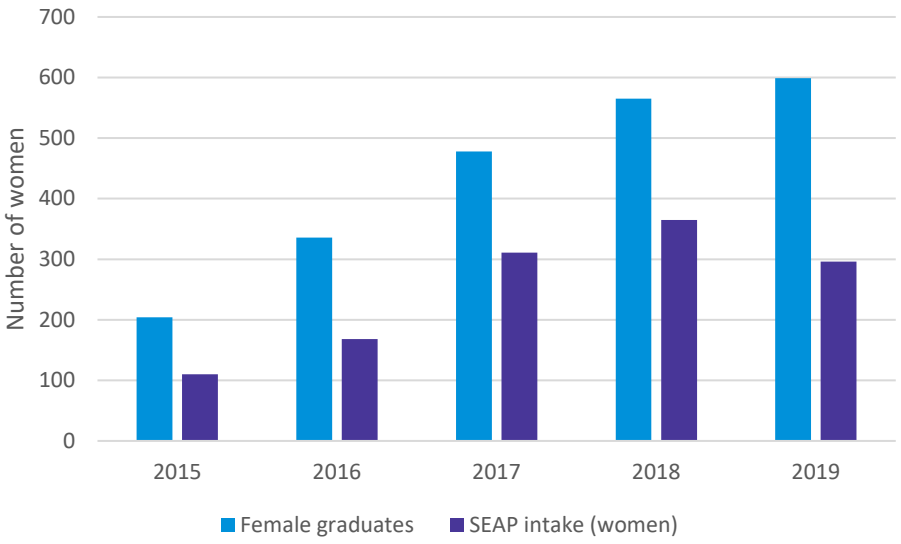
3.2.3 Program concept and theory of change

The program’s theory of change is based around a core assumption that there is a bottleneck in traineeships where too few female graduate engineers have the opportunity to register as PEs and work as an engineer because of a lack of allowance. In the female engineers pyramid below, the program is aimed at the female trainees’ level. This assumes that there is a sufficient number of female engineering graduates who want to register as PEs. Implicit in the program design, further, is the assumption that what is holding female trainees back is the lack of funding, or that it is more difficult for women to obtain the funding that is available.



Both of these assumptions are reasonable. The data shows clearly that the number of female graduates far outstrips the intake to SEAP, even though the gender balance is in fact better at SEAP level than among graduates, meaning a higher share of women go from graduate to trainee. The question of allowances is discussed in Box 1 below.

Figure 1 - Female graduates and SEAP intake for women (including RNE funded)



Another large assumption in the theory of change is that registering women trainees as PEs leads to more women working as engineers. In practice, because of a lack of engineering jobs generally, and discrimination women engineers, making it more difficult for them to obtain the few existing engineering jobs, few women PEs actually work as engineers. The impact of the program is clearly reduced if the Norwegian-supported women are not able to work as engineers upon completion of the program (see further discussion under section 3.6 on impacts below).

Box 1 – Relationship between allowance levels and progress in SEAP

The various sources of financing for SEAP provide different levels of allowances.

Funding source	Monthly allowance rate (Tshs)
GoT/ERB	300,000
RNE	645,000
World Bank (DUTP)	645,000
ESPJ	300,000*
SEAP providers under private arrangements (average)	525,000**

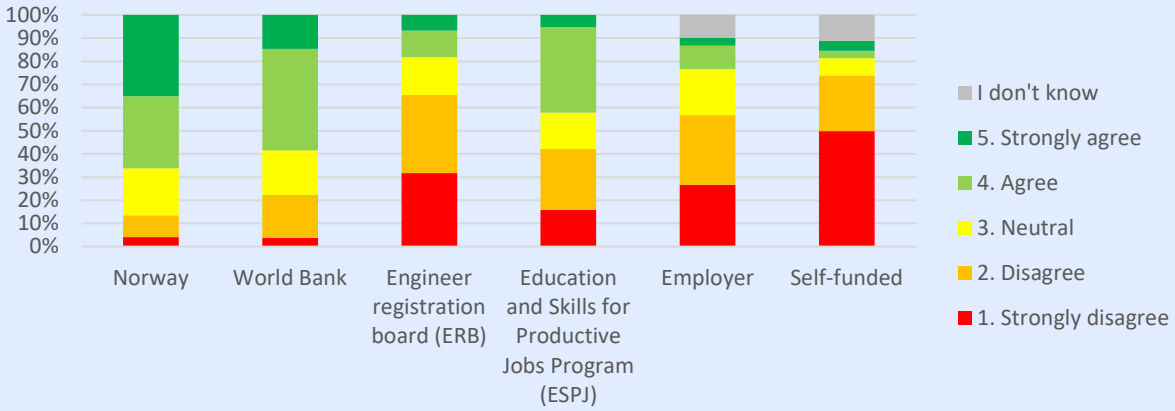
*The proposed amount was 300,000, but the first batch of trainees have been receiving 500,000.
** Source: 2020 Sustainability report; calculated as an average of funding for self-financed trainees

The RNE monthly allowance started out at $100 in phase 1, but was increased to $200 (Tshs 645,000) in phase 2, after feedback that the allowance was too small, causing issues for trainees leading to delays and dropouts.

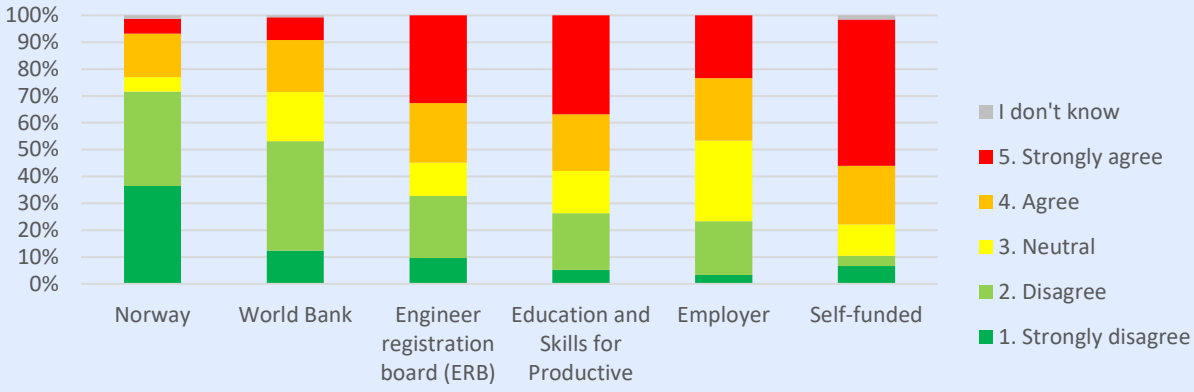
Data from the phase 2 agreement claims that the dropout rate is indeed much lower for RNE-supported trainees (14%) than for self-funded trainees (79%) and GoT-funded trainees (43%). However, it should be noted that ERB follow up on RNE-supported trainees more closely than other trainees, because of the grant agreement.

From our survey, we also find that RNE and World Bank funded trainees report fewer financial issues and fewer delays.

Trainees: The financial support for SEAP is sufficient

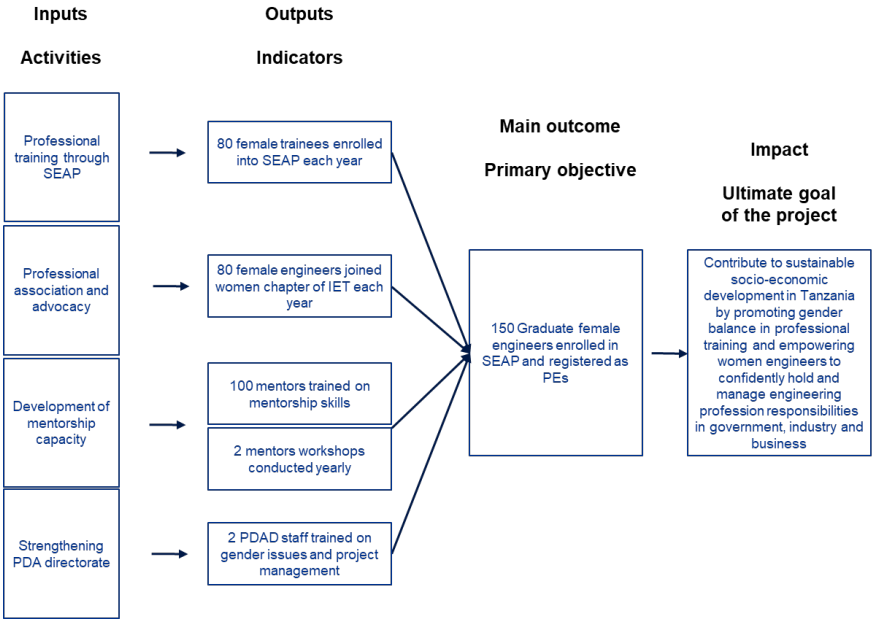


Trainees: I have had financial problems preventing me from continuing SEAP traineeship



At the macro level, the program's theory of change builds on an understanding that positive discrimination has long-term equalizing effects on gender equality. The implicit understanding is that a low share of women engineers leads to fewer women wanting to become engineers, in a vicious cycle. The targeted efforts under the Norwegian program, including increasing the allowance to female engineers, is meant to increase the number of women engineers, which will in turn make it more attractive for women to become engineers. This dynamic is illustrated in the results framework, for example in one indicator which explicitly states: "More females enrolling for engineering courses at higher learning institutions as they will see many role models registered in the engineering profession". Without this effect, the program benefits would be very narrow in scope, limited to the 190 female trainee beneficiaries. This effect is to some extent validated in the literature[10], if not explicitly for this case.

The program builds on already existing structures of SEAP and the management of that program by ERB, but adds some factors intended to benefit female trainees. The SEAP structure was already at the start of the Norwegian funded program a proven tool for preparing trainees for certifying as PEs. The theory of change is therefore limited in describing the processes. In addition to the normal SEAP processes, the program also includes some additional activities meant to strengthen the program and increase the number of trainees that complete the program. These include training ERB staff, providing training for mentors, and strengthening the IET women's chapter.



While the program's benefits are wide-ranging in the areas of skills development and industrialization, the focus in the theory of change and results framework is squarely on gender equality. The program's beneficial impact is thus understated in the frameworks.

The rationale for the program changed since its original conception in 2010. The original objectives were gender balance in the energy sector, but this has later expanded to include the entire engineering industry.

[10] See for example Pande, R. & Ford. D (2011) Gender Quotas and Female Leadership: A Review; Morgenroth, T., Ryan, M., Peters, K. (2015) The Motivational Theory of Role Modeling: How Role Models Influence Role Aspirants' Goals

3.3 Coherence

	Is the program fit for purpose?
Coherence	The extent to which project fits and add value to other programs and interventions

Other relevant interventions by Norway are found mostly in the energy and skills development sectors. On the energy side, Norway has a long history of cooperation with Tanzania[11], including construction of both energy generation and transmission. Infrastructure programs in Tanzania can benefit from the SEAP funding, as more certified engineers are available to work on development cooperation programs.

SEAP is also receiving funding from the World Bank. World Bank is funding 351 trainees through the large-scale infrastructure program *Dar es Salaam Urban Transport Improvement Project* (DUTP). The SEAP element of the program is based on the Norwegian support to SEAP, using the same allowance rates and funds. At the same time, the World Bank is also funding a targeted 2,000 trainees through the Tanzania Education and Skills for Productive Jobs Program for Results (ESPJ). Being a Program for Results (PforR), the nature of ESPJ is different from the DUTP in that the World Bank is funding an already existing government program, the National Skills Development Strategy (NSDS), and the government is thus expected to co-finance the activities. This means that unlike in DUTP, the funding goes through government systems, in this case through MoEST, the allowance rate for this funding is set at 300,000[12], and it includes no additional activities to support ERB.

RNE has had a good relationship with ERB built up over the ten years of the collaboration. Interviews with both RNE and ERB showed that they are happy with the relationship, and communication and expectations have improved over the course of the two phases. RNE does not seem to have much communication with the wider GoT over the program. A particularly salient point is that the financing agreement is signed directly with ERB despite this going against GoT regulations, which state that financing agreements can only be signed with Ministry of Finance. The lack of involvement of GoT (in particular MoWT) is presumably a reason why issues on the sustainability of financing have been slow to be addressed (see below).

[11] https://www.norad.no/globalassets/publikasjoner/publikasjoner-2021/tanzania-and-norway.pdf

[12] For the first batch of trainees, the allowance given was Tshs 500,000

3.4 Effectiveness

Effective-ness	Is the program achieving its objectives? The extent to which the project is achieving or is expected to achieve, its objectives, and its results, including any differential results across groups

3.4.1 The reporting framework

The results framework is somewhat unclear and mixes up outputs and outcomes. Some indicators are shared between the list of outputs and outcomes, such as "enroll 80 female trainees into SEAP programme each year". Combined with some inconsistencies in the reporting, this makes it difficult to track progress from year to year. Outputs should be the activities ERB is conducting throughout the year, while the outcomes should be results of those activities. For example, the output would be "trainees supported financially", while the outcome would be "female trainees enrolled". What we would identify as outputs are reported on in the annual progress reports, but is outside of the results framework. This is of less importance to the success of the program, but could potentially improve understanding of the program both internally and externally.

Despite this, the outcome indicators are very clear and easily measurable. The outcome indicators are easy to track and to understand, and they are easy to quantify. They are also relevant for the program, and can be measured each year.

The results framework is rather weak on the impacts of the program. While the results framework measures well the number of female trainees supported and ultimately registering as PEs, there is no tracking of what happens to female PEs after registration. As discussed in the chapter on relevance, the issue of gender equality in the engineering profession is complex, and it is not certain that the female PEs go on to work as engineers. The detailed annual reports from ERB contains information on female engineers in management positions etc., which is very useful for following the theory of change. A recommendation could be to include this is in the results framework.

3.4.2 Outputs achieved

Outputs have largely been achieved, on time and on budget. 7 out of 10 quantifiable outputs have been achieved as planned, although with some delays and re-scheduling between the years. Table X shows the outputs by year.

Outputs	Achieved 16/17	Achieved 17/18	Achieved 18/19	Achieved 19/20	Achieved 20/21	Total budget	Total achieved	Achieved %
Payment of subsistence allowances to 150 trainees	39	82	120	120	66	600	427	71 %
Payment of subsistence allowances to trainees from Phase 1	35					-	35	NA
Induction and Report Writing Training (4 Days),1 session each year	1 seminar 1 training	1 seminar 2 training	1 seminar 1 training	1 seminar 1 training	5 training	5 seminars 5 trainings	4 seminars 10 trainings	>100%
Training materials	50	70	30	150		200	300	150 %
Conduct SEAP Monitoring visits (10 Days) for 2 visits per year	2	4	2	2	4	10	14	140 %
Conduct training visits for 20 female SEAP trainees to industrial and construction sites one visit per year (5 days)	-	1	1	-	1	5	3	60 %
Support female trainees to attend AED and IET Annual Conference	10	10	15	15	42	75	92	123 %
Award best graduating female engineering students for 15 students	-	20	20	20	-	75	60	80 %

Outputs	Achieved 16/17	Achieved 17/18	Achieved 18/19	Achieved 19/20	Achieved 20/21	Total budget	Total achieved	Achieved %
Review of quarterly reports each Tshs. 10,000 per report for 150 trainees engineering students for 15 students each year	78	328	480	326	270	3,000	1,482	49 %
Support female Professional Associations e.g. IET women ch apter	-				-	-	-	NA
Conduct 2 workshops for mentors and trainees per year (40 participants)	2	4	2	2	2	10	12	120 %
Support 20 mentors who are supervising female trainees to attend CPD courses	-	-	20	-	128	100	148	148 %
Strengthen Professional Development Affairs (PDA) directorate	1	17 staff trained			1 scanner and a Video conference Facilities procured			
Miscellaneous						-	-	NA

The most important output indicator – payment of allowances – has not been achieved. The main reason the spending has been slower than planned is delayed submissions of report by trainees. The monthly allowance payment is linked to successfully submitting quarterly reports on time – when trainees miss reporting deadlines (two consecutive quarters) their allowances are not paid out. This is an issue that has been identified in previous reviews. *Delays in reporting are covered in more detail in section 4.2.*

The effects of the COVID-19 pandemic has caused a slowdown in activities in 19/20 and 20/21. While the pandemic has not had a recorded effect on the traineeships and allowances paid, the pandemic did imply a temporary pause in activities such as field visits and IETWC-organized activities. Another effect of the pandemic is that the ERB has invested in teleconferencing equipment.

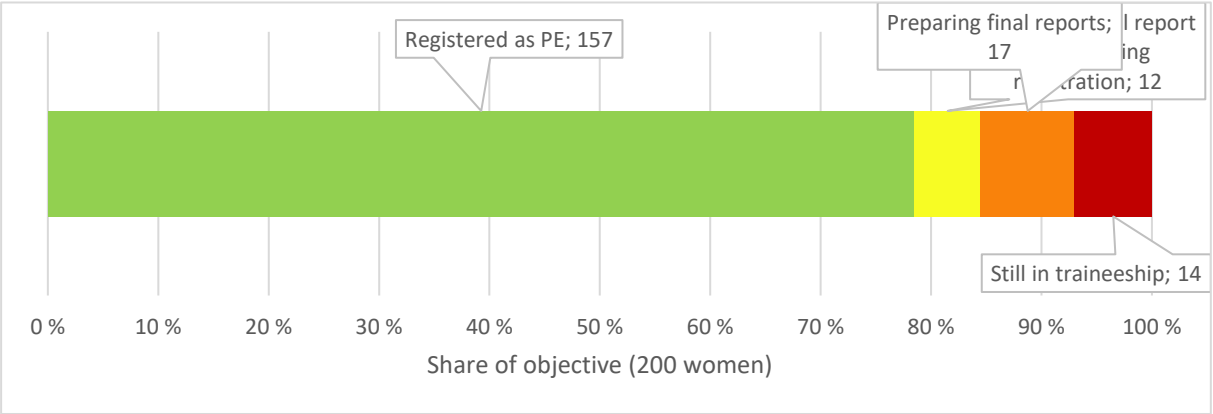
3.4.3 Outcomes achieved

The main objective of the program – to enroll and register as PEs 150 (later 200) graduate female engineers – has not been met at the time of writing this report. As of the last report from ERB to RNE

(FY20/21), of the 200 targeted graduates, 14 are still in their traineeships and 186 have completed the traineeship[13]. Of the 186 that have completed:

- 157 (84,4%) have registered as PEs
- 12 (6.5%) had submitted their final reports and were awaiting registration
- 17 (9,1%) were still preparing their final reports

Thus, the achievement of the target is 157 out of 200, or 78.5%.



The delays in completion has been a problem highlighted throughout the implementation of SEAP, and in both phases of the Norwegian funding. By the original close of the program (July 2021), the achievement was only 42%. For comparison, during phase 1, of the targeted 290 women, only 75 (26%) had registered by the initially planned close of the program. *Further analysis of delays are addressed in section 4.1.3 below.* For Phase 2, according to ERB, some of the delays have been due to the COVID-19 pandemic.

Due to the shortfall in achievement of the final outcome owing to delays, the program was given a no-cost extension to June 2022, in order to ensure the registration of the remaining 107 trainees. In most cases, the allowances for the trainees have already been paid out, but the trainees have not yet submitted their final reports. As of the latest (FY20/21) annual report, out of the 200 RNE-funded trainees, 31 were still completing their traineeship, while 59 had completed their traineeships but not submitted final reports (more recent data from December 2021 shows 14 still completing traineeship and 17 still preparing final reports).

All secondary outcomes except one has been met and even over-achieved. The program has been very successful in achieving the outcomes planned. The difference from lack of progress in the main objective illustrates the difficulty in actually graduating and registering women as PE as compared to enrolling them in SEAP.

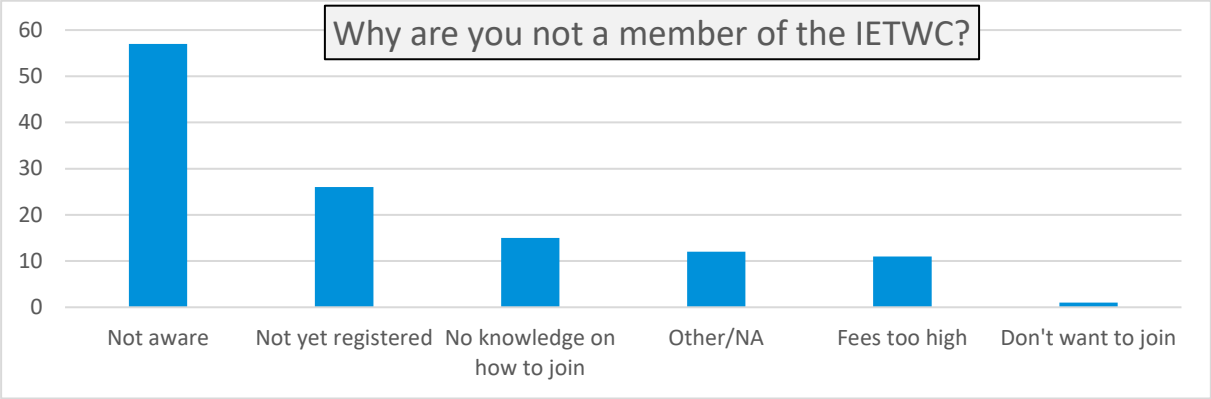
Outcomes	Achieved 16/17	Achieved 17/18	Achieved 18/19	Achieved 19/20	Achieved 20/21	Total achieved	Target
Enroll 80 female trainees into SEAP programme Each year (not limited to Norwegian support) (total for 4 years is 320)	168	311	365	290	299	1433	400 (80 per year)
80 female engineers joined in the women chapter of the institutions (total for 4 years is 320)	64	86	65	24	29	268	400 (80 per year)

[13] The data was received from ERB in December 2021. The December data shows considerable improvement since the final (FY20/21) annual report was submitted:

- 84 (42%) have registered as PEs
- 26 (13%) had submitted their final reports and were awaiting registration
- 59 (29.5%) were still preparing their final reports

100 mentors trained on mentorship skills for 5 years (80 mentors to be trained for 4 years)	61		551	63	377	1052	100 (20 per year)
5 Technical ERB staff trained on Gender issues for 5 years	5	17	12	7	12	53	5 (1 per year)
2 Mentors Workshops conducted yearly (8 mentors workshops for 4 years)	Not reported	4	10	2	2	18	10 (2 per year)

The only secondary outcome not met was the number of women engineers joining the IET Women's chapter (IETWC). There are a number of reasons for this shortcoming. First of all, few women trainees even know about the organization. From our survey of female trainees, only 29% of female trainees were members, and among the ones that were not members, the most common answer given as to why they were not members, was that they were not familiar with its activities. Secondly, there are few incentives for female engineers to become members: interviews showed that many of the women who were indeed active in the events organized by IETWC were not members, but were still enjoying the same benefits as members. Thirdly, there is little incentive for the IETWC to increase their membership. In practice, none of the membership fees collected by IET are transferred to the women's chapter, but are instead spent at the IET central level. IETWC's activities are instead all funded ad hoc by registration fees to individual events. On top of all this, the fourth reason is that there is no communication between RNE and IETWC, and communication between ERB and the women's chapter is limited. A recommendation would be to involve IETWC in annual meetings or similar.



3.5 Efficiency

Efficiency	Are resources well used?
	The extent to which the project delivers, or is likely to deliver, results in an economic and timely way

3.5.1 Timeliness, budget and financials

The program has experienced delays in registering female PEs due to delays in their traineeship and final reports. The main expenditure item under the program – monthly allowances to trainees – account for 81% of the total budget. Delays in reporting leads to non-payment of allowances to trainees, which in turn has caused the slightly delayed program spending. By the time of the final ERB report, the entire budget for allowance was spent.

As of the time of the final ERB report, the entire budget was spent. In fact, there was slight overspend compared to the budget, on account of exchange rate fluctuations.

There are only minor changes in spending compared to the initial budget. But they are not significant, as any non-allowance spending is quite low. Slight overspending was recorded under supporting female trainees attend Annual Engineering Day (AED) and IET conferences, induction and reporting writing training, and training materials, while underspending was recorded under strengthening the Professional Development Affairs (PDA) directorate and support IETWC. Some of these shortfalls are because of limitations due to COVID, which forced ERB to relocate the money to other posts. Reports by ERB show that strengthening PDA directorate was cheaper than initially planned.

	Budget	Budget (Tshs)	Actual (Tshs)	Share %
1	**Payment of subsistence allowances to 150 trainees (@ Tshs. 645,000 x 150 x 36)**	3,483,000,000	3,495,435,000	100 %
	Payment of subsistence allowances to trainees from Phase 1	-	54,180,000	NA
2	**Induction and Report Writing Training (4 Days),1 session each year**	96,995,000	163,509,250	**169 %**
3	**Training materials**	16,770,000	27,938,000	**167 %**
4	**Conduct SEAP Monitoring visits (10 Days) for 2 visits per year**	78,000,000	112,708,500	**144 %**
5	**Conduct training visits for 20 female SEAP trainees to industrial and construction sites one visit per year (5 days)**	80,320,000	75,699,000	94 %
6	**Support female trainees to attend AED and IET Annual Conference**	28,222,000	66,536,000	**236 %**
7	**Award best graduating female engineering students for 15 students each year @ Tshs. 1,075,000**	80,615,000	52,673,170	65 %
8	**Review of quarterly reports each Tshs. 10,000 per report for 150 trainees engineering students for 15 students each year @ Tshs. 1,075,000**	18,000,000	16,864,000	94 %
9	**Support female Professional Associations e.g. IET women chapter**	86,000,000	42,613,000	**50 %**
10	**Conduct 2 workshops for mentors and trainees per year (40 participants)**	159,900,000	180,536,300	113 %
11	**Support 20 mentors who are supervising female trainees to attend CPD courses @ Tshs. 430,000**	43,000,000	16,323,000	**38 %**
12	**Strengthen PDA directorate**	129,178,000	40,903,000	**32 %**
13	**Miscellaneous**	-	18,357,381	NA
	TOTAL	**4,300,000,000**	**4,364,275,601**	**101 %**

Given the unique nature of ERB and SEAP, it is not likely that RNE could have achieved similar results any other way. SEAP is one of two options for funding engineering graduates' traineeships, and the unstructured option would have undoubtedly been more complicated to fund. In order to meet the outcome target of graduating engineers, SEAP is thus assessed to be the best option.

The Norwegian funding is efficient in that is uses established structures, processes and the ERB organization, which reduces costs. ERB staff costs are not covered by the Norwegian funding, which improves the efficiency of the Norwegian funding. The Norwegian funding has also benefited from SEAP-wide improvements such as the online reporting system, which has improved reporting at no cost to RNE.

The unit price for each registered female PE (assuming all the targeted women will register) has increased from Tshs 9,000,000 in phase 1 to Tshs 21,500,000 (NOK 82,000) in phase 2. This is partly because the allowance has increased and partly because the budget for other supporting activities has increased.

Despite the high unit cost, the allowance seems to be a crucial component of the Norwegian funding, and has contributed to the good results. The issue of allowance is discussed in Box 1 above.

The impact of the supporting activities is less clear and not as easily quantifiable; however survey results indicate that the activities are well received. Some activities, such as report writing workshops has had good results in making completed trainees finalize their final reports. Further, there are non-financial reasons for including the support activities, such as reducing discrimination and sexual harassment from mentors.

The impact of the Norwegian funding could arguably go further if it involved matched financing from other funders. Norwegian funding could for example top up the difference between GoT funding and the 645,000 target allowance. This could help increase the share of women trainees, but at the expense of a lower number of male trainees, which might make it politically unfeasible. The issue is discussed in further detail in the section on financial sustainability below.

3.5.2 Governance, communication and reporting

Both the ERB and RNE have been satisfied with communication during the implementation of the program. Annual reports have been submitted as expected, and have improved in quality over the course of phase 2. According to interviews with both ERB and RNE they have both voiced satisfaction with the collaboration.

The main issue with communication is with IETWC, who have not been involved in discussions even though they are instrumental in meeting one of the objectives (increasing number of women members in IETWC). Funding to IETWC goes through ERB, and interviews with IETWC showed that these payments are not always in line with IETWC expectations. As seen in Effectiveness section 3.4, the IETWC indicator is one of few outcomes that have not been achieved. This is partly attributable to insufficient communication with IETWC.

Trainees are satisfied with communication from RNE and ERB. The Norwegian funding has a high standing among trainees who receive the funding, partly no doubt, because of the higher allowance it entails. Some trainees not receiving the funding did perceive the allocation to be unfair, which suggests that ERB could improve transparency around the selection criteria, including making the selection criteria and data basis for the calculations publicly available online.

3.6 Impact

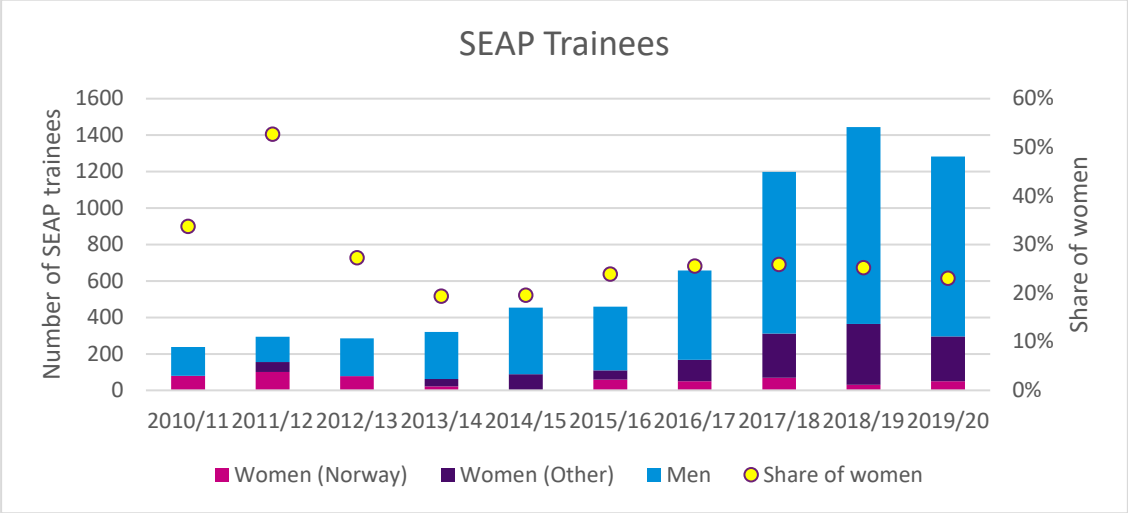
	What difference does the program make?
Impact	The extent to which the program is generating or is expected to generate significant positive or negative, intended or unintended, higher-level effects.

The impact objectives, as stated in the program document, are:

1. Contribute to sustainable socio-economic development in Tanzania
2. Promoting gender balance in professional training
3. Empowering women engineers to confidently hold and manage engineering profession responsibilities in government, industry and business

The impact on sustainable socio-economic development in Tanzania is considered to be low. This is partly because it is not clear what benefit the PE registration has to the direct beneficiaries – as discussed in further detail below, unemployment among engineers combined with discriminatory mindsets towards employing women, mean that even with the PE certification, employment as engineer is not guaranteed[14]. It is also partly because the funding targets relatively well-off people (graduate students), where the impact of the funding is lower. More direct positive impacts could be achieved by targeting relatively worse-off recipients.

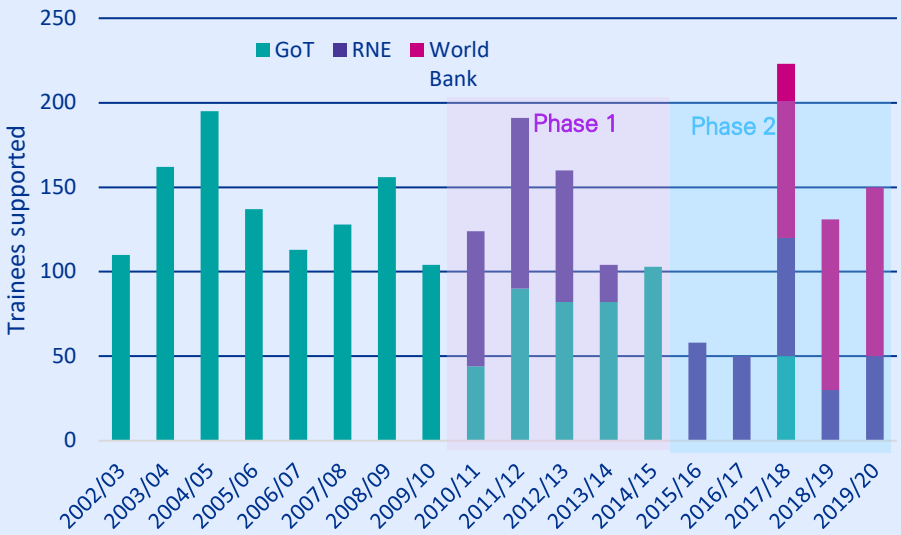
The impact on gender balance in professional training is difficult to measure, due to uncertainties around the counterfactual. While it is clear that 190 female trainees have been supported to participate in the SEAP traineeship, it is not clear what the situation would have looked like if the Norwegian funding was not available (see Box 2).



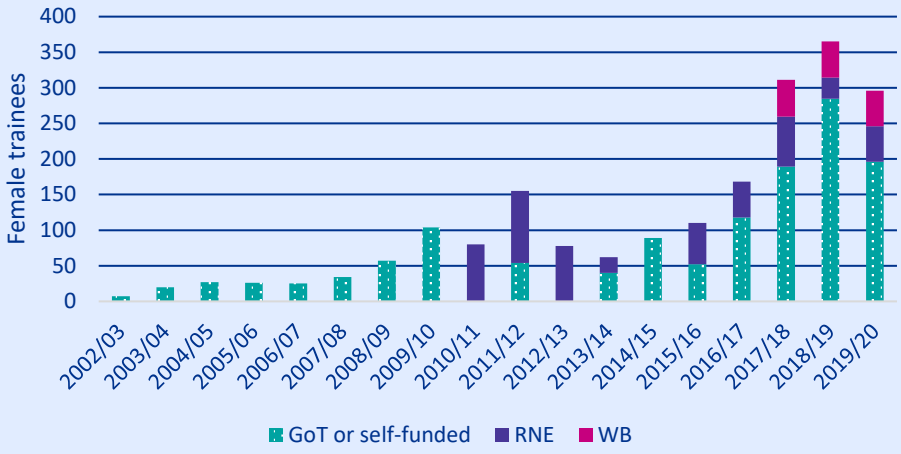
Box 2 – Additionality and fungibility of funding

While the Norad funding has provided allowances for trainees, it is plausible that this funding has had an impact on ERB/GoT's views on funding – pulling out money for female trainees and substituting it with donor financing. First of all, we see a decrease in GoT funding in the same time period as RNE and World Bank funding started sponsoring allowances. As the figure below shows, while the absolute number of trainees supported by allowances has remained stable, the funding has shifted from GoT to donors (the chart excludes ESPJ funding which started in 2019/20 and does not show self-funded).

[14] Unfortunately data on employment after registration was not available at the time of writing



Looking at female trainees only, we see that starting from 2010/11, all women enrolled in SEAP were funded by RNE, at the same time as total number of female trainees stabilized. This suggests that the funding was not additional, but rather that funding previously going from GoT to female trainees was now directed towards male trainees.



As we know that no trainees (except 50 in 2017/18) were funded by GoT, this suggests that the recent increase in female trainees have been because the number of self-funded female trainees has increased. The importance of allowances is discussed in Box 1 above.

The impact on women engineers is positive and has been documented well by ERB. For example, ERB reports highlight female engineers who have moved on to managerial positions as well as female engineers that have started their own companies. The final report (FY2020/21) lists 117 women in managerial positions, around 50 of which received funding for SEAP from Norway. Again, it is difficult to say that this would not have happened without RNE funding. Even women trainees in SEAP not receiving RNE funding has benefited from the indirect positive impacts of strengthening ERB capacity and some of the training activities with broad scopes.

However, there are still difficulties for female engineers getting jobs in Tanzania, some of which are specific to women. On the one hand, many PEs fail to get jobs in engineering despite their certifications, regardless of gender[15]. On the other hand, women PEs face particular discrimination in the labor force. In our survey, questions on attitudes to female engineers highlighted that both men and women view female

[15] This is based on interviews with stakeholders. Data on employment after certification was not available at the time of writing.

engineers different from male engineers. 17% of trainees and 29% of mentors surveyed agreed or strongly agreed to the statement "*As an employer I would rather hire male engineers than women*", while equivalent numbers were 37% of trainees and 46% for the statement "*There are some engineering tasks female engineers are not suited for*". The numbers for mentors are not significantly different whether the mentors had ever had female trainees or not.

Figure 2 - Trainees' attitudes towards women engineers

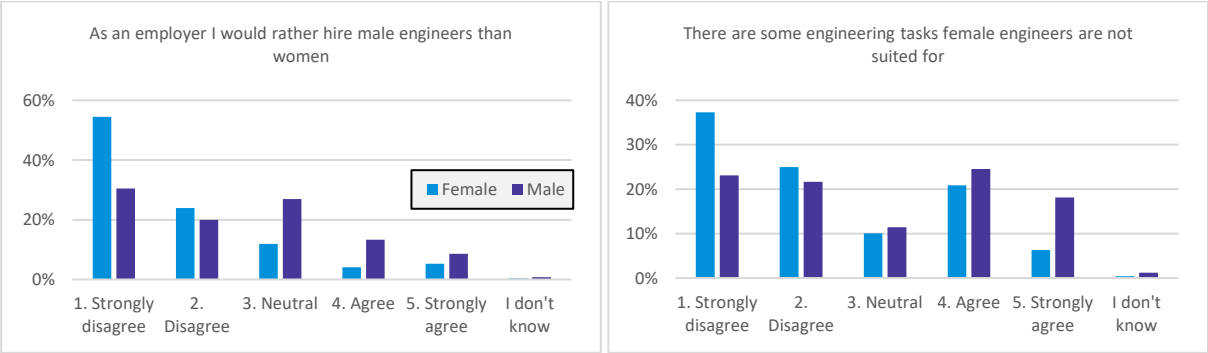
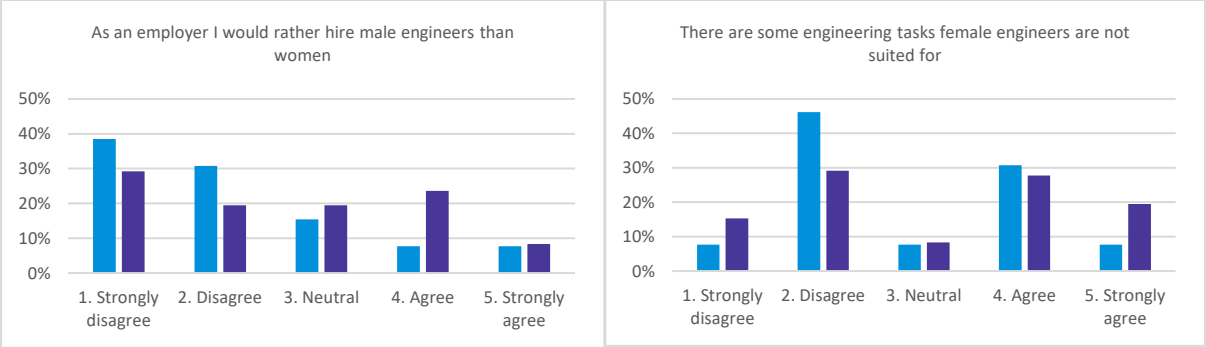


Figure 3 - Mentors' attitudes towards women engineers



The program has also brought other indirect positive impacts, for example in strengthening ERB and SEAP management. Through the Norwegian funding, ERB has improved its management of SEAP, including through training staff and purchasing office equipment. These improvements are documented to have beneficial benefits for all SEAP trainees, a much larger number than the trainees receiving funding from Norway.

3.7 Sustainability

Sustainability	Will the benefits last?
	The extent to which the net benefits of the intervention continue or are likely to continue.

Assuming the causal links in the theory of change are realistic, there are likely to be long-lasting impacts from the program beyond the 200 supported women. The program builds on a theorized self-reinforcing effect whereby more women aspire to become engineers when there are already female engineers (or, conversely, the mere fact of there being few female engineers leads to fewer women wanting to become engineers). If this effect is true, a one-time drive for more female engineers would have a lasting positive effect.

Another potentially lasting impact of the Norwegian funding is the lessons learned through the program. While ERB has previously been aware of the gender gap and has implemented measures to alleviate it, the funding from two rounds of Norwegian funding has allowed them to experiment with measures they otherwise would not have implemented. As discussed in Box 1 above, the increased monthly allowance has led to lower dropout rates, which is a useful point of information for ERB. The same is true for the final report writing workshops, which have proved to be effective at finalizing final reports for laggard trainees. ERB has also mainstreamed gender issues into training materials and guidelines that are used across all mentors.

The Norwegian funding only accounts for a small, and decreasing, share of SEAP funding. During the four years of admissions for phase 2 of the program, while Norway funded 200 trainees, the total admissions to SEAP was 4,510 trainees. Even among women, the total intake was 1,140. The good news is that the number of women trainees outside of Norwegian funding has increased at a steady pace, which could imply that the gains made in gender balance will not be immediately lost.

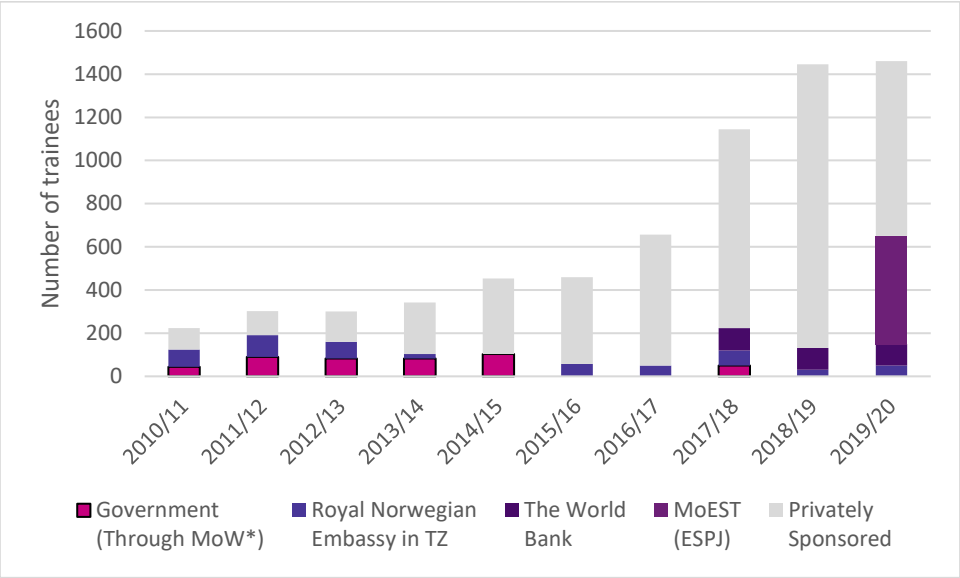
In order to ensure sustainability, Norway should support ERB in making changes to the base SEAP program to include gender equality factors. The most obvious area for including gender equality is the formula used to allocate allowances. The formula is currently being revised, and it would be a good occasion to enshrine gender equity in the program.

Funding from other sources has increased considerably in recent years, partly thanks to the success of the Norwegian program. The World Bank DUTP team built on lessons learned from the Norwegian program during their project preparation, citing the Norwegian program as an important factor in the World Bank betting on ERB's capacity[16]**.** The World Bank team also copied the allowance level from the Norwegian program after studying its impacts.

However, at the same time, government funding for trainee allowances has dropped to zero. Since 2015, only 50 trainees have received government allowances. This is down from 2010/11 when GoT funding accounted for 20% of trainees (44 trainees). The remaining GoT funding is now solely through the World Bank supported ESPJ PforR. See section 4.1.2 below for more on financial sustainability.

[16] Based on interviews with the World Bank DUTP team

Figure 4 - SEAP trainees funding 2010-2020



GoT and ERB needs to come up with a sustainable solution to funding trainees. As the evidence in Box 1 has shown, higher allowances are correlated with higher rates of completion (fewer dropouts), more timely registrations, and fewer financial problems among trainees. The self-funded option is less optimal than providing the allowance. In order to avoid being reliant on donors, GoT needs to revise the funding structure to either:

- Provide allowances from GoT
- Force host companies to pay trainees allowances (or at least provide accommodation and/or transportation costs, etc.)
- Provide loans to trainees similar to student loans. This could also incentivize higher, timely completion rates.

3.8 Norad specific cross-cutting concerns

Cross-cutting issues	How have concrete issues been addressed
	Concrete issues raised by Norad, including specific issues related to implementation of this specific program

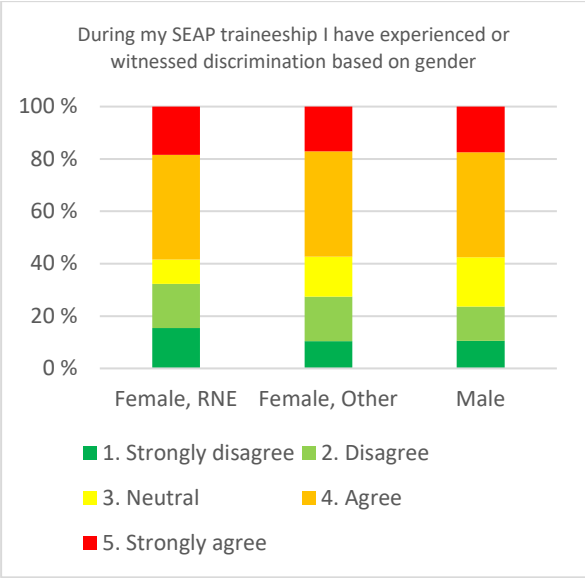
3.8.1 Risk management

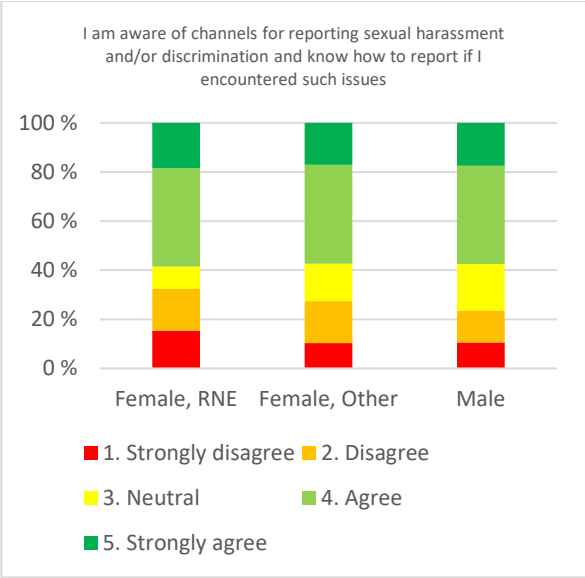
The risks identified during program design have been broadly managed well. Of the myriad risks highlighted in the program risk matrix, according to ERB's self-reporting, only four have materialized to any considerable extent: a burn injury with one trainee, some complaints from female counterparts that did not receive funding, trainees being delayed in reporting and inadequate SEAP placement opportunities.

Table 3 - Risk matrix, abridged

	Risks (factors, event)	Assessment	Status
1	Occurrence of accidents & disability to trainees during practice	S (8)	1 case of injury in 19/20
2	Women Discrimination at workplace, projects and construction sites	S (8)	
3	Corruption / Un-ethical and corrupt practice	R (10)	
4	Financial Irregularities	R(10)	
5	Inequality in the SEAP selection	R (10)	
6	Climate & Environment	S (8)	
7	Human Right	S (8)	
8	Spreading of HIV /AIDS at working place	S (6)	
9	Political Change	S (8)	
10	Failure to meet sustainability targets	S (8)	
11	Sexual harassments	R (10)	
12	Complaints from other female counterparts who do not receive the Norwegian Support.	S (6)	Has happened
13	Complaints from the male trainees that why only female supported from the Norwegian Fund.	AC (4)	
14	The funding may cause negative perception amongst the few SEAP providers who top up the SEAP allowance	AC (4)	
15	Withdrawal of Government support after the 2nd extension of support period.	AC (4)	
16	Government delays in disbursing funds	S (8)	
17	The trainees may complete the training programme and delay to submit final reports for registration and hence delay the completion of the project. This may also affect the number of registered engineers within the project period	R (12)	Has happened
18	Inadequate SEAP placement opportunity	AV (16)	Has happened
19	Occurrence of Viral Diseases (Pandemic diseases) (COVID-19)	S (8)	

In terms of discrimination and sexual harassments, ERB has put in a particular effort, and has not received reports of neither. However, in our survey, 32% of the RNE-funded trainees responded Agree or Strongly agree on the statement "*During my SEAP traineeship I have experienced or witnessed discrimination based on gender*". This is roughly in line with the 34% of women with other sources of funding answering the same. We also see from the survey that only 53% of RNE-funded trainee respondents agreed or strongly agreed with the statement "*I am aware of channels for reporting sexual harassment and/ or discrimination and know how to report if I encountered such issues*". This suggests that although no discrimination or sexual harassment cases have been reported to ERB, there could be a weakness in the reporting systems.





3.8.2 Anti-corruption

No cases of or venues for corruptions were identified during the review. Echoing previous reviews, there were no cases of corruption or mishandling of funds reported. Audit reports from the Auditor General do not have any material findings and are shared with RNE on a regular basis. There has historically been at least one case of discussion between RNE and ERB on financial management, regarding unfavorable exchange rates from the banks used in the transactions. This was remedied after being voiced by RNE. Birth registration and IDs of trainees are collected upon registration, in order to prevent payment going to 'ghost trainees'.

The allocation criteria for allowances are objective and transparent. The selection of the best qualified trainees, who are to receive the funding, is done by a committee of the board, decreasing the risk of corruption in the selection process. However, the criteria were not well understood by trainees. A potential area for improvement could be increased transparency of the calculations, including making publicly available online all data that goes into the calculations.

3.8.3 Human rights

The allocation of Norwegian funding is fair and based on an objective formula. Allocation is merit-based, using GPA scores, in addition to additional weighting based on age, experience and years since graduation – as the scheme is intended to support recent graduates. The funding is only available to women. The fact that the money is only available to engineering graduates – who are presumably of a higher socio-economic background than most Tanzanians – could be an issue for the fairness of allocation, but reaching other classes would be impossible given the context.

3.8.4 Environment and climate

The impact of the program on environment and climate is uncertain, as there is no guarantee what graduated PEs will do after completing their traineeship. PEs go on to work in a large variety of sectors, some with beneficial effects on environment and climate like renewable energy, while other sectors might have less positive impact, such as petroleum.

Engineering training in Tanzania in general includes guides for ensuring environmental sustainability. For example, the ERB Code of Ethics, applicable to all engineers, include broad guiding principles on sustainability. Environmental sustainability issues are also touched upon in the guidelines given to SEAP trainees, and in the SEAP project implementation document.

4. Forward-looking assessment

Forward-looking	How can the program be improved in the future Concrete issues raised by Norad related to how a potential next phase of the program can be improved based on lessons learned

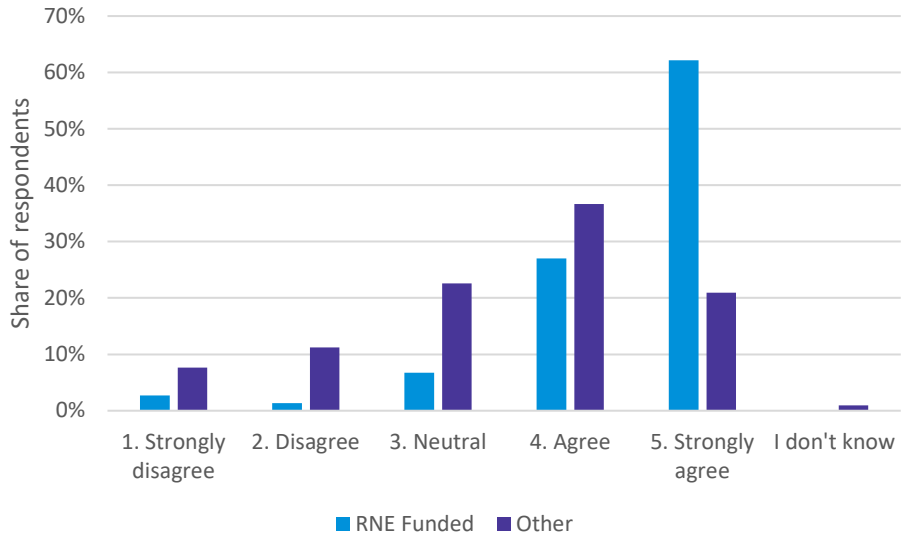
4.1 Previous recommendations and follow-up

Recommendations from the previous two reviews have been partly addressed. The recommendations are from the 2015 Norad end-review of phase 1, and the 2018 NIRAS combined end-review of phase 1 and mid-term review of phase 2.

4.1.1 ERB capacity

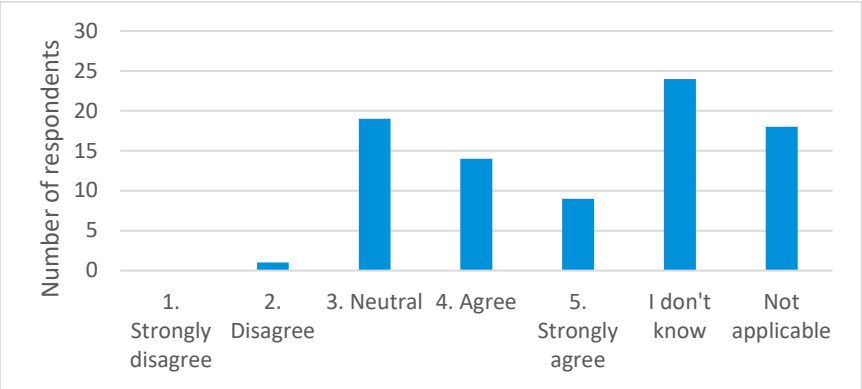
Recommendations to strengthen ERB program management capacity has yielded results. The end-review of phase 1 highlighted the low capacity of ERB and suggested an increased focus on supporting ERB. Phase 2 has included greater spending on ERB strengthening activities, including training for PDA staff and office equipment. It is clear from our interviews with ERB, the track-record of ERB and the annual reports that ERB capacity has increased since that time. It is however less clear to what extent this can be attributed to the Norwegian funding. In 2010, ERB only had 2 staff working on SEAP, which has now increased to 6, as a result of the expansion of the program, but this happened as a result of increased number of trainees, beyond the ones supported by RNE. In 2019, ERB established an online reporting system, which has helped with reporting and tracking delays. Again, this was done on ERB's own accord without any support from RNE. Survey results show that most trainees are content with the support they are receiving from ERB, and this is even more so with the trainees receiving support from RNE. This is presumably a reflection of the closer follow-up from ERB of RNE funded trainees.

Figure 5 - Trainees: ERB provides/has provided sufficient support to me during my SEAP traineeship



The capacity of mentors also seems to have improved. Based on a recommendation from the phase 1 review, phase 2 included specific support for mentors, in the form of mentor workshops, including general training and gender training. From our survey and focus group interviews, the trainings have been well received by mentors, and trainees have few complaints about mentors.

Figure 6 - Mentor survey: ERB training on gender was useful to me in my role as SEAP mentor



4.1.2 Sustainability of funding

The sustainability of funding is still an unsolved issue. While total funding for SEAP has increased, this is due to increased support from the World Bank through ESPJ and through its funding of MoWT. The World Bank support is temporary and there are still many more applicants to SEAP than funds available for allowances. Over the period of the Norwegian support, GoT funding has dropped to zero outside of the World Bank supported ESPJ, causing continued concern for the funding situation.

While ERB has established the Engineers Development Facility (EDF), this is not yet an adequate answer to the funding problem. EDF does not pay for trainees' allowances, which has been identified as a major source of success in the Norwegian program. The EDF was established in 2019, and is, as a facility, a way for ERB to collect money from members without being required to transfer this back to the central government. ERB is currently collecting a quasi-voluntary fee from registered engineers and engineering firms into EDF, which is being used for the construction of buildings, sponsoring innovation projects and some capacity building activities.

The National Construction Industry Policy proposes funding SEAP through a levy on construction material. While the exact details are unclear, there would be a small levy (1-3%) on construction material, which would be earmarked towards funding SEAP (and potentially other capacity building activities), possibly through EDF. This policy is inspired by other Skills Levy Systems (SLSs) including the Skills Development Fund (SDF) in Tanzania. Under the SDF, there is a 4.5% levy on payrolls, paid by the employer, which in turn is spent by Vocational Education and Training Authority (VETA) on vocational education and training[17].

Under the World Bank DUTP funding, a comprehensive study on the financial sustainability of SEAP was commissioned. The report, finalized in 2020, is a review of SEAP and its financial and legal status. Some key recommendations arising out of the study are:

- Adopt local content policies to increase demand for Tanzanian engineers
- Operationalize the new Construction Industry Policy including the skills development levy
- Re-designate SEAP as an internship program in line with the National Internship Guidelines

In order to work towards financial sustainability, Norway should work with the World Bank to influence the government to adopt the recommendations of the sustainability study. Since the

[17] ILO (2020) https://www.ilo.org/wcmsp5/groups/public/---ed_emp/---emp_ent/documents/publication/wcms_753306.pdf

release of the study, the World Bank has been working to influence GoT to adopt its recommendations. It would make sense for donors to work together on this issue.

4.1.3 Delays in reporting

Delays in quarterly reporting and final reports are still a widespread issue. Delays in the reporting means that few trainees finish within the 3-year SEAP program period. There are mainly two types of delays:

4.1.3.1 Delays in progress during the traineeship

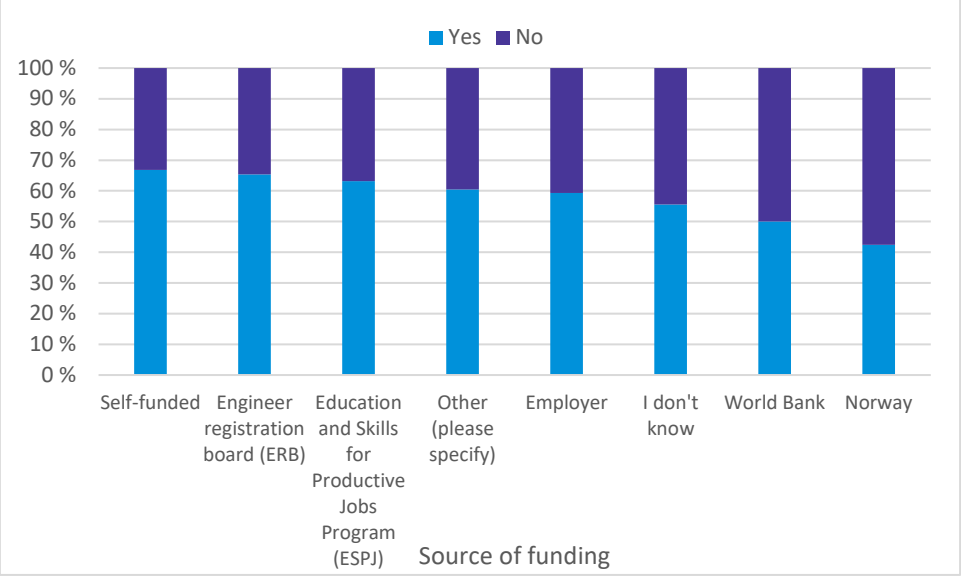
Delay in progress during the traineeship. Throughout their traineeships, trainees are expected to submit quarterly reports to ERB where they summarize activities performed over the past three months. Many trainees are delayed in submitting these reports, leading to a delay in the completion of the traineeship, beyond the stipulated three years. In some cases this is caused by an actual pause in their progress, for example because of financial, personal or professional reasons. For example, the trainee was unable to afford living expenses and so had to find a temporary job, the job discipline (planning, design, site supervision) required for the next quarterly report was not available, etc. In other cases, the trainees have followed the structured program, and only the submission of the report has been delayed. Data from our survey show that among the trainees that started SEAP between 2016-2018 and should have finished by 2021, only about 4 out of 5 complete on time.

		Finished SEAP					
Started SEAP		2017	2018	2019	2020	2021	Not yet happened
	2016	0	2	12	3	2	5 (21%)
	2017	1	0	4	60	20	14 (14%)
	2018	0	0	1	7	101	41 (27%)
	2019	0	0	1	1	33	129
	2020	0	0	0	0	2	96
	2021	0	0	0	0	0	42

In terms of the Norwegian aided trainees from phase 2, of the 200 supported trainees, 184 had finished their traineeship by the time of the FY20/21 annual report. This suggests that the completion rate is higher among Norwegian aided trainees.

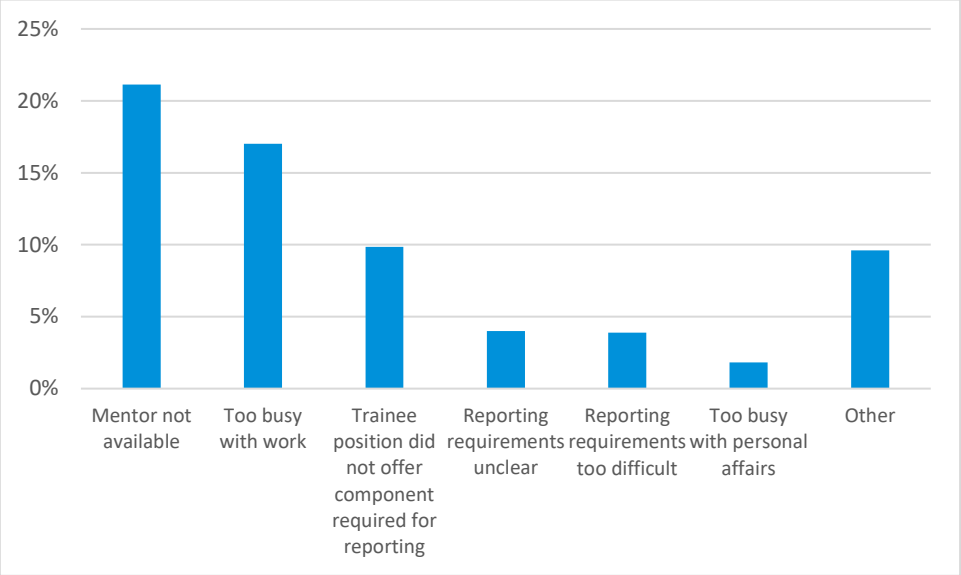
From our survey, we find that the share of trainees who have ever been delayed in quarterly reports is correlated with the source of their funding: trainees receiving the high allowance from Norway and World Bank are less likely to have been delayed in their quarterly reports than self-funded trainees and those with the low allowance from ERB and/or ESPJ.

Figure 7 - Have you ever been delayed in submitting quarterly reports?



Amongst those who have been delayed, the largest reasons for missed quarterly reports was that the mentor was not available. There was no discernable difference between funding source.

Figure 8 - Why were you delayed in submitting quarterly reports?



These findings suggest that adequate allowances are important to keep trainees on track to complete their traineeships on time. The likely effect is that trainees with no or lower allowances are too occupied with alternative tasks and sources of income that don't allow them to focus on the traineeship.

The second implication is that mentors are a large source of delays, and should be incentivized to keep trainees on track. With the new online system for submitting reports, mentors have fewer excuses for not being present and available to support in submitting reports.

With the new online reporting system (MIS), ERB has access to detailed data which could help them track and monitor progress on reporting. In the online portal, ERB can see when trainees have submitted their reports and when mentors have approved them. ERB should follow up with both trainees and mentors when they see there are delays. This would however require more staffing capacity.

4.1.3.2 Delays in registering as PE after completion of traineeship

After the three-year traineeship, the trainee is expected to submit a final report, summarizing the quarterly reports submitted to date. For many trainees, completing this final report is a major obstacle, because their allowance funding has already run out, and no allowance is provided for report-writing. From the annual reviews, we see that phase 1 trainees were still submitting their final reports and registering as PEs as late as 2020/21. The latest status for the phase 2 trainees is that 17 trainees that had already finished their three-year traineeships were still writing their final reports (12 had submitted final report and was awaiting approval).

Table 4 - Norwegian funded SEAP trainees progress status

Year	Sponsorship					
	Intake for Phase 1	*Intake for Phase 2*	*Finished from Phase 1*	*Finished from Phase 2*	*Registered as PE from Phase 1*	*Registered as PE from Phase 2*
2010/11	80		138		75	
2011/12	101					
2012/13	78					
2013/14	22					
2014/15						
2015/16	58					
2016/17		50	133	117	196	33
2017/18		70				
2018/19		30				
2019/20		50	13		13	
2020/21		?	4	69	4	51
2021/22*				26		73
Total	**339**	**200**	**288**	**186**	**288**	**157**

*As of December 2021

For Norwegian aided trainees, ERB has been hosting report writing workshops, which have had great effect. In the workshops, ERB invites trainees who have completed their traineeship period but have not submitted their final reports and give them hands-on support in writing their reports. The results have been positive, and has led to prompt submission by many attendees. However, ERB does not see this as a scalable solution for non-Norwegian aided trainees, as it is too expensive to do without external support.

The solution to the problem seems to be a revision to the final report structure and process, simplifying the process and capitalizing on the work already done in the quarterly reports. The final report is supposed to be a compilation of the quarterly reports, but in practice, final reports contain more information, more details and more narrative than the quarterly reports. This means that writing the final reports is more work than simply consolidating quarterly reports. To rectify this, either the format of the final report and/or its requirements should be revised, or the format and requirements of the quarterly reports should be revised. Guidance should be given early on in the traineeship, and trainees should be made more aware that their work in the quarterly reports will save them work later. Towards the end of the traineeship, trainees should start compiling the final report before completion of the traineeship, in order to avoid running out of allowance before completing the report.

4.1.4 Ensuring sufficient placements

Due to the high number of engineering graduates, the placements provided by ERB are not sufficient. As shown in section 1.1.2, the growth in the number of engineering graduates has outpaced the number of SEAP trainees. SEAP trainees are required to have a placement in an engineering firm (or consulting firm) that can give the trainee work experience in all three areas of the traineeship (planning, design, site supervision). In some cases, the trainees identify potential host companies through direct contact, while in others, they apply to ERB to find them a placement.

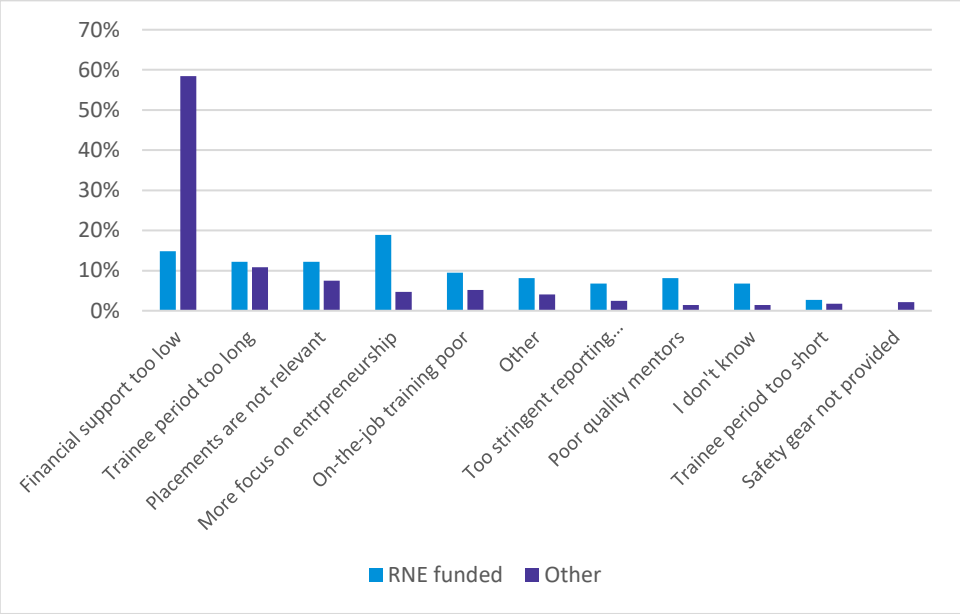
The reasons for insufficient available placements include insufficient demand from engineering firms and inadequate communication between ERB and firms. On the one hand, the rate of educating graduate engineers has outstripped the demand for engineers. Interviewees from engineering companies, mentors and trainees have all voiced concerns that there are not enough jobs for Tanzanian engineering firms. In private companies in particular, they are only able to take on SEAP trainees when there are jobs available, which is difficult to predict in advance. Increasing the demand for Tanzanian engineers is a larger problem, outside the scope of the program, but it does suggests that there are limits to scaling up SEAP. At the same time, interviews with companies, for example TANESCO (national electricity company) and TTCL (national telecom company), showed that they have capacity to take more trainees, but have not had a

proper dialogue with ERB on the number of trainees they could absorb. Some mentors also suggested there might be more placement opportunities available in more remote areas, and that ERB should look beyond the big cities. This suggests there is room to increase the number of placements in state owned enterprises.

A government hiring reform has made trainees less appealing to state-owned enterprises. In 2014, new government policies centralized hiring for all government agencies, including state-owned enterprises, consolidating all hiring to a central agency. This made it impossible for state-owned enterprises to retain their trainees after completed traineeship, as the trainees had to apply for jobs through the central agency. According to interviewees this has made hosting trainees less appealing, as retaining trainees was viewed as a good way of hiring. This could potentially have negative impacts on the availability of placements, as state-owned enterprises become less interested.

4.1.5 Entrepreneurship

While previous reviews have highlighted the demand for entrepreneurship training, our findings do not confirm this. Among interviewees, few voiced a demand for entrepreneurship training, and the survey results show that few respondents believed this to be an important area for improvement of SEAP (5%). However, the rate is higher among RNE-funded trainees (19%).



Promoting entrepreneurship among recently graduated engineers is difficult, as regulations restrict the minimum experience needed to open engineering companies. For example, engineers are not allowed to open engineering consulting firms without having five years of engineering experience.

ERB has carried out 3 entrepreneurship training sessions during phase 2:

	Title	Presenter	Date & Location
1.	Blending Engineering and Entrepreneurship Skills".	Prof. Elisante Ole Gabriel, the Permanent Secretary, Ministry of Livestock and Fisheries	on **15th March 2019** at Rock City Mall Conference Centre, Mwanza
2.	Indomitable Success: The Impact of Gender and Ethics on Entrepreneur's Long Lasting – Lasting Legacy	Mr. Paul Mashauri	On April 15, 2021 at Karimjee Conference Hall, DSM
3.	Entrepreneurship Skills to SEAP trainees	Eng. Farida Mawenya	August 6, 2018, at Karimjee Conference Hall, DSM

ERB's proposals for phase 3 includes various items on innovation and entrepreneurship. These are activities targeted at PEs. This could be an avenue for promoting entrepreneurship, which is probably better suited than SEAP itself.

Limitations of entrepreneurial trainings. There is little evidence in the literature that trainings on entrepreneurship in themselves yield the desired results. While training programs often have a positive impact on business attitudes and knowledge of female entrepreneurs, they are unlikely to have any impact on the performance and growth of their enterprises. Bundled services i.e. capital combined with traditional business training seem to be more effective in improving business performance for women led or owned SMEs than stand-alone interventions. This is one of the reason why the Women Finance Entrepreneurs Finance Initiative (We-FIi) has taken and ecosystem approach, leveraging both Access to Finance, Access to Markets, Access to Skills and Enabling Environment reforms in order to support women entrepreneurs.[18]

A hypothetical future expansion of the program towards entrepreneurship support should start with a mapping of already existing programs and projects, in order to build synergies with other programs and avoid conflicts and/ or double work. The area of female entrepreneurship, job creation and scaling up small enterprises is large, and already covered by myriad donors in Tanzania. Rather than establishing a new sub-objective under the SEAP funding, it might be prudent to look for ways to use SEAP to provide support to already existing programs.

[18] We-Fi Theory of Change 2021 Updated Version (processed) and https://we-fi.org/wp-content/uploads/2021/10/KPMG-We-Fi-MTR-Final-report-adjusted-unlocked.pdf

4.2 Proposed phase 3

While the program has been effective, Norad/RNE funding is now quite small compared to the total number of female trainees, so Norad/RNE needs to consider what they want to do with future funding. During the second phase of the funding, RNE funding has supported only 18% of the female trainees, compared to 61% for phase one, meaning the significance of the allowance funding from Norway is quite limited. While this is a good thing – gender equality in SEAP has improved – it means that continued funding for allowances would potentially have a small effect. Continued support to the program management, especially the sensitization of mentors, strengthening ERB and support to ancillary activities, such as IETWC (or similar) could have a large effect.

ERB has submitted a concept note to RNE for future funding, which includes a particular focus on innovation and capacity building for PEs. The concept note includes:

- Innovation and Industrial Development Centre (IDC), including building construction
- Capacity Building for SEAP and Engineering Consulting Firms
- Mhandisi House to host (Innovation and IDC)
- Promotion of the private sector so that they can be able to offer placements
- Training on soft skills, this can improve quality of training
- Training on special programs i.e. 4th Industrial Revolution
- Review of the SEAP Program Implementation Document

The interventions and program proposed by ERB does not correspond well to the challenges they themselves have identified. In its proposal, ERB has identified challenges in line with what we have found in our review; insufficient placements, unemployment after completion, and delays and prolonged traineeships. But the activities proposed by ERB are not very well suited to address these challenges, in particular the aspects involving construction of buildings and the innovation centers (which account for 87% of the proposed budget). Some proposed areas do however meet the challenges well, especially training on soft skills, and attracting more placement firms. These are areas that should be highlighted more.

At the same time, the concept note does not address the main challenge: sustainability of funding for allowances. The ERB concept note outlines a future of SEAP that continues to rely on donor funding.

The concept note does not have a particular focus on women. Activities proposed in the concept note are general activities. Thus, the activities are to a low extent in line with the overarching objective of the Norwegian funding, which is to promote women engineers in Tanzania.

4.2.1 ERB SWOT

As part of the 2015 review, a participatory SWOT analysis was made of ERB. Many of the findings are still relevant today, but some of the weaknesses have been addressed. Notably, the shortage of staff was identified, which has been dealt with (see 4.1.1). The same is true for “lack of gender awareness” – which phase 2 has dealt with directly, through the ERB and mentor trainings.

The potential threat and weakness of lack of funding is still present. As discussed in section 4.1.2, sustainable funding has not been achieved, and SEAP allowances are dependent on donor funding.

In June 2021, ERB conducted an Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis. This was carried out internally as a part of their formulation of a strategic plan. The findings are summarized in the table below:

Criteria	Strengths	Weaknesses	Opportunities	Challenges
Leadership	(i) Existence of skilled and experienced leaders (ii) Existence of effective Board of Directors. (iii) Teamwork (iv) Ability to influence (v) Hard working (vi) Ability to delegate powers and responsibilities.	(i) Absence of documented Succession Plan.	(ii) Ministry of Works commitment to enhance transparency, accountability and good governance. (iii) Availability of potential engineering professionals to work with the Board. (iv) Availability of Leadership training Institutions	(i) Interference to the Profession
Policies, Legislation &Strategies	(i) Existence of Construction Industry Policy (2003) (ii) Existence of Engineers Registration Act No. 15 of 1997 and its amendment Act No.24 of 2007, Regulations and By-Laws. (iii) Availability of Guidelines and Manuals for Regulation of the Engineering Profession. (iv) Ability to enforce the Act No. 15 of 1997 and its amendment Act No.24 of 2007 and its Regulations (v) Availability of Engineering Development Facility (EDF) Strategy.	(i) Inadequate implementation of policies and Legislation. (ii) Inadequate compliance to the law.	(i) Existence of Public Private Partnerships Policy of 2009 and Private Partnerships Policy Act of 2010 (ii) Existence of Environmental Management Act of 2004 (iii) Existence of Professional Regulatory Boards. (iv) Existence of Professional Associations. (v) Involvement of the Board in implementing various Policies, Legislation and Strategies. (vi) Existence of National Five Year Development Plan. (vii) Availability of Strategic Projects	(i) Inadequate knowledge in Private Partnerships Policy projects (ii) Absence of Building Policy and Building Act (iii) In adequate knowledge of public on services offered by the Board.
Systems & Processes	(i) Availability of clear registration system. (ii) Availability of clear organization structure (iii) Existence of meetings as a means of exchange and sharing of informations. (iv) Availability of Management Information Systems. (v) Existence of Engineering Regulation System.	(i) Inadequate operations of Management Information System. (ii) Inadequate implementation of Performance Management Systems (OPRAS, CSC, SP). (iii) Inadequate implementation of Board's business process.	(i) Existence of Treasury Registrar's Office to monitor and regulate performance of Public Institutions. (ii) Existence of e-Government Authority. (iii) Availability of Government engineering research centers such as TIRDO, TEMDO, CAMARTEC. (iv) Availability of Strategic Projects. (v) Availability of PLANREP and other budgeting and financial systems. (vi) Availability on new technologies.	(i) Inadequate knowledge on appropriate systems. (ii) Rapid advancement in technology. (iii) Encroachment on engineering profession. (iv) Existence of multiple systems, procedures and guidelines intervening effective functioning of the Board.
Human and Financial Resources	(i) Presence of professional and qualified staff. (ii) Availability of internal revenue generation mechanism.	(i) Inadequate skilled Human Resources. (ii) Inadequate working facilities (iii) Inadequate Incentive Scheme (iv) Inadequate resources mobilization strategy.	(i) Availability of funds from the Government. (ii) Availability of skilled human resource in the market (iii) Existence of Development Partners funds for supporting Board's projects. (iv) Availability of Strategic Projects (v) Availability of different sources of funds	(i) Inadequate remuneration (ii) Delays in promoting staff (iii) Delays of employment permits (iv) Occurrence of epidemic and pandemic diseases. (v) Delay in disbursement of funds. (vi) Inadequate Financial Resources.

4.3 Zanzibar

ERB and SEAP only covers mainland Tanzania – Zanzibar has a parallel system for certifying and registering engineers. On Zanzibar, the entity in charge of certifying engineers is the Architects, Engineers and Quantity Surveyors Registration Board (AEQSRB). The registration of engineers is not addressed in the Articles of Union between Zanzibar and Tanzania, meaning the legal status requires two parallel systems. However, there is an agreement in place that ascertains that engineers registered on the mainland can practice as engineers on the mainland and vice versa after going through a short approval process. ERB and AEQSRB is also working on an MoU that covers sharing of data between the two organizations.

The AEQSRB does not operate a structured traineeship program equivalent to SEAP. A program has been proposed, the Structure Apprenticeship Program for Architects, Engineer and Quantity Surveyors (SAPAEQ), however this has not been operationalized. All engineers registering on Zanzibar thus go through a self-financed unstructured program. However, Zanzibar residents are allowed to do SEAP on the mainland.

The engineering training situation on Zanzibar is witnessing the same issues as on the mainland, but at a smaller scale. The number of annual engineering graduates is far larger than the annual number of graduates registering as engineers, and among the registered engineers, there are a large number of unemployed. AEQSRB registers around 60 PEs each year, compared to around 500 on the mainland[19].

The capacity of AEQSRB is low, and the government funding of AEQSRB is low. On Zanzibar, registering engineers and engineering firms, and in particular foreign engineering firms is seen as a source of income for the government, but very little of this is returned to AEQSRB. The government has not discussed funding allowances for the SAPAEQ, and the government has not provided funding for it to date.

Expanding Norwegian support to Zanzibar would therefore not be as easy as transplanting the SEAP funding to Zanzibar. The program would have to be setup in parallel, and the capacity of AEQSRB strengthened considerably. Our findings suggest that it would be prudent to capitalize on the ten years of improvements seen in SEAP and to harmonize the programs between SEAP and Zanzibar. At the very least, AEQSRB should draw as much as possible from ERB to study how they have achieved the capacity they currently are at, and what the success factors of SEAP are.

4.4 Norwegian institutions

Norad/RNE has expressed a desire to draw from Norwegian expertise to strengthen a future phase of the program. Norway has been mildly successful promoting female engineers, with women making up 26% of engineers. Norad/RNE wants to employ Norwegian competence on the topic of promoting female engineers, for example through pairing Norwegian institutions with their Tanzanian counterparts.

Næringslivets Hovedorganisasjon (NHO: Confederation of Norwegian Enterprise) implements Norad-funded projects in a number of African countries, including Tanzania. For example, in Kenya, NHO is promoting Science, Technology, Engineering and Mathematics (STEM) among girls through the Girls and Technology program[20], modeled on the Norwegian program "Jenter og Teknologi" through its sister organization in Kenya, the Federation of Kenya Employers (FKE). NHO also has experience on sharing lessons on government-private sector policy education that could be relevant i.e. how to align needs of private sector with what's done in schools and through skills training. In Tanzania, NHO is already implementing programs through its sister organization Association of Tanzania Employers (ATE), including activities like promoting women leadership.

Other professional organizations such as Norges Ingeniør- og Teknologorganisasjon (NITO) have been drivers of gender equality in the engineering profession in Norway, but they have not been as directly involved with counterparts in developing countries. While they do have international activities, these are typically organized through international umbrella organizations such as IndustriALL, which is a global union.

There is therefore scope to increase Norwegian organizations' work in Tanzania within the area of gender balance. A more careful mapping of potential actors should be carried out to identify which

[19] More detailed data from Zanzibar was not forthcoming at the time of writing the review

[20] http://www.fke-kenya.org/site/index.php/news-and-media/news

particular organizations could be relevant, both on the Norwegian side and on the Tanzanian side, for example IET.

4.5 Recommendations

Based on the review findings, we propose the following recommendations for areas that should be addressed for future phases of funding in order to improve the program:

4.5.1 Policy level

1. **RNE should include a broader set of stakeholders, in particular the Ministry of Works andTransport (MoWT) and Ministry of Education, Science and Technology (MoEST) to build a comprehensive policy response to the issue of gender equality in the engineering profession**. The first two phases have proved that funding allowances for female trainees is an effective method of promoting female engineers. However, the small scale of the program compared to the increasing number of graduate engineers combined with the reliance on external financing means that larger scale solutions need to be found. RNE should work with GoT to ensure financial sustainability of funding for SEAP, and to mainstream gender into SEAP and provide for gender equality in the selection criteria for all trainees regardless of funding source. Working with the World Bank, who already has a policy dialogue with GoT based on their Sustainability Report would be a good way forward.

2. **RNE should consider the implication of the general economic and social situation, which limits the impact of funding SEAP**. Female trainees completing SEAP often fail to find jobs as engineers because (i) there is insufficient demand for Tanzanian engineers, and (ii) discrimination against women in hiring engineers means that it is even more difficult for women to find the engineering jobs available. This means that the importance of improving gender equality in PEs is reduced.

4.5.2 Implementation level

1. **ERB should take steps to reduce delays in reporting and completion of traineeships**. First, the structure of the quarterly reports and/or the final reports could be revised to make the process simpler. Secondly, with the newly implemented online reporting system, ERB should have access to more information which could allow them to monitor and follow up on delays more closely

2. **ERB should consider strengthening its outreach to potential host companies in order to ensure sufficient available placements for trainees.** This includes improving its dialogue with public companies, expanding the list of private sector companies contacted, as well as reaching out to companies and branches outside of the main urban areas. Dialogue with the private sector could also be beneficial in terms of mapping what skills and training are required from private sector employers.

3. **The Institution of Engineer Tanzania Women Chapter (IETWC) should be involved more in discussions**. The objective of increasing the membership of the organization has not been met. This is because of a myriad reasons, but fundamentally the underlying issue is that the organization has not been party to discussions and meetings between RNE and ERB.

4. **ERB should change the selection formula to include a gender component**. As a quick win, this would mainstream gender into the program, and could be done with approval of the ERB board.

5. **The results framework should be clarified to clearly separate outputs from outcomes and spell out assumptions**. While the data is currently being collected and reported on, there is some confusion in the results framework. Outputs should be activities and actions done by ERB, for example “allowances paid” or “mentor training activities organized”. Outcomes should be the result of those activities, for example “female trainees enrolled” or “number of mentors trained”.

6. **As a part of this, impact indicators should be integrated into the results framework**. To stay focused on the ultimate goal of the program, the results framework should be adjusted to include impact indicators such as number of women engineers working as engineers, starting their own businesses and working in managerial roles. This data is already collected by ERB so it should not impose much of a burden.

Annex I

List of consultations

Organisation	Name
ERB	Patrick Barozi
	Veronica Ninalwo
	Elizabeth Sway
	Andrew Chambo
RNE	Neema Michael Shayo
	Morten Heide
AEQSRB	Mansour Rashid
	Dalila Ramadan Mwadini
	Shadia Fauz Mohammed
IET	Ipyana Moses
IETWC	Upendo Haule
TANESCO	Robert Magere
UDSM, College of Engineering and Technology	Bakari Mwinyiwiwa
SEAP Trainees focus group	Confidential
	Confidential
	Confidential
	Confidential
	Confidential
SEAP Mentors focus group	Confidential (Private sector)
	Confidential (Private sector)
	Confidential (Private sector)
	Confidential (Public sector)
	Confidential (Public sector)
NHO	Anna Häggblom
NITO	Marianne Bevum
	Sondre Asdøl
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