

EXAMPLE: Five Steps to a Gender Sensitive Engineering Project



22 minute read

As funders increasingly ask researchers to conduct gender sensitive research, GenderED has received requests from PIs across various disciplines for ‘bad’ and ‘good’ examples of HE projects trying to respond to funder requirements to undertake gender sensitive research. This document is a response to those requests. It takes the reader through [GenderED’s 5 step toolkit](#) for gender sensitive research, working through a fictional engineering project focused on climate change adaptation.

This *fictional* project has been devised specifically to illustrate common missteps that GenderED staff have seen, when supporting HE researchers to identify the gender impacts of their projects. As such it is not based on any single real project. You can find more materials about gender sensitive research on our [website](#).

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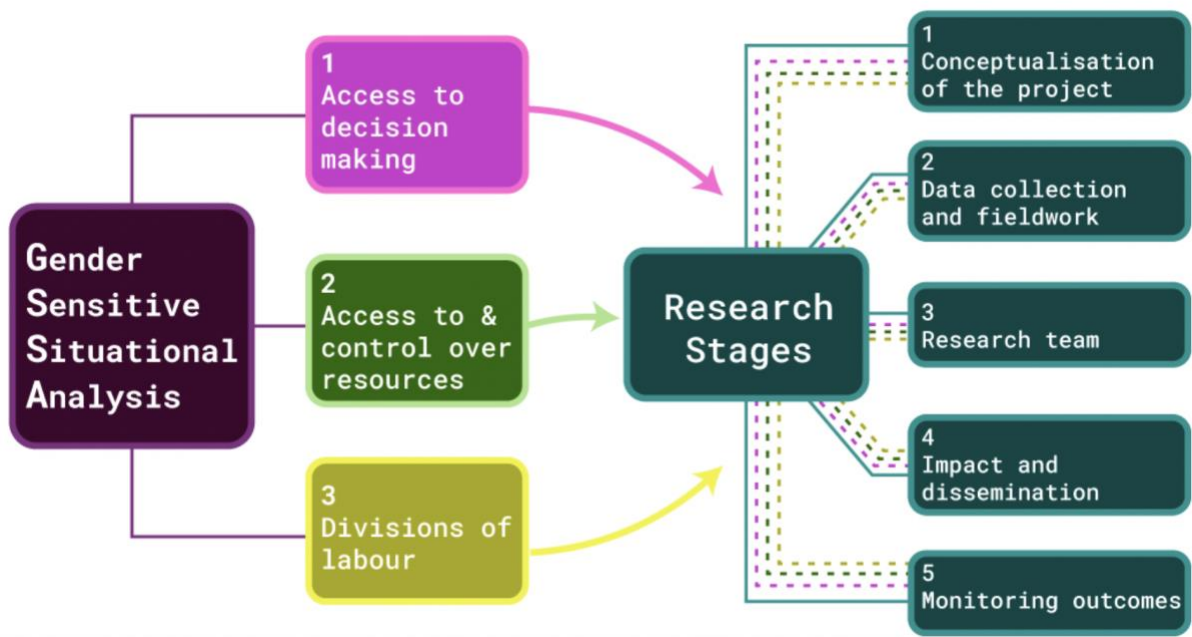


Figure 1: Graphic Overview: Applying Gender Sensitive Situational Analysis to Your Research Project

How is gender relevant in scientific research?

Experience has shown that we can't simply assume that technology and research will benefit everyone equally. In fact, the impacts of technology are usually mediated by existing social structures and power relations – such as gender, race, class and disability (Felt 2017). As result, new technologies can exacerbate existing social, economic, and political inequalities.

Key [international frameworks guiding international development and Higher Education](#) (HE), such as the Sustainable Development Goals recognise these links between technology and equality by 'mainstreaming' gender equality into all wider goals.

This means that when a researcher in HE is thinking about the relevance of gender in their project, they should not only consider promoting gender balance on the team. They should consider how their project could impact on or interact with, existing intersectional gender inequalities.

Key Terms

Gender - Gender is a social scientific term used to describe shared social ideals of femininity and masculinity, associated behavioural expectations and relations between the sexes. These shared ideas vary across time and place, and between cultures. They are reproduced in individuals (e.g., gender identity), institutions and wider society. The two most common gender identities are 'man' and 'woman'. Transgender and non-binary gender identities are becoming increasingly visible in the UK. We use 'people of all genders' as an inclusive term, in keeping with UKRI language.

Sex - Sex is biologically determined and refers to reproductive organs and characteristics. Male and female are the most common sexes and small proportion of the population have intersex characteristics.

Intersectionality - intersectionality is a social scientific term used to draw attention to the ways that different identity markers (such as race, caste, disability, age, migration status, or sexuality) intersect with one another to structure privileges and disadvantages, such as gender. Its intellectual antecedents lie in Black feminism.

The International Development sector has led the way in understanding how technology interacts with social realities on the ground, developing tools (often called 'Gender Sensitive Situational Analysis', (GSSA)) to identify and mitigate asymmetrical gender impacts (e.g. Oxfam 2019; Feed the Future USAid, n.d.).

These toolkits emphasise that researchers cannot reasonably assume that gender inequality is irrelevant in their work. Nor can they assume that their own cultural experiences of gender in/equality are applicable in other contexts.

[GenderED](#) has translated these insights into a 5-step tool designed specifically for Higher Education research projects. This can help you to respond to queries from funding agencies about the gender impacts of your research or to complete a 'Gender Equality Statement', which funders increasingly require.

Most importantly, however, undertaking GSSA prevents researchers from *unwittingly* exacerbating intersectional gender inequalities. These kind of errors could for example include: developing agricultural technologies and sharing them through dissemination pathways that are inaccessible to widows – one of the most vulnerable groups of (subsistence) farmers in many societies; designing early warning systems for disaster risk reduction that ignore cross cultural gender differences in mobile phone access, or literacy; or testing community health interventions without including LGBTQI family models or taking account of how community delivery may increase women's caring burdens within the family.

Getting started: working out how gender is relevant to *your* specific project

To work out how gender could be relevant to your project, it is helpful think about gender in terms of three domains:

- access to decision making;
- access to and control over resources; and
- divisions of labour.

The graphic below helps you to understand these domains. This is a basic, simplified model of GSSA.

1. Access to Decision Making	2. Access to and Control Over Resources	3. Divisions of Labour
Are women and men, and where relevant trans and non-binary people, equally represented in decision-making related to your project's goals and themes in target countries? (E.g., in urban planning decision making structures; local/national agriculture systems; health care planning; disaster relief committees, as appropriate). Do social attitudes, vulnerability to violence or discrimination limit access to these arenas?	Do women and men, and where relevant transgender and non-binary people have equal access to resources related to this theme? (E.g., If your work focuses on agriculture, energy or health do women, men and where relevant trans and non-binary people have equal ownership of and access to livestock/ land/equipment and training/ energy / food / healthcare?)	Do women and men, and where relevant transgender and non-binary people, perform the same labour in relation to the social/economic/political theme of your research? Are different social groups performing, or assumed to perform, distinctive tasks and responsibilities? Are they performed in different spheres or locations (domestic/private or public)?

Figure 2: Summary of the three domains of gender

Working through a fictional example: climate adaptation technologies in shack settlements

GenderED has received many requests from PIs across various disciplines for 'bad' and 'good' examples of HE projects trying to respond to funder requirements to undertake gender sensitive research. The fictional project we work with in this document has been devised specifically to illustrate common missteps that GenderED staff have seen when supporting HE researchers to identify the gender impacts of their projects. Our fictional project summary is as follows:

Example: project summary – fictional 'Cool Homes' climate change adaptation project

"The 'Cool Homes' Project will test the effectiveness of two energy saving technologies in shack dwellings and share findings with urban planners in Nepal and Kenya. Informal settlement dwellers face cold conditions in winter and intense heat during the summer, each causing energy poverty (Kimemia et al. 2020). To respond to these challenges policy makers in many countries have developed both slum upgrading plans, and urban heat action plans. However, cooling solutions in particular, often rely on technologies which consume high amounts of energy, thus exacerbating summer energy poverty (Kimemia et al. 2020). Our interdisciplinary project develops two cutting edge solutions to tackle these problems: thermally reversable thermochromic paints that can be applied to shack roofs and phase change materials (PCMs) that can be built into roofs. Each of these provide energy saving benefits in cold and warm weather.

Though the effectiveness of these materials is fairly well understood in formal dwellings, more research is needed to understand how effective they may be in informal dwellings (Kimemia et al. 2020). The team is led by Prof Kelpie at the Rebus Research Institute, University of Edinburgh and supported by engineers and sociologists at a Kenyan University and a Nepalese University.

Our project includes three work packages 1) lab testing of thermally reversable thermochromic paints and PCMs in simulated shack dwellings; 2) onsite refinement and re-testing of adjusted material in informal dwellings in Kenya and Nepal; 3) the team's sociologist will hold an impact online seminar, sharing findings with policy makers in Kenya and Nepal."

Our fictional project's PIs were required by their fictional funders to include a statement that detailed the potential asymmetrical gender impacts of their project and how they would respond to them. As these fictional researchers hadn't come across this requirement before, they struggled to imagine how gender could be relevant to their project and wrote the gender equality statement below.

Example: 'bad' gender equality statement 'Cool Homes' project

"The Rebus Engineering Research Institute based in Edinburgh, holds a Silver Award for Athena Swan. The Athena SWAN Charter recognises and celebrates good employment practice for women working in science, engineering and technology in higher education and research. The Institute was granted the award in recognition of the additional efforts made, over and above standard university-wide policies, to promote gender equality and address the particular challenges for women within science. Our activities to promote gender equality include several outreach events aimed at schoolgirls during the Edinburgh Science festival, a series of blogs promoting the engineering achievements of Scottish women (both recent and historical) and the establishment of an Equality and Diversity committee, in 2021.

By adopting a policy of gender neutrality throughout its life cycle our project will mitigate against any potential for gender discrimination (unintentional or otherwise). All engineering team and co-ordinating members of staff will benefit from participating in the research project, gaining experience in leading a product from design to market delivery. The post doc in sociology will gain experience delivering an impact seminar. Our gender-neutral approach will ensure the recognition attributed to each member of staff will be fairly commensurate with their contribution.

Our project applies two cutting edge technological solutions to tackle energy poverty in shack settlements: thermally reversible thermochromic paints and phase change materials (PCMs). Both these products help to reduce the energy burden on household both in summer and winter, with particular benefits for hot countries, namely the simultaneous prevention of heat stroke and summer energy poverty. Because physiological impact of cold and heat are the same for women and men our project will have gender neutral impacts."

We can from this statement that the PIs have gone beyond just thinking about gender balance on the team and are aware that funders want to know about relevance of gender to the project's technological aims and resultant impacts. However, the assessment provided has three fundamental weaknesses.

Firstly, it lists the host institution's gender equality policy awards and general activities, rather than concrete, proactive actions relating to the project at hand. Secondly, the assessment of how gender is relevant to the *project* is rather crude. It causally references biology and does not show evidence of thinking seriously about the social realities of peoples' lives and how this relates to climate change adaptation measures. There is a large body of research showing that gender is a highly relevant factor in the social realities 'on the ground' where climate change adaptations will be implemented. This is the kind of information that a gender sensitive project will draw on in its design (see below). Thirdly, the statement references gender neutrality without making it clear what this means. Removing information that identifies a candidate's gender can be helpful in peer review, grant assessment and job hiring (League of European Research Universities 2012, 12; Wennerås and Wold 1997). However, 'gender-neutrality' within the workplace often, in fact, amounts to rhetorical commitments 'not to see gender' whilst implicitly adhering to a male-as-norm ideal worker mode. Rather than promoting gender balance this can include valorising and rewarding staff who are free from caring responsibilities, do not take maternity leave or parental leave and who display stereotypically masculine behaviours such as competitiveness rather than collaboration (Zippel 2018; Lyall and Fletcher 2013).

Existing knowledge on gender, engineering and climate change adaption

There is a lot of evidence showing how climate change adaptation technologies can have unintended gendered consequences. For example, ENERGIA's five year study of energy access programmes in 12 countries, showed that initiatives that did not specifically engage with women's needs were frequently subject to 'elite capture' and **perpetuated gender inequalities in access to and control over energy** (ENERGIA 2019; Oparaocha and Dutta 2011). Similarly, evaluations of **slum upgrade programmes**, (installing electricity, sanitation and replacing zinc shacks with more permanent structures) in South Africa, show that they **resulted in increases in domestic violence, rape and child abuse** in some communities, because they disrupted existing community networks and informal measures of social control (Brown-Luthango, et al 2017, 480).

These examples show how the introduction of technology and infrastructure can interact with existing gender hierarchies and gendered divisions of labour and create new and intensified inequalities in access to resources and safety. Luckily, there are many easily accessible, thematically-specific and validated frameworks that can help PIs identify the relevance of gender to their project and its goals (Few 2007; Ginige et al 2014; UN Habitat 2013; UN-Habitat 2014; ICUN Global Gender Office 2018; Care International 2019). These include gender sensitive frameworks used to plan policy responses to climate change, such as risk calculation, urban planning or energy provision offer. [Sex and gender sensitive engineering/product design protocols](#) can also be applied to product design processes (Gendered Innovations n.d.). Many national and international NGOs also have experienced, in-house 'gender experts' who can provide theme specific expertise throughout the life-cycle of a project as a member of the research team.

Five Steps to Gender Sensitive Research

This existing knowledge shows how important it is to properly assess the relevance of gender in our fictional climate adaptation engineering project. By applying genderED's 5 step guide to doing gender sensitive research we can elaborate a more concrete and accurate assessment of potential asymmetrical gender impacts of a research project.

We will now work through genderED's 5 step guide, so that our fictional project can elaborate a more accurate and practical response to gender equality requirements from their funder.

Step 1: Gender in the conceptualisation of the project

Let's review the three domains of gender: access to decision making; access to and control over resources; and divisions of labour, and to identify how gender could be relevant to this project.

Actions: to gather this information it may be necessary to:

- ✓ approach a gender and development specialist with expertise in the project's thematic area to **join the project team at the beginning of the proposal development**;
- ✓ approach local community/civil society partner organisations for input in project development (e.g., women's civil society representatives; development NGOS specialising in your project's thematic area);
- ✓ **consult NGO reports and/or academic** literature on gender issues relevant to the project's themes and goals, to get an overview of the current state of knowledge on gender issues related to your research;

- ✓ consider participatory measures or literature review *during project inception*¹.

Following this process should enable you to:

- identify the local relevance of gender inequality in your project's aims; and in turn identify:
- any barriers to equal and meaningful opportunities for participation of people of all genders;
- how the project might impact (benefit and losses) on people of different genders;
- potential risks to gender equality, including unintended impacts.

Quickly working through these three domains of gender in relation to this (fictional) project, on the basis of a brief review of existing knowledge on gender and climate change adaptation available in existing publications, yields the insights below.

Example: basic gender sensitive situational analysis for the 'Cool Homes' Fictional Project	
Decision making	Gender inequalities in access to decision-making concerning maintenance of the home and energy consumption are extensively documented . Evidence shows that in most instances men control expenditure over home improvement and energy related decision making within households. However this does vary across cultures. For example, in Kenya 68% of couples report joint decision making, though men as prime earners control actual expenditure (ENERGIA 2019). Evidence also shows that internationally women are systematically excluded from local, national and international level policy making processes related to urban planning/ energy policy (Dekens and Dazé 2019; UN Habitat 2013). Decision making in engineering firms and building material manufacturers in the private sector is also dominated by men (Wawasi Kitetu, 2009.; ICUN Global Gender Office 2018, 2009:14). Decision making in higher education is also overwhelmingly dominated by men in Nepal and Kenya (UNESCO 2018; 2017).
Access to and control over resources	Gender inequalities in access to and control over household and community resources are also well documented . In both countries included in this project, men have more access to and control over financial resources that can be used to upgrade homes and the education and professional/DIY skills that enable them to participate in the provision of home upgrades. Although women have to maintain homes and are likely to spend more time working within them, for example caring for vulnerable and sick relatives (e.g. sufferers of heat stroke) they tend not to have <i>control over</i> resources such as fuel, appliances and materials for repairs in their homes (ENERGIA 2019).
Divisions of labour	In both of the countries included in this project women and girls are expected to maintain and run the home (e.g. cooking, cleaning, laundry and collecting fuel) and care for dependents including children, the sick and elderly (Action Aid 2013; Oparaocha and Dutta 2011). These responsibilities are very time consuming and limit women's and girl's participation in paid work and education (Action Aid 2013). Evidence shows that these differences in division of labour shape differences in men and women's energy priorities within the home – women have been shown to prioritise expenditure and energy consumption related to domestic responsibilities where men prioritise expenditure for in home leisure (ENERGIA 2019, 14). At community level, local gender norms create an expectation that men work in construction sectors and study 'scientific' disciplines whilst women study more social subjects and those associated with service industries (Action Aid 2013; Oparaocha and Dutta 2011; Khanal 2018).

Reviewing this simplified and very cursory analysis we can see that **this project confronts a real danger**

¹ See [Oxfam Novib Gender Action Learning System](#) for an excellent and diverse selection of activities and tools or DFID PPA Learning Partnership Gender Group (2015) What works to achieve gender equality and women and girls' empowerment? [DFID PPA Learning Partnership Gender Group](#).

that it will have minimal impact because several gender inequalities converge within the arena where this project is focused.

Women are likely to experience wide-ranging benefits from upgrades that could result in cooler and warmer homes that consume less energy. Women work within the home for longer each day and are responsible for the care of children and elderly relatives – the two groups most vulnerable to heat stroke (Kimemia et al. 2020, 29). The technologies that the project aims to deliver could reduce women's time spent caring for family members suffering heat stroke, freeing them to undertake more paid work and education and increasing their personal comfort and health. This is highly beneficial for the whole community and could have a very positive impact on gender equality. However, women *do not* have control over the financial resources that would enable them to upgrade their homes, nor do they possess the skills and knowledge that would enable them to undertake upgrades themselves. The evidence shows that these resources are in fact controlled by men, who spend less time in the home. In addition, evidence also shows that men are less likely than women to prioritise expenditure on non-leisure home maintenance. Finally, participation in all the decision-making structures relevant to this project - urban planning, engineering/energy related research and household maintenance/energy consumption choices are marked by stark gender differences.

This project therefore confronts a real danger that it will have minimal impact - the uptake of the project's technologies is likely to be limited because the main beneficiaries of these products, women, are excluded from the decision-making structures (within the home community, government, and HE/engineering) **that will decide whether or not to install them.** There is a danger that male-dominated decision-making structures, deciding whether or not to spend scarce resources, will not recognise the full scope of benefits that they can deliver and prioritise other urban development measures. Ensuring women's involvement in the project would therefore increase the likely hood of technology uptake. As we work through the next steps of genderED's toolkit we will find even more ways that this project will interact with existing gender inequalities.

The next four steps of GenderED's guide help you apply effective responses to these kinds of insights across the project life-cycle.

Step 2: Data collection, consultation, and fieldwork

GenderED's tool kit asks PIs to think about actions to enable equal and meaningful opportunities for people of all genders to participate in your project as respondents, building on insights from step 1. Actions might include:

- adjusting fieldwork times to fit around the work or household duties of people of different genders (e.g., women collecting children from school or having to prepare meals at fixed times);
- choosing locations that are safe for women to travel to alone, or providing safe transport to venues for consultation;
- holding single sex focus groups;
- using researchers of the same or different gender as respondents, in line with relevant local cultural expectations relating to safety, privacy or modesty;
- adjusting the use of online fieldwork approaches to take account of gender differences in access to technologies and related privacy of use (or lack thereof);

- using local community or civil society groups to access hard to reach groups – for example religious organisations, men’s or women’s groups, co-operatives or residents associations.

Consulting with partners and/or civil society in target fieldwork sites is often the most effective way to devise the most appropriate measures. Consulting existing literature can also provide invaluable insights.

Example: gender sensitive data collection on the ‘Cool Homes’ project

In response to their GSSA, the PIs realised that the role of the team’s sociologists needed to be greater than only holding impact seminars at the end of their project. In fact, technology uptake and the maximisation of benefits rested on a truly interdisciplinary approach. Social scientists working on the Cool Homes project were upgraded to Co-Investigators and more resources were dedicated to investigating, documenting and responding to the ways the project’s technologies could interact with existing social and economic factors and to documenting them in peer reviewed international publications. The team reached out to local women’s organisations and residents’ associations during the project inception to devise fieldwork schedules. Using these existing trusted networks, the team were able to reach women whose participation in decision making in public spaces was hampered by 1) domestic responsibilities in the home 2) safety concerns such as gender-based street harassment and 3) social norms limiting women’s movement.

In conjunction with local women’s organisations, researchers identified times of day and locations that women respondents found safe, accessible, and private. A female researcher was used to interview women in their homes, taking account of local people’s preference not to spend time alone with a stranger of the opposite sex. Single sex focus groups, arranged through local residents’ associations in suitable, local locations were also arranged using existing networks. In interviews and focus groups the project engineers demonstrated technologies, gathering information about resident needs and feasibility. Consumer consultation aiming to work out people’s technology needs and important feasibility constraints, preceded lab testing.

As a result, the project team could design technologies that were appropriate to local context and understand and address the role of gendered divisions of labour in home maintenance and caring. The team could also identify barriers to women’s access to technologies generated from the project. This data collection also enabled the team to describe expected gender impacts of the project, for example, highlighting that cooler homes would reduce women and girls’ caring burdens, freeing up more time for participation in education and paid work.

Step 3: Supporting gender balance on research teams

GenderED’s tool kit asks PIs to think about actions to support gender balance on the project team. The toolkit points out that most research institutions, have policies in place to support gender balance in scientific research. In many instances though these policies suffer from a lack of implementation.

To encourage gender balance the genderEd toolkit prompts PIs to ask themselves **the following five questions** (adapted from Swedish International Development Agency 2016; and GARCIA 2015):

- To what extent are women and men, and where relevant transgender and non-binary people, involved in the planning, design and evaluation of research within each research partner organisations?
- What hinders an increase in the participation of women and men, and where relevant transgender and non-binary people, within each research partner organisation/university? For example, do working conditions (e.g. working hours, fieldwork organisation) accommodate people of all genders equally? This could also include factors outside your control – such as social attitudes, or gender specific safety concerns.

- How does each research partner organisation/university handle staff safety and gender-based violence on their premises? Can staff report if they have been victims of sexual harassment or other types of discrimination? Is there a mechanism to meaningfully respond to these reports?
- What risks to gender equality do the above factors present? For example, could discrimination or violence on campus mean that LGBTQI+ people or women cannot easily participate on your research team, or advance professionally? Could lack of access to child-care facilities prevent people with caring responsibilities being able to travel to conferences or attend meetings?
- What concrete plans do research partner organisations, have to tackle problems or barriers identified in the proceeding questions?

Actions: to find answers to these questions it may be necessary to:

- ✓ consult and discuss relevant institutional or national gender equality policies in place in your own, and partner institutions;
- ✓ consult staff involved in your project. This usually provides the best chance of identifying gendered barriers to career progression, and elaborating the most appropriate measures (Genovate 2016; Massachusetts Institute of Technology 1999; Massachusetts Institute of Technology 2011);
- ✓ consult local, national or regional women in STEMM or discipline specific gender equality promoters (e.g. [EQUATE Scotland](#), [GenderInSite](#), [Women in Bioinformatics and Data Science Latin America](#); relevant local UNESCO² field offices; [The African Gender Institute](#); [Women Engineers Pakistan](#), [African Academy of Sciences](#);) to discuss relevant barriers to equal participation and measures that would help, or for signposting to partners who could be relevant;

This should enable you to:

- identify relevant barriers to equal and meaningful participation in your own and partner research institutes;
- devise measures to promote equal and meaningful participation in your project within research institutes and scientific teams.

Common measures to support gender equal participation in research projects include actions such as:

- funded fellowships reserved for female researchers if they are under-represented in your discipline;
- networking/mentoring³ to support female researchers if they are under-represented in your discipline;
- the provision of funding to cover child care costs during international research conferences (see UKRI GCRF 2017; International Veterinary Vaccination Network 2018; AWARD n.d.; The Roslin Institute 2017);
- adjustments to working patterns to support parents' participation at work; and
- responding to social constraints or safety concerns limiting women's participation in fieldwork by facilitating female-only fieldwork teams if helpful;
- discussing LGBTQI-specific safety concerns and security measures with research partners;

² UNESCO is very active in the promotion of gender equality in education, its local offices may therefore be helpful starting points for locally relevant contacts.

³ It is important to note that any mentors should be remunerated for their time.

- incorporating mutual commitments to gender equality into partnership agreements and memorandums of understanding with partners to formalise shared commitment to the implementation of gender equality measures.

Example: supporting gender balance on the ‘Cool Homes’ project team

Initially, the Cool Homes PI team did not include women. This reflects the gender balance in engineering in each of the partner countries. The team’s sociologist, who specialises in social impacts of technologies, provided reports discussing women’s under-representation in HE research and engineering. These detailed **multiple factors that maintaining occupational gender segregation** (Cavaghan 2017; Zippel 2018; Equate Scotland 2020; UNESCO 2018; WomEng 2019), including long-hours working cultures; stereotypes of what makes a ‘good engineer’ which overlap with stereotypically masculine behaviours; male dominated social/mentoring networks and work place cultures of sexual harassment / sexist behaviour. These were relevant factors in all three countries involved in the project, though the latter was especially acute in one partner country. Safety concerns during fieldwork and social norms governing women’s movement also play a role in preventing women from working on site in this latter country. Lack of childcare to attend conferences was also a factor in all three countries. Together, these factors present barriers to women’s participation in the project on equal terms and their advancement in engineering, despite equal professional competence.

Consultation with each HE partner institute, revealed that each of the partner institutions had a gender equality policy of some form. In one partner country this policy was wholly unimplemented, in the other an active gender studies department had had contact with a leading East African University that had developed effective anti-sexual harassment training and campaigning materials.

To tackle barriers to women’s participation in engineering, PIs consulted reports detailing the most effective measures to improve gender balance in Higher Education sector (GCRF Africa Catalyst and WomEng 2020; Equate Scotland 2016) and approached relevant gender equality focused technology NGOs and engineering bodies: [EQUATE Scotland](#), [Women in Science and Engineering](#) (WISE) Nepal and [WomEng’s](#) Kenyan chapter. In partnership with these organisations the project offered fellowships for women post docs to participate on the project and attend conferences. These included mentoring from a female engineer (both in the UK and one of the partner countries as preferred by the candidate), to support career progression and networking. Mentors were remunerated for their time. The team also structured fieldwork so that female staff either worked together and/or were accompanied by male team members, as preferred by female staff. The PIs noted in their funding bid that the funder’s own criteria made it impossible to fund childcare costs for staff attending conferences and flagged this as an unmet need that the funder should consider if they are seeking to promote gender balance on teams. Finally, to tackle issues of sexual harassment, the PI team approached staff from a leading East African gender studies department which has been active in developing anti-sexual harassment policies, to facilitate a cross cultural discussion on sexual harassment during induction workshops. The UK based PI also suggested some materials produced by UK universities as model materials for discussion of UK context and approaches⁴.

Step 4: Gender sensitive impact and dissemination

GenderED has written [guidance on building a theory of change](#) that takes gender issues into account. It details the differences between Results; Impact; Outcomes; Outputs and Activities.

Many of the research projects undertaken at an institution like the University of Edinburgh are fundamental scientific projects, which may have quite a distant relationship to communities. As a result, we caution

⁴ For example, UCU’s [‘Still a Bit of Banter’](#) report on sexual harassment and Queens University Belfast’s [Pledge Against Sexual Harassment](#)

against unrealistic impact claims and argue primarily for a coherent narrative that connects your activities to the desired change, through a logical sequence of intermediate results. Whether these are called ‘outputs’ or ‘outcomes’ will often depend on the specifics of your project.

Results	a generic term to indicate the outputs, outcomes or impact of your intervention.
Impact	the ultimate development change to which your intervention will contribute.
Outcomes	all the intermediate development changes to which your intervention will contribute, and that, combined, will enable impact to emerge.
Outputs	the immediate results of your activities – these can be products, services, or short-term changes that will contribute to bring about outcomes.
Activities	the things you will actually do in your interventions. ⁵

It can also be helpful to think about four ‘levels’ of impact targets: the international community; national policy makers and NGOs; communities; and individuals.

The results of Step 1 (the conceptualisation of your project) should have helped you identify any relevant gender inequalities that your project might affect and how⁶. You can feed this into a gender sensitive description of the intended results, impacts and outcomes that your project will generate, in your impact statement and/or dissemination plans. You should consider for example, any identified differences in the use of the technologies that your project will develop or the knowledge it will generate. Gender differences in access to decision-making or education on the other hand, should shape your dissemination plans.

Building on the results of step 1 consider the following questions:

- What gender inequalities will your project ultimately impact upon?
- How will your project’s outcomes affect these gender inequalities?
- What could affect the likelihood of your project delivering gender equal impacts, or positive impacts on gender equality (where relevant)?
- How will you encourage equal access to your project’s knowledge outputs for women and men, and where relevant trans and non-binary people? (See also your responses to Step 1).
- What outcomes and outputs could you measure with data disaggregated by age and gender. What would be meaningful but proportionate (see step 5)?

⁵ Source: University of Edinburgh Using a Theory of Change Guidance.

⁶ See step 1 above for initial analysis. To summarise these inequalities are as follows. In **decision making in the following locations**: within the home concerning home maintenance and energy consumption; at local, national and international urban planning/energy policy; and in the engineering sector (ENERGIA 2019; Wawasi Kitetu 2008; ICUN Global Gender Office 2018; UN Habitat 2013; UNESCO 2017; 2018). In **access to and control over resources**: within the home regarding fuel, resources to upgrade homes (including knowledge), and gender differences in related spending priorities (ENERGIA 2019). In **divisions of labour** the project’s technologies will interact with stark differences in the divisions of labour within the home and family - women and girls are expected to run the home and to care for relatives within it, whilst men spend more time working elsewhere. Local gender norms around divisions of labour mean that engineering/construction work is dominated by men.

N.B. the elaboration of new knowledge or theoretical frameworks that incorporate an understanding of gender inequalities and their relevance into academic, practical, political, or technological perspectives could in many instances be a key project output/ impact, if you have sought to thoroughly incorporate gendered analysis into your project. Where relevant, you could consider publications discussing and detailing gender relevant insights and lessons learned. This kind of contribution can be a key ‘unique selling point’ of your research project.

Actions: to respond to these queries it may be necessary to:

- ✓ consult women’s community groups or civil society organisations for insights into the best methods and channels to ensure that women benefit directly from research findings.
- ✓ consult community NGOs for insights into the best methods to ensure equal benefit for different religious or ethnic groups, thereby targeting, for example, differently positioned men where relevant, women from different religious or ethnic groups, and trans and non-binary people, where relevant.
- ✓ consult women’s community groups or civil society organisations, and community NGOs, to solicit their views on meaningful measures of outcomes and outputs.
- ✓ decide on any relevant measures of outputs or outcomes using data disaggregated by age and gender.

The answers you gather will help you work out and explain:

- the expected impact of the project (benefits and losses) on people of different genders, both throughout the project and beyond;
- how your project will document gender equality in impacts (benefits and losses) produced;
- methods to ensure dissemination and knowledge transfer strategies do not replicate or exacerbate asymmetries in access to knowledge;
- the types of outcomes and outputs you should be capturing (see Step 5);

Example: gender sensitive impact and dissemination on the ‘Cool Homes’ project

Reviewing the questions in Step 4 the PIs on the Cool Homes project made the following assessment: the technologies that the project seeks to deliver will **interact with, and therefore impact upon, multiple interconnected gender inequalities.**

As noted in step 1 **these inequalities interact in a way that significantly lessens the likelihood of the project achieving its ultimate intended impact – improving energy efficiency of homes in informal settlements and reducing fuel poverty.** Differences in men and women’s energy consumption priorities and inequalities in access to decision-making mean that the actors most likely to recognise the full benefits of this project’s technologies and to prioritise expenditure on non-leisure energy consumption (women) are excluded from the decision-making structures responsible for adopting or rejecting these technologies.

If we assume the project were **implemented in a ‘gender blind’ manner** (i.e., one that does not respond to existing inequalities) and the project’s technologies are nonetheless taken up, the **following unintended impacts** on gender inequality are practically guaranteed. **1)** This approach would ensure that decisions regarding the rollout of the project’s technologies would be taken largely without the participation of women, further entrenching their exclusion from decision making. **2)** The project would deliver technology related learning benefits and income generation opportunities to the construction sector, which is overwhelmingly comprised of men. **3)** This would increase the gender gap in knowledge regarding home energy saving technologies and increase gender disparities in income. **4) All these outcomes would actively increase existing gender inequalities regarding decision making, access to and control over resources and divisions of labour.** Without a gender sensitive approach, the project nonetheless has the potential to have the following positive impacts on gender inequalities: **5) Installing energy saving technologies that reduce energy consumption in winter and**

summer has the potential to reduce women and girls' risks of suffering heatstroke whilst in the home and to reduce the amount of time women and girls spend caring for relatives suffering heat stroke. This can free more of women and girls' time to participate in other activities such as paid work, education and local civic participation (though it will not of course, tackle barriers to women's participation in paid work education and local civic participation). We can therefore see that **gender impacts are complex**, but that this project is **extremely likely to have, on balance, negative gender impacts if it is delivered in a gender-blind manner**.

Having undertaken this informed assessment, the Cool Homes project PIs agreed that a gender sensitive approach would be required to support equal access to the project's outputs and benefits and to ensure that the project did not have negative gender impacts. This would be preferable not only to comply with funder requirements, but also on both ethical **and pragmatic grounds**.

As a result, the PIs included the **following actions in their impact and dissemination activities to encourage the delivery of gender equal outcomes in knowledge transfer and employment opportunities**:

- In each field site the PIs worked with two kinds of NGOs - a local women in engineering NGO (e.g. [WomEng](#), [Women in Construction Nepal](#) or [Association of Kenya Women in Construction](#)) and a local anti-poverty and community development NGO with expertise in promoting women's employment and civic participation. In partnership with these organisations the team organised fieldwork and consultation that included women (see step 2); and
- devised knowledge transfer (KT) methods that specifically targeted women. These KT methods included providing training in PCM installation and application methods for thermally reversible thermochromic paint using existing local programmes, funded by international NGOs, designed to support women's self-employment in construction. This took place in addition to KT activities in local engineering colleges (where attendees are overwhelmingly male). These measures encourage equal access to the project's knowledge outputs.

The team deemed these two measures proportionate and sufficient to minimise avoidable, negative gender impacts.

Step 5: Monitoring risks and outcomes

A gender sensitive project will monitor any relevant gender equality risks and outcomes, and evidence outputs/outcomes with data disaggregated by sex/gender as appropriate. The previous steps should have helped you identify any risks to gender equality associated with your project. This final step helps you ensure that you can monitor these risks; and identify any relevant outcomes and outputs with data disaggregated by sex/gender as appropriate. Robust measures of gender impacts often need to draw on contextual knowledge or information rather than abstracted data sources. For researchers in STEMM used to the prioritisation of objective measures, this is sometimes a new approach.

Actions: questions to consider devising your monitoring framework:

- ✓ referring to previous steps, what actions have you taken to mitigate any relevant risks to gender equality including unintended consequences, which you identified? How could you monitor and capture these in a meaningful and proportionate way?
- ✓ reviewing previous steps, what actions have you taken to ensure gender equality in data collection and consultation? How could you monitor and capture these in a meaningful and proportionate way?
- ✓ reviewing previous steps what actions have you taken to support gender balance on the team and participation in fieldwork (including mitigation of any gender specific safety concerns)? How could you monitor and capture these in a proportionate and meaningful way?
- ✓ reviewing your impact and dissemination plans in Step 4, what actions have you taken to maximise gender equality in dissemination? How could you monitor and capture this in a proportionate and meaningful way?

Following this process should enable you to explain:

- what outcomes and outputs you will measure with data disaggregated by sex/ gender. What would be meaningful but proportionate?
- how you will mitigate risks to gender equality and how you will monitor any risks and unintended negative consequences to gender equality;
- how you will monitor meaningful participation of people of different genders throughout the project;
- how you will evidence the expected impact of the project on people (and between people) of different genders in a manner that is meaningful and proportionate;
- how you will measure any relevant outcomes and outputs, with data disaggregated by age and gender.

Example: monitoring gender equality outcomes and risks on the 'Cool Homes' project

Reviewing prior steps of genderED's toolkit, the PIs of the Cool Homes climate adaptation project found they had devised several measures to promote gender equality in their project, on which they could collect meaningful quantitative or qualitative data/contextual knowledge.

To measure project **outcomes and outputs in a gender sensitive manner** the team collected quantitative data on gender, age, and ethnicity of **fieldwork respondents** and **participants at KT events**, aiming to ensure that equal numbers of men and women were ultimately trained in the instillation of PCMs and thermochromatic thermally reversible paints.

To capture learning around responding to and tackling sexual harassment in fieldwork and HE, the project's final workshop included a facilitated discussion on lessons learned during the project concerning team experiences facilitating women's participation in fieldwork, and reflections on the sensitivities of cross-cultural discussions around sexual harassment. These were led by the PIs and the external trainer from a leading East African University who had delivered the cross-cultural training on tackling sexual harassment during project inception (see step 3). Representatives of the funder and management at all HE institutions involved in the project were invited to attend (in person or online as appropriate).

To capture gender impacts of technologies delivered the sociologists' research package included analysis (and comparison across two sites) of the qualitative impacts of the project on: men and women involved and on local socio-economic intersectional power dynamics. This research was published in international peer reviewed journals and shared in KT events with national and international policy makers in engineering, urban planning and HE.

These measures enabled the project to evidence the measures they had taken to ameliorate risks to gender equality and the gender impacts of their project. It also ensured that learning associated with these actions was actively shared within the engineering, urban planning and HE sector.

Conclusion: The Added Value of a Gender Sensitive Approach

After spending an afternoon working through genderED's toolkit on gender sensitive research, the PIs of the Cool Homes Project found that a gender sensitive approach would provide significant added value to their project. This included:

- **increased likelihood that the technologies their project sought to develop would be implemented;**
- preventing predictable, unintended negative consequences for gender equality;
- ensuring that a wider range of people benefited from the knowledge produced by the project (i.e., both men *and* women);

- ensuring that a wider range of people benefited from the income generation opportunities produced by the project (i.e., both men and women);
- increasing knowledge within the engineering sector on how to respond to and tackle sexual harassment in fieldwork settings and HE, including in cross-cultural settings;
- increased knowledge on the social impacts of energy saving technologies, such as the changes in intersectional socio economic and power dynamics that these technologies can have.

Taking a gender sensitive approach led to changes in project design and planning. **The new project summary marked with ‘track changes’ in red, is presented below.**

Example: revised ‘Cool Homes’ project summary

“The ‘Cool Homes’ Project will test the effectiveness of two energy saving technologies in shack dwellings and share findings with urban planners in Nepal and Kenya. Informal settlement dwellers face cold conditions in winter and intense heat during the summer, each causing energy poverty (Kimemia et al. 2020). To respond to these challenges policy makers in many countries have developed both slum upgrading plans, and urban heat action plans. However, cooling solutions in particular, often rely on technologies which consume high amounts of energy, thus exacerbating summer energy poverty (Kimemia et al. 2020). Our interdisciplinary project develops two cutting edge solutions to tackle these problems: thermally reversible thermochromic paints that can be applied to shack roofs and phase change materials (PCMs) that can be built into roofs. Each of these provide energy saving benefits in cold and warm weather.

Though the effectiveness of these materials is fairly well understood in formal dwellings, more research is needed to understand how effective they may be in informal dwellings (Kimemia et al. 2020). The project takes an interdisciplinary approach with a team spanning the University of Edinburgh, a Kenyan University and a Nepalese university. The team is led by two Co-Is, Prof Kelpie of Engineering and Prof N’Yongo of Sociology

Our project includes five work packages 1) consultation and feasibility/impact assessment of PCMs and thermally reversible thermochromic paint use and installation in informal dwellings in Kenya and Nepal; 2) prototyping of locally suitable PCM and thermochromic paint products; 3) technology lab testing and refinement; 3) knowledge transfer and dissemination through community development organisations specialising in inclusive local decision making; 4) technology transfer and dissemination through existing NGOs specialising in women in construction/engineering organisations and mainstream construction training institutes; 5) comparative analysis of the intersectional gender impacts of our technologies on local socio economic power dynamics.”

The team also thoroughly updated the compulsory Gender Equality Statement that their funder demanded. The changes included removing the lengthy description of institutional policies on gender equality such as Athena Swan at Edinburgh University and elaborating better informed and practical response that was directly related to the content of the project at hand. **The new material that the PI’s included in their gender equality statement are marked below with track changes.**

Example: revised gender equality statement for the 'Cool Homes' project

Our project applies two cutting edge technological solutions to tackle energy poverty in shack settlements: thermally reversible thermochromic paints and phase change materials (PCMs). Both these products help to reduce the energy burden on household both in summer and winter, with particular benefits for hot countries in summer – namely the simultaneous prevention of heat stroke and summer energy poverty. Reducing heatstroke has the potential to reduce women and girls' caring burdens, freeing up time for paid work and participation in education or the community. However, our literature-based 'gender sensitive situational analysis' has indicated that interacting gender inequalities reduce the likelihood that our project's technology will be taken up. Existing research shows that men are less likely than women to prioritise spending on non-leisure home appliances and energy consumption, and that they dominate existing decision-making structures governing home improvements at all levels – within the home, community and national and international urban planning (ENERGIA 2019). Local gender norms also mean that whilst women are seen as responsible for home maintenance, they do not control resources related to it such as DIY budgets or DIY/construction knowledge. Thus, whilst our technologies have the potential to realize benefits to the whole community and specific positive gender equality impacts, male dominated decision-making institutions are less likely to prioritise the technologies we are developing, because they spend less time in the home, and are less likely to appreciate first-hand the full scope of knock-on benefits that reduced heat-stroke incidence could deliver for carers.

In addition, the well documented male dominance in existing decision-making structures and construction industry institutions means that without intentional efforts to reach out to women, our project would deliver technologies, related knowledge, and income generation opportunities almost exclusively to men.

For these reasons, our project includes **gender sensitive consultation and feasibility/impact assessment**, in conjunction with local community development NGOs. These measures will ensure women's voices and experiences are included in our project from the outset and will amplify the voices of women in local decision-making. We aim to ensure that evidence of the full benefits of our technologies, including reduced time spent caring for victims of heatstroke are fed into local decision-making processes where women are actively and intentionally consulted and included. We will also undertake knowledge transfer and dissemination processes in conjunction with NGOs that specialise in KT to women working in construction/engineering. These gender sensitive KT activities will mitigate risks that our project could unintentionally widen energy/technology related gender knowledge gaps and associated gender income disparities.

Whilst our core project team composition reflects wider male dominance in the engineering discipline, we have taken measures to support gender balance in engineering. Our project includes mentored fellowships for women postdocs. Fieldwork practices that enable women to work despite sexual harassment risks, such as chaperoning will be implemented as required and the whole team will participate in a cross-cultural workshop on sexual harassment to foster understanding of these issues across the whole team. These practices represent a proportionate response to the widespread male dominance in engineering. Whilst we are aware that lack of childcare represents a core barrier to women's participation in international conferences and childcare, we are unable to fund this on account of the funder's own definition of allowable costs. We would like to flag this as an area for the funder to consider for alteration.

To monitor gender equality risks and evidence gender equality impacts and outcomes we will 1) collect gender disaggregated data on participation in consultation and KT activities 2) undertake comparative qualitative impacts of the project on men and women involved and local socio-economic intersectional power dynamics and disseminate findings in peer reviewed journal articles and at KT events in the climate change adaptation community with HE funders; 3) include presentations on lessons learned from our cross-cultural training on tackling sexual harassment and facilitating women's participation in fieldwork in situations with a high risk of sexual harassment at our closing workshop."

About genderED

This toolkit and guidance was produced as part of a genderED [project](#) for the University of Edinburgh. Short clips and further guides to help understand, analyse and discuss gender impacts of research, including STEMM are available on our [website](#).

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GenderED is the University of Edinburgh's interdisciplinary hub for gender and sexualities studies.

For more information: www.iash.ed.ac.uk/gendered | gender.ed@ed.ac.uk | @UoE_genderED

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