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This report has been prepared by the United Nations Development Programme (UNDP) under Engineer Girls of Turkey Project.

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This work does not reflect the institutional views of the Ministry of Family, Labour and Social Services and Ministry of National Education.

TOWARDS GENDER EQULITY IN ENGINEERING

TABLE OF CONTENTS

List of Abbreviations	6
Executive Summary	7
PART ONE	13
Introduction: Scope and Conceptual Framework of	15
Engineer Girls of Turkey Project	13
1 M/hert la a Dasfaasier er el Laur la lt Diffanaati	
What is a Profession and How is it Differenti Other Professional Work?	18
11 Professions and Gender Equality	19
2 Development of the Engineering Profession	22
2.1 Gender Equality in the Eiglide of Science Tech	hnology
Engineering and Mathematics (STEM)	23
22 Engineering in Turkey and Women's	
Participation in Engineering	24
2.3. Engineering and Gender Equality	25
 Current Situation in Turkey in Engineering Pro 	actice: Different
Experiences of Man and Woman Engineers .	26
3.1. Factors Influencing Career Choice and Genc	der Equality27
3.2. Lack of Role Models	28
3.3. Higher Concentration of Women in Certain A	Areas of Engineering
(Horizontal Segregation)	
3.4. Searching for a Job / Recruitment	32
3.5. Professional Hierarchy (Vertical Segregation)33
3.6. Becoming Genderless/Masculine	34
3.7. Invisibility and Over-Visibility/Prominence	35
3.8. System of Informal Relationships	36
3.9. Family Life	37
3.10. Professional/Occupational Organisation	38

PART TWO

	Practices Empowering Women in	
	Engineering and Contributions of EGT	41
4.	Approach of EGT	43
4.1.	Scope of EGT	44
4.2.	Methodology of EGT	44
5.	Intervention Areas of EGT	46
5.1.	Career Choice and Education: High School Programme	47
5.1.1.	Target Group Students	47
5.1.2.	Target Group Teachers	48
5.1.3.	Target Group Parents	48
5.2.	Direct Supports in Universities and	
	Work Life Areas	50
5.2.1.	Scholarship Programme and Internship Opportunities	51
5.2.2.	Social Engineering Certification Programme	54
5.2.3.	Istanbul Meeting: Joint Empowerment and	
	Social Responsibility	55
5.2.4.	Mentorship Programme	56
6.	Awareness Raising, Common Understanding and Mainstreaming	57
7.	Conclusion	61

39

ANNEX 1. National and International Best Practices
ANNEX 2. Sustainable Development Goals and
Gender Equality Approach75
ANNEX 3. Game Design98
ANNEX 4. Key Concepts100

TOWARDS GENDER EQULITY IN ENGINEERING

List of Abbreviations

EN Abbr.	EN Definition
BUYEM	Boğaziçi University Lifelong Learning Centre
CHE	The Council of Higher Education
DSI	State Hydraulic Works
EGT	Engineer Girls of Turkey
ESF	European Social Fund
et al.	and others
ETCEP	Promoting Gender Equality in Education Project
F	Number of female students
F%	Percentage of female students
HRE	Democratic Citizenship and Human Rights Education
IPA	Instrument for Pre-Accession
ITU	Istanbul Technical University
Μ	Number of male students
M%	Percentage of male students
METU	Middle East Technical University
MoNE	Ministry of National Education
MTA	Mineral Research and Exploration
NASA	National Aeronautics and Space Administration
NGO	Non-governmental Organisation
R&D	Research & Development
See	See
SMF	Social Mobility Foundation
STEM	Science, Technology, Engineering and Mathematics
T.R.	Turkish Republic
ТММОВ	Turkish Union of Chambers of Engineers and Architects
TOBB ETU	Union of Chambers and Commodity Exchanges of Turkey, Economy and Technology University
TUBITAK	Scientific and Technological Research Council of Turkey
TURKSTAT	Turkish Statistical Institute
UNDP	United Nations Development Programme
Uni.	University
UNICEF	United Nations Children's Fund
WES	Women's Engineering Society

Executive Summary

Engineer Girls of Turkey (EGT) Project, which aimed to ensure gender equality and empowerment of women, was initiated with a multi-sector approach in cooperation with public, private and international institutions. It has a holistic approach by targeting several actors from academia to civil society, high school students to parents, chambers of professions to employers and by incorporating them as stakeholders.

This Report has been prepared within the scope of the EGT Project which aims to build a gender equal structure in the field of engineering and in line with the goal to increase and support women's participation in the profession of engineering under equal conditions and in equal numbers as men. This Report aims to serve as a resource not only for this project but also for other projects or studies to be implemented in the field and to convey the experience obtained through the project. In line with this aim, the Report primarily refers to the existing conceptual and analytical information in the literature and then the evaluations carried out up until now in the scope of the EGT Project.

"Researches indicate that woman engineers encounter genderbased inequalities and **exclusion during various stages of their education and work life."** In the first part of the Report, conceptual relations between professions and women's participation in the field of engineering are addressed in order to demonstrate and summarize the framework on which the project activities are based.

Professionalism emerges as a system, which is based on vocational expertise skills, oversees and manages itself with the approval from the society, develops and protects its own values and provides privileges to the professionals in terms of societal and economic status. The field of professions and in particular engineering contain various structural gender inequalities.

Researches indicate that woman engineers encounter gender-based inequalities and exclusion during various stages of their education and work life. They face with obstacles in work life such as being kept apart from the field work, exclusion, not being

taken seriously and not being promoted. To be able to cope with those obstacles, woman engineers sometimes need to develop defence mechanisms. As a result, they sometimes abandon their gender roles, gender-related habits and behaviours and instead adopt masculine codes. In comparison with men, women need to struggle more not only to get in the field but also to stay and really exist there. This makes it harder for women to protect the home-work life balance and causes them to sacrifice more in work and private lives. Gender-based stereotypes may foster the conception that women can only work in particular areas of engineering and are not proper for different working styles.

Decision of choosing engineering as a profession may also be affected by similar stereotypes; however, role models may be influential in transforming these stereotypes positively. Girls' decisions to choose engineering do not only depend on their academic success or personal preferences but are also affected by role models in their families or people around them.

EGT Project was initiated by Limak Foundation in 2015 and gained momentum in 2016 in cooperation with the Republic of Turkey Ministry of Family, Labour and Social Services and the United Nations Development Programme (UNDP) Turkey. Encountering successful woman engineers, knowing about them and having a woman engineer around result in positive consequences in girls' preference of the engineering profession.

In the following sections of the Report, specific conditions regarding women's participation in occupations in general and in particular in engineering are provided and the existing situation in Turkey is assessed. According to the Household Labour Force Participation data of 2012, in urban areas of Turkey, 26.5% of the female labour force and 63% of the male labour force consisted of professional and semi-professional jobs. On a global scale, the rate of women's participation in the labour force with professions such as engineering is higher in Turkey when compared to similar countries.

This unique quality that women in Turkey have, in terms of participation in work life has historical roots. From 1965 onwards, male engineers' advancement in politics in Turkey became a factor in the acceptance of engineering as a reputable profession for men, while it was considered as an unconventional field for women. Today, engineering is still far from being a field in which women can easily participate and exist. Therefore, the presence of women in these areas should be encouraged, supported and this trend which was created by the historical process and resulted in a relatively high participation of women should be sustained. Moreover, support for women who want to enter or already entered the professional field, creation of egalitarian conditions

for women's participation in professional life, the increasing involvement of women and girls in the fields of science, engineering, mathematics and technology are increasingly on the global and national agenda.

In the second part of the Report, experiences gained through the EGT Project are shared. EGT Project was initiated by Limak Foundation in 2015 and gained momentum in 2016 in cooperation with the Republic of Turkey Ministry of Family, Labour and Social Services and the United Nations Development Programme (UNDP) Turkey. The overall objective of the EGT Project is to contribute to inclusive and sustainable growth by developing a model which increases the employment of skilled women. The programme developed for high schools within the scope of the EGT Project is being implemented with Republic of Turkey Ministry of National Education (MoNE) which is also one of the project partners.

The EGT Project, which was formulated with a holistic approach, aims to catch all the multidimensional determinants of the existing structure and develop intervention methods for all these areas.

Areas of intervention of the EGT Project can be addressed under three main headings and in the scope of three programmes.

The first area of intervention is "Career Choice and Education: High School Programme":

The programme for high schools which was developed within the EGT Project, aimed to mention the main problems such as girls' preferring the engineering profession less and being directed towards professions which are considered more conventional for their gender roles, while taking into account the problems women encounter in work life. This programme aimed to break this cycle and encourage girls to take interest in these areas and prefer engineering professions. Within all activities of the program, themes highlighting the fact that engineering is not a man's job were featured.

Within the program 'awareness raising', 'training' and 'training of trainers' activities are being carried out with three main target groups; students, teachers and school administrators and parents. Program activities include interactive and innovative methods such as meeting with role models, a board game specifically designed for the project which ensures group participation, and virtual reality applications.

The second area of intervention is the "University Programme" which involves supports for woman candidates of engineering who are studying in universities in the scope of the scholarship programme:

These supports are scholarships for women studying in electrical & electronics, industrial, civil, mechanical, computer and environmental engineering departments in state universities; mentorship support from woman engineers actively working in the sector; internship opportunity at Limak Group and other organizations; job opportunities at Limak Group and other organizations in the sector after graduation on availability basis; online English



training and finally, free participation right in the 'Social Engineering Certification Programme' in cooperation with Boğaziçi University Lifelong Learning Centre (BUYEM) in order to support their employability.

TOWARDS GENDER EQULITY IN ENGINEERING

16

scholarship holders who are 2nd, 3rd and 4th grade students at universities have participated in the 'Social Engineering Certification Programme'.



In 2017

135 35 56 students teachers parents

participated in the training programmes which were implemented during the pilot implementations in two high schools in Hatay. Moreover, scholarship holders and programme teams get together in various social events and provide valuable examples of collective empowerment and solidarity.

- Between 2015-2017, a total of 65 students benefited from the scholarship programme. In addition, 40 students were provided with internship opportunities and 16 graduates were employed. As of 2018, the total number of scholarship holders has reached 102.

- In order to reach various fields of engineering, 40 mentors were selected using the volunteering network between 2015-2017. Mentors and scholarship holders were matched based on their fields. As of 2018, the number of mentors has reached 83.

- 16 scholarship holders who are 2nd, 3rd and 4th grade students at universities have participated in the 'Social Engineering Certification Programme' in order to increase their knowledge and skills on finance, business administration, management and sustainability. This programme was turned into an online training system in 2018 due to dissemination purposes.

- In 2017, 135 students, 35 teachers and 56 parents participated in the training programmes which were implemented during the pilot implementations in two high schools in Hatay within the scope of the High School Programme. As a result, participants' awareness on gender equality, the relation between gender and career choice, and engineering as a profession was increased. In order to reach more students, training of trainers have been planned for 50 administrators and 50 school counsellors in the provinces of Antalya, Ankara, Artvin, Çanakkale, Elazığ, Hatay, Istanbul, Kırklareli, Muğla and Siirt in 2018. These training programmes aim to reach 40,000 people in the target group. The EGT Project does not only carry out awareness-raising and empowerment activities on women's access to the field of engineering, but also creates a ground for discussing inequalities women face with during the access and practice stages of the profession.

The third area of intervention of the EGT Project is about the area of professions itself:

The EGT Project has planned activities in two directions to achieve a mental transformation in the social areas in which the engineering profession is being practised. The first one is to build a ground for dialogue in which institutional structures, which may be influential in ensuring equal and increasing presence of woman engineers in the field, are brought together. The second one is a series of mainstreaming activities in which gender equality is applied in work life and concrete steps are taken. The mainstreaming activity is planned to be initiated in one of the firms under Limak Group as a pilot implementation in which the perspective of gender equality is reflected in all master plans and programmes, work relations and business models. Thereby, the goal is to build a standardized method which can be disseminated and create exemplary business models.

The EGT Project is significant as it creates an inclusive model which is based on research and information generation activities towards understanding the needs of the field; develops holistic interventions within a multi-stakeholder structure; and carries out different activities for different target groups to make sure woman engineers and engineering candidates have equal presence as men in the community.

This Report has been prepared with the aim to ensure the comprehension of the model in which this inclusive development and growth perspective is put into action.

TOWARDS GENDER EQULITY IN ENGINEERING



SCOPE AND CONCEPTUAL FRAMEWORK OF ENGINEER GIRLS OF TURKEY PROJECT

PARTONE

TOWARDS GENDER EQULITY IN ENGINEERING

INTRODUCTION:

SCOPE AND CONCEPTUAL FRAMEWORK OF ENGINEER GIRLS OF TURKEY PROJECT

The United Nations Development Programme (UNDP) Turkey has been operating since 1990 with the motive that development is a concept which is not dependent only on economic advancement but also on social and individual well-being.

It has been realised that the development steps taken by countries and the world do not only cover the increase in the economy, income or production. This perspective came into existence in the first Human Development Report prepared in 1990 where it was acknowledged that social equality and human prosperity was the main goal for a sustainable development approach and this goal became a norm with the Sustainable Development Goals.

According to this approach called human development, the goal is not only to expand the richness of the economy in which human beings live, but also to expand the richness of human life¹ Sustainable Development Goals which are the United Nations' goals for 2030, are the concrete expression of this perspective and they define the steps required to create a fair, sustainable and steady world.

Human development perspective aims, in all works undertaken for the development goal based on fundamental human rights, to ensure social wellbeing, equal and fair treatment in access to resources and opportunities that enable people to realise their own potential, and no discrimination based on race, language, religion, class, income level, physical capacity, age or gender.

In this scope, women's participation in the development is not only considered in terms of the value they add to production and the economy, but also in terms of their being the main actors of development as well as the importance of their self-actualisation. Women's participation in both education and work life, their presence as influential actors in decision-making mechanisms and at the higher levels of business life are considered important.

In recent years, with respect to the development studies, there has been an acceleration in the projects aiming to increase women's effectiveness in the fields of science and technology and eliminating the inequalities and barriers against their presence in these fields. Public and private sectors, non-governmental organisations and the academia have increased interest in these areas and they take part in successful projects which we will detail in the following sections. This issue is also included in United Nations' agenda in the context of human development and the focus is put on researches related to women's increased presence in the fields of science, technology, engineering and mathematics, improving their working conditions and directing them towards relevant professions.

In the Sustainable Development Goals, access to education, technology, science and professions is addressed on the level of sub-goals and indicators by taking into account the gender equality variable. This issue is not only referred to under Goal 5, which is the main goal regarding gender equality, but also under various other main goals².

Sustainable Development Goals

"End all forms of discrimination against all women and girls everywhere" (Goal 5.1.)

"By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations" (Goal 4.5.)

"Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women" (Goal 5.b.)

"By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value" (Goal 8.5.)

"By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion, economic or another status" (Goal 10.2.)

In Turkey, there has been an increase in recent years in the studies and practices on women's participation in the fields of science, technology, mathematics and engineering. The statistics indicating that the number of women who choose and practise the engineering profession in Turkey is higher than Europe and America have resulted in a superficial perception that there are no gender inequality problems in professions in general and in engineering in particular (Smitha & Dengiz, 2003). This has led the issue being ancillary among women's labour studies in Turkey.³ Due to the information being academic, existing studies have remained limited and only a certain segment of the society had access to it. This indicates the need for studies and projects that will contribute to the knowledge in the field of engineering while also containing interventions regarding this field.

On the other hand, while the female students' choosing of engineering profession is limited and determined by their gender roles, it is possible to say that there is an increase in their inclinations towards different branches of engineering. Supporting and encouraging girls who are increasingly interested in engineering has major importance both in terms of its potential transforming effects on gender equality as well as its relationship with the goal of women's empowerment.

Based on the most general conclusion of the related studies, the fact that inequalities are observed in work life and wages despite women's academic success during their education lives indicates that the field of professions is an area that requires immediate intervention in terms of human development.

In this framework, the overall objective of the EGT Project which is financed by Limak Foundation and carried out by the cooperation among the Ministry of Family, Labour and Social Services, Ministry of National Education and UNDP Turkey is to contribute to inclusive and sustainable growth through the development of a model for increasing the employment of skilled women.

The EGT Project aims to increase the presence of woman engineers in Turkey by addressing the issue of women's relatively less participation in the engineering profession, with various dimensions. EGT is a project

² For detailed information on Sustainable Development Goals and Targets see Annex 2.

³ According to the data from Eurostat 2017, the rate of women working full time in the fields of natural sciences and engineering is 30.1% in European Union countries. This rate is 34.1% in Turkey.

which considers the needs mentioned above and aims to ensure gender equality and empowerment of women. It was initiated in cooperation with the public, private and international institutions and in practice, aimed to reach and incorporate with several stakeholders varying from academia to civil society, high school students to parents, chambers of profession to employers. The project proceeds by the areas of intervention determined by consulting with experts on every stage.

One of the outputs of the project is to form a support programme to foster and encourage the girls who study or plan to study in engineering departments. The project focuses on developing the support programme led by the private sector to encourage girls in high schools to choose engineering professions, to carry out awareness raising activities for teachers and parents in this regard and to empower them.

However, supporting and encouraging girls is not itself enough to overcome the structural inequalities that keep girls away from the engineering sector or to empower girls. So, the intervention area was expanded and education and work life related interventions were also planned within the project. These interventions were determined based on the belief that existing gender roles in both the educational structure and work relations can be transformed by achieving a more egalitarian environment within the engineering profession. Therefore, not only girls, but also their male classmates, high school teachers, families, university professors, employers, business world and professional associations are being supported within the project in order to develop a gender responsive and egalitarian approach.

Another output of the project is to adopt institutional models which will advocate and implement gender sensitive approaches. Limak Group, by beginning with its own firms will lead the implementation of a model that acknowledges gender equality as corporate responsibility.

Interviews were made with various relevant actors in the scope of the project in order to achieve goals and results mentioned above and their opinions and recommendations were collected. Results of these interviews and focus group meetings as well as the results of the needs assessment and situation assessment reports were aimed to be used during the development of the programme for high schools.

The EGT Project meets the need in an organized and complementary manner: It brings many actors together, such as university students and their families and the business world as well as policymakers and educators, in order to raise awareness and support capacity building. On the other hand, it meets the need by developing inclusive business models to be adopted by the representatives of the private sector and supports the sector for being more balanced in terms of gender equality.

This Report was prepared for the purpose of determining the next steps to be taken to increase the number of female engineers in Turkey and build a gender responsive structure in the field of engineering. It was prepared by drawing on the previous studies (the literature reviews and the assessments of all interventions applied within the EGT Project to date) of our experts Dr. Selin Akyüz and Ebru Çakır Hanbay and finalised with the contributions of Dr. Ezgi Pehlivanlı Kadayıfçı and Dr. Gökçe Bayrakçeken Tüzel.

1. What Is a Profession and How Is It Differentiated from Other Professional Work?

A profession is one of the most fundamental economic activities of educated women in urbanised Turkey. This is considered as the most significant feature of women's participation in the labour force in Turkey. According to the Labour Force Statistics of February 2018, participation in the labour force is 33.3% for women and 71.5% for men in Turkey. Although women's percentages are lower in professional₄ and other related occupations compared to men, this gap is smaller than the gap between women's and men's participation rates in other business models. This is a graph that needs to be highlighted. In fact, while women's participation in the labour force consists mainly of agricultural works, in a context in which women are usually unpaid household workers, it is not common to see such a high rate of participation in the professional work life.

In the late 1960s, many social scientists like Slocum, Turner & Hodge, Goode, Green-wood, Gross, Taylor, Carr-Sounders, Volmer & Mills and Freidson considered professionalism as the dominant field of work in contemporary, urban and industrial societies; and emphasized that the future economies will be determined by professionals. These approaches which focus on the definition of professions highlight the distinctive features of this type of professional work. Accordingly, professionalism is mainly based on theoretical information which cannot be easily accessed by anyone in terms of quantity and difficulty (Greenwood, 1966; Freidson, 1970); is applicable to concrete problems; is produced, altered, discussed and used by professionals; is believed to solve the problems of the society (Goode, 1969: 275-278; Gross, 1958) and can be obtained via an academic formal education which takes years and is certified under a qualification system (Turner & Hodge, 1970; Greenwood, 1966; Taylor, 1968; Carr-Sounders 1966; Vol-mer & Mills, 1966).

Professionals who are equipped with this information and has been through the socialisation process via education are the only ones who have a say in defining and supervising the work, knowledge, skills and practices in their own field (Turner & Hodge, 1970, Freidson 1970; Burrage & Tronstendal, 1988). Society, on the other hand, approves this monopoly that the professionals have on their own professions (Gross, 1958); and professionalism turns into a self-controlling autonomous organisation structure with the support it gets from the approval of the society (Goode, 1969). This autonomous organisation of professionalism determines the legal regulations about themselves through chambers of profession, associations and societies and creates the infrastructure that ensures professional practices are supervised by the professionals. Therefore, membership to those structures is vital for those professionals and in many cases, it is considered as a pre-requisite to practice that profession (Carr-Saunders, 1966).



According to the Labour Force Statistics of February 2018



participation in the labour force is

%33,3 for women and

%71,5 for men in Turkey. In the light of all these information, we can say that professionalism has a structure which is too complex to be regarded solely as professional expertise skills. All of these features which determine the structure of professionalism form a cultural pattern that defines professional identities, language, jargon, behavioural patterns and lifestyles (Greenwood, 1966). Professionalism, which is a structure that manages and supervises itself with the approval of the society and develops and protects its own system of values, emerges as a system that is oriented towards the ideal of protecting and improving its existence and privileged position within the society.

1.1. Professions and Gender Equality

Aforementioned system is not free from the structural inequalities in the society including those based on gender. Gender-based inequalities appear in various ways within this system and they influence and determine women's presence in the professional area. It is indicated that individuals first learn gender-related thoughts and approaches during the pre-school period from the family and these thoughts and behaviours become discriminatory and restrictive in the school environment (Esen, 2013).

Analyses on gender-based inequalities in work life address the problems faced by women in terms of employment, with a focus on concepts such as low pay, uninsured work, double burden created by family related responsibilities, being unqualified and difficulty in accessing education opportunities. When we think by using the conceptual analyses generated by the studies in this field, we may assume that women have a privileged and equal position in the professional areas. Whereas, women of these professions have higher education degrees, rare qualifications, hard-to-obtain skills and large human capital. They are on the top levels of professional hierarchy and rewarded with high wages while having a respectable position in the public. Those women are able to pay for the labour force that will fulfil the responsibilities encumbered on them at home and as a result do not experience their profession as a second burden.

However, analyses on women's participation in the professional work area indicate that women are exposed to various types of pressure in professional areas. The expertise called as "ticket to ride" by Parkin (1996) does not require or enable women's equal participation in professional areas. It is because women's participation in this area is not defined by material conditions, diplomas or education but by stereotypes and ideological representations based on gender inequalities. As indicated by Witz (1992), the professionalism project, that aims to form a monopoly in terms of the use of certain talents and skills and is shaped in the form of closed systems, is structurally gender biased. Women working in professional areas dominated by men are not only considered as "different" but also are perceived as less talented than men in performing that particular profession (Spencer & Padmore, 1987).

Epstein states that the involvement of women in specialised professional areas such as engineering, which is mainly dominated by men and in which men are historically the main actors in the formation of the professional structure, is considered unusual, even contradictory and inappropriate (Epstein, 1970: 152). She underlines that such professions are perceived as 'communities for men' and have unwritten rules saying that women do not belong in those communities and so should not ask for acceptance.

This is the case because professions are often identified by masculine characteristics rather than feminine characteristics and it is assumed that impartial, reasonable, determined. pragmatic, aggressive and competitive people would be successful in professions (Gray, 1987; Epstein, 1970; Fox & Hessbiber, 1984; Homans, 1987; Coates, 1996). While the characteristics which are considered as masculine such as rationalism, determination, power-centred behaviour and competitiveness affect having a profession in a positive way, qualities which are biologically assumed to belong to women such as empathy, human-centred behaviour and collaborationism are considered as negatively affecting the professional work. Professions' being identified by masculine characteristics emerges as one of the main reasons of discrimination against women particularly in the field of engineering and exists in the life experiences of many women engineers. It is argued that masculine characteristics attributed to specialized professions do not fit with feminine characteristics and thereby these professional areas are not suitable for women. In the professional area which is associated with masculine characteristics such as rationalism, logic and autonomy women's empathy skills, connection styles based on collaboration and solidarity as well as their emotional capacities and relationship attitudes are considered as negative attributes (Cavanagh, 2003). Therefore, it is assumed that feminine social gender role does not match with the masculine social gender definition of professions (Spencer & Padmore, 1987; Fox & Hess-Biber, 1984). These sexist stereotypes sustain and strengthen the stratification system which is based on social gender roles. In such a structure, women have difficulty in entering professional areas or more commonly prefer professions such as teaching and nursing. While this sometimes appears as if it is a personal choice, what determines this choice is the perception surrounded by the stereotypes mentioned above.

One of the strategies developed by women to take part in these professions is to adopt these masculine characteristics. This structure of the professionalism culture is assumed to be unwavering and affects women's socialisation within this area together with its patriarchal characteristic. Women's presence and getting acceptance in the professional area is not sometimes determined by the modification in the gender biased structure, but by their own efforts to adapt themselves to the masculine nature of these areas. Within the professional world, first of all, women experience a shock at the entrance, then they develop a coping strategy that manifests as resigning or protesting, and at the last stage they try to exist in this area by internalising the existing system of values (Nicolson, 1996).

As of 2016/17, 46% of

7,198,987

students still continuing their university education consists of women. As for post graduate studies,

39.1% of students continuing master's and doctorate programmes are women. Studies carried out by Riska (2001), Blits (1990) and Epstein (1970) through different time periods demonstrate that woman professionals mostly work in the areas which are accepted as proper by the society for women. Those professions include teaching, some branches of medicine related to the needs of child and elderly, and social work and nursing which are directly related to people's needs. Based on this information, it is possible to say that among professions, there is a division of labour based on gender.

This is also apparent in terms of the statistics. According to the Youth by Statistics data of Turkish Statistical Institute (TURKSTAT), while higher education schooling rate was 40.9% in 2015/16 academic year, it increased to 42.4% in 2016/17 academic year. When the data is analysed in terms of gender, this rate increased from 42.6% to 44.4% for women and from 39.2% to 40.5% for men. As of 2016/17, 46% of 7,198,987 students still continuing their university education consists of women. As for post graduate studies, 39.1% of students continuing master's and doctorate programmes are women. While the percentage of female students is high in educational sciences (62.6%), health (63.7%) and handicrafts (64.4%), it is significantly low in fields such as engineering (22%), architecture and construction (32.6%) and veterinary medicine (32.2%)s

While the percentage of female students is high in

educational sciences	health	handicrafts
(%62,6)	(%63,7)	(%64,4)

it is significantly low in fields such as

engineering	architecture and construction	veterinary medicine
(%22)	(%32,6)	(%32,2)

2. Development of the Engineering Profession

Origins of the word "engineer" come from the Latin word "ingeniatorem" which means expertise in creating a tool (Levis, E.E., 2005:18). The word "mühendis" (means engineer in Turkish) comes from the word "hendese" in Arabic and means a person who deals with geometry (Özçep et al., 2003; cited by Alparslan, N., 2011). From a different viewpoint, an engineer deals with technique. Technique can be defined as achieving a creation through logic and scientific knowledge (Levis, E.E., 2005:18). In total, an engineer is a person who deals with technology by using scientific methods such as geometry and mathematics. In this regard, the profession of engineering is closely related to industry and has been popular throughout history for fulfilling military needs. In many countries military needs have played a significant role in the profession and its positioning as a profession.

A study by Canel et al. (2010) demonstrated that women have been the unseen actors of technology production throughout the history. They took part in various sectors of the engineering field, particularly in order to fulfil the industrial and military needs that have arisen during 19th century (Canel et al., 2000). This study also demonstrated that during the periods in which men were at war women found jobs in the engineering field; during the World Wars I and II, in 1919 and afterwards in England, during the cold war in the USA and Russia, and in the Nazi Germany. (Canel et al., 2000:2).

The first engineering schools in Turkey were opened in the late 1800s in order to increase military equipment and modernise the army (Uluçay & Kartekin, 1958:8-9). Women in Turkey found a place in engineering not because of a deficiency of the male labour force, but because of the Republican reforms. In 1927-1928, with the open call of the government and the support of the media, young girls enrolled in engineering schools for the first time (Gaye Erbatur, cited by Naymansoy, 2010: preface).

In Turkey, girls enrolled in engineering schools for the first time, in 1927-1928.

2.1. Gender Equality in Science, Technology, Engineering and Mathematics (STEM)

Does science have a gender? Studies examine this question indicated that, a 'cognitive authority' (Laslett et al., 1996: p.1). has been granted to science because of its objectivity (Harding, 1986). Such privilege to science is mistaken because the practice of science, like any other branch of human endeavor, cannot be disembedded from the value systems and implicit biases and ideologies of its practitioners (Harding, 1991, 89). In that sense, since science has been conducted mainly by men, it cannot be neutral from masculine values.

Generation of the scientific knowledge, which has been historically dominated by men, is not neutral, contrary of what it has been claimed to be. First of all, it is not impartial in terms of the gender of the labour force. Second, scientists are individuals formed by the society just like any other people and they cannot isolate themselves from the value systems and ideologies they were born into. Similarly, science dominated by masculine ideology cannot be separated from masculine values (Harding, 1986; Fox-Keller, 1985). Within this paradigm, characteristics such as rationality and analytical thinking are considered as features define manhood while women are identified with emotionality and irrationality (Harding, 1986; 1987; 1991; 2008).

In terms of scientific practice and technology, we often see women as the users and consumers of technology instead of creating it. Technology based division of labour within the family has also the same logic. Man is the one who uses the screwdriver; broken appliances in the house wait to be repaired by the man. Woman may be the one who uses the vacuum cleaner the most, but it is left to the man when it comes to repairing it (Cockburn, 1993, Faulkner, 2004).Woman is considered as technically incompetent.

Mentioned ideological division, which is seeded in the division of labour within the family, is rooted in the idea that genders have different technological skills. This idea of technological ability creates an inequality between men and women. Therefore, men are assumed to possess the technical information whereas women are only consumers of it (Cockburn, 1985:9). Having technical know -how, at least developing familiarity with it since early ages makes boys more advantageous than girls.

While children grow up, technology and toys play a great role in defining gender roles. Boys play with toys that resemble their fathers' jobs; such as toolboxes, cars and trucks. Girls on the other hand are engaged with dolls, makeup toys and miniature kitchen tools. Within the institution of family, technologies are shared based on gender roles. Boys receive toys that they can break apart and reassemble while girls are usually raised to consume instead of producing. This steering affects many aspects of their lives in the future from their career choices to perspectives of life (Cockburn, 1985; 1993; 2009).

2.2. Engineering in Turkey and Women's Participation in Engineering

Based on the literature, it is important to look at the historical development of the engineering profession in Turkey in to understand its structure. Engineering schools were first established in 1830 in the Ottoman Empire in order to contribute to the modernisation of the army and fulfil military needs (Uluçay & Kartekin, 1958:8-9). The Reforms made after the proclamation of the Republic, aimed to found Turkey on liberal, democratic and secular principles, and took the western style modernisation, which was thought to be founded on scientific bases, as an example for this goal (Arat, Y. 1998:85; Mardin, 1997:189). During this time, many successful students were sent abroad for engineering education and many foreign engineers came to Turkey. Engineers were considered as the actors of social change and development. They were defined as rational, masters of scientific knowledge and the practitioners of the reforms (Uluçay & Kartekin, 1958:8-9). While Republican reforms were based on western modernisation, they also combined this basis with the efforts of founding a nation state. In other words, western science and technique were melted in the same pot as the national values of the time. The best example in this regard was welcoming women to education and work life (Durakbasa, 1983: 55-59).

Republican reforms encouraged women from middle and upper middle class positions to enter the field of engineering. Naymansoy indicates in her work titled "Atatürk's Engineer Girls", that many women graduated from engineering faculties during this period and participated in construction, excavation and production jobs which were important for the future of the country Naymansoy, 2010).

'We all love and respect Banu. She endured quite an unpleasant education where she studied with 80 men, and always proved that a girl could also work just like men. [...] She never allows anyone to pay for her tram ticket. Another thing she cannot comprehend is that an appreciative whistle in the corridors.' (Naymansoy, 2010:20) 'She mentioned that during the first days of her job, many people left her room right after entering and seeing her because they thought she could not be an engineer. Many of them hung up the phone saying "Wrong number" when they heard a woman's voice; but then they got used to her presence in time.' (Naymansoy, 2010:20).

Engineering, which was believed to be the pioneer for the western style-based modernisation, became professionalised during the Republican reforms in Turkey with its given masculine codes. These codes were articulated into Turkey's patriarchal structure in time. In 1965 and afterwards, Turkey witnessed male engineers' rise in political life.

(Göle, 2007: 8). From 1965 to the 2000s, male politicians with engineering degrees (Turgut Özal, Süleyman Demirel, Necmettin Erbakan) became the leading figures in the political structure of Turkey. As these actors who based their actions on development in line with the political discourse of the time, they had been recognized and accepted by the society and thereby, engineering is perceived as a respectable profession for men.

Positivist tradition which shaped the modernisation movements in Turkey, social engineering attempts of the leftist thought in the 1970s, the significant mark left by the liberal politics with engineering pragmatism in the 1980s are all crucial to be able to understand engineering profession in Turkey (Göle, 2008).

2.3. Engineering and Gender Equality

According to Wendy Faulkner (2000), familiarity with technical knowledge constitutes the essence of engineering practice. This also determines the difference between what is social and what is technical (Fox-Keller, 1985). According to the author, understanding the relationship between technology and gender roles means understanding the social factors incorporated in technical knowledge (Faulkner, 2000:79). Historically, technological development has been a male dominant field. Technology related sectors have not provided equal opportunities to men and women structurally. In this scope, engineering as the producer of technology is far from being a field in which women can easily participate and stay.

As a result of this history which determines the current conditions of engineering, women are the minority in the engineering profession in the world and in Turkey (Canel et al., 2000; Faulkner, 2000; 2007; 2009; Mellström, 2002; 2004; Miller, 2002; 2004; Wilson, 2002; Sagebiel & Dahmen, 2006; Jolly, 2007; Cockburn, 2009; Male et al., 2009; Peterson, 2009). According to the statistical data prepared by Council of Higher Education (CHE) in 2016-2017, the total number of male students studying in engineering or engineering related departments of faculties was 219,590 whereas the total number of female students was 61,861.⁶ In the field of food processing these numbers were 6,080 for male students and 13,952 for female students, while there were 109,208 male students and 31,913 female students in electronics and automation field. According to the CHE 2018 statistics, compared to many countries, women have a higher percentage (44.3%) in academia as Professors, Associate Professors, Assistant Professors, Lecturers, Research Assistants, Translators and Instructors in Turkey.. Although this is a very significant percentage, higher positions such as rectorates are still male-dominated. (8.6%).

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31,913 female students in electronics and automation field.



Academic studies which examined the relationship between engineering and gender roles since the 1960s, underlined the low number of women in the field of engineering in the 1960s and addressed women's problems regarding to exist in a male-dominated world (Veter, 1980; Finn, 1983; Onaral, 1985; Jagacinski, 1987). During the 1980s and 1990s, also with the influence of the women's movements, studies started focusing on the problems faced by diversity issues in the field of engineering. (Shenhav, 1992; Byanyima, 1994; Chinn, 1999).

⁶ https://istatistik.yok.gov.tr

The common ground for mentioned studies is that they claim that the engineering profession has a maledominated working culture. This finding emphasizes that engineering is a profession dominated by men, and even it possesses masculine characteristics in its work culture. Throughout the history, the way technological knowledge and skills produced and transferred has been associated with men by the society, thereby the norms and values of engineering also became masculine. Some of the examples of these masculine features are the reproduction of this culture by communication styles specific to the engineering practice, power balance between the white-collar and blue-collar employees and engineers being forced to demonstrate their technical skills to prove themselves (Cockburn, 1981; 1987; 2009; Cockburn & Ormrod, 1993; Jagacinski, 1987; Caputi, 1988; Robinson & McIlwee, 1991; Massey, 1995; Evetts, 1998; Faulkner, 2000; Mellstrom, 2002; 2004; Miller, 2002; İsmail, 2003; Küskü et al., 2007; Hoh, 2009; Holth & Mellstrom, 2011; Male el al., 2011).

Another finding in the literature on gender equality and engineering is that gender-based division of labour is present also in the engineering practice. Accordingly, characteristics socially attributed to men and women and the social meanings attributed to genders are not only about rationality. Since men are physically stronger than women, tough jobs are considered as men's job. Hard, dirty and risky jobs such as hunting and fighting are for men. In contrast, women are usually deemed appropriate for soft jobs such as housework and childcare. Moreover, since the tough jobs done by men occur in the public space, they are deemed more valuable. This hard/soft distinction attributed to gender roles and jobs also applies to the types of scientific knowledge and technology, and hard branches are considered to be more convenient for men while soft ones are for women (Edwards in Lerman et al., 2003: 180).

In the same terminology; physics, chemistry and mathematics are the positive sciences while sociology and psychology considered as the soft sciences. These fields are populated respectively by men and women. Similarly, as mentioned in the findings of Berna Zengin's master's thesis titled "Engineer Girls in Turkey: Gender Equality, Education and Work Life" (2000), engineering departments are also divided into categories as hard/masculine and soft/feminine. Mechanical, civil, metallurgy, petroleum and geology engineering are mostly preferred by men since they are math-intensive and heavy-duty based, and they are considered as the masculine engineering branches. On the other hand, departments of food, environmental and chemical engineering are considered more convenient for women since they are assumed to require relatively lighter duties (Zengin, 2002; Edwards in Lerman et al., 2003: 180).

Another function of the hard/soft distinction in addition to grouping genders into certain branches is that it determines the value of the job. Particularly in engineering, hard jobs are accepted to be the technical ones which require technical skills, involve risk, utilise physical strength and mathematical knowledge. For instance, while nature of the work in production departments is considered as a hard task, engineers who work in sales or quality departments are considered to have soft tasks. This creates a hierarchy in terms of the nature of the job within engineering profession. Since men focus more on the hard engineering tasks such as production and R&D, this field ideally constitutes the ideal nature of the engineering profession. Women on the other hand, are populated more on soft taskss within office settings such as organisation and quality development(Cockburn, 1981; 1983; 1987; 1993; 2009).

3. Current Situation in Turkey in Engineering Practice: Different Experiences of Man and Woman Engineers

Although the percentage of woman engineers is considerably high in Turkey compared to many countries, statistical information does not represent gender equality based qualitative data. It is observed that, during the university and work life, woman engineers in Turkey are subjected to gender-based expectations, experience gendered jokes, , neglection and exclusion from social networks (Pehlivanlı-Kadayıfçı, 2017). Women's presence in jobs which require field duties and close work with blue-collar employees is mostly barriered. It is also known that the professional work of women in general or particular in engineering are not only neglected but sometimes

they are overly visible. Exclusion is not only caused by vertical and horizontal segregation but is also closely related to staying out of the system of informal relations; being married and having children are considered as a disadvantage whereas it is an advantage for male engineers (Bayrakçeken Tüzel, 2004). In this context, the aim is to demonstrate the different experiences of men and women under the following headings.

3.1. Factors Influencing Career Choice and Gender Equality

The education system in Turkey drives students who want to continue higher education, towards private extra-school courses. This system, which is very costly for families, requires students to compete with each other and correctly answer as many questions as possible in the university entrance exam. Students who want to choose medicine and engineering faculties are directed towards mathematics-science field in high school.

To enter engineering schools , it is necessary to graduate from mathematics-science field in high school. Studies on career choices indicate that existence of role models in the society, in the family and the influence of teachers emerge as factors that lead the inclination towards mathematics (PehlivanII-Kadayıfçı, 2017b). Engineering, which is a profession socially coded as respectable in Turkey, it is also accepted as a representation of being successful and being intelligent Thereby, it is a commonchoice for many students.

Gender roles are learned through socialization which might explain women's presence in certain professional areas (Fox & Hessbiber, 1984). Gender stereotyping creates disadvantages for women especially in fields dominated by men. Socialisation processes during professional education instructs women and men students to choose more secure fields for their gender roles. (see Bekata Mardin et al., 2000). As mentioned above, professional education and features attributed to a specific professional area are not independent from the characteristics attributed to men and women by the society. While women's presence is being negated in areas which are generally deemed to be in a deeper connection with masculine features, women tend to prefer professions such as pediatrics, teaching and pharmaceutics in which are associated with female characteristics. In the literature, it is often indicated that women's presence in specialised

professions is seen as an extension of their gender roles and women's domestic roles influence their professional orientation (Epstein, 1970; Blitz, 1990; Alvarez et al., 1996; Riska, 2001).

Institute for Public Policy Research (2014) conducted a research to examine the causes of the low percentage of woman engineers in the professional workforce (women constitute only 7% of the engineering workforce) and published a research report with the title "Women in Engineering: Fixing the Talent Pipeline" in 2014.

This research demonstrates that the age of 16 is the critical point when women lose their potential career in engineering. Career choices made at this age are closing the path to engineering profession for many women, rather than men. In addition, evidence suggests that this choice made at the age of 16 is based on attitudes and perceptions about engineering created over many years. Engineering is still considered as a career for "smart boys", and teachers, career counsellors, families and work experiences do not resist this opinion, in fact, they usually sustain it.

Research results indicate that age of 16 is very late to influence girls. It is stated that the key of making more women enter the field of engineering was to make engineering an attractive choice for girls at an early age and repeat this message throughout their education as well as their lives outside the school (Amna, 2014).

3.2. Lack of Role Models

A role model can be defined as "an individual who significantly influences a person in shaping his/her own behaviour in certain social roles and in developing similar behaviours in those areas" (Marshall, 1998: 572). Girls' decisions regarding their career choices or their existence patterns in the professional area are closely related to the role models they have in these areas.

Although being good at mathematics and science is the key to engineering, it is emphasized that if there was a role model around or in the families of academically successful girls in high school, they were inclined towards engineering more easily (McIlwee & Robinson, 1992; Nauta et al., 1999; Zengin-Arslan, 2002; Amelink & Creamer, 2010).

Within the scope of the EGT Project, y Ebru Hanbay Çakır prepared a report relying on , phone surveys with 639 woman members of TMMOB (Turkish Union of Chambers of Engineers and Architects). Surveys conducted by Nurcan Özkaplan and Asuman Türk in 2009 and as a result, various problems encountered by women engineers reflected by engineers' own narratives. As an answer to the question on how engineering students felt about having few girls in classrooms; the problems were mentioned as the socialisation problem, feeling uncomfortable due to masculine behaviours and failure to develop a sense of belonging towards the profession.

In their study on engineering education, Smitha and Dengiz (2010) conducted one of the most extensive works ever done in Turkey. 800 women and man engineering candidates participated in the study and women mentioned that in addition to their predisposition towards mathematics, the encouragement coming from their families and teachers also had an influence on their career choices. They highlighted the fact that they hadn't had enough role models throughout university education, and there was a significant difference between them and male engineering students in this regard. Therefore, in terms of career choice, the low number of woman engineers in the field decreases the chance of girls to meet possible role models. On the contrary, the superiority of man role models in numbers, which reinforce the idea that engineering is a masculine field supports this masculine structure and reproduce it.

As stated by Akın Bakanay, an individual begins discovering his/her skills, areas of interest and values especially during adolescence. Adolescence is in fact one of those periods when guidance and support are needed the most. Adolescents need healthy role models to observe and look up to while discovering themselves.⁷ Young people incline towards career choices during high school years and the more they get influenced by the stereotypes about their gender roles, the more their choices change accordingly. These stereotypes which are based on gender inequality sometimes create obstacles to fulfilling their own aspirations and potential. This is why role models are individuals who enable the change in the society and make young people be aware of this change as well as have the opportunity of self-actualisation.

An ind, ivivula may not knowknow his/her role models in person; some people may shape their behaviours for certain roles, based on real or ideal people from the history. Therefore, it is important that knowledge on successful woman engineers in the history is widely known, or woman engineering candidates have to be supported and empowered with the impact of these figures.

Having an engineer in the family or one of the having a parent whose profession is engineering and/or meeting with woman engineers in close circles or at the university meets the demand for role models. The study conducted by Smitha and Dengiz also underlines the low number of woman academicians in engineering faculties. The presence of woman academicians is an encouraging factor for woman students in engineering who tend to consider academic careers (Smitha & Dengiz, 2010: 56).

⁷ Ece AKIN BAKANAYhttp://www.guncedanismanlik.net/index.php?option=com_content&task=view&id=385&Itemid=22

3.3. Higher Concentration of Women in Certain Areas of Engineering (Horizontal Segregation)

Horizontal segregation refers to gender-based segregation in occupations cause women working in professions with lower status and lower pay, which are less demanding and less visible (Spencer & Padmore, 1987; Fox & Hessbiber, 1984). This segregation has also been demonstrated in the studies which reveal the negative correlation between prestige of a profession and women's choiceof it (Fox & Hessbiber, 1984). The reflection of this phenomenon in the field of engineering is that women incline towards certain areas of engineering and are deemed more proper for certain groups of tasks after graduation.

Relatively higher number of women's participation in the labour force in Turkey does not mean there is equality in this participation. There is an obvious segregation in areas of work which require qualifications associated with manhood. In fact, although participation levels of women are relatively high, women's work life is often limited to the areas deemed proper for them, which are less competitive and less prestigious. Technical professions are divided into groups based on gender, women are the subordinates. While the gender roles of professions are often advantageous for men, and yet restrictive for women. Women are being excluded in various ways, from various types of professional work which are not addressed in this Report. It is argued that, with respect to gender roles, definitions of professions are more in compliance with characteristics perceived to be male rather than female.8 This brings along socially constructed prejudices.

It is common to steer girls who are successful in STEM fields in high school, towards the medical profession during the period they choose a professional path. The main preference of girls who are good at mathematics and science, appears to be towards medical school. Justification for this behaviour is that medicine is a more suitable field for women compared to engineering. Engineering is considered as a field to be more preferred by male students. This is also apparent in the statistics from 2017.

Universities	Medical Faculties					Engineering Faculties					Mechanical Engineering				
	Tot.	F	М	F%	M%	Tot.	F	М	F%	M%	Tot.	F	Μ	F%	M%
Koç Ün.	40	17	23	42,5	57,5	265	65	200	24,5	75,5	64		55	14,1	
Hacettepe Ün.	380	191	189	50,3	49,7	320	72	248	22,5	77,5					
İstanbul Ün.	391	169	222	43,2	56,8	427	93	334	21,8	78,2					
Ankara Ün.	323	178	145	55,1	44,9	181	63	118	34,8	65,2					
TOBB ETÜ	40	22	18	55	45	320	93	227	29,1	70,9					
Başkent Ün.	70	49	21	70	30	230	69	158	30	70	60			21,7	

Source: Council of Higher Education, https://istatistik.yok.gov.tr/ last accessed in 2017

⁸ See: Riska, E. (2001), "Towards Gender Balance: But Will Women Physicians Have an Impact on Medicine?", Social Science and Medicine, no: 52, pp. 179-187.; Bayrakçeken Tüzel, G (2004) Being And Becoming Professional: Work And Liberation Through Women's Narratives In Turkey. Unpublished Master's Thesis; Zengin-Arslan, B. (2002), "Women in Engineering Education in Turkey: Understanding the Gendered Distribution", Int. J. Engng Ed. Vol. 18, No. 4, pp. 400-408.; Spencer, A. & Padmore, D. (1987), "Women Lawyers: Marginal Members of a Male- Dominated Profession", A.Spencer & D.Padmore, In a Man's World, Essays On Women in Male-Dominated Professions, Tvistock Publications, London, New York.; Alvarez, R., Robin, L.,Tuan, M. & Shui-i Huang, A. (1996), "Women in Profession: Assessing Progress", P.J.Duback & K.Borman, Women at Work, Rutgers University Press, New Jersey.

Gender based stereotypes which are prominent in choosing engineering and medical professions are also seen in the experiences shared by the scholarship holders of the EGT Project.

"My mother has always said 'My daughter will be a doctor'. In my first year, I only applied to medical schools. I couldn't succeed. Second year, I wondered why I was fixated on the health sector. One of our family friends had a son, he told. He suggested that I should consider engineering. First year I argued a lot with my family; second year they let me do, so I applied to engineering schools. I chose environmental and food engineering. I got into environmental engineering. I am so glad that I did."

"There is a perception that you should study medicine if you are successful at school. But I don't like biology and stuff. I was good at math. I was good at physics. So, I wanted to study industrial engineering. Especially in order to become a manager. I wanted to manage. I especially wanted men to do what I said. Afterwards I got into electric & electronic engineering. To know that I made a device, to know that it was my production, was very exciting."

"When you choose maths in high school it's either medicine or engineering. My relatives told me that engineering would be too difficult for a woman, that I could not do it. I didn't listen them, of course."

"My whole family told me to choose medicine. Only my father told me that I was a strongly built girl and that I could also succeed in engineering. My school counsellor steered me towards being an architect. But my heart was in engineering and so I chose it and I am very glad that I did. In other words, it was my dream to make things that I could touch."

"My teacher at the study center told me to study for medical school. First year my exam score was not enough for the medical school. Second year my teacher again told me to study for medical school. My family started advising me to become an architect. All I had in my mind was mechanical engineering. I didn't listen to anyone and chose engineering."

(EGT Project, Face-to-Face Interviews with engineering candidates who participated in the project)

"When a girl becomes a doctor, she can practise her profession on her own, she can find her own place. So does a computer engineer. But this is difficult for a mechanical engineer. Families consider this of course. Professional education has fallen behind. A boy can struggle but it is very difficult for a girl to struggle against these outside."

"...Even when I was first assigned to my job I heard things like "how can a woman be a physicist?"; no need to mention being a petroleum engineer. Therefore, I always tell children to be whatever they want. Regardless of being a girl or a boy, all that matters is being happy."

(EGT Project, Face-to-Face interviews with high school teachers who participated in the project)

While women are numerical minorities in the field of engineering, we see a picture that depicts a higher concentration of woman engineers in some branches of engineering and lower concentration of them in some other branches (Zengin, 2002; Pehlivanlı-Kadayıfçı, 2015, 2017a). While girls often choose food engineering, chemical engineering, genetic engineering and industrial engineering, boys prefer mechanical engineering, civil engineering and electrical & electronic engineering.⁹

As mentioned above, according to the CHE statistics, as of 2016-2017, the number of male students is approximately 3.5 times more than female students. While this ratio is valid for all engineering faculties, it varies for certain fields of engineering. While the malefemale numbers are balanced in certain engineering fields, in others the number of women is higher or very low.

⁹ See: Riska, E. (2001), "Towards Gender Balance: But Will Women Physicians Have an Impact on Medicine?", Social Science and Medicine, no: 52, pp. 179-187.; Bayrakçeken Tüzel, G (2004) Being and Becoming Professional: Work And Liberation Through Women's Narratives In Turkey. Unpublished Master's Thesis; Zengin-Arslan, B. (2002), "Women in Engineering Education in Turkey: Understanding the Gendered Distribution", Int. J. Engng Ed. Vol. 18, No. 4, pp. 400-408.; Spencer, A. & Padmore, D. (1987), "Women Lawyers: Marginal Members of a Male- Dominated Profession", A.Spencer & D.Padmore, In a Man's World, Essays On Women in Male-Dominated Professions, Tvistock Publications, London, New York.; Alvarez, R., Robin, L.,Tuan, M. & Shui-i Huang, A. (1996), "Women in Profession: Assessing Progress", P.J.Duback & K.Borman, Women at Work, Rutgers University Press, New Jersey. ber 2013 WOW Conference Centre, Istanbul http://cebitsinerji.com/kategori/ekim-25 Schelmetic, T. (2013). Where are America's women engineers? http://news.thomasnet.com/IMT/2013/02/19/where-are-americas-women-engineers/ For instance, there are 6,080 male students in the field of food processing while there are 13,952 female students. On the other hand, there are 109,208 male students and 31,913 female students in the field of electronics and automation.

It has been mentioned before, horizontal segregation results in higher concentration of female engineers in certain fields. Kazak (2007) indicates that, similar to the reluctance of girls to choose engineering compared to other professions, they are also consciously reluctant to choose certain fields of engineering. She states that while chemical engineering and architecture are deemed as more proper professions for women, they are reluctant to become mining or petroleum engineers. Kazak provides important data on this segregation in her article titled "Engineering Education and Women in Engineering" dated 2007.

"When the fields of electrical, mechanical and computer engineering are considered in the same group, we see that the number of girls in these branches is lower than their average in departments of architecture and engineering. While there is a 22%-23% percentage in all branches of engineering, there are only 7.5%-9.1% woman students in mechanical engineering and 10.7%-12% in electrical engineering departments. It is possible to say girls find computer engineering more convenient for themselves as the percentage is around 21.7-32. In the light of this information, even among the branches which are based on the same science areas, with similar education and work fields, there are some branches which are considered more as "man's profession", as they are perceived improper for women due to job opportunities and working conditions. As for electrical engineering field, while the total percentage of girls in electrical and electronics, electronics and communication engineering departments is around 10.7%-12%, this percentage is around 9.1%-10.5% for electrical engineering, 14.6%-16.1% for electronics engineering, 14.1%-10.7% for electronics and communication engineering departments" (Kazak, 2007).

Recent studies indicate that when asked about being an engineering student at the university, most female participants mention male students were the majority. Participants who state that there was an equal or nearly equal distribution come from those fields of engineering called "feminine" as termed in the study conducted by Berna Zengin in 2000.¹⁰ Moreover, it was stated that this dominance of men is considered normal in fields of engineering. The reason of this is explained by the participants with the fact that men are being steered more towards technology and machines, during early socialization processes (PehlivanII-Kadayıfçı, 2015-2017a 2017b).

Low numbers of woman engineers in certain fields also cause a dominance of men in sectors which generate employment for engineering fields such as automotive in particular, as well as mechanical, industrial and management engineering. Social judgments claiming that engineering is not convenient for women also deprive the sector and the national economy of many women who would be successful in this field. Besides, women's not choosing the field of engineering results in a deficiency of woman role models in the field, which reinforces the idea that engineering is not a proper field for women, therefore high school students keep acting based on genderbased stereotypes while choosing the engineering profession, and role models who will eliminate these judgments cannot be created.

¹⁰ See. Berna Zengin, 2002.

3.4. Searching for a Job / Recruitment

Gender based horizontal segregation in the field of engineering can also be a determinant in the processes of searching for a job and recruitment for woman engineers. In this scope, it should be highlighted that basis engineering fields sustain male-dominated codes and female engineers in these fields do not have equal conditions with their male colleagues in terms of working at desired positions, equal pay and promotion.

A study conducted by Pehlivanlı-Kadayıfçı in 2015, indicates that gender-based problems are encountered during recruitment processes. Findings of the study demonstrated that state owned institutions such as DSİ (State Hydraulic Works) and MTA (Mineral Research and Exploration) which employ engineers have been publishing job advertisements indicating that they prefer male engineers, until a short time ago. These adverts explicitly exclude women engineering while in areas which require field work, women cannot exist in at least half of the jobs which create this labour composition. Due to the efforts of some woman engineers who reacted to the ads, mentionedinstitutions have withdrawn their job adverts and have not published such adverts ever since. This demand was addressed in the Prime Ministry Circular No. 2004/7 called "Acting according" to the principle of equality in recruitment of the personnel" and pursuant to this Circular, a provision was introduced for public institutions on avoiding gender discrimination in the recruitment of the process, except for service requirements.

The same study also underlines the fact that women participants have a very difficult time finding a job in the market and that they have to compete with their male colleagues in particular. Woman participants state that working in industrial jobs is not very well received. It is indicated that since a woman engineer who works in production is required to work with men in workshops and factories, this is preferred by neither male employees nor the employer, and the job is not conceived proper for women since it is dirty and heavy.

Another finding is that freedom of travel creates a disadvantage for women regarding recruitment (Miller, 2004). Firms may act reluctant to recruit women engineers who are married and have children. Single women may be preferred for such positions or job ads are addressing male only applicants. Thiss situation affects most of the woman engineers' job seeking processes. (Ecevit et al. 2003). Another issue is recruiting women engineers in the quality departments as an entrance strategy rather than recruiting them in engineering tasks. . This means that although women apply for an engineering position, they are recruited for quality and organisation related duties and are deemed more proper for office jobs (Pehlivanlı-Kadayıfçı, 2015). This type of work is usually performede within physically closed environments and is preferred to prevent any contact with male employees and in male-dominated firms, which results in the woman engineers' not being able to show their true potential and indirectly creates a barrier to their advancement.

3.5. Professional Hierarchy (Vertical Segregation)

Horizontal segregation is having a higher concentration based on gender roles, in the fields of the same profession. Women dominated areas are less prestigious and less profitable fields compared to those dominated by men. Vertical segregation on the other hand is about advancement in work life.

While women concentrate more at the lower levels of the professional hierarchy, they are less present at the higher levels or the positions of decision-making. Hern (1987) points out that even in fields in which women are the majority, executive positions are often held by men. Women's low representation in executive positions in comparison with the high percentage of women among professions demonstrates that professions are segregated by gender. According to the data of 2016 by TURKSTAT (Turkish Statistical Institute), while 2.5% percent of the female labour force holds executive positions, this percentage is 6.3% for the male labour force.

According to a research conducted in 2015 on the experiences of woman engineers of Turkey called "Manifestation of Gender Based Engineering Culture in Turkey: Different Experiences of Female and Male Engineers", following findings were obtained:

- While the percentage of participants who think they are sometimes subjected to discrimination in work life because they are women is 51.8%, the percentage of those who think they are never subjected to discrimination is 34.2%.
- When asked about discriminatory practices in work life; 49.2% of the participants stated that they encountered negative discrimination in recruitment, 40.2% stated that they were not recruited in compliance with their qualifications, 36.9% mentioned that they found their wages low and 30.2% stated that they were subjected to harassment/emotional harassment just because they were women.
- In terms of specialisation in work place; areas with the highest percentage of specialisation with 57.1% emerge as project/design/planning/research/audit. Percentages of women who can work in production and worksites are 8.5% and 9.6% respectively.
- While women at executive positions constitute 12.7% of the participants, 45.1% of woman executives stated that they face with resistance from their subordinates.



While 2.5% of the female labour force holds executive positions, this percentage is

6.3% for the male labour force. While the percentage of participants who think they are sometimes subjected to discrimination in work life because they are women is

51.8%, the percentage of those who think they are never subjected to discrimination

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planning/research/ audit. Percentages of women who can work in production and worksites are

8.5% and 9.6% respectively.

TOWARDS GENDER EQULITY IN ENGINEERING

Studies conducted in the 2000s in Turkey indicated that woman engineers encountered various obstacles about career advancement and were forced to develop coping mechanisms against them (Ecevit et al., 2003; Pehlivanlı-Kadayıfçı, 2015). These obstacles are divided into three groups:

• Visible Obstacles: Being kept away from field work, being separated from blue-collar employees, not being allowed to work in production departments

• Hidden Obstacles: Being excluded via communication, not being taken seriously, mobbing

• Glass Ceiling Effect: Invisible barrier preventing women from rising to the highest ranks

These three types of barriers may be related to each other and at the same time have effects on work life. For instance, if a woman who is not allowed to go on field duties cannot prove herself in her job, she may not rise. Or a woman who is excluded via communication may not progress enough in her job because she is outside of the social networks in which work related discussions are held. It is known that some women who encounter or are likely to encounter similar situations, postpone marriage or totally give up the idea of marriage, in order to focus more on work life (Ecevit et al., 2003).

Postponing or giving up marriage is a coping strategy to deal with obstacles. Another strategy to mitigate the effects of these barriers is as women to hide their feminine qualities, in other words, to become more "masculine". Woman engineers' need to hide their feminine characteristic from clothes to behaviours demonstrates the rigidity of professional hierarchy.

3.6. Hiding Feminine Features as a Coping Strategy

Hiding feminine features is one of the coping mechanisms against challenges which emerge in work lives of woman engineers. Many studies indicate that feminine attributes are considered as a weakness in the engineering profession, particularly in production where the work involves blue-collar employees (Robinson & Mcllwee, 1992; Pehlivanlı-Kadayıfçı, 2015). As a result of this labelling, it has been discovered that women work in departments so-called "the pink-color ghetto" within the field of engineering, in which they are paid less than men and have difficulty proving themselves professionally (Kanter, 1977). Narratives of woman engineers provide examples to similar situations:

"There is a perception that girls do not want to get dirty. That is why many girls work in the departments of quality, documentation and production management. Even if you are not required to touch anything dirty, there is such a perception in the society about engineering."

(Nevin, Woman, Mechanical Engineer, quoted by Pehlivanlı-Kadayıfçı, 2015) It is an observed practice for women to try to lose/ hide their feminine characteristics in order to cope with this labelling and horizontal segregation in the workplace. To this end, they may prefer genderless clothes and adapt to masculine ways of talking and behaviours. In other words, woman engineers are forced to become genderless in order to prove their professional competence (Faulkner, 2009).

Assessment studies carried out by Selin Akyüz in the scope of the EGT Project demonstrate the pressure to abandon gender identity as follows by making references to the narratives by woman mentors: "You cannot go to the worksite with your high heels. Simple as that."

"You cannot start by saying you are a woman. Then you start as defeated."

"You cannot put on the lipstick or nail polish as you want, you can't."

(EGT Project, Face-to-Face Interviews with Mentors)

In fact, mentors themselves used expressions showing that they overcome challenges of being a woman in the field sometimes by changing their behaviours and choices. Women abandon their gender roles, genderrelated habits and behaviours and adopt male codes, in order to exist in the field of engineering as it is in all other male-dominated fields.

3.7. Invisibility and Over-Visibility/Prominence

They don't even recruit women. I was working at the cement factory there were no women. I gained a lot of technical knowledge but of course sometimes I hesitated."

"The way workers at the factory look at us can be disturbing sometimes. But women are more detailoriented. And more careful. I think this is an advantage."

"I wait in the mud in the cold. It's very very difficult. It is also difficult psychologically. It is very hard to make the employees accept you. They don't like taking orders from you. You go through a period of acceptance, but it finally ends..."

Existing in professional areas also requires more effort for women than men to survive, just like it does for entering these areas. While invisibility is a problem for women in work life and the public arena; ignorance as well as prominence are problematic, in the occupational area. Work life emerges as an area that contains gender biased and prejudiced elements.

In the assessment studies carried out by Selin Akyüz

"As women, we always need to work more. They test a man once whereas they test you three times."

"Men don't listen to you at work. They don't pay attention to women. You need to make them accept you with your work. After a while you start turning into a man anyways."

"As women, we are regarded as unpromising personnel. They think that we will get married, have children, etc. You have to work like a man. You shouldn't shy away. You need to do everything."

(EGT Project, Face-to-Face Interviews with Mentors who participated in the project)

in the scope of the EGT Project, mentors consisting of woman engineers shared their experiences which exemplify the gender biased structure of the occupational area as well as the thoughts of female students who participated in the project. Gender biased structure of the occupational area as well as the unusual presence of women in the occupational areas were articulated in many experiences. Some of these narratives are given below:

"You, as a woman, are always tested."

"I went there and suddenly realized all employees were male. They just stared at me. I was running around, trying to do things. I was learning in one hand. I was a newly graduate. I had no experience. One day a foreman at the worksite asked me how I, as a flower, ended up among all these bugs. I didn't know how to react."

"During my internship they told me to avoid leaving my room very often. They told me that I shouldn't walk around. There were those who didn't even look at my face."

(EGT Project, Face-to-Face Interviews with woman engineers who participated in the project)

These implicit or explicit references which result in women's invisibility leave female engineers outside of the system. Many experiences were shared confirming the fact that women needed to show relatively more effort compared to men during this process:

"(As women) We have to prove ourselves. Especially within the business world of men. In some maledominated workplaces, women are always obliged to show themselves." (Engineering Faculty, female student)

"...We are always trying to prove that the social perception of "you cannot do it" is wrong." (Engineering Faculty, female student)

(EGT Project, Face-to-Face Interviews with engineering candidates who participated in the project)

In a study conducted in 2016 on gender equality in Engineering Faculties in Turkey (Pehlivanlı-Kadayifci, 2017), faculty members and students stated that they thought male faculty members treated students equally. On the other hand, female students complained about the faculty members who acted like there are no genders, to treat equally. This approach, which makes women's presence invisible, annoyed female engineering students who wanted to exist in the engineering profession with their own gender specific characteristics, not despite them (Pehlivanlı-Kadayıfçı, 2017b).

Acting like there are no different genders in a classroom reproduces the hierarchies within the structure. Woman engineers mentioned similar issues during the focus group meetings conducted in the scope of the project.

"Male students were the majority in the classroom of course. We were only a few girls. It was the same in the faculty as well. Faculty members were also all male. We only had a couple of women professors. It was all man-talk. Professor was coming into the classroom and starting the course saying 'good morning gentlemen'. It was like as if we were not there. Actually, girls were always sitting in front, but...."

(EGT Project, Face-to-Face Interviews with woman engineer)

3.8. System of Informal Relationships

Professional challenges forf female engineers are not only limited to their being minority and underlying causes cannot be explained using only statistical data. Causes of this numerical weakness are multidimensional and they are hidden in daily expressions embedded in the profession as well as prejudices and ways of communication. This is caused by the internalisation of patriarchal relationships; and professional culture, or rather professional ideology sustains these patriarchal bonds and strengthens them. Unequal gender relations manifest themselves not only in professional works of engineering, but also on the level of informal relationships, behaviours and communication.

Smoking rooms, places people hang out after work, onlinefootball games or computer games are some of the various ways of socialisation among colleagues. Such ways of socialisation indicate processes of forming networks of solidarity in which work related issues are also discussed and experiences are shared. Gender roles attributed to women results in the exclusion of women from these areas.
Another example of women's exclusion through informal ways is the jokes they encounter during professional work. Jokes have also been observed as a discrimination mechanism in studies previously conducted in the field of engineering (Collinson, 1988). Some of the woman participants emphasize that they sometimes cannot stand male employees' jokes with sexual content. They say that, while it may be possible to avoid "man jokes" at the workplace, the work-based social communication which is continued via e-mail groups causes the same behaviours to persist electronically. In the study, it is mentioned that while these groups were mainly used for work, they were also environments in which male employees socialise and recreate their own language (Miller, 2004; Pehlivanlı-Kadayıfçı, 2015).

Both jokes with sexual content and swearwords occur among means of socialisation for men at the workplace. According to Collinson (1988) jokes with sexual content at the workplace may be a factor for creating male dominance. Especially blue-collar employees may make jokes at the workplace using women's sexuality as if they sustain their authority at home (Collinson, 1988:198). This creates such an environment that, if a woman wants to exist in that workplace, she has to ignore these jokes, swearwords and hints. Therefore, most woman engineers state that they ignore jokes and hints at their workplaces where this male language is quite dominant, and consciously choose being ignored (PehlivanII-Kadayıfçı, 2015).

3.9. Family Life

Another issue assumed as challenging in terms of women's presence in the professional field is the family and home life. Family and home life are considered as an advantage for male professionals but as a significant disadvantage for female professionals. It is assumed that a woman would quit their job particularly during pregnancy. Homans (1987) indicates that this is an illusion and that the most common cause of job quitting is career advancement, and pregnancy comes at the third rank.

Studies in this regard indicate that marriage is desired at the workplace. This, in fact, corresponds to the employer mentality that tries to separate potential woman employees during the recruitment process based on travel obstacles. This means, employers recruit women, whom they think as convenient for work and who are married. It is mentioned that married women are respected more when compared to single women (Ecevit et al., 2003).

Despite all these discourses encouraging marriage, maternity leave is a serious problem for all women in terms of promotions. Family-oriented discourse which encourages having children on one hand, and the maternity leave which hinders women's career advancement on the other, place all women not only those who are engineers, in a dilemma. It should be emphasized that this dilemma serves the male dominance and social networks that dominance constantly grows in. This also causes married women to be promoted less and paid low.

3.10. Professional/Occupational Organisation

In terms of participation in occupational organisations, woman engineers have low rates. Findings of international literature and the status of professional organisations in Turkey indicate that occupational organisation will be very effective in overcoming the problems encountered by woman engineers (Cockburn, 2009; Pehlivanlı-Kadayıfçı, 2015b). To this end, within the scope of EGT Project a meeting was held with TMMOB - Women's Working Group. The aim was to understand the problems faced by women in the professional life as well as the role of chambers of profession in resolving these problems.

There have been 4 women's congresses and 2 women's symposiums within TMMOB concerning women's issues. The reports and booklets of these congresses and symposiums are available on the website.ⁿ

During the meeting, it was stated that the decisions made at the First Congress were significant in terms of women's being organized and empowered within TMMOB and chambers of profession, as well as making women engineers' problems visible; and works are still continuing in line with these decisions. The following items were determined at this congress.

- We should be willing to have active roles in bodies of chambers of profession and/or TMMOB.
- As women, we all should be aware of women who are willing to have active duties.
- B We should provide support to ensure the election of women who are willing to have active duties.
 - We should follow-up whether these women were elected or not.

- We should identify the obstacles, which hinder women who are willing to have active duties, and share them with all members.
- We should always provide support to women who have active roles to carry out their duties as planned.
- 7 We should be aware of the problems these women encounter during their duties and provide support to resolve them.
- As women, we should encourage each other to take active duties.

The prominent conclusion reached at the EGT-TMMOB meeting was that, gender inequality directly affects many factors such as the process of girls' choosing the engineering profession, working conditions and challenges at the engineering sector and women's low presence in certain fields of engineering; and those problems cannot be resolved without focusing on this issue. This meeting provided important data which will be used for planning and structuring many activities of the EGT Project. It provided the opportunity to have first-hand conceptual and practical information on the obstacles and problems encountered in work life by woman engineers at TMMOB, which is the largest professional organisation where woman engineers in Turkey are organised. This information provides great contribution in the goal of EGT which is "to support female students who want to become engineers and develop model practices led by the private sector by developing and disseminating gender equality practices at institutional level ".

¹¹ http://www.tmmob.org.tr/sayfa/tmmob-kadin

PRACTICES EMPOWERING WOMEN IN ENGINEERING AND CONTRIBUTIONS OF EGT



TOWARDS GENDER EQULITY IN ENGINEERING

PART TWO

PRACTICES EMPOWERING WOMEN IN ENGINEERING AND CONTRIBUTIONS OF EGT

In the previous part, a general conceptual picture has been drawn depicting how the professional area contains gender inequalities and how it reproduces such inequalities. This picture is important in terms of realising what kind of a struggle women are in within the field of expert professions. There are social and ideological causes of women's being left outside male-dominated professions such as engineering, including the dominant masculine characteristics embedded in professional identity, culture and morals. These manifests themselves in the process of career choice, during professional education and in work life, as well as within professional chambers and organisations.

Male-dominated characteristics of career and occupations are neither the result of men's joint success in professions, nor the natural formation of the professions. It is the result of the gender biased, unequal structure of the society in general and professions. This structure determines the conditions of women's presence in a profession and lowers their bargaining potential.

Consequently, men have the primary position and put into practice their natural demand to protect and use the advantage created by this position; whereas women have the secondary position in professions and in order to advance in their careers and/or to exist in fields in which women's presence is traditionally considered unnatural, they have to struggle with obstacles which are sometimes implicit sometimes explicit.

Therefore, it is very important to support women's struggle to exist in these areas. This support is important to enable women's entry in these areas and empower them in these areas as well as transforming the maledominated structure of the area with their presence. There is an increasing number of studies on women's participation in professions in general and engineering. As mentioned in the introduction, women's empowerment in the fields of science, technology, engineering and mathematics occupies a significant part in the agenda of UN. There are various projects being carried out in different countries of the world which would provide good examples in this field. Some of these projects are as follows: MentorSET, which is a significant counselling programme initiated by Women's Engineering Society (WES) in England in 2002 with the aim to aid woman engineers in their career advancement; Girls Day initiative, which is implemented/supported by the European Social Fund (ESF) in Germany, which aims to encourage women towards fields of science and technology which are traditionally considered as male-dominated fields; Artemis Project which includes summer camps and other activities to increase women's participation in the labour force in fields of science, technology, engineering and mathematics (STEM) in the United States of America and empower girls via STEM education; Magnificent Women and Their Flying Machines Project, which is inspired by the first woman engineering pioneers who participated in engineering activities during World War I in England, and via various activities tries to eliminate the perception of "a career in these fields is not convenient for women" among girls at the age of career choice.¹²

Also, there are many projects being undertaken in this field in Turkey. **Promoting Gender Equality in Education Project** (ETCEP), which aimed to increase sensitivity on gender equality in the education sector, was implemented in 10 pilot provinces for 24 months. The project was carried out in the scope of the Instrument for Pre-Accession Assistance (IPA) and Ministry of National Education (MoNE) was the beneficiary. In the context of the project, topics of education and gender equality were addressed through various variables such as the legislation, curriculum, course books and capacity building and standardization. To this end "A Gender Equality Assurance Tool for Schools" were developed in order to contribute in ensuring quality education for teachers, school administrators and students in environments where they will not be restricted by gender-based stereotypes and will be able to reach their true potentials. The standards of the tool were implemented in pilot schools. After the completion of the Project, in order to ensure the sustainability of the outputs of ETCEP, "Dissemination of Gender Equality Assurance Tool for Schools" activities are carried out in 162 schools affiliated with the General Directorate of Secondary Education in 81 provinces, in cooperation with UNICEF.

Some of other projects being carried out in Turkey include: My Madame Curie Project, carried out by the Flying Broom Organisation with the support of Central Finance and Contracts Unit (CFCU) and the Ministry of National Education in the scope of the "Democratic Citizenship and Human Rights Education (HRE) Grant Programme" of European Union and Turkish Republic; I Support Gender Equality for My Country: Honey Bees are Becoming Engineers Project, which is carried out by the Ministry of National Education, Ford Otosan and the Flying Broom Organisation with the aim to increase the number of girls who choose engineering as a profession, which is not among the professions traditionally considered as proper for women in the framework of gender based stereotypes, as well as raising awareness on the importance of equal opportunities for men and women in education and career choice; Prof. Aziz Sancar STEM Camps for **Girls Project** which aims to provide a total of 700 girls from 7 provinces, which are Istanbul, Zonguldak, Uşak, Ankara, Mersin, Ardahan and Şanlıurfa, with training programmes at STEM camps.

¹² See ANNEX 1 for more details.

The EGT Project has been shaped as a comprehensive work which is based on the existing knowledge within these initiatives, built on the needs of the field and aims to address all sides together. The project, which was initiated with the general aim to increase women's participation in the labour force and the specific aim to involve more woman engineers in the economy, acts with the potential of creating a transforming effect on the male-dominated structural and discursive order in the sector.

The EGT Project was organised around the goal to have more young women in the engineering field based upon the question "Why not have more engineer girls?". First steps for the EGT Project were taken in 2013. After a long and rigorous preparation period, the project was initiated on the institutional level in 2015. Firstly, steps were taken to carry the activities implemented in the scope of the scholarship programme, mentorship programme and social engineering certification programme, which aimed to empower young female engineering candidates, a step further and turn them into a comprehensive programme. In this scope, in June 2016, Limak Foundation began working in cooperation with the Ministry of Family, Labour and Social Services and UNDP Turkey in order to reach larger masses, adopt a more comprehensive roadmap and ensure sustainability. Also, the Ministry of National Education (MoNE) became one of the project partners for the implementation of the high school programme of the EGT Project.

The following section summarizes the approach, areas of intervention and transforming goals of the project.

4. Approach of EGT

The most important reason for undertaking the EGT Project is the fact that women aren't equally present in the engineering education and profession compared to men in Turkey and around the world. When the social, economic, legal, political and cultural factors which make women being the minority in the engineering education and profession and working on the lower levels of professional hierarchy are evaluated, it becomes apparent that the most important cause is the social order based on gender inequality.

Issues such as girls' reluctance to choose engineering faculties, families' unwillingness about their daughters being engineers, problems female engineers encounter in work life and gender-based prejudices within the education system particularly about career choice are all closely related to this social structure.

EGT aims to ensure gender equality in the fields of engineering and empower women as well as seeing the multidimensional determinants of the existing structure together, developing intervention methods for all of these areas and eliminating the types of discrimination women face in the field of engineering.

4.1. Scope of EGT

Various activities have been planned throughout the project within the framework of the approach mentioned above with a broad scope and target groups. These activities have been designed in a way covering the engineering profession and its fields of activity. The aim is to achieve a transforming effect through simultaneous interventions involving socialisation, field choice in high school, career choices and various areas of work life. The EGT Project, which is based on the awareness that "Engineering needs our girls" has been initiated with the goal to have more women in the engineering field in which gender inequality is wide.

4.2. Methodology of EGT

In the scope of the Project, current situations, needs and expectations were determined with an analytical approach for the predetermined areas, in order to achieve success and effectiveness in the programmes developed for different goals and various target groups. People were directly consulted for their opinions on resolving problems via researches which were conducted by taking into account the characteristics of target groups and analyses carried out based on these researches; and these opinions formed the foundation of the project. Analyses guided the project with the reports and recommendations submitted afterwards to the project team. These studies provide a picture, at least a limited one, of women's presence in the field of engineering in Turkey, involving various stages ranging from career choice to the career processes.

Two simultaneous studies were carried out for this method which constitutes the informational foundation of the project.

First, it includes an evaluation of the activities undertaken by Limak Foundation in the scope of the EGT programme before August 2016, which is the date the Foundation implemented the project with its new partners. This evaluation was conducted specifically by consulting the knowledge and experiences of the participants of the scholarship programme and the mentors. The goal of this evaluation was to ensure that new steps would be taken more effectively in the further period by drawing on the experiences.

During this stage, evaluation of the previous experiences had been the main approach. Experiences have been turned into systematic information with this evaluation and they created the basis for the steps to be taken in the future through the project. In this scope, a field study was conducted to discover the effects of scholarship, mentorship and social engineering programmes and an evaluation report was submitted after this study. This Report aims to present a general assessment of the steps taken under the EGT Project to date such as the scholarship programme, mentorship support provided by woman engineers working actively in the field, "Social Engineering Certification Programme" and the Istanbul meeting where all students and mentors of the EGT Project got together.

The second study aimed to determine the areas and types of intervention and has been designed in a way to enable identifying the current situation and needs. This study which has been undertaken by Ebru Hanbay Çakır constitutes the most important components of the basis on which the project has been built. In this context, a series of activities have been carried out including focus group meetings, face-to-face interviews and in-depth interviews with the target groups and evaluation of national and international best practices.

Focus group meetings were held with high school students, teachers and parents to identify the factors influencing career choice, as well as with female engineers and female students at engineering faculties to draw a picture of the discrimination within the professional area.¹³

In addition to the target groups, interviews were also conducted within the networks consisting of NGOs, professional associations and women working at universities and in the private sector, which work to achieve gender equality and women's empowerment in social and economic life.

These interviews with relevant organisations and individuals contributed to creating an awareness-raising programme to be developed for high schools as well as adopting institutional models which would advocate and implement gender sensitive approaches in general.

This contribution, in addition to preparing a basis for the design of the elements such as the target group, purpose, content, method and timing of the programme prepared by the EGT Project for the abovementioned areas of intervention, also provides a rich experience for the development of gender sensitive approaches and institutional models as well as creating potential opportunities for possible cooperation.

Evaluation of the analyses conducted based on focus group meetings reveals that almost all participant groups consciously or unconsciously had adopted thoughts and perceptions which are based on unequal gender relationships. It has been observed during this study that levels of knowledge and awareness on the unequal structure of gender relationships are also low in our country, as it is in all societies where gender inequalities are deep-rooted.

¹³ Focus group meetings involving high schools were conducted in two high schools in Ankara. High schools were selected by Ankara Provincial Directorate of National Education of the Ministry of National Education. First high school was the Ali Naili Erdem Anatolian High School located in Mamak and the second one was Ankara Science High School located in Çankaya. Focus group meetings were held in these high schools with 11 students (9 female, 2 male), 10 teachers (5 female, 5 male) and 9 parents (5 female, 4 male). The focus group meeting involving female engineers was held at Limak Holding in Ankara with the participation of 5 female engineers. 4 of the female engineers who participated in these focus group meetings were also mentors in Engineer Girls of Turkey Project. The focus group meeting involving female students from engineering faculties was held with the participation of 5 female students who were scholars under Engineer Girls of Turkey project.

5. Intervention Areas of EGT

5.1. Career Choice and Education: High School Programme

Awareness raising and training programme prepared for high schools under the EGT Project focused on the interests and talents of students and gender equality as well as the relationship between these concepts and training, employment and the engineering profession.

The aim of the programme prepared for high schools under the EGT Project is to address the main problems such as girls' lower preference of engineering profession, girls' being steered towards professions which are considered convenient for their gender roles, and the problems women encounter in work life.

"I wanted to study electrical & electronic engineering. People reacted saying "How are you going to study among all those men?" I think this is about the society. They consider these professions more proper for men."

(EGT Project, Face-to-face Interviews with high school students)

The aim of the programme developed for high schools under the EGT Project is to raise awareness of high school students, parents and teachers on occupational prejudices, career choice and gender-based stereotypes affecting career choices and to encourage students to choose engineering faculties in line with their interests and talents, via introducing the engineering profession. The goal of the EGT Project's high school programme is to support the career choice activities carried out especially by counselling services at high schools and to disseminate gender equality sensitivity in the choice of profession.

Findings of the research conducted under this project demonstrate that activities concerning career choice are well received by high school students and there is a need to enhance such activities. In the scope of the project, programmes were created and implemented in order to introduce the work-fields of the engineering profession. Moreover, via introducing successful woman role models to students the emphasis was laid on the fact that the engineering profession should be chosen based on interest and talent, not on gender roles. Drawing on the results of the needs assessment studies carried out by Ebru Hanbay Çakır, the programme developed for high schools under the project involved the topics of the career planning process, knowing and assessing oneself, factors influencing career choices, engineering profession and gender equality in education.

In this context, the programme addressed the concept of gender equality, how it shapes and influences daily life, school life, school/career choices and work life and how the resulting gender inequality negatively affects not only women but also men and the whole society. It was emphasized during the programme that gender equality had been an important indicator of social development, human rights as well as democratic, economic and societal development.

During the focus group meetings, results of which were compiled by Ebru Hanbay Çakır, participants were also asked questions about what needed to be done regarding career choices to ensure that girls choose the engineering profession. These questions aimed to collect the opinions and recommendations of students, teachers, parents, woman engineers and women studying at engineering faculties on the topic.

Opinions on this topic of woman engineers and women studying at engineering faculties who participated in the focus group meetings show similarities. Both groups' opinions on what needs to be done at schools to ensure that girls choose engineering faculties more often, can be gathered under these headings:

- Carrying out activities about career choice at schools, especially within counselling departments,
- Involving successful role models in these activities and having them give speeches to students and parents,
- Visiting engineering faculties at universities and making girls talk to female engineering students,
- Using visual materials in these activities and creating posters and wallboards about engineering,
- Organising trips to different working areas where engineering is practiced such as factories, worksites, fields and offices to see the areas of implementation of this job
- Using social media for such activities.

Target groups of the high school programme were determined in the light of the findings of these interviews.

5.1.1. Target Group Students

Primary target group of the high school programme is students. Studies carried out in the scope of Çakır's research involving high school students demonstrate how important it is to work with high school students in order to eliminate stereotypes and increase sensitivity on gender equality. These stereotypes have a determining role at career choice.

While developing the programme for students, it was tried to consider different variables within the target group. Appropriate age groups were determined with the support and cooperation of MoNE in order to make sure that the programme delivered the right messages. During this process, activities were planned for students in the 10th and 11th grade, which are the years that they gravitate towards career choice.. The variables considered about the schools were students' genders, age groups (10th grade, 11th grade), types of high schools (Science High School, Anatolian High School, Vocational and Technical Anatolian High School etc.), average success of schools (highest and lowest scores of students enrolled) and regional characteristics of schools (province, district, town, slum areas, district borders, central areas etc.).

Content of the programme for students included topics such as career planning process, knowing and assessing oneself, factors influencing career choice and the engineering profession as well as examples and information which will make students understand the concept of gender equality, its importance and see the relationships between gender equality and the perception of engineering profession and many other fields. The content was created in a way which will enable students' active participation by covering examples that match with students' own lives and experiences and by using visual/audio and actionbased modules. In the programme prepared for high school students, attention was paid to introduce the professional fields by using people who will pose as role models for students. Findings of the study conducted by Ebru Hanbay Çakır demonstrate that students pay attention to such role models while choosing their professions.

"I did research on professions... I also observed the career choices of people around me. Are they happy in that profession? If they are, why? If they are not, why not? I talked to them like this and then made my decision."

(EGT Project, Face-to-Face Interviews with high school students who participated in the project)

5.1.2. Target Group Teachers

Another target group of the high school programme is the teachers. It should be kept in mind that educators also learn and adopt gender roles while they grow up within the society as men and women, so they also possess and even reproduce genderbased stereotypes. Therefore, educators should receive training on gender equality awareness, to ensure that they carry out educational activities with this perspective and pass the sensitivity on gender equality onward their students. "It is very difficult to handle the pressure created by the society. If you look at the Eastern region, it is almost impossible to see any female engineers. This will only happen by developing the country, providing education to persons and providing them with values. It may not happen suddenly but in years. This should be explained to people, I don't know how much they explain it to people. Even in the smallest village school, this can be done in all schools, in fact, elementary schools across Turkey. All teachers can be trained accordingly. It is important not to associate a profession with a gender ..."

"...Because teachers steer children and shape their intelligence. They steer them on whether they will choose science or literature fields. A child with a literature intelligence should not be forced to do maths. Therefore, it is important where teachers steer children in elementary and secondary schools. Medical school is praised a lot but maybe a child studying Literature may also be very intelligent."

(EGT Project, Face-to-face Interviews with engineering candidates who participated in the project)

It has been observed that some of the teachers who participated in the face-to-face interviews conducted under the EGT Project, had such stereotypes to a certain degree. They explained the term of 'occupational convenience' with gender-based values.

"Rather than our girls, the life in our society is important. We look at girls differently, I mean, in such environments, yes, we don't think it is appropriate. We, in fact, as men, we don't think it's appropriate."

"...but unfortunately, there is the reality. I mean, when recruiting, female engineers are often employed in R&D departments of factories, which means they have not worked that actively. Or civil engineers prefer the public sector because there are fewer women in the private sector since nobody wants female civil engineers in the private sector. They encounter this problem, I know people who do."

(EGT Project, Face-to-face Interviews with high school teachers who participated in the project)

While selecting the teachers to participate in the research, their genders, age groups, branches, whether they participated in a previous study on gender, whether they participated in a previous study on vocational guidance, as well as regional characteristics of schools were taken into account. Since guidance counsellors play a key role in occupational guidance, they constitute one of the most important categories within the target group.

The goal of the programme for teachers is to equip teachers with the knowledge and awareness that will turn them into mediators for eliminating gender-based stereotypes in their schools and their environment.

The programme prepared for teachers included topics such as the effects of gender on students' choices of departments and professions, the relationship between engineering profession and gender perception as well as the roles and capabilities of teachers in this regard. The program has been planned in a way to ensure teachers' participation by using visual and audio materials and activities.

5.1.3. Target Group Parents

The last target group for the programme prepared for high schools is the parents. During the focus group meetings held in the scope of the project by experts, it has been determined that parents constitute a very important factor in children's choices regarding schools, departments and professions. As a matter of fact, answers to the questions asked during the research revealed that families were among the most important factors in determining children's department and career choices. Recommendations on conducting studies, which will help families question profession related stereotypes by taking into account the role played by families in career choices, shaped the high school programme. It should be kept in mind that these recommendations are also those developed by experts based on the needs of the field.

"I think there might be seminars to which our families can also participate. In fact, families often don't meddle with boys' choices but sometimes they interfere with their daughters about career choices. That is why, there might be seminars on career choice in which girls can participate with their families. For example, about engineering. It could be at our schools or in other venues around."

"...I think families should be informed about this. I mean, I didn't have such a pressure in my family, so I don't think that engineering is only for boys or medicine is only for girls; anyone can do what they want. But in other families, they have such pressures; for example, women do the house work and men have jobs. They treat their children like that because that is how they saw it in their own families, but we need to raise awareness to eliminate this and it takes a long time to raise awareness, so we cannot expect it to be internalised suddenly."

(EGT Project, Face-to-face Interviews with high school students who participated in the project)

"We need to train families. Someone whose father was a civil engineer wants his daughter to also become a civil engineer, but she is completely opposite. This takes you even deeper. Families should definitely be trained. For example, they think, if their children become health care provides, their profession will be guaranteed. Teachers are somewhat informed, but families need to be given more seminars."

(EGT Project, Face-to-face Interviews with engineering candidates who participated in the project)

The goal of the activities planned to be carried out with parents is to explain to them that gender-based stereotypes significantly influence department and profession choices in order to support girls and boys in making profession choices based on their own interests and talents.

During the study conducted by Hanbay Çakır, high school teachers also mentioned the critical role played by families.

"Family is the important one generally in the choices of girls. Studying in the city where family lives becomes a factor from a financial perspective. Architecture and engineering are departments usually preferred by boys. Girls complain a lot saying 'My family didn't let me go."

"I agree with my colleagues, students are significantly influenced by their families. Families lead girls towards teaching and boys towards engineering. And of course, children act accordingly."

(EGT Project, Face-to-face Interviews with high school teachers who participated in the project)

As in other two target groups, Hanbay Çakır also emphasized in her report that different categories such as age, gender etc. should be considered while developing the programmes. Accordingly, parents' genders, age groups, educational backgrounds as well as regional characteristics of schools (socioeconomic level, cultural and traditional structure etc.) should be kept in mind in these training programmes.

Programme for parents is anticipated to be delivered in shorter periods compared to other groups. Content of the programme was developed accordingly. Therefore, recommendations of experts on delivering the message by using a short film or well known, loved, famous and successful role models in the society were taken into consideration.

Pilot Implementation in Hatay Province

Experience gathered from the pilot implementations at Antakya Anatolian High School and İskenderun İstiklal Makzume Anatolian High School located in Hatay province led to the conclusion that the activities carried out at a limited number of schools within a limited time period have been just the beginning and the activities involving teachers should be planned more effectively in order to achieve sustainability.

Training programmes targeting students, teachers and parents were carried out in the scope of the pilot programme. 135 students were reached with the programme whereas the goal was 120; and all students participated in the training programmes. Activities were organised to raise awareness among students on gender equality, gender roles in career choice and engineering profession. Pre-tests and post-tests were applied to evaluate the knowledge and attitude changes of students, and lessons were taken for the future training programmes in light of the findings. Additionally, a board game called "Decision is Yours" developed to help students gain experience about the engineering profession was presented to students.¹⁴ Moreover, role model woman engineers were invited to 2 pilot schools in order to provide students, teachers and parents first-hand information on engineering.

35 teachers and 56 parents participated in training programmes and activities which were organised to raise their awareness on gender equality, gender roles in career choice, engineering profession as well as guidance to students on their career choices. Finally, as role model engineers, Arçelik Production Planning Manager (Industrial Engineer) Ms. Sevim Gündüz and Vodafone Network Planning and Optimisation Director (Electronics and Communication Engineer) Ms. Ayşenur Şenyer contributed in the programme via sharing their professional experiences.

5.2. Direct Supports in Universities and Work Life Areas

The EGT Project covers many of the engineering fields as well as providing versatile supports for these fields. These supports include scholarships for women studying in electrical & electronics, industrial, civil, mechanical, computer and environmental engineering departments in state universities; mentorship support from woman engineers actively working in the sector; internship opportunity at Limak Group and other organizations; job opportunities at Limak Group and other organizations in the sector after graduation on availability basis; online English training and finally, free participation right in the 'Social Engineering Certification Programme' in cooperation with Boğaziçi University Lifelong Learning Centre (BUYEM) in order to increase their employability.

In 2018, the total number of scholarship holders reached 102

¹⁴ Game designs are provided in ANNEX-3.

5.2.1. Scholarship Programme and Internship Opportunities

A total of 65 students benefited from the scholarship programme in 2015, 2016 and 2017. In 2018, the total number of scholarship holders reached 102.

The goal of the scholarship programme is to support female engineering candidates who choose engineering as their profession and are currently students at the universities. In addition to the scholarship provided in the scope of this project, various other opportunities are also provided to develop different attributes of students throughout their engineering faculty education, such as the 'social engineering' training, mentorship support and internship opportunities.

Scholarship programme is available for female students who are studying computer, electrical & electronics, industrial, civil, mechanical and environmental engineering faculties of universities.

During the first semester of the scholarship programme, letters were sent to the rectorates and scholarship offices of 30 state universities which are the leading institutions in engineering education in Turkey. Academic success was taken as the criterion in order to access the most successful students and introductory documents and posters were sent to the relevant units of all the universities in this list. The goal to reach young female engineers studying in civil, mechanical, industrial, electrical & electronics and environmental engineering departments was achieved based on the fundamental aim to provide employment within Limak Group. A total of 120 applications were gathered via the scholarship offices of the universities and those applications were evaluated and each candidate was being interviewed.

During the second stage of the programme in 2017, online application was enabled through the project website and announcements were made.¹⁵ An introductory advertisement was prepared to this end and broadcast on television channels.¹⁶

Among the students who apply for the program, scholarship holders are being selected as the result of the evaluation conducted by the 'Scholarship Commission'. Interviews were conducted within the framework which was determined in the interview guide and communicated to the members of the commission.

Engineer Girls of Turkey are considered not only as young women supported to exist in the field but also as mediators who will transform the field. Therefore, while determining the selection criteria, in addition to academic success, communication skills and need situation, future view and determination were also included. It is believed that the steps to be taken in the future and having the determination while taking these steps, especially selecting young engineers who will do this with the awareness on the main goal of the Project is very important for the success of the EGT Project which aims to achieve a transformation in mentality in the most general framework.

During the interviews conducted with the scholarship holders of the previous period, academician Selin Akyüz who evaluated the programme of 2016 by conducting surveys and interviews, revealed that young female engineering candidates had determination on issues concerning their own lives despite the social pressure and being steered towards medical schools. This indicates that self-confidence and professional awareness levels of selected scholarship holders are high.

"I wanted to become an architect. I loved drawing. Then civil engineering came forward. Leaving something behind is a magical thing. I thoroughly searched it on the Internet. Then I chose civil engineering. I am very glad that I did."

"I wanted to contribute in science. I learned by myself. The guidance counsellor at the private learning center also helped. I am very glad that I chose engineering."

(EGT Project, Face-to-face Interviews with engineering candidates who participated in the project)

This becomes even more important in the framework of the starting point and goal of the EGT Project. In this context, it is very important to support the determination showed by scholarship holders in choosing their careers.

The experience from the process subject to the evaluation conducted by Akyüz indicates that empowering qualities of the EGT Project is especially important for female students. In addition to the pride of achieving goals, respect towards the profession was also mentioned. Most of the scholarship holders are also able to make very detailed projections about work life and they dream of a future in which they can actualize jobs which will make a difference for them. Most of these scholarship holders, the majority of whose dreams are dependent on their career advancement, have focused on "doing their job the best way" "making a difference" and "self-actualisation". Such thoughts indicate that these young women are ready to take effective steps with self-confidence and demonstrate the contributions of the programme in the goal of women's empowerment. Sometimes, this is reflected in their dreams of being part of the EGT Project, sustaining the existing unity and supporting young female engineering candidates just like themselves. Sustainability of this project indicates that it has the potential to create transforming effects.

"I don't have long-term dreams, they are for the near future. First, when I will graduate and get a job, I will put on my helmet and visit my father's grave. He wanted this a lot but couldn't see me. I have endless respect for the helmet. I want my father to see me like that. I know he will. I will be a graduate of EGT. I will become an engineer."

"I live abroad. I imagine myself there. I graduate, go there and I am working so hard. Besides, I become a manager."

"I want to do something about myself. An innovation... For example, a concrete. Like a new kind of concrete... Or developing a brand-new system. I want to become a well-known engineer."

(EGT Project, Face-to-face Interviews with engineering candidates who participated in the project)

Since the determination of scholarship holders, selected 65 young engineering candidates received higher education scholarship and had the opportunity to meet with mentors.

Additionally, 40 students were provided with the opportunity to have internships at Limak Group and other companies. The fact that 16 graduates were employed at Limak Group and various other firms in the sector is a good example of the success aimed within the first chapter of the project.

Success of the scholarship programme stems from its initiation of a sustainable influence. The mission assumed by young female engineers as a result of this experience leads them towards a goal which will make them become examples for other young women just like themselves and transform the gender biased structure of the field. This indicates a continuous and transforming effect that will be created by the momentum initiated in terms of ensuring gender equality in the field of engineering.

40 students were provided with the opportunity to have internships at Limak Group and other companies.

16 graduates were employed at Limak Group and various other firms in the sector. "EGT is not only a scholarship programme, it is much more than that."

"I also want to become a mentor in the future. That is my dream..."

"What if we as the EGT girls set up a company in the future? Wouldn't that be great?"

"I feel special, thanks to EGT."

"I want to get into work life as soon as possible and show myself. EGT keeps my motivation alive."

(EGT Project, Face-to-face Interviews with students who participate in the project)

5.2.2. Social Engineering Certification Programme

In 2016, 16 scholarship holders, who are 2nd, 3rd and 4th grade students at universities, have participated in the 'Social Engineering Certification Programme' designed jointly by BUYEM and Limak Foundation in order to increase their knowledge and skills on finance, business administration, management and sustainability. Scholarship holders, who completed the programme successfully, were entitled to obtain the 'Social Engineering' certification after the training which was provided in different modules under important topics such as effective communication styles at the workplace, management and leadership skills, fundamentals of business administration, innovation and creativity management, sustainability, social responsibility and philanthropy, entrepreneurship and social media management.

EGT scholarship holders participated in the 'Social Engineering Certification Programme' designed in cooperation with BUYEM in July 2016. The assessment conducted by Selin Akyüz demonstrated that the Social Engineering Certification Programme was a great contribution for scholarship students in terms of knowledge and equipment, while also having other various results such as prestige and developing collective consciousness.

Accordingly, it is also believed to emphasize that it is an important quality that such a Certification Programme is offered by Boğaziçi University, which is a state university with a significant success rating in Turkey and across the world. Another result inferred from experiences was that being in such an educational institution with national and international recognition rather than any private institution, provided students with a different kind of motivation. Experiences of interviewees on the Social Engineering Certification Programme prove the importance of the training they had, as well as how the training process provided added value to their will to succeed together. The following narrative of one of the scholarship holders who was empowered as both professionally and individually is extremely important.

"We were pumped with confidence at Boğaziçi. We socialised with the girls there. It's like they have been my friends all my life."

"Experiences we had at the Social Engineering programme were so valuable. EGT made me feel very special again. I am so lucky."

"We became EGTs at Boğaziçi. It made us a part of EGT. You know how they say 'We are from METU', 'We are from ITU'... Now we are from EGT. We were awakened."

(EGT Project, Face-to-face Interviews with students who participated in the project)

Engineering Certification Social Programme is planned to be transformed into an online training programme so that more students can participate. This is going to be a system in which students have oneto-one relationships with teachers, a system reinforced by participatory tools and activities where they come together periodically and socialise. Consequently, it will be available for the use of more and more young engineering candidates female contribute will sustaining and positive effects of socialisation and experience sharing.

16

scholarship holders, who are 2nd, 3rd and 4th grade students at universities, have participated in the 'Social Engineering Certification Programme' in order to increase their knowledge and skills on finance, business administration, management and sustainability.



5.2.3. Istanbul Meeting: Joint Empowerment and Social Responsibility

Collective consciousness and empowerment, which are among the expected effects of the Social Engineering Certification Programme, constitute the main goals of the meetings held regularly in the scope of the project. This goal, as exemplified in the evaluation study conducted by Akyüz, created the expected results. Therefore, activities such as the Istanbul meetings are anticipated to be continued in the following years of the project and in the scope of the direct support activities.

These meetings aim to bring together scholarship holders and the team and mentors of EGT Project, enable them to get to know the whole structure which they are a part of, and share the social responsibility activities which they choose and participate in with other friends and participants. Thereby, they are able to holistically experience a volunteering project which does not only benefit them but also in which they assumed an active role.

Experiences shared by scholarship holders during the evaluation study conducted by Akyüz, contain hints of the feeling of being companions and especially the feeling of belonging which were reinforced during the training where they got together and which were nurtured by the strength of walking on this road together. During interviews, most scholarship holders meant other EGT Project stakeholders while saying "we" and frequently emphasized that they had joint experiences. It is believed that especially the feeling of unity created by 'being together', psychological support provided by 'not being alone' and witnessing 'success' stories might have strengthened this idea of collectiveness among students.

"Istanbul Meeting amplified our excitement. It was amazing. It expanded my world."

"Istanbul Meeting doubled my enthusiasm. It increased my willingness."

"I was appreciated like never before, thanks to EGT. Istanbul meeting reinforced this."

"I got connected to EGT in Istanbul. It was like magic." (EGT Project, Face-to-face Interviews with students who participated in the project)

The strength obtained by the feelings of being together and not being alone has also been discovered as a data in the resulted from the previous survey study. In-depth interviews proved this result too. Being in a collective relationship resulted women having positive influence on each other.

Having an increased collective consciousness and being a part of a group increased the motivation of female students who hit the road to struggle in a masculine field, made them feel that their existence in the field is not unique or unusual and enabled them to take strength from the experiences of other woman engineers.

EGT meetings will be continued as a part of the direct support programme.

5.2.4. Mentorship Programme

Second programme planned to be implemented in order to empower young female engineering candidates and support them in the field is the mentorship programme. Mentorship creates vital opportunities for engineering, which is a field with low level of woman representation and a lack of role models.

Another factor in developing the mentorship programme was the fact that learning relationships, informal relationships and experience sharing within a profession play an important role in professional advancement. This topic was addressed under the titles of informal relationships and role models in the section about the conceptual framework. Mentorship programme is regarded as an effective tool, in which women transfer both their technical knowledge and work experience to other women, which creates a system that is reinforced based on the collective empowerment principle.

The study conducted by Selin Akyüz which includes an evaluation of the activities undertaken in the previous years under the project, demonstrated that the mentorship programme was able to fulfil these needs, was an effective programme and involved important gains in terms of the empowerment of scholarship holders.

Mentors were gathered via the volunteering network created by Limak Foundation and mentor candidates from Limak Group and outside when needed, were contacted. During this process, the main determinant in selecting 40 mentors was to reach different fields of engineering. Afterwards, mentors and scholarship holders were matched based on their fields. As of 2018 the number of mentors has reached 83.



Successful woman engineers from Limak Group and different institutions from the sector, began providing voluntary mentorship support to lead the way for the selected students. Before meeting their young colleagues, mentors participated in the mentorship training offered by 'Corporate Volunteers Association' so that began well-equipped to their journey. Participants were provided with informative documents during this training and this full-day training ensured that they began this process with more equipment. Documents which accompany the training and will be a guide in designing the relationship to be formed were presented to the mentors. These documents were; (1) Mentor guide for the first, (2) Mentee recognition form, (3) Mentor checklist, (4) Mentorship agreement, (5) Example themes and questions, (6) Goal setting.

Surveys and interviews carried out with mentors within the evaluation study conducted by Akyüz reveals the influence the mentorship system had. Involving this practice of experience-sharing between woman engineers working at Limak Group or other institutions and their future colleagues in the process is an extremely effective implementation for this part of the project. Creating role models within the EGT Project and the effective communication that young engineers will form with these persons may be considered as a factor that will play a dominant role in ensuring that the project takes more solid steps towards its goal. As supported by narratives, both sides have internalised the importance of the relationship established

"Our professors are not very attentive to our questions but my mentor tells me everything. We live in the same city so we meet frequently. We go everywhere. A professor of mine said in class that we would visit a wastewater treatment system in April. I must see it before anyone else. So, I immediately talked to my mentor and she arranged it. We will go soon. I will see it before my friends. There was even a time we studied for an exam together. It is very important for me to have her. A great luck..."

"It is a chance to learn by practicing. Our education is very technical. We learn better this way."

"My way has been opened, thanks to this programme. It has expanded my vision. We learn about things that aren't taught in the lecture. I am very excited."

"There are no engineers in my family or around me. Now there are people whom I can ask my questions. I gained awareness, thanks to this programme."

(EGT Project, Face-to-face Interviews with students who participated in the project)

Filling the gap that young engineering candidates have in terms of practical knowledge to be added to their professional academic knowledge, through a relationship founded together, makes scholarship holders more equipped as well as providing them with the added value created by experience sharing.

Experiences of mentors and scholarship holders have also provided guidance in terms of reinforcing and strengthening the positive influence created by the mentorship programme. Experiences addressed various issues from possible challenges in the relationship with mentees to decreased efficiency due to workload, from hesitations about setting the boundaries of the relationship to the practical problems which hardens meeting face-to-face. Shared experiences incorporated information that will guide the next term of the scholarship programme.

Accordingly, the mentorship programme is being strengthened through studies on incorporating gender equality topics in the mentorship training, expanding the scope of the training, paying attention to ensure both the mentor and the mentee live in the same city while matching mentors and mentees, making a calendar and sticking to it, determining the principles of the relationship between the mentor and the mentee, creating an opportunity for mentors to come together and share their experiences, and creating a supervision system which mentors may need during their mentorship.

Mentorship programme will be supported with a comprehensive training module that will be enriched with the recommendations from the evaluation study.

6. Awareness Raising, Common Understanding and Mainstreaming

"First, I need to say this, is this a need? We need to discuss this. As my colleague said, we need to figure out how we can overcome the situation of women and men enduring difficult conditions out there..." (EGT Project, Face-to-face Interviews with teachers who participated in the project)

These thoughts which were expressed during the face-to-face interviews conducted with teachers in the scope of the EGT Project highlight how important it is to act collectively in terms of girl students' entry into the professional areas and women's equal participation in the engineering profession. Sometimes, it is observed that women's equal representation in these fields is not embraced. And sometimes, girls' access to these fields is obstructed not based on concrete facts but on prejudices.

During the interviews, teachers underline the most important difference between girl and boy students as girls being more disciplined and hardworking, but when it comes to career choice, they mention that engineering which is a profession that requires discipline and success will be difficult for girls. Under these circumstances, it should be the major goal to focus on other factors which result from mostly gender based stereotypes and which make this profession difficult for women; to conduct projects to strip the professional area from its gender biased structure; to establish mainstream gender equality.

The EGT Project not only carries out awareness and consciousness raising and support activities for women's entry into the field, but also creates a basis for examining the unequal relationships during the processes of entering into the professional field and practicing the profession. In fact, as stated in the first part of this Report, the main factor that determines the career choice, vocational guidance and professional work is the way engineering profession was defined and constructed on a gender basis. Within this construct, women have trouble finding a place for themselves; parents accept the given order of the field while fearing that their children will face these challenges and will not be able to practice their professions; teachers cannot evaluate students' future independent from social expectations and the pressure created by these expectations so aim to present the most proper choices for their students.

At this point, it is apparent that it is not possible to change perceptions without changing the facts about the field; in other words it is not easy to change the perception about career choices without changing the gender biased structure and organisation of the profession. This prompted the EGT Project to develop interventions at various scales. Last and the most important intervention of the EGT Project is to ensure a mental transformation in the social areas where the engineering profession is practiced.

In the research conducted based on the face-toface interviews with woman engineers in the scope of the EGT Project, they mentioned that the main reason for the problems and barriers they encounter in professional life is the fact that they are women. Cause of these problems may be generalised as family related responsibilities and gender biased perception of the society. Other barriers and problems include factors such as men's being the majority in the engineering profession, men's being the majority of managers, working conditions' and workplaces' being designed according to men, the preference towards men during recruitments, and women's not being able to find jobs or advance at work.

"It is also about the culture. Our culture cannot handle this. We couldn't change the place of the woman figure in our subconscious. I think this is relevant to that. Of course, there is more than one factor. But I think this is one of them. Second one is that working conditions in engineering may not be proper for a woman or a mother. I mean I think there are many women who do not choose engineering because they don't want to. In addition to the steering by the society, I also know many people who say 'I don't want these conditions'. There are also many people who work at a worksite for a year and say 'No, I cannot take this life anymore' and quit their jobs to work in offices - we call them plaza engineers. I also think this has a role in women's being the minority in engineering faculties. For one thing, mechanical engineering, physics engineering etc... I think men should stay away from these too. They don't have to choose these professions which are so unnecessary and which make people die. They even pride themselves at METU saying "It is a great deal to graduate from mechanical engineering". Come on, if you don't want to graduate anyone then don't open that department. Women are a little bit naive in general terms. The examples here are all those outside the box. The ones who play football, marbles... But those women who played with Cindy dolls don't prefer this that often. A woman who cannot go to the restroom alone for instance, does not prefer this." "Because working conditions are not very proper for women, families don't support it either. That could be why young people don't prefer it much. One more thing; there is this thing like boys are better at things like math. I mean they choose engineering if they are good at math. But girls are better at language and social fields. Young people cannot go to work putting their fancy clothes on; they have to work under tougher conditions; this may be why they don't prefer it. I mean life of an engineer is not a colourful one."

"Companies also, prefer the man when there are a woman and a man at the same time. Why? When a man has completed his military duty, he will not have a leave again. Woman will have maternity leave; maybe she won't be able to travel to the places they want. They also consider this. Women may not be choosing it thinking that they will have less chance to find a job.

"...For instance, the worksite. This is what we, engineers encounter the most. Going to the worksite. We have job interviews. Some of them are married. If women are married and have children, there is a 90% chance that they will say 'I cannot go to the worksite'. But men... The other day I talked to this guy. He is married. He will go abroad. I ask 'Would it be a problem?', he says 'No, no problem. They can take care of themselves here'. A woman can never say this."

(EGT Project, Face-to-face Interviews with engineers who participated in the project)

"We all look for a job guarantee after graduation. It is already difficult to find a job in today's circumstances. It becomes even more difficult when you are a woman and a Civil Engineer. "

"...For example, we have women at the office and men in the field and there is a difference in their wages. It is a difference between the office and the field. There wouldn't be any difference if women were accepted to the field. But since women usually work at the office, there has to be a difference..."

(EGT Project, Face-to-face Interviews with engineering students who participated in the project)

Women in the field of engineering fight against this gender biased structure and make effort to exist in this field. As reflected in the concrete experience obtained from Hanbay Çakır's research and presented in the box on the right, the increaser in the number of women in this profession plays a crucial role in overcoming challenges and barriers.

A success story:

In a corporate firm where engineers work, most woman engineers were only able to advance in their careers to a certain point and then did not have the chance to promote any further; because one of the criteria to promote to certain positions was to stay for night shifts. However, there was also a practice at the firm that prevented women from staying for night shifts. Therefore, most woman engineers could not fulfil the criteria for promotion since they could not stay for night shifts. A woman engineer who could not resolve this problem that occurred because she was a woman, while her male colleagues, who started working at the same time as her and who had the same qualifications, advanced in their careers, became managers so had developments in their careers and wages, quit her job and wrote in her resignation letter that this is a clear act of discrimination. After she left the firm and started working in another company, the managers from her previous job called her and said that they had evaluated the situation she mentioned in her resignation letter and they had already been thinking about making a change about this issue for a long time and that they had eliminated this discriminatory practice after this incidence and invited her to come back. While telling about this story, that woman engineer said "I didn't go back to that firm but other woman engineers who work/will work at that firm after me will not encounter such a discriminatory practice anymore".

(EGT, Face-to-face interviews, narrative from a female engineer)

Having increasing participation of women in the professional life and the field of engineering creates an important potential to ensure a transformation on a certain level.

"In fact, maybe women's conditions may improve if more women work in the field of engineering. For example, companies prefer 9 male and 1 female engineers. If they recruit 5 male and 5 female this may start the improvement."

"If 10 field engineers are required there should be a quota. For instance, 7 male and 3 female engineers should be recruited. This should be a state policy. Besides, people should be told that civil engineering is not all about field work..."

(EGT Project, Face-to-face Interviews with engineering students who participated in the project)

In the scope of the EGT Project, activities were designed in two directions in the framework of supporting these efforts and the existing potential towards the goal to achieve a more egalitarian development perspective.

First one is to prepare dialogue grounds on which institutional structures, which are among the significant determinants of women's existence in the field of engineering on an equal level with increasing numbers, come together. These grounds are important in terms of corresponding to the significant moments when structures such as public officials, scientists, private sector representatives and professional associations evaluate the conditions of women's existence in the field of engineering. Their goals include ensuring a holistic overlook on the issue, allowing all sides to develop a joint approach on the importance of the issue; facing the troubles of each other, recognising the experiences of each other and learning from each other; being able to express each other's expectations, having joint decisions on the resolution of the problem and taking steps together.

Secondly, a series of mainstreaming activities carried out, in which gender equality is implemented in work life and concrete steps are taken. During the studies conducted in the scope of the EGT Project it has been frequently underlined that especially the connection between the engineering profession and private sector makes engineering less desirable for women. During the process of career choice, parents want their daughters to have professions that will allow them to have state guaranteed jobs without being involved in the private sector. It is a common belief that private sector does not prefer women or does not constitute a secure workplace for women.

TOWARDS GENDER EQULITY IN ENGINEERING

"Something with state guarantee, like a teacher or a doctor... after studying... I would want her to become a teacher." (EGT Project, Face-to-face Interviews with parents who participated in the project)

"Men often want to work in the field whereas women want to work at an office or in the public sector."

"Important thing is the profession, not the gender. For example, this is what I told my daughter, 'It's okay if you study medicine. You become a doctor and the state will employ you.'. But it is difficult if she becomes an engineer. Families guide their children with this thought in their subconscious."

"...but unfortunately, there is the reality. I mean, when recruiting, female engineers are often employed in R&D departments of factories, they are not worked that actively. Or civil engineers prefer the public sector thinking there are fewer women in the private sector because nobody wants woman civil engineers in the private sector. They encounter this problem, I know people who do."

(EGT Project, Face-to-face Interviews with teachers who participated in the project)

The cause of this situation lies in the fact that private sector considers women's family responsibilities and reproductive potential, in other words processes related to birth and childcare, as an obstacle and believes that investments made for women's employment will create negative effects on the profitability of the company.

However, this indicates a gender-based stereotype not only for students, parents and teachers but also for the representatives of the private sector, and proves the necessity of works to transform this stereotype. On the other hand, positive effects women have on work life mean gains for the economy in general and business world in particular. One of the most effective results of the EGT Project will be the answer it will provide on how to implement the gender mainstreaming in work life within a business model process. Experiences of UNDP Turkey in terms of gender mainstreaming within institutional structures provide an important repertoire to find an answer for this question.

Finding business models which are based on gender equality guarantees increased participation of women especially in the field of engineering.

UNDP Turkey carries out more effective and systematic projects to prioritise minding and implementing gender equality in all actions related to development; strengthen its works on gender equality and their influence; internalise its approach on gender equality within the institution and reflect it on various areas such as organisational structure, programme development and implementation; in short, to contribute more to the steps taken in Turkey to establish a structure based on gender equality.

UNDP Turkey has been working to make gender equality mainstreaming a practical method and programme for its stakeholders as well.

Activities to be carried out in the scope of the EGT Project with the goal to develop egalitarian institutional models will be among the pioneering works in which UNDP Turkey's gender mainstreaming experience will be put into practice. In this framework, gender mainstreaming activities, which will be implemented in one of the institutions within Limak Group, involve determining the potentials, needs and possible types of interventions of the institution and carrying out those interventions. In this scope, the aim is to construct a gender responsive and sensitive structure in various areas ranging from personnel policies to communication strategies, management habits to relationships with stakeholders.

7. Conclusion

In this Report, the founding aspects of the area of gender inequality indicated by the EGT Project, the holistic approach required to transform these aspects into egalitarian structures and the types of interventions shaped based on the needs of the area have been summarised. The EGT Project is a multistakeholder programme with a wide target group and holistic approach that has been constructed on the goal to achieve a transformation in the maledominated professional areas which are among the most important areas for establishing a society based on gender equality in Turkey.

Women in the professional areas in Turkey constitute the largest group among women who are economically active in urban areas. On the global level, percentage of women's participation in professions such as engineering is relatively higher compared to similar countries.

Therefore, it becomes important to encourage and support this existence of women in male-dominated fields and strengthen their existence especially in male-dominated fields such as engineering.

On the other hand, this relatively better picture in Turkey should not create a perception of equality. In fact, inequalities which occur on every level of vocational education and work life have been clearly demonstrated both in the literature and situational analysis studies conducted under the EGT Project. In other words, while providing this support, it is necessary to look also from the other side of the mirror and reveal existing inequalities in work life and education.

The EGT Project addresses gender equality in engineering in a structural and complementary way which brings together all actors. This structural and complementary approach is put into practice in three directions.

First one is reflected in the variety in the target groups of the project and in the specific activities designed for these groups. Project approaches the issue from a holistic perspective with various types of activities which target many groups ranging from high school and university students to families and teachers, academicians to businesspeople, chambers of professions to regulatory and implementing units of the public sector. Second reflection of the structural and complementary approach manifests itself in that all activities at all stages are planned considering the needs of the field. Determining the needs by conducting researches and analyses, makes it possible to see the structural inequalities in the field of engineering and identify the areas of intervention regarding these inequalities. Thereby, different areas and types of intervention become complementary. Various field studies were conducted by taking into account the characteristics of target groups and the analyses carried out as a result of these studies guided the project activities. These studies provide a picture that depicts the relationship between the engineering profession and gender equality in Turkey, in addition to the approaches of actors from different segments of the society, who are in different stages of professional life and education which leads to this professional life. This information is shaped following the belief that it will provide a contribution to relevant experts who work in the field, projects, studies at different scales and scopes and to initiatives. The main approach is to share all lessons and steps taken and information generated at all stages and disseminate them in a way to contribute to public knowledge.

To date, two simultaneous research studies were undertaken by the experts of the field. One of these researches focuses on the assessment of the activities carried out under the EGT Project until 2016 and the other one presents the current situation and needs. Both research studies are based on personal experiences of high school and university students, woman engineers, scholarship holders, counsellors, woman experts, professional organisations, members of non-governmental organisations, academicians, families and high school teachers. These studies have provided a significant source of information to answer the following questions and to plan the areas of intervention: How does the employment structure that implicitly or explicitly excludes women manifests itself in women's personal life experiences? In which ways are women excluded? What kinds of interventions are needed to create a work life that ensures active and equal participation of women? The reports which seek answers to these questions are crucial for actors in the field in order to be able to reveal the ways they perceive their life experiences as well as their needs.

Third structural and complementary approach manifests itself in the way this project is an intervention related to the STEM topic which has been included increasingly more in development studies in recent years. The Project is placed among accelerated actions on gender equality and women's empowerment in the fields of science, mathematics, engineering and technology and thereby has a complementary quality in terms of the structural transformation aimed at a global level.

Comprehensive activities have been planned for different target groups within this approach. These activities are as follows:

"High school programme" activities which target both female and male high school students and teachers in order to eliminate gender based stereotypes which influence career choice; "high school programme" activities for parents, who were determined to be the most important actors at career choice, during the research and is the group that most effectively carries the gender based stereotypes; "direct support programme" activities, including the scholarship programme, mentorship programme and social engineering certification programme, which were designed to empower and encourage female engineering candidates who study at universities and have the potential to be transforming actors and role models of future generations ; advocacy activities which address the academia and chambers of professions in order to achieve a more egalitarian understanding and professional relationships in terms of gender equality and to create transforming effects in the field of engineering; "mainstreaming" activities in order to increase high-quality employment of women and advocate gender equality principles in leading service and manufacturing sectors with the aim of improving economic development in an inclusive and sustainable way are the activities that will be carried out in the scope of the Project, within the perspective mentioned above.

The aim of the EGT Project, which is being conducted in cooperation with the Ministry of Family, Labour and Social Services, Ministry of National Education, UNDP Turkey and Limak Foundation is to contribute in inclusive and sustainable growth. The Project was initiated as a support programme by Limak Foundation which included scholarship, mentorship and social engineering, then was taken a step forward with the cooperation with UNDP Turkey and public sector and resulted in the development of the structural and complementary model mentioned in the previous section. Limak Foundation, with the power generated by this partnership, works to take it a step further than a philanthropic approach with the EGT Project and achieve equality which is a fundamental right. The fact that it defines gender equality and development of business models based on it as corporate social responsibility, and the way it shows the determination to initiate the change and transformation within its own internal structure by including itself in the area of intervention demonstrates a remarkable work which will be regarded as an example.

In this scope; the EGT Project is an effective tool with the potential to create transformative effects on the simultaneous interventions towards the versatile structure of women's participation in the field of engineering.

The project is progressing with the enthusiasm and energy shared by partners, by questioning each and every step and responding to every emerging need with bold steps.

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Annex 1. National and International Best Practices

Best Practices on Guiding Girls Towards STEM fields

Second part provides best practices implemented and succeeded in Turkey and in other countries, in order to steer girls towards STEM (initials of science, technology, engineering and mathematics) fields. Best practices in the STEM area are provided under two sub-headings as national and international best practices. Knowing and drawing on these best practices will contribute in ensuring that the programme developed for high schools under the EGT Project fits its purpose, is effective and successful.

Best practices from Turkey and around the world implemented to ensure and improve gender equality in education and employment are presented in detail in the Situation and Needs Assessment Report prepared in the scope of the EGT Project.

1. National Best Practices

Technical Support to Promoting Gender Equality in Education Project (ETCEP)

Promoting Gender Equality in Education Project (ETCEP), which was jointly financed by European Union and Turkish Republic and coordinated by the General Directorate of Secondary Education of Ministry of National Education, was implemented for 24 months between 19 September 2014 and 19 September 2016.

Target group of the project, which aimed to ensure gender equality for male and female students at schools and disseminate an egalitarian and gender responsive approach throughout the educational sector, consists of pre-school, elementary school and secondary school students, parents, teachers and other personnel having roles within the education process. Project was implemented in 40 pilot schools located in Erzurum, Batman, Samsun, İzmir, Malatya, Mardin, Şanlıurfa, Karaman, Trabzon and Sivas provinces.

During the implementation of the project, 'A Gender Equality Assurance Tool for Schools' consisting

of gender responsive school standards was developed which has guiding qualities as well as adequate implementation capacity to be used as an assessment tool. MoNE's capacity was increased in terms of disseminating an egalitarian and gender responsive approach throughout the whole education sector. In this scope, MoNE legislation and policy documents as well as 14 education programmes and 82 course books were reviewed with a gender equality perspective and the Gender Equality Certification Programme was developed for educators. "Leadership and Entrepreneurship Training for Woman Teachers" was prepared in line with the goal to equip woman teachers with the competencies that would take them to management positions and to make them role models for their students; and 542 female educators were trained in project provinces. Media campaigns and local activities raised awareness among students, teachers, parents and MoNE personnel about gender equality in education. (http://etcep.meb.gov.tr/)

In the scope of the sustainability activities of the project, "Gender Equality Activity Book in Draft Education" was prepared which provides concrete examples and is linked to the outcomes, subjects or themes included in the curriculum of 12 courses (Biology, Physics, Chemistry, English, Turkish Language and Literature, Philosophy, Health and Traffic Culture, Visual Arts, Mathematics, Physical Education, Geography and History) on secondary education level. 'Gender Equality in Education' courses were conducted with the participation of a total of 468 people including school administrators, school counsellors and branch teachers from 162 schools affiliated with the General Directorate of Secondary Education in 81 provinces.

A briefing meeting for branch managers in charge of secondary education in 81 provinces as well as representatives of the Counselling and Research Centre was organised regarding the dissemination of Gender Responsive School Standards. Pilot implementation is still ongoing in 162 schools for the dissemination of Gender Responsive School Standards.

My Madame Curie Project

My Madame Curie Project, which was carried out by the Flying Broom Organisation with the support of Central Finance and Contracts Unit (CFCU) and the Ministry of National Education in the scope of the "Democratic Citizenship and Human Rights Education (HRE) Grant Programme" of European Union and Turkish Republic, has been carried out between August 2013 - February 2015 in Ankara which was selected as the pilot province.

Short animation movies depicting success stories of four woman scientists who left their mark in the history and led the way were prepared in order to help eliminate stereotypes attributed by gender roles, to destroy the stereotypical professional perception attributed to women and especially to expand girls' horizon about their career choices. These scientists were astrophysicist Prof. Dr. Dilhan Eryurt who made several significant discoveries and received NASA's Apollo Achievement Award; first female chemist of Turkey and Marie Curie's student Prof. Dr. Remziye Hisar; pathologist Prof. Dr. Kamile Şevki Mutlu who enabled the development of pathology in Turkey; sociologist, jurist and political scientist Prof. Dr. Nermin Abadan Unat who was a pioneer in social sciences and advocated for women's rights. The goal of this movie bundle was to introduce children our own "Madame Curie"s who had significant achievements in our country just like Marie Curie, who is usually the first name coming to mind when considering women in science, and thereby to develop new role models.

A total of 22 teachers from 10 elementary schools in the Pursaklar district, 4 teachers in 1 elementary school in Altındağ district and 9 teachers in 3 schools in Çankaya district of Ankara participated in the project. Besides, 1060 students participated in in-class activities of teachers.

For the impact assessment of the project, in addition to attitude scales, interviews conducted with class teachers and school counsellors were also used. During individual and focus group evaluation meetings, attention was paid to the observations of teachers about the changes in students' attitudes and perspectives during and after watching the movies as well as the changes in teachers' own attitudes and opinions.

As a result of the evaluations, it was observed that not only the movies but also the worksheets used during activities as well as the discussions in classrooms helped to explain to children "gender equality" which is not included in curricula but essential for human rights and helped to eliminate stereotypes based on gender roles, while also being effective in increasing students' awareness on professions.

(http://www.ucansupurge.org/TR,1337/benimmadam-curiem.html)

l Support Gender Equality for My Country: Honey Bees are Becoming Engineers Project

I Support Gender Equality for My Country: Honey Bees are Becoming Engineers Project is carried out by the Ministry of National Education, Ford Otosan and the Flying Broom Organisation with the aim to increase the number of girls who choose engineering as a profession which is not among the professions traditionally considered proper for women in the framework of gender based stereotypes and to raise awareness on the importance of equal opportunities in education and career choice for men and women. It includes activities to inform and encourage girls to choose the engineering profession and the families to support their daughters' choices, through explaining the engineering profession and its working conditions to 8100 female high school students and their families in 81 provinces. Besides, through raising awareness on the importance of equal opportunities on gender equality, it aimed to increase awareness on the importance of equal opportunities for men and women in education and career choice. Other goals of the project include increasing awareness on women engineers' visibility across the society and mitigating the impact of gender-based stereotypes in career choice and thereby ensuring more participation of women in technical professions and using labour force more efficiently.

http://www.balarilarimuhendisoluyor.com/

Prof. Aziz Sancar STEM Camps for Girls Project

This project was planned for girl students in 6th grade.

Project aims;

To provide 6th grade female students with awareness on global education, science and cultural exchange and to help them understand these better.

To encourage students to keep in mind STEM (initials of science, technology, engineering and mathematics) while laying the foundation of their future.

To provide them curiosity towards STEM education at the earliest possible age with an exchange programme among Turkey, South Korea and U.S.A.

Project aimed a total of 700 girls from 7 provinces, which are Istanbul, Zonguldak, Uşak, Ankara, Mersin, Ardahan and Şanlıurfa, to receive training programmes at STEM camps. Project was initiated on March 8, 2016 and ended on May 24, 2016.

Another aim of the project was to select 14 girls by drawing lots and send them to either the Science and Technology Summer School in South Korea or summer school programmes in Silicon Valley in United States of America. From each province, the first 100 applicants were accepted to the project. Upon recommendation from Prof. Dr. Aziz Sancar, Syrian female students were also included in the project. Project was carried out jointly by governorships, universities, Directorates of National Education, chambers of industry and trade, municipalities and NGOs in selected provinces.

Various companies and institutions such as Turkish Airlines, TUBITAK and Samsung also contributed to the project.

STEM camps organised in 7 provinces consisted of a 2-day programme. The first day of the camp programme consisted of a seminar titled "Importance of Guiding Girls Towards STEM Education". Second day of the camp consisted of (in order);

• Briefing on STEM and one-hour long briefing session on how to do the selected STEM activity,

• Dividing 100 female students into 10 groups of 10 and engaging them in group works which were conducted under the mentorship of a female student for an hour and a half,

• Two-hour presentation section where students present the STEM product they created,

• STEM camp draw and award ceremony.

http://gisproject.org

2. International Best Practices

The European Social Fund (ESF)

This project was financed by ESF in Germany and aimed to encourage women towards fields of science and technology which are traditionally considered as male-dominated fields.

For the last decade, thousands of technology and research companies in Germany have selected a day as a technology-based 'Girls Day' and opened their doors to more than 100,000 girls to encourage them to have interest in a technical or scientific career. Project attracted a great deal of attention and succeeded in achieving its aim of encouraging girls to choose science and technology related fields.

This example from Germany is among the best practices undertaken by the technology related private sector and succeeding to reach many girls.

http://www.girls-day.de/Girls_Day_Info/English_

Artemis Project

Artemis Project is a 5-week free and intense summer programme for 9th grade girls. Programme was initiated in 1996 by two Bachelor's students from Brown University, namely Laurie Kardos and Jesse Marmon, with the goal to increase self-confidence and visibility of women in the computer sciences community.

Justification for targeting 9th grade female students is given as follows; the aim of the project is to introduce young women to computer sciences at the critical age before the inequality among men and women becomes distinct.

Project also has a website: http://cs.brown.edu/ people/orgs/artemis/2016/ about.html

Programme was later implemented in other universities as well. One of these universities is Boston University in U.S.A. It is implemented there as a 5-week summer programme designed for 9th grade female students. The aim of the project is to increase girls' interest in technical subjects as well as their selfconfidence.

The programme implemented in the scope of Artemis Project at summer camps is called STEM education. This programme is focused on increasing women's participation in the fields of science, technology, engineering and mathematics (STEM) and empowering girls with STEM education. Students learn about technical and computer programmes in the framework of Artemis Project. During these 5 weeks, girls develop projects about the fields of engineering and computer sciences. They also listen to guest speakers from these fields, take part in field trips and have the opportunity to see how and where these technical issues are put into practice.

Companies work in these technical fields can provide support to the project by sponsoring the programme, participate in activities in the summer camp and provide a mentorship-like support with their own woman engineers. For instance, Formlabs is one of the companies that provide such support. It participated in a two-day workshop at a summer camp in Boston with 5 women engineers who work for the company. Those woman engineers shared their experiences with the girls at camp and also became role models of working in STEM fields. 5 participating woman engineers highlighted the necessity of girls being encouraged towards these fields as early as possible, based on their own experiences. According to those experiences, most of the woman engineers and scientists who work at Formlabs stated that they chose those professions by virtue of their teachers or school counsellors at middle school or high school. Also, they emphasized that workplace and field trips organised within the project encouraged students towards those fields.

Rachel Davis, who works at Formlabs as a material scientist, expressed this based on an example from her own life: "When we were taken to Stony Brook University in Long Island by our advisors for our high school research programme, it became the source of inspiration for me to choose engineering and work in a material engineering laboratory." Davis also summarised how important woman mentors were for her who guided them at the laboratories of the university during this visit as follows: "They were these two inspiring woman mentors. It was so surprising to see these amazing women achieved such great things. I think about Dr. Miriam Rafailovich from Stony Brook all the time and I still use in my own laboratory the skills I learned at her laboratory."

Five woman Formlabs employees, who led the Artemis workshop also delivered presentations on various technical themes at the camp and after these presentations, they answered students' questions and provided them with feedback on various questions they asked. At the end of this process, Formlabs employees said that it was also inspiring for them to discover and improve students' interests towards STEM. They said they saw themselves in the students.

Formlabs, with a special page on their website for the activities they carried out in this scope, try to make STEM fields encouraging for girls.

https://formlabs.com/blog/formlabs-womeninspiregirls-to-pursue-stem/ Magnificent Women and Their Flying Machines

Project was developed by Women's Engineering Society (WES) which carries out its operations in England to commemorate the works of first woman engineering pioneers who participated in the engineering activities during World War I. The aim was to see how women progressed in the engineering career as a result of the engineering works they carried out during World War I.

Magnificent Women and Their Flying Machines was planned as an exciting and fun social assistance activity for schools and other institutions. It allowed the redesign of plane wings seen in the picture of women working at the Garlick factory in 1914.

The main goal of the project is to associate girls of 11-16 age groups with the field of engineering and eventually provide them with the social assistance that will allow them to have a more accessible career in the field of engineering.

Magnificent Women and Their Flying Machines Project combines the design and technology methods of producing and building authentic wing structures with the pioneering works of woman engineers who have been around for more than 100 years. It also brings together the knowledge on wing design, flight mechanics, team work skills and career choice with the history of World War I which includes women's increased movement to vote within the fight for women's rights.

Girls, who constitute the target group of the project, get surprised when they see that women have actually been playing those roles successfully for the last 100 years because they see engineering as a profession not proper for women. Effort is made to change participating girls' "perceptions about inappropriateness of a career in this field for women" through various activities.

Magnificent Women and Their Flying Machines was initiated in April 2014 and attracted a great deal of attention from schools and students.

Since 2014, the project has appeared in schools, in conferences and exhibitions of various associations and organisations, in fairs and conferences in the fields of science, technology, engineering and mathematics (STEM) and in many school-based activities in England, Scotland, Ireland and Wales.

In total, approximately 20,000 students, teachers and citizens participated in this activity. In 2015 and 2016, the activity was supported by Northrop Grumman. Additional support was also received from the Union of Royal Aviation in 2016.

In the scope of Magnificent Women and Their Flying Machines Project, students participate in sessions which have a focus on the historical development of the engineering field and include recommendations for those who want to choose it as a profession.

These sessions include basic subjects such as mathematics, physics, English and history as well as themes that will also improve basic skills of students such as teamwork, communication, research and time management.

Information and materials on the project are available on http://www.magnificentwomen.org.uk/resources. html
MentorSET

MentorSET is a significant counselling programme initiated by Women's Engineering Society (WES) in England in 2002 with the aim to aid woman engineers in their career development and advancement.

Programme was started in 2002 and continued till September 2012 but had to cease its operations temporarily due to financial problems.

Programme is now continued with the sponsorship of Department for Business, Energy & Industrial Strategy.

In the scope of the programme, counselling activities are offered to both female engineers and female engineering students.

Programme also develops partnerships with various groups to strengthen its mentorship support. For instance, partnerships were developed with the Mechanical Engineers Support Network Institution to create a broader network aiming to solve the problems women face when they try to go back to their jobs after maternity leave or any other career breaks.

A partnership was developed with the Social Mobility Foundation (SMF) in order to support female students financially. This foundation is a charitable organisation that aims to provide practical developments in social mobility of successful students with low income. Every year, with the help of professionals, SMF supports hundreds of students who can advance in the best universities and best professions but are deprived of the required incentives and networks to access them.

Activities and goals of MentorSET programme can be summarised as follows.

- To work to make more women enter in the engineering profession;
- Through the MentorSET training, to ensure that women can practice and excel at employment criteria which may have become unfamiliar especially after they have been away from employment for a while;
- To ensure woman engineers' access to counselling services and thereby increase women's applications, self-confidence and performance and make them more successful;

- To encourage young women to improve their engineering skills through providing them with mentors;
- To make woman engineers feel supported through the mentors who share the problems they face;
- To support woman engineers and students in terms of career advancement planning

1. Women who receive mentorship support have the opportunity to go back to their jobs after a career break.

2. Women who are supported, trained, fairly paid and fairly promoted would be happier and more productive and thereby they will have a higher chance to stay employed.

3. Mentorship aiming to develop skills of women for positions in senior management and board of directors will expand the talent pool of women who are proper for such positions.

4. Intersecting sectors of MentorSET will provide mentees with counselling from senior level women at other companies.

5. Woman mentors will develop important leadership and coaching skills.

Both people willing to receive mentorship support as well as those willing to provide mentorship support can apply to the website created for the programme. On the website, there is also information presented under various headings about the problems and areas woman engineers might need.

http://www.mentorset.org.uk/

Conclusion and Recommendations

TWhen the best practices applied on STEM field in Turkey and across the world are evaluated, the prominent aspects appear to be common for most of them. Following items appear to be prominent in the evaluated best practices;

- Gender equality principles were taken into account at all stages of the projects.
- Most projects target the 11-16 age group. It is believed that studies conducted after the age of 16 will not be very influential on young people.
- STEM camps are a common method used in many projects.
- Duration of the activities ranges between 2 days to 5 weeks. Increasing the duration also increases the influence of the activity on students.
- Interactive methods were used in the activities.
- Most projects were carried out with the support of the private sector.
- Media campaigns were used in such projects.
- Social media has been definitely used to announce and disseminate the projects.
- Web pages were created for studies and projects and information on the theme, application conditions and relevant news and links were provided on these pages.
- Universities are among the stakeholders of such projects.
- Projects involve successful role models as guest speakers.

- Projects provide the opportunity to see how the professions are practiced through workplace excursion and field trips.
- Most projects offer mentorship support.
- Projects include the cooperation among various segments such as the public and private sectors, NGOs and universities.
- Famous woman heroes from the history are taken parts in the projects.
- Projects are not limited to technical information but also include training programmes on different topics such as team skills, career planning, communication, time management and women's rights and its history.
- Successful studies and projects were included in conferences, seminars, fairs and school-based activities of various schools, NGOs and organisations.
- Some of the projects include activities that financially support university education of female students.
 Especially girls who choose STEM fields to study were supported by scholarships.
- During these projects, which were implemented targeting students, children and young people, contents and activities were also planned for their families, teachers and school personnel.
- Activities and contents in most projects were planned in a way to ensure the participation of both male and female children or teenagers.
- Examples, games and visual-audio materials which were based on the experiences of children/teenagers were used.

Annex 2. Sustainable Development Goals and Gender Equality Approach

In the following list, you can find Sustainable Development Goals determined by the United Nations as goals for year 2030 which include common needs and interests of countries together with their explanations, targets and global indicators on achieving them. Purple coloured goals and targets are relevant to gender equality. As you can see in the whole text, gender equality goal accompanies almost all goals. Also Goal 5 is directly about ensuring gender equality in all areas. This relationship which was formed in parallel with the approach of the United Nations demonstrates the dual approach that includes having gender equality as a main goal as well as minding and aiming it within all other plans and programmes.

1. NO POVERTY

Eradicating poverty in all its forms remains one of the greatest challenges facing humanity. While the number of people living in extreme poverty dropped by more than half between 1990 and 2015 – from 1.9 billion to 836 million – too many are still struggling for the most basic human needs.

Globally, more than 800 million people are still living on less than US\$1.25 a day, many lacking access to adequate food, clean drinking water and sanitation. Rapid economic growth in countries like China and India has lifted millions out of poverty, but progress has been uneven. Women are more likely to live in poverty than men due to unequal access to paid work, education and property.

Progress has also been limited in other regions, such as South Asia and sub-Saharan Africa, which account for 80 percent of those living in extreme poverty. New threats brought on by climate change, conflict and food insecurity, mean even more work is needed to bring people out of poverty. The SDGs are a bold commitment to finish what we started, and end poverty in all forms and dimensions by 2030. This involves targeting the most vulnerable, increasing access to basic resources and services, and supporting communities affected by conflict and climate-related disasters. **1.1.** By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than \$1.25 a day

1.1.1. Proportion of population below the international poverty line, by sex, age, employment status and geographical location (urban/rural)

1.2. By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions

1.2.1. Proportion of population living below the national poverty line, by sex and age

1.2.2. Proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions

1.3. Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable

1.3.1. Proportion of population covered by social protection floors/systems, by sex, distinguishing children, unemployed persons, older persons, persons with disabilities, pregnant women, new-borns, work-injury victims and the poor and the vulnerable

1.4. By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance

1.4.1. Proportion of population living in households with access to basic services

1.4.2. Proportion of total adult population with secure tenure rights to land, with legally recognized documentation and who perceive their rights to land as secure, by sex and by type of tenure

1.5. By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters

1.5.1. Number of deaths, missing persons and persons affected by disaster per 100,000 people

1.5.2. Direct disaster economic loss in relation to global gross domestic product (GDP)

1.5.3. Number of countries with national and local disaster risk reduction strategies

1.a. Ensure significant mobilization of resources from a variety of sources, including through enhanced development cooperation, in order to provide adequate and predictable means for developing countries, in particular least developed countries, to implement programmes and policies to end poverty in all its dimensions

1.a.1. Proportion of resources allocated by the government directly to poverty reduction programmes

1.a.2. Proportion of total government spending on essential services (education, health and social protection)

1.b. Create sound policy frameworks at the national, regional and international levels, based on pro-poor and gender-sensitive development strategies, to support accelerated investment in poverty eradication actions

1.b.1. Proportion of government recurrent and capital spending to sectors that disproportionately benefit women, the poor and vulnerable groups.

2. ZERO HUNGER

Rapid economic growth and increased agricultural productivity over the past two decades have seen the number of undernourished people drop by almost half. Many developing countries that used to suffer from famine and hunger can now meet the nutritional needs of the most vulnerable. Central and East Asia, Latin America and the Caribbean have all made huge progress in eradicating extreme hunger.

These are all huge achievements in line with the targets set out by the first Millennium Development Goals. Unfortunately, extreme hunger and malnutrition remain a huge barrier to development in many countries. 795 million people are estimated to be chronically undernourished as of 2014, often as a direct consequence of environmental degradation,

drought and loss of biodiversity. Over 90 million children under the age of five are dangerously underweight. And one person in every four still goes hungry in Africa.

The SDGs aim to end all forms of hunger and malnutrition by 2030, making sure all people – especially children – have access to sufficient and nutritious food all year round.

This involves promoting sustainable agricultural practices: supporting small scale farmers and allowing equal access to land, technology and markets. It also requires international cooperation to ensure investment in infrastructure and technology to improve agricultural productivity. Together with the other goals set out here, we can end hunger by 2030.

2.1. By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round

2.1.1. Prevalence of undernourishment

2.1.2. Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale (FIES)

2.2. By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons

2.2.1. Prevalence of stunting (height for age ←2 standard deviation from the median of the World Health Organization (WHO) Child Growth Standards) among children under 5 years of age

2.2.2. Prevalence of malnutrition (weight for height >+2 or ←2 standard deviation from the median of the WHO Child Growth Standards) among children under 5 years of age, by type (wasting and overweight)

2.3. By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment

2.3.1. Volume of production per labour unit by classes of farming/pastoral/forestry enterprise size

2.3.2. Average income of small-scale food producers, by sex and indigenous status

2.4. By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality

2.5. By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed

2.5.1. Number of plant and animal genetic resources for food and agriculture secured in either medium or long-term conservation facilities

2.5.2. Proportion of local breeds classified as being at risk, not-at-risk or at unknown level of risk of extinction

2.a. Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries

2.a.1. The agriculture orientation index for government expenditures

2.a.2. Total official flows (official development assistance plus other official flows) to the agriculture sector

2.b. Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round

2.b.1. Producer Support Estimate **2.b.2.** Agricultural export subsidies

2.c. Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility

2.c.1. Indicator of food price anomalies

3. GOOD HEALTH AND WELL-BEING

We have made huge strides in reducing child mortality, improving maternal health and fighting HIV/AIDS, malaria and other diseases. Since 1990, there has been an over 50 percent decline in preventable child deaths globally. Maternal mortality also fell by 45 percent worldwide. New HIV/AIDS infections fell by 30 percent between 2000 and 2013, and over 6.2 million lives were saved from malaria.

Despite this incredible progress, more than 6 million children still die before their fifth birthday every year. 16,000 children die each day from preventable diseases such as measles and tuberculosis. Every day hundreds of women die during pregnancy or from child-birth related complications. In many rural areas, only 56 percent of births are attended by skilled professionals. AIDS is now the leading cause of death among teenagers in sub-Saharan Africa, a region still severely devastated by the HIV epidemic. These deaths can be avoided through prevention and treatment, education, immunization campaigns, and sexual and reproductive healthcare. The Sustainable Development Goals make a bold commitment to end the epidemics of AIDS, tuberculosis, malaria and other communicable diseases by 2030. The aim is to achieve universal health coverage and provide access to safe and affordable medicines and vaccines for all. Supporting research and development for vaccines is an essential part of this process as well.

3.1. By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births

3.1.1. Maternal mortality ratio

3.1.2. Proportion of births attended by skilled health personnel

3.2. By 2030, end preventable deaths of new-borns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births

3.2.1. Under-five mortality rate

3.2.2. Neonatal mortality rate

3.3. By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases

3.3.1. Number of new HIV infections per 1,000 uninfected population, by sex, age and key populations

3.3.2. Tuberculosis incidence per 1,000 population

3.3.3. Malaria incidence per 1,000 population

3.3.4. Hepatitis B incidence per 100,000 population

3.3.5. Number of people requiring interventions against neglected tropical diseases

3.4. By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and wellbeing

3.4.1. Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease **3.4.2**. Suicide mortality rate

3.5. Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol

3.5.1. Coverage of treatment interventions (pharmacological, psychosocial and rehabilitation and aftercare services) for substance use disorders

3.5.2. Harmful use of alcohol, defined according to the national context as alcohol per capita consumption (aged 15 years and older) within a calendar year in litres of pure alcohol

3.6. By 2020, halve the number of global deaths and injuries from road traffic accidents

3.6.1. Death rate due to road traffic injuries

3.7. By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes

3.7.1. Proportion of women of reproductive age (aged 15-49 years) who have their need for family planning satisfied with modern methods

3.7.2. Adolescent birth rate (aged 10-14 years; aged 15-19 years) per 1,000 women in that age group

3.8. Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all

3.8.1. Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, new born and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population)

3.8.2. Number of people covered by health insurance or a public health system per 1,000 population

3.9. By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

3.9.1. Mortality rate attributed to household and ambient air pollution

3.9.2. Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services)

3.9.3. Mortality rate attributed to unintentional poisoning

3.a. Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate

3.a.1. Age-standardized prevalence of current tobacco use among persons aged 15 years and older

3.b. Support the research and development of vaccines and medicines for the communicable and noncommunicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration on the TRIPS Agreement and Public Health, which affirms the right of developing countries to use to the full the provisions in the Agreement on Trade-Related Aspects of Intellectual Property Rights regarding flexibilities to protect public health, and, in particular, provide access to medicines for all

3.b.1. Proportion of the population with access to affordable medicines and vaccines on a sustainable basis

3.b.2. Total net official development assistance to medical research and basic health sectors

3.c. Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing States

3.c.1. Health worker density and distribution

3.d. Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks

3.d.1. International Health Regulations (IHR) capacity and health emergency preparedness

4. QUALITY EDUCATION

Since 2000, there has been enormous progress in achieving the target of universal primary education. The total enrolment rate in developing regions reached 91 percent in 2015, and the worldwide number of children out of school has dropped by almost half. There has also been a dramatic increase in literacy rates, and many more girls are in school than ever before. These are all remarkable successes.

Progress has also been tough in some developing regions due to high levels of poverty, armed conflicts and other emergencies. In Western Asia and North Africa, ongoing armed conflict has seen an increase in the number of children out of school. This is a worrying trend. While Sub-Saharan Africa made the greatest progress in primary school enrolment among all developing regions – from 52 percent in 1990, up to 78 percent in 2012 – large disparities still remain. Children from the poorest households are up to four times more likely to be out of school than those of the richest households. Disparities between rural and urban areas also remain high.

Achieving inclusive and quality education for all reaffirms the belief that education is one of the most powerful and proven vehicles for sustainable development. This goal ensures that all girls and boys complete free primary and secondary schooling by 2030. It also aims to provide equal access to affordable vocational training, to eliminate gender and wealth disparities, and achieve universal access to a quality higher education.

4.1. By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes

4.1.1. Proportion of children and young people: (a) in grades 2/3; (b) at the end of primary; and (c) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex

4.2. By 2030, ensure that all girls and boys have access to quality early childhood development, care and preprimary education so that they are ready for primary education

4.2.1. Proportion of children under 5 years of age who are developmentally on track in health, learning and psychosocial well-being, by sex

4.2.2. Participation rate in organized learning (one year before the official primary entry age), by sex

4.3. By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university

4.3.1. Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex

4.4. By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship

4.4.1. Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill

4.5. By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations

4.5.1. Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators on this list that can be disaggregated

4.6. By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy

4.6.1. 4.6.1. Percentage of population in a given age group achieving at least a fixed level of proficiency in functional (a) literacy and (b) numeracy skills, by sex

4.7. By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development

4.7.1. Extent to which (i) global citizenship education and (ii) education for sustainable development, including gender equality and human rights, are mainstreamed at all levels in: (a) national education policies, (b) curricula, (c) teacher education and (d) student assessment

4.a. Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all

4.a.1. Proportion of schools with access to: (a) electricity; (b) the Internet for pedagogical purposes; (c) computers for pedagogical purposes; (d) adapted infrastructure and materials for students with disabilities; (e) basic drinking water; (f) single-sex basic sanitation facilities; and (g) basic hand washing facilities (as per the WASH indicator definitions)

4.b. By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries

4.b.1. Volume of official development assistance flows for scholarships by sector and type of study

4.c. By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States

4.c.1. Proportion of teachers in: (a) preprimary; (b) primary; (c) lower secondary; and (d) upper secondary education who have received at least the minimum organized teacher training (e.g. pedagogical training) pre-service or in-service required for teaching at the relevant level in a given country.

5. GENDER EQUALITY

Ending all forms of discrimination against women and girls is not only a basic human right, but it also crucial to accelerating sustainable development. It has been proven time and again, that empowering women and girls has a multiplier effect, and helps drive up economic growth and development across the board.

Since 2000, UNDP, together with our UN partners and the rest of the global community, has made gender equality central to our work. We have seen remarkable progress since then. More girls are now in school compared to 15 years ago, and most regions have reached gender parity in primary education. Women now make up to 41 percent of paid workers outside of agriculture, compared to 35 percent in 1990.

The SDGs aim to build on these achievements to ensure that there is an end to discrimination against women and girls everywhere. There are still huge inequalities in the labour market in some regions, with women systematically denied equal access to jobs. Sexual violence and exploitation, the unequal division of unpaid care and domestic work, and discrimination in public office, all remain huge barriers. Affording women equal rights to economic resources such as land and property are vital targets to realizing this goal. So is ensuring universal access to sexual and reproductive health. Today there are more women in public office than ever before, but encouraging women leaders will help strengthen policies and legislation for greater gender equality.

5.1. End all forms of discrimination against all women and girls everywhere

5.1.1. Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex

5.2. Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation

5.2.1. Proportion of ever-partnered women and girls aged 15 years and older subjected to physical, sexual or psychological violence by a current or former intimate partner in the previous 12 months, by form of violence and by age

5.2.2. Proportion of women and girls aged 15 years and older subjected to sexual violence by persons other than an intimate partner in the previous 12 months, by age and place of occurrence

5.3. Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation

5.3.1. Proportion of women aged 20-24 years who were married or in a union before age 15 and before age 18

5.3.2. Proportion of girls and women aged 15-49 years who have undergone female genital mutilation/cutting, by age

5.4. Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate

5.4.1. Proportion of time spent on unpaid domestic and care work, by sex, age and location

5.5. Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life

5.5.1. Proportion of seats held by women in national parliaments and local governments

5.5.2. Proportion of women in managerial positions

5.6. Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences

5.6.1. Proportion of women aged 15-49 years who make their own informed decisions regarding sexual relations, contraceptive use and reproductive health care

5.6.2. Number of countries with laws and regulations that guarantee women aged 15-49 years access to sexual and reproductive health care, information and education

5.a. Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws

5.a.1. (a) Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (b) share of women among owners or rights-bearers of agricultural land, by type of tenure

5.a.2. Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control

5.b. Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women

5.b.1. Proportion of individuals who own a mobile telephone, by sex

5.c. Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels

5.c.1. Proportion of countries with systems to track and make public allocations for gender equality and women's empowerment.

6. CLEAN WATER AND SANITATION

Water scarcity affects more than 40 percent of people around the world, an alarming figure that is projected to increase with the rise of global temperatures as a result of climate change. Although 2.1 billion people have gained access to improved water sanitation since 1990, dwindling supplies of safe drinking water is a major problem impacting every continent.

In 2011, 41 countries experienced water stress – 10 of which are close to depleting their supply of renewable freshwater and must now rely on alternative sources. Increasing drought and desertification is already worsening these trends. By 2050, it is projected that at least one in four people will be affected by recurring water shortages.

Ensuring universal access to safe and affordable drinking water for all by 2030 requires we invest in adequate infrastructure, provide sanitation facilities, and encourage hygiene at every level. Protecting and restoring water-related ecosystems such as forests, mountains, wetlands and rivers is essential if we are to mitigate water scarcity. More international cooperation is also needed to encourage water efficiency and support treatment technologies in developing countries.

6.1. By 2030, achieve universal and equitable access to safe and affordable drinking water for all

6.1.1. Proportion of population using safely managed drinking water services

6.2. By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

6.2.1. Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water

6.3. By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally

6.3.1. Proportion of wastewater safely treated

6.3.2. Proportion of bodies of water with good ambient water quality

6.4. By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity

6.4.1. Change in water-use efficiency over time **6.4.2.** Level of water stress: freshwater

withdrawal as a proportion of available freshwater resources

6.5. By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate

6.5.1. Degree of integrated water resources management implementation (0-100)

6.5.2. Proportion of transboundary basin area with an operational arrangement for water cooperation

6.6. By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

6.6.1. Change in the extent of water-related ecosystems over time

6.a. By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies

6.a.1. Amount of water- and sanitation-related official development assistance that is part of a government-coordinated spending plan

6.b. Support and strengthen the participation of local communities in improving water and sanitation management

6.b.1. Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management

7. AFFORDABLE AND CLEAN ENERGY

Between 1990 and 2010, the number of people with access to electricity has increased by 1.7 billion, and as the global population continues to rise so will the demand for cheap energy. A global economy reliant on fossil fuels, and the increase of greenhouse gas emissions is creating drastic changes to our climate system. This is impacting every continent.

Efforts to encourage clean energy has resulted in more than 20 percent of global power being generated by renewable sources as of 2011. But still one in five people lack access to electricity, and as the demand continues to rise there needs to be a substantial increase in the production of renewable energy across the world.

Ensuring universal access to affordable electricity by 2030 means investing in clean energy sources such as solar, wind and thermal. Adopting cost-effective standards for a wider range of technologies could also reduce the global electricity consumption by buildings and industry by 14 percent. This means avoiding roughly 1,300 mid-size power plants. Expanding infrastructure and upgrading technology to provide clean energy in all developing countries is a crucial goal that can both encourage growth and help the environment.

7.1. By 2030, ensure universal access to affordable, reliable and modern energy services

7.1.1. Proportion of population with access to electricity

7.1.2. Proportion of population with primary reliance on clean fuels and technology

8. DECENT WORK AND ECONOMIC GROWTH

Over the past 25 years the number of workers living in extreme poverty has declined dramatically, despite the lasting impact of the 2008 economic crisis and global recession. In developing countries, the middle class now makes up more than 34 percent of total employment – a number that has almost tripled between 1991 and 2015.

However, as the global economy continues to recover we are seeing slower growth, widening inequalities, and not enough jobs to keep up with **7.2.** By 2030, increase substantially the share of renewable energy in the global energy mix

7.2.1. Renewable energy share in the total final energy consumption

7.3. By 2030, double the global rate of improvement in energy efficiency

7.3.1. Energy intensity measured in terms of primary energy and GDP

7.a. By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology

7.a.1. Mobilized amount of United States dollars per year starting in 2020 accountable towards the \$100 billion commitment

7.b. By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries, in accordance with their respective programmes of support

7.b.1. Investments in energy efficiency as a percentage of GDP and the amount of foreign direct investment in financial transfer for infrastructure and technology to sustainable development services.

a growing labour force. According to the International Labour Organization, more than 204 million people were unemployed in 2015.

The SDGs promote sustained economic growth, higher levels of productivity and technological innovation. Encouraging entrepreneurship and job creation are key to this, as are effective measures to eradicate forced labour, slavery and human trafficking. With these targets in mind, the goal is to achieve full and productive employment, and decent work, for all women and men by 2030. **8.1.** Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries

8.1.1. Annual growth rate of real GDP per capita

8.2. Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors

8.2.1. Annual growth rate of real GDP per employed person

8.3. Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services

8.3.1. Proportion of informal employment in non-agriculture employment, by sex

8.4. Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead

8.4.1. Material footprint, material footprint per capita, and material footprint per GDP

8.4.2. Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP

8.5. By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value

8.5.1. Average hourly earnings of female and male employees, by occupation, age and persons with disabilities

8.5.2. Unemployment rate, by sex, age and persons with disabilities

8.6. By 2020, substantially reduce the proportion of youth not in employment, education or training

8.6.1. Proportion of youth (aged 15-24 years) not in education, employment or training)

8.7. Take immediate and effective measures to eradicate forced labour, end modern slavery and

human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms

8.7.1. Proportion and number of children aged 5-17 years engaged in child labour, by sex and age

8.8. Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment

8.8.1. Frequency rates of fatal and non-fatal occupational injuries, by sex and migrant status

8.8.2. Increase in national compliance of labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status

8.9. By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products

8.9.1. Tourism direct GDP as a proportion of total GDP and in growth rate

8.9.2. Number of jobs in tourism industries as a proportion of total jobs and growth rate of jobs, by sex

8.10. Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all

8.10.1. Number of commercial bank branches and automated teller machines (ATMs) per 100,000 adults

8.10.2. Proportion of adults (15 years and older) with an account at a bank or other financial institution or with a mobile-money-service provide

8.a. Increase Aid for Trade support for developing countries, in particular least developed countries, including through the Enhanced Integrated Framework for Trade-related Technical Assistance to Least Developed Countries

8.a.1. Aid for Trade commitments and disbursements

8.b. By 2020, develop and operationalize a global strategy for youth employment and implement the Global Jobs Pact of the International Labour Organization

8.b.1. Total government spending in social protection and employment programmes as a proportion of the national budgets and GDP.

9.INDUSTRY, INNOVATIONANDINFRASTRUCTURE

Investment in infrastructure and innovation are crucial drivers of economic growth and development. With over half the world population now living in cities, mass transport and renewable energy are becoming ever more important, as are the growth of new industries and information and communication technologies.

Technological progress is also key to finding lasting solutions to both economic and environmental challenges, such as providing new jobs and promoting energy efficiency. Promoting sustainable industries, and investing in scientific research and innovation, are all important ways to facilitate sustainable development.

More than 4 billion people still do not have access to the Internet, and 90 percent are from the developing world. Bridging this digital divide is crucial to ensure equal access to information and knowledge, as well as foster innovation and entrepreneurship.

9.1. Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all

9.1.1. Proportion of the rural population who live within 2 km of an all-season road

9.1.2. Passenger and freight volumes, by mode of transport

9.2. Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries

9.2.1. Manufacturing value added as a proportion of GDP and per capita

9.2.2. Manufacturing employment as a proportion of total employment

9.3. Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable

credit, and their integration into value chains and markets

9.3.1. Proportion of small-scale industries in total industry value added

9.3.2. Proportion of small-scale industries with a loan or line of credit

9.4. By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities

9.4.1. CO2 emission per unit of value added

9.5. Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending

9.5.1. Research and development expenditure as a proportion of GDP

9.5.2. Researchers (in full-time equivalent) per million inhabitants

9.a. Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States

9.a.1. Total official international support (official development assistance plus other official flows) to infrastructure

9.b. Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities

9.b.1. Proportion of medium and high-tech industry value added in total value added

9.c. Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020

9.c.1. Proportion of population covered by a mobile network, by technology.

10. REDUCED INEQUALITIES

It is well documented that income inequality is on the rise, with the richest 10 percent earning up to 40 percent of total global income. The poorest 10 percent earn only between 2 percent and 7 percent of total global income. In developing countries, inequality has increased by 11 percent if we take into account the growth of population.

These widening disparities require the adoption of sound policies to empower the bottom percentile of income earners, and promote economic inclusion of all regardless of sex, race or ethnicity.

Income inequality is a global problem that requires global solutions. This involves improving the regulation and monitoring of financial markets and institutions, encouraging development assistance and foreign direct investment to regions where the need is greatest. Facilitating the safe migration and mobility of people is also key to bridging the widening divide.

10.1. By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average

10.1.1. Growth rates of household expenditure or income per capita among the bottom 40 per cent of the population and the total population

10.2. By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status

10.2.1. Proportion of people living below 50 per cent of median income, by age, sex and persons with disabilities

10.3. Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard

10.3.1. Proportion of the population reporting having personally felt discriminated against or harassed within the previous 12 months on the basis of a ground of discrimination prohibited under international human rights law

10.4. Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality

10.4.1. Labour share of GDP, comprising wages and social protection transfers

10.5. Improve the regulation and monitoring of global financial markets and institutions and strengthen the implementation of such regulations

10.5.1. Financial Soundness Indicators

10.6. Ensure enhanced representation and voice for developing countries in decision-making in global international economic and financial institutions in order to deliver more effective, credible, accountable and legitimate institutions

10.6.1. Proportion of members and voting rights of developing countries in international organizations

10.7. Facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies

10.7.1. Recruitment cost borne by employee as a proportion of yearly income earned in country of destination

10.7.2. Number of countries that have implemented well-managed migration policies

10.a. Implement the principle of special and differential treatment for developing countries, in particular least developed countries, in accordance with World Trade Organization agreements

10.a.1. Proportion of tariff lines applied to imports from least developed countries and developing countries with zero-tariff

10.b. Encourage official development assistance and financial flows, including foreign direct investment, to States where the need is greatest, in particular least developed countries, African countries, small island developing States and landlocked developing countries, in accordance with their national plans and programmes

10.b.1. Total resource flows for development, by recipient and donor countries and type of flow (e.g. official development assistance, foreign direct investment and other flows)

10.c. By 2030, reduce to less than 3 per cent the transaction costs of migrant remittances and eliminate remittance corridors with costs higher than 5 per cent

10.c.1. Remittance costs as a proportion of the amount remitted

11. SUSTAINABLE CITIES AND COMMUNITIES

More than half of the world's population now live in urban areas. By 2050, that figure will have risen to 6.5 billion people – two-thirds of all humanity. Sustainable development cannot be achieved without significantly transforming the way we build and manage our urban spaces.

The rapid growth of cities in the developing world, coupled with increasing rural to urban migration, has led to a boom in mega-cities. In 1990, there were ten mega-cities with 10 million inhabitants or more. In 2014, there are 28 mega-cities, home to a total 453 million people.

Extreme poverty is often concentrated in urban spaces, and national and city governments struggle to accommodate the rising population in these areas. Making cities safe and sustainable means ensuring access to safe and affordable housing, and upgrading slum settlements. It also involves investment in public transport, creating green public spaces, and improving urban planning and management in a way that is both participatory and inclusive.

11.1. By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums

11.1.1. Proportion of urban population living in slums, informal settlements or inadequate housing

11.2. By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons

11.2.1. Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities

11.3. By 2030, enhance inclusive and sustainable urbanization and capacity for participatory,

integrated and sustainable human settlement planning and management in all countries

11.3.1. Ratio of land consumption rate to population growth rate

11.3.2. Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically

11.4. Strengthen efforts to protect and safeguard the world's cultural and natural heritage

11.4.1. Total expenditure (public and private) per capita spent on the preservation, protection and conservation of all cultural and natural heritage, by type of heritage (cultural, natural, mixed and World Heritage Centre designation), level of government (national, regional and local/municipal), type of expenditure (operating expenditure/investment) and type of private funding (donations in kind, private non-profit sector and sponsorship)

11.5. By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations

11.5.1. Number of deaths, missing persons and persons affected by disaster per 100,000 people

11.5.2. Direct disaster economic loss in relation to global GDP, including disaster damage to critical infrastructure and disruption of basic services

11.6. By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management

11.6.1. . Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban solid waste generated, by cities

11.6.2. Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)

11.7. By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities

11.7.1. Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities

11.7.2. Proportion of persons victim of physical or sexual harassment, by sex, age, disability status and place of occurrence, in the previous 12 months

11.a. Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning

11.a.1. Proportion of population living in cities that implement urban and regional development plans integrating population projections and resource needs, by size of city

11.b. By 2020, substantially increase the number

of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels

11.b.1. Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030

11.b.2. Number of countries with national and local disaster risk reduction strategies

11.c. Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials

11.c.1. Proportion of financial support to the least developed countries that is allocated to the construction and retrofitting of sustainable, resilient and resource-efficient buildings utilizing local materials.

12. RESPONSIBLE CONSUMPTION AND PRODUCTION

Achieving economic growth and sustainable development requires that we urgently reduce our ecological footprint by changing the way we produce and consume goods and resources. Agriculture is the biggest user of water worldwide, and irrigation now claims close to 70 percent of all freshwater for human use.

The efficient management of our shared natural resources, and the way we dispose of toxic waste and pollutants, are important targets to achieve this goal. Encouraging industries, businesses and consumers to recycle and reduce waste is equally important, as is supporting developing countries to move towards more sustainable patterns of consumption by 2030.

12.1. 12.1. Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries

12.1.1. Number of countries with sustainable consumption and production (SCP) national action plans or SCP mainstreamed as a priority or a target into national policies

12.2. By 2030, achieve the sustainable management and efficient use of natural resources

12.2.1. Material footprint, material footprint per capita, and material footprint per GDP

12.2.2. Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP

12.3. By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses

12.3.1. Global food loss index

12.4. By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment

12.4.1. Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement

12.4.2. Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment

12.5. By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse

12.5.1. National recycling rate, tons of material recycled

12.6. Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle

12.6.1. Number of companies publishing sustainability reports

12.7. Promote public procurement practices that are sustainable, in accordance with national policies and priorities

12.7.1. Number of countries implementing

sustainable public procurement policies and action plans

12.8. By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature

12.8.1. Extent to which (i) global citizenship education and (ii) education for sustainable development (including climate change education) are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment

12.a. Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production

12.a.1. Amount of support to developing countries on research and development for sustainable consumption and production and environmentally sound technologies

12.b. Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products

12.b.1. Number of sustainable tourism strategies or policies and implemented action plans with agreed monitoring and evaluation tools

12.c. Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities

12.c.1. Amount of fossil-fuel subsidies per unit of GDP (production and consumption) and as a proportion of total national expenditure on fossil fuels.

13. CLIMATE ACTION

There is no country in the world that is not experiencing first-hand the drastic effects of climate change. Greenhouse gas emissions continue to rise and are now more than 50 percent higher than their 1990 level. While Eastern Europe and Central Asia is not a big producer of greenhouse gas emissions, the region is suffering disproportionately from the consequences of climate change.

Floods in the Western Balkans have destroyed homes and displaced thousands of people. Shrinking glaciers and dwindling water resources in Central Asia could seriously impact irrigation and hydropower generation. Moldova and southern Ukraine are experiencing severe droughts, with major agricultural losses.

But across the region, people are mobilizing to cut greenhouse gas emissions, save lives and help communities cope. The capital of Croatia has vowed to become a carbon zero city by 2050. Unprecedented steps are being taken in the peatlands of Belarus to keep carbon safely stored in the ground. Georgia now has sophisticated early warning systems and better protection against flooding.

Global warming is having a drastic impact on the lives of people. Let's act now.

13.1.Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

13.1.1. Number of countries with national and local disaster risk reduction strategies

13.1.2. Number of deaths, missing persons and persons affected by disaster per 100,000 people

13.2. Integrate climate change measures into national policies, strategies and planning

13.2.1. Number of countries that have communicated the establishment or operationalisation of an integrated policy/strategy/ plan which increases their ability to adapt to

the adverse impacts of climate change, and foster climate resilience and low greenhouse gas emissions development in a manner that does not threaten food production (including a national adaptation plan, nationally determined contribution, national communication, biennial update report or other)

13.3. Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

13.3.1. Number of countries that have integrated mitigation, adaptation, impact reduction and early warning into primary, secondary and tertiary curricula

13.3.2. Number of countries that have communicated the strengthening of institutional, systemic and individual capacity-building to implement adaptation, mitigation and technology transfer, and development actions

13.a Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalise the Green Climate Fund through its capitalization as soon as possible

1**3.a.1.** Mobilized amount of United States dollars per year starting in 2020 accountable towards the \$100 billion commitment

13.b Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities

13.b.1. Number of least developed countries and small island developing States that are receiving specialized support, and amount of support, including finance, technology and capacity-building, for mechanisms for raising capacities for effective climate change-related planning and management, including focusing on women, youth and local and marginalized communities.

14. LIFE BELOW WATER

The world's oceans – their temperature, chemistry, currents and life – drive global systems that make the Earth habitable for humankind. How we manage this vital resource is essential for humanity as a whole, and to counter balance the effects of climate change. Over three billion people depend on marine and coastal biodiversity for their livelihoods. However, today we are seeing 30 percent of the world's fish stocks overexploited, reaching below the level at which they can produce sustainable yields.

Oceans also absorb about 30 percent of the carbon dioxide produced by humans, and we are seeing a 26 percent rise in ocean acidification since the beginning of the industrial revolution. Marine pollution, an overwhelming majority of which comes from landbased sources, is reaching alarming levels, with an average of 13,000 pieces of plastic litter to be found on every square kilometre of ocean.

The SDGs aim to sustainably manage and protect marine and coastal ecosystems from pollution, as well as address the impacts of ocean acidification. Enhancing conservation and the sustainable use of ocean-based resources through international law will also help mitigate some of the challenges facing our oceans.

14.1. By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution

14.1.1. Index of coastal eutrophication and floating plastic debris density

14.2. By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans

14.2.1. Proportion of national exclusive economic zones managed using ecosystem-based approaches

14.3. Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels

14.3.1. Average marine acidity (pH) measured at agreed suite of representative sampling stations

14.4. By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics

14.4.1. Proportion of fish stocks within biologically sustainable levels

14.5. By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information

14.5.1. Coverage of protected areas in relation to marine areas

14.6. By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation

14.6.1. Sustainable fisheries as a percentage of GDP in small island developing States, least developed countries and all countries

14.a. Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries

 $\ensuremath{\textbf{14.a.l.}}$. Proportion of total research budget allocated to research in the field of marine technology

14.b. Provide access for small-scale artisanal fishers to marine resources and markets

14.b.1. Progress by countries in the degree of application of a legal/regulatory/policy/institutional framework which recognizes and protects access rights for small-scale fisheries

14.c. Enhance the conservation and sustainable use of oceans and their resources by implementing

international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of "The future we want"

14.c.1. Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nation Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources.

15. LIFE ON LAND

Human life depends on the earth as much as the ocean for our sustenance and livelihoods. Plant life provides 80 percent of our human diet, and we rely on agriculture as an important economic resource and means of development. Forests account for 30 percent of the Earth's surface, providing vital habitats for millions of species and important sources for clean air and water; as well as being crucial for combating climate change.

Today we are seeing unprecedented land degradation, and the loss of arable land at 30 to 35 times the historical rate. Drought and desertification is also on the rise each year, amounting to the loss of 12 million hectares and affects poor communities globally. Of the 8,300 animal breeds known, 8 percent are extinct and 22 percent are at risk of extinction.

The SDGs aim to conserve and restore the use of terrestrial ecosystems such as forests, wetlands, drylands and mountains by 2020. Halting deforestation is also vital to mitigating the impact of climate change. Urgent action must be taken to reduce the loss of natural habitats and biodiversity which are part of our common heritage. **15.1.** By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements

15.1.1. Forest area as a proportion of total land area

15.1.2. Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type

15.2. By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally

15.2.1. Progress towards sustainable forest management

15.3. By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world

15.3.1. Proportion of land that is degraded over total land area

15.4. By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development

15.4.1. Coverage by protected areas of important sites for mountain biodiversity

15.4.2. Mountain Green Cover Index

15.5. Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species

15.5.1. Red List Index

15.6. Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed

15.6.1. Number of countries that have adopted legislative, administrative and policy frameworks to ensure fair and equitable sharing of benefits

15.7. Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products

15.7.1. Proportion of traded wildlife that was poached or illicitly trafficked

15.8. By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species

15.8.1. Proportion of countries adopting relevant national legislation and adequately resourcing the prevention or control of invasive alien species

15.9. By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts

15.9.1. Progress towards national targets established in accordance with Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011-2020

15.a. Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems

15.a.1. Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems

15.b. Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation

15.b.1. Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems

15.c. Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities

15.c.1. Proportion of traded wildlife that was poached or illicitly trafficked.

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16. PEACE, JUSTICE AND STRONG INSTITUTIONS

Without peace, stability, human rights and effective governance, based on the rule of law - we cannot hope for sustainable development. We are living in a world that is increasingly divided. Some regions enjoy sustained levels of peace, security and prosperity, while others fall into seemingly endless cycles of conflict and violence. This is by no means inevitable and must be addressed.

High levels of armed violence and insecurity have a destructive impact on a country's development, affecting economic growth and often resulting in long standing grievances that can last for generations. Sexual violence, crime, exploitation and torture are also prevalent where there is conflict or no rule of law, and countries must take measures to protect those who are most at risk. The SDGs aim to significantly reduce all forms of violence, and work with governments and communities to find lasting solutions to conflict and insecurity. Strengthening the rule of law and promoting human rights is key to this process, as is reducing the flow of illicit arms and strengthening the participation of developing countries in the institutions of global governance. **16.1.** Significantly reduce all forms of violence and related death rates everywhere

16.1.1. Number of victims of intentional homicide per 100,000 population, by sex and age

16.1.2. Conflict-related deaths per 100,000 population, by sex, age and cause

16.1.3. Proportion of population subjected to physical, psychological or sexual violence in the previous 12 months

16.1.4. Proportion of population that feel safe walking alone around the area they live

16.2. End abuse, exploitation, trafficking and all forms of violence against and torture of children

16.2.1. Proportion of children aged 1-17 years who experienced any physical punishment and/or psychological aggression by caregivers in the past month

16.2.2. Number of victims of human trafficking per 100,000 population, by sex, age and form of exploitation

16.2.3. Proportion of young women and men aged 18-29 years who experienced sexual violence by age 18

16.3. Promote the rule of law at the national and international levels and ensure equal access to justice for all

16.3.1. Proportion of victims of violence in the previous 12 months who reported their victimization to competent authorities or other officially recognized conflict resolution mechanisms

16.3.2. Unsentenced detainees as a proportion of overall prison population

16.4. By 2030, significantly reduce illicit financial and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organized crime

16.4.1. Total value of inward and outward illicit financial flows (in current United States dollars)

16.4.2. Proportion of seized small arms and light weapons that are recorded and traced, in accordance with international standards and legal instruments

16.5. Substantially reduce corruption and bribery in all their forms

16.5.1. Proportion of persons who had at least one contact with a public official and who paid a bribe to a public official, or were asked for a bribe by those public officials, during the previous 12 months

16.5.2. Proportion of businesses that had at least one contact with a public official and that paid a bribe to a public official, or were asked for a bribe by those public officials during the previous 12 months

16.6. Develop effective, accountable and transparent institutions at all levels

16.6.1. Primary government expenditures as a proportion of original approved budget, by sector (or by budget codes or similar)

16.6.2. Proportion of the population satisfied with their last experience of public services

16.7. Ensure responsive, inclusive, participatory and representative decision-making at all levels

16.7.1. Proportions of positions (by sex, age, persons with disabilities and population groups) in public institutions (national and local legislatures, public service, and judiciary) compared to national distributions

16.7.2. Proportion of population who believe decision-making is inclusive and responsive, by sex, age, disability and population group

16.8. Broaden and strengthen the participation of developing countries in the institutions of global governance

16.8.1. Proportion of members and voting rights of developing countries in international organizations

16.9. By 2030, provide legal identity for all, including birth registration

16.9.1. Proportion of children under 5 years of age whose births have been registered with a civil authority, by age

16.10.1. Number of verified cases of killing, kidnapping, enforced disappearance, arbitrary detention and torture of journalists, associated media personnel, trade unionists and human rights advocates in the previous 12 months

16.10.2. Number of countries that adopt and implement constitutional, statutory and/or policy guarantees for public access to information

16.a. Strengthen relevant national institutions, including through international cooperation, for building capacity at all levels, in particular in developing countries, to prevent violence and combat terrorism and crime

16.a.1. Existence of independent national human rights institutions in compliance with the Paris Principles

16.b. Promote and enforce non-discriminatory laws and policies for sustainable development

16.b.1. Proportion of population reporting having personally felt discriminated against or harassed in the previous 12 months on the basis of a ground of discrimination prohibited under international human rights law.

17.PARTNERSHIPS FOR THE GOALS

The SDGs can only be realized with a strong commitment to global partnership and cooperation. While official development assistance from developed countries increased by 66 percent between 2000 and 2014, humanitarian crises brought on by conflict or natural disasters continue to demand more financial resources and aid. Many countries also require Official Development Assistance to encourage growth and trade.

The world today is more interconnected than ever before. Improving access to technology and knowledge is an important way to share ideas and foster innovation. Coordinating policies to help developing countries manage their debt, as well as promoting investment for the least developed, is vital to achieve sustainable growth and development.

The goals aim to enhance North-South and South-South cooperation by supporting national plans to achieve all the targets. Promoting international trade, and helping developing countries increase their exports, is all part of achieving a universal rulesbased and equitable trading system that is fair and open, and benefits all

Finance

17.1. Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection

17.1.1. Total government revenue as a proportion of GDP, by source

17.1.2. Proportion of domestic budget funded by domestic taxes

17.2. Developed countries to implement fully their official development assistance commitments, including the commitment by many developed countries to achieve the target of 0.7 per cent of gross national income for official development assistance (ODA/GNI) to developing countries and 0.15 to 0.20 per cent of ODA/GNI to least developed countries; ODA providers are encouraged to consider setting a target to provide at least 0.20 per cent of ODA/GNI to least developed countries

17.2.1. Net official development assistance, total and to least developed countries, as a proportion of the Organization for Economic Cooperation and Development (OECD) Development Assistance Committee donors' gross national income (GNI)

17.3. Mobilize additional financial resources for developing countries from multiple sources

17.3.1. Foreign direct investments (FDI), official development assistance and South-South Cooperation as a proportion of total domestic budget

17.3.2. Volume of remittances (in United States dollars) as a proportion of total GDP

17.4. Assist developing countries in attaining longterm debt sustainability through coordinated policies aimed at fostering debt financing, debt relief and debt restructuring, as appropriate, and address the external debt of highly indebted poor countries to reduce debt distress

17.4.1. Debt service as a proportion of exports of goods and services

17.5. Adopt and implement investment promotion regimes for least developed countries

17.5.1. Number of countries that adopt and implement investment promotion regimes for least developed countries Technology

17.6. Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism

17.6.1. Number of science and/or technology cooperation agreements and programmes between countries, by type of cooperation

17.6.2. Fixed Internet broadband subscriptions per 100 inhabitants, by speed

17.7. Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed

17.7.1. Total amount of approved funding for developing countries to promote the development, transfer, dissemination and diffusion of environmentally sound technologies

17.8. Fully operationalise the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology

17.8.1. Proportion of individuals using the Internet

Capacity-building

17.9. Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the Sustainable Development Goals, including through North-South, South-South and triangular cooperation

17.9.1. Dollar value of financial and technical assistance (including through North-South, South-

South and triangular cooperation) committed to developing countries

Trade

17.10. Promote a universal, rules-based, open, nondiscriminatory and equitable multilateral trading system under the World Trade Organization, including through the conclusion of negotiations under its Doha Development Agenda

17.10.1. Worldwide weighted tariff-average

17.11. Significantly increase the exports of developing countries, in particular with a view to doubling the least developed countries' share of global exports by 2020

17.11.1. Developing countries' and least developed countries' share of global exports

17.12. Realize timely implementation of duty-free and quota-free market access on a lasting basis for all least developed countries, consistent with World Trade Organization decisions, including by ensuring that preferential rules of origin applicable to imports from least developed countries are transparent and simple, and contribute to facilitating market access

17.12.1. Average tariffs faced by developing countries, least developed countries and small island developing States

Policy and institutional coherence

17.13. Enhance global macroeconomic stability, including through policy coordination and policy coherence

17.13.1. Macroeconomic Dashboard

17.14. Enhance policy coherence for sustainable development

17.14.1. Number of countries with mechanisms in place to enhance policy coherence of sustainable development

17.15. Respect each country's policy space and leadership to establish and implement policies for poverty eradication and sustainable development

17.15.1. Extent of use of country-owned results frameworks and planning tools by providers of development cooperation

Multi-stakeholder Partnerships

17.16. Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries

17.16.1. Number of countries reporting progress in multi-stakeholder development effectiveness monitoring frameworks that support the achievement of the sustainable development goals

17.17. Encourage and promote effective public, publicprivate and civil society partnerships, building on the experience and resourcing strategies of partnerships

17.17.1. Amount of United States dollars committed to public-private and civil society partnerships

17.18. By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national context

17.18.1. Proportion of sustainable development indicators produced at the national level with full disaggregation when relevant to the target, in accordance with the Fundamental Principles of Official Statistics

17.18.2. Number of countries that have national statistical legislation that complies with the Fundamental Principles of Official Statistics

17.18.3. Number of countries with a national statistical plan that is fully funded and under implementation, by source of funding

17.19. By 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product, and support statistical capacity-building in developing countries

17.19.1. Dollar value of all resources made available to strengthen statistical capacity in developing countries

17.19.2. Proportion of countries that (a) have conducted at least one population and housing census in the last 10 years; and (b) have achieved 100 per cent birth registration and 80 per cent death registration

EK 3. Oyun Tasarımı





Bir turun tamamlanması

Her turda altı oyuncuya birer soru yöneltilir. İlk tur tamamlandığında, oyun tahtası üzerine kapalı durumda yerleştirilen ipucu kartlarından ilki açılarak yüksek sesle okunur. Buna uygun olarak ipucunda belirtilen kat planı parçası zemine yerleştirilir.

Her tur tamamlandığında, yeni bir ipucu kartı açılarak belirtilen kat planı parçası zemine yerleştirilir. Böylece, oyunun sonuna gelindiğinde zeminin üzerine yerleştirilen parçalarla ev tamamlanmış olacaktır.

Tur Sonu Değerlendirme

Oyun yöneticisi, her turun sonunda oyuncuların aldığı kararlarla parametrelerin ne şekilde değiştiğini öğrencilerin grup olarak değerlendirilmesini sağlayabilir.

Oyunun tamamlanması

Oyun, son turdaki soruların cevaplanması ve son ipucu kartının da açılarak maketin son parçasının yerleştirilmesi ile tamamlanır.

Bu oyun TMK projesi kapsamında ODTÜ – Tasarım fabrikası (DTS)'nda, 2016 sonbahar dönemi projelerinden biri olarak, disiplinlerarası bir grup çalışması yoluyla, mentor akademisyenler Prof. Dr. Özlem Özlemi ve Yrd. Doç. Dr. Pinar Kaygan'ın katkılarıyla; öğrencilerimiz İnci Tüğçe Üçkök, Meltem Düzgün, Yusuf Tatlı, Elif Bilir, Lilyana Yazirlıoğlu tarafından tasarlanmıştır. Oyun içerisinde yer alan videolar, Bir Limak Enerji projesi olan Kırklareli'ndeki Hamitabat Doğal Gaz Kombine Çevrim Santrali ve Limak Yatırım İstanbul Ofisi'nde kaydedilmiş ve videolarda gönüllü çalışan ve TMK bursiyerleri rol almıştır.

Oyun Sonu Değerlendirme

1. Zaman+ Bütce-

Diger ölçeklere özen gösterirken projeyi beklenenden daha yüksek bir bütçede tamamladınız. Bir dahaki projede maliyet hesaplarınıza daha çok dikkat etmelisiniz.

Bir mühendisin amacı proje planlanırken belirlenen bütçe, kalite ve zaman değerleri içinde kalmaktır.

2. Zaman+ Kalite-

Tebrikler!

Evin inşaatını belirlenenden daha kısa sürede tamamladınız. Ev sahipleri bu duruma çok sevinecekler.

Diğer ölçeklere özen gösterirken kaliteden ödün verdiniz. Bunun sonucunda inşa ettiğiniz ev hedeflenenden daha dayanıksız malzemelerle ve daha düşük konfor seviyesiyle tamamlandı. +

Bir mühendisin amacı proje planlanırken belirlenen bütçe, kalite ve zaman değerleri içinde kalmaktır.

3. Bütce+ Zaman-

Tebrikler!

Ev inşaatını beklenenden çok daha düşük bir bütçe ile tamamladınız, İşvereniniz parasının cebinde kalmasından çok memnun oldu.

Diğer ölçeklere özen gösterirken zamandan ödün verdiniz. Evin inşaatı hedeflenenden daha uzun sürede sonlandı. Ev sahipleri bu durumdan pek memnun olmayabilirler.

6

Bir mühendisin amacı proje planlanırken belirlenen bütçe, kalite ve zaman değerleri içinde kalmaktır.

4. Bütçe+ Kalite-

Tehrikler

tarmanladınız. İşvereniniz parasının cebinde kalmasından çok memnun oldu

Diğer ölçeklere özen gösterirken kaliteden ödün verdiniz. Bunun sonucunda inşa ettiğiniz ev hedeflenenden daha dayanıksız malzemelerle ve daha düşük konfor seviyesiyle tamamlandı.

Bir mühendisin amacı proje planlanırken belirlenen bütçe, kalite ve zaman değerleri içinde kalmaktır.

5. Kalite+ Zaman-

Tebrikler! İnşa ettiğiniz ev en yüksek standartlarda olup, en iyi malzemelerle yapıldı. Üzellikle evin sahipleri bundan çok memnun olacaktır.

Diğer ölçeklere özen gösterirken zamandan ödün verdiniz. Evin inşaatı hedeflenenden daha uzun sürede sonlandı. Ev sahipleri bu durumdan pek memnun olmayabilirler.

Bir mühendisin amacı proje planlanırken belirlenen bütçe, kalite ve zaman değerleri içinde kalmaktır.

6. Kalite+ Bütce-

Tebrikler!

İnşa ettiğiniz ev en yüksek standartlarda olup, en iyi malzemelerle yapıldı. Özellikle evin sahipleri bundan çok memnun olacaklar.

Diğer ölçeklere özen gösterirken projeyi beklenenden daha yüksek bir bütçede tamamladınız. Bir dahaki projede maliyet hesaplarınıza daha çok dikkat etmelisiniz.

7

Bir mühendisin amacı proje planlanırken belirlenen bütçe, kalite ve zaman değerleri içinde kalmaktır

Annex 4. Key Concepts

Gender and Sex: Sex mostly refers to the biological differences between the male and female body. On the other hand, gender refers to the socially constructed and culturally based differences between men and women. In other words, a person's gender is not only determined by "natural" or biological factors but rather consists of roles and characteristics imposed by norms and traditions. Gender is a structure that changes based on time and culture.

Gender Differences: This refers to the differences between men and women in terms of status, state, rights, responsibilities or other aspects. These differences do not always stem from gender-based discrimination (for instance women's ability to give birth). But ideological, biased and subjective reflections of these differences, which we think as "natural", "objective" and "biological" at first glance result in stereotypes. And these stereotypes can sometimes become the cause of direct or indirect discrimination and gender-based inequalities.

Gender-Based Stereotypes: These are the assumptions about roles, skills and characteristics of men and women (which are often outdated). Sometimes they emerge based on concrete differences between sexes. These stereotypes neglect the distinguishing features both between men and women as well as among women and define people from a biased perspective. This may result in social, psychological and material barriers for people in terms of making choices or fully exercising their rights. Some examples are; engineering is a male profession; it is natural that women handle all domestic work including caring for children and the elderly; women are delicate and fragile and therefore not proper for certain professions; management skills are specific to men; etc.

Gender Roles: These are the socially constructed roles, behaviours, actions and qualities that are deemed proper for men and women by the society. These roles determine behavioural patterns, responsibilities, sharing arrangements and our access to resources and privileges. These are not only different, they also contain judgments on one's value.

Gender roles often emerge based on patterns, judgments and assumptions about what men and women can and should do. Gender roles' being shaped differently for men and women does not always create a problem. However, it becomes a source of discrimination when the roles of a certain gender (mostly men's) or qualities attributed to that gender are valued more.

Gender Based Division of Labour: This refers to the division of labour created based on the stereotypes, gender roles mentioned above and socially constructed ideas and values and is about what men and women should or can do. This is the most important source of gender inequality.

Hierarchical structure of the gender-based division of labour acts based on the assumptions that the reproductive role attributed to women by the society is a main determinant and it legitimizes the unequal structure of the domestic division of labour between men and women.

What do women do? What do men do?: Woman's labour: It is inside the house; visible only when it is missing, not when it is properly done; handles 70% of food production; is for 'market money', 'dowry money', is the backbone of informal economy. Man's labour: It is outside the house; is the backbone of formal economy; is in decision-making mechanisms.

Gender Blindness: This refers to neglecting different roles, responsibilities and capacities of men and women which are socially constructed. Gender-blind policies are developed based on information about male activities and/or assume that the sides affected by the policy have same needs and interests.¹⁷ Gender-neutral: Gender-neutral policies do not target specifically men or women and assume that the policies affect men and women the same. However, these policies may be blind to.¹⁸

Gender Equality Perspective / Glasses / Lens: Using the "gender equality perspective" means keeping in mind, addressing or examining how a situation affects or may affect individuals differently based on their genders. This is also called as seeing it "through a gender equality lens / glasses". In other words, it means using a filter or strainer that emphasizes the real and potential gender-based differences.

This strainer makes it visible that men and women be affected by a situation differently and will affect the situation differently. Gender equality sensitivity efforts accept that gender-based division of labour and related norms, values and ideologies about men and women are defined by complex power relations. Within these power relations, women are given less opportunity to have a voice; women are attributed socially/culturally secondary values; and women have limited access to economic resources and the opportunity to control these resources. Gender based power relations are historical, which means they differ based on time period and region and are in interaction with inequality relations in the society such as class, cast, ethnicity or race.

Gender Equality: Refers to individuals, regardless of their sex, benefiting from the same opportunities and rights in all areas of life, receiving the equal treatment and being able to develop their personal knowledge and skills in any field they want and make choices.

Equality can be achieved when gender-based inequalities are eliminated and all individuals, regardless of their different gender positions, are provided with equal social value, equal rights and equal responsibilities and when individuals have equal access to resources (opportunities) to use these. Formal equality or 'de jure' (legal) equality means equality before the law and indicates legal responsibilities about equal treatment.

Factual equality or 'de facto' equality refers to equality in practice. This means all necessary steps are taken in order to allow enjoyment of all rights defined by the legal framework. This is an approach that also includes creating the favourable environment for the use of equal opportunities and equal rights. Transformative equality incorporates all responsibilities towards transforming gender-based stereotypes and the social structure, normative system or institutions which establish and/or reproduce inequality. It indicates indirect discrimination. CEDAW defines the provision of equality in all of these three areas as the responsibility of states parties.

Gender Equity, indicates an approach that can take into account that different gender positions have different needs. However, this approach is based on equality. In order to achieve gender equity, measures should be applied to compensate for the historical and social disadvantages that would prevent individuals from living under equal conditions due to gender-based inequalities. Gender equity cannot be separated from gender equality, it definitely brings equality.

Empowerment: Allowing an individual to have legal power and authority. Also means people's efforts to create a relationship among themselves and with the world to change the elements that create problems. This also includes creating new ideas, perceptions and knowledge. Education should be an empowering, active process. Empowerment can be addressed in two ways:

- Women having the power to make decisions about their lives and control them
- Awareness, self-confidence, increased opportunities, access to resources and having increased control over them, transformation of institutions and structures that create gender-based discrimination

Temporary Special Measures / Positive Actions:

Refers to taking corrective measures until discrimination is eliminated or until de facto equality is achieved between groups among which there is inequality (CEDAW Article 4, ILO111 Article 5).

Gender-Based Discrimination

Direct Discrimination: To discriminate a person obviously in the law, policies or practices due to a his/ her gender or any other characteristics that he/she cannot change (such as age, physical qualities, race etc.). For instance, prohibiting women from practicing certain professions by law; specifying during the recruitment process, including job adverts, that a job position is only for "men" or "women" (except for the professions with specific aspects).

Indirect Discrimination: Hidden discrimination which is hard to notice. It refers to the situations which do not have explicit discrimination, appear to be impartial but systematically discriminate against a certain group. It can be defined as a seemingly non-discriminatory provision, criteria or practice putting an individual in a disadvantaged position due to their sex, age, disability etc.; except for the cases when it has a legitimate purpose and the means to achieve this purpose are appropriate and obligatory.

Discrimination in Labour Market

Discrimination in labour market can be defined as treating people unequally or with prejudice, excluding them or hinder their access to resources based on age, race, sex, religion, political view, ethnicity or any other grounds.

Gender Equality in Work Life:

- Not discriminating men or women based on their gender
- Not discriminating women or men through job adverts within the recruitment processes or the questions asked to female and male candidates during interviews; during the processes of work life such as career planning, promotion, in-service training; and at the policies for harmonising family and work life.

Decent Work: A job that provides adequate income and adequate social and legal protection. The main goal of International Labour Organisation (ILO) is to develop the opportunities of men and women [both in formal and informal sectors] to find decent and productive work on the basis of freedom, equity, security and dignity.

ILO/Decent Work approach includes the following:

- Opportunity and treatment equality in employment
- Equal pay for equal work
- Equal access to social Security and secure and healthy working environments
- Equality in organizing and collective agreements
- Equality in a meaningful career development
- Fair home-work life balance for both women and men
- Equal participation in decision-making mechanisms (including ILO bodies)

Gender Mainstreaming in Work Life

- To ensure and support fundamental principles and rights required to fully implement the principle of nondiscrimination, legally (de jure) and in practice (de facto)
- To provide decent work and income and thereby create better opportunities for women and men to achieve the goals of decent life standards, social and economic integration, personal satisfaction and social development

Glass Ceiling: This refers to the institutional practices that hinder women's advancement to upper level positions, whether in the public or private sector. These practices may be political, legal, social or economic. Glass ceiling is a reflection of gender-blind legal practices that do not often have concrete legal grounds but feed on gender-based stereotypes or indirect discrimination. The word "ceiling" is used because these obstacles are invisible and often emerge in institutions due to the desire to protect the status quo, instead of providing transparent and equal career advancement opportunities to men and women.







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