

CLIMATE-SMART AGRICULTURE FOR A RESILIENT COASTAL BANGLADESH



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ASSESSING LABOUR MARKET FOR THE FUTURE CSA GRADUATE

FINAL REPORT

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Executive Summary

Bangladesh is a country that has been experiencing extreme heat waves, hurricanes, drought, soil salinity, famine, and floods for a long time due to climate change. The average temperature of the country will increase by around 1°C in 2030. Climate change is estimated to displace about 20-30 million people in the country by 2050. Climate-Intelligent agricultural intervention is necessary to improve agricultural systems' resilience and productivity.

Climate-Smart Agriculture (CSA) is a modern technique that can boost farm production and farm income sustainability. The Dutch Embassy in Bangladesh and the Government of the Netherlands, through their Ministry of Foreign Affairs, have launched a project grant in March-April 2019, intended to have an impact on food safety and agricultural growth in the coast of Bangladesh. Implementing the country plan (CPI) in Bangladesh was also a critical development strategy for climate-smart agriculture. Patuakhali Science and Technology University (PSTU), together with the Wageningen University and Research (WUR) have agreed to work together to create a leading international institution for the building of climate-smart agricultural capacity. PSTU, WUR, Acacia Water, Salt Doctors, and CIMMYT are implementing the project jointly based on the agreement to develop a Climate-Smart Agriculture (CSA) Institution at PSTU to provide CSA education in coastal Bangladesh and to build resilience. Initially, an M.S. degree on CSA is planned (MS-CSA).

The present study is aimed to assess the future job market for future CSA graduates, to find out what potential employers want, so that the Institute can provide the kinds of MS-CSA graduates that they need, who can make a real, positive contribution to climate resilience through CSA in Bangladesh. The principal goal is to evaluate potential graduates' employment sectors, whether they are ready to absorb, e.g. (i) the existing job market, or (ii) what additional skills they need to develop to achieve the job they want, (iii) gender awareness. And to assess the competitive advantages and the need for CSA graduates to get jobs in different areas of agriculture and development will be evaluated. The approach and methodology for the task were key informant interviews with snowball sampling. Fifty respondents from various employer organizations were the key informants.

In Bangladesh, the graduate unemployment rate is 47%, against the total unemployment rate of 5%. Among educated and non-educated people, females are the most unemployed. Inadequate work opportunities for women in the workplace and lack of proper policies and awareness for women empowerment are the main reasons. University graduates are addicted to civil service employment and its promise of unlimited bribery with limited work, to the extent that they would rather stay unemployed for years, sitting the Civil Service Examination in vain, than take a job in the private or NGO/IO sectors. The Government should develop a human resource strategy, perhaps ending the policy of recruiting generalists for the Civil Service and conscientiously building up the private and NGO/IO sectors as good, secure places in which to work, to end this addiction and a massive waste of quality human resources. To achieve this goal, productive local/foreign investments that produce secure, good-paying jobs and policies to establish good governance are critical.

Although climate change research is a matter of survival in Bangladesh, No research institute related to CSA has been developed in Bangladesh. Most of the Universities in Bangladesh do some research on climate change, but still, there is no focus on resources, financial or human, on the issue. To meet the current requirements of climate change research in Bangladesh, the Climate Smart Agriculture Institute at PSTU can play a vital role in agricultural development in climate-changing conditions. Indeed, this is what the key informants demand, first and foremost, even more than graduates. Graduates' prospects will thus depend on the Institute's doing so.

There is a substantial need for CSA graduates in the private sector, NGOs, I.O.s, and development organizations in Bangladesh. Many international organizations such as the International Rice Research Institute (IRRI), International Maize and Wheat Improvement Center (CIMMYT) are working on climate change and risk reduction. There are around 35 NGOs currently in Bangladesh working with the CSA goals, i.e., adaptation, productivity, and climate risk reduction. Many respondents, during data collection, complain that they have been searching for graduates with CSA expertise, but there are almost no such people in the job

market. Currently, BSc Agriculture graduates with some experience get these posts, but they have little education in CSA. Therefore, in the private and NGO/IO/Development sector, CSA's graduates will get a keen interest and a warm welcome if they are the right kind.

Most of the respondents in the study recommended designing core courses based on the total demand of the country. The increased danger of cyclones and flooding, drought, soil salinity penetration, the extreme temperature should be included in the main courses for this subject. Along with the theoretical studies, many practical classes and field attachment should be required for this degree. The employers were emphatic that they need graduates with strong practical skills with machines and equipment, good communication skills with rural people, and field experience, not theoreticians. Give them people who can show them, and rural Bangladeshis, how to make CSA work.

In Bangladesh, women always get lower wages than men (almost half pay) and gender productivity gaps exist in agriculture. CSA initiatives should concentrate on capacity- building programs for the CSA graduates through proper training and practical classes to mainstream gender into program/project activities. The strategic relationship between partnerships, engagement, and gender needs to be understood, emphasized, and fostered to make it fruitful. Necessary steps and plans should be taken to ensure that both men's and women's needs and voices are taken into account in CSA projects. Many employers raised this issue, and it is essential to them. It is one place where Bangladesh lags, and they need CSA experts who can show them how to involve women with impact and respect.

What the experts and fighters for climate resilience in Bangladesh want and need is a CSA Institute which is more like a Dutch University than a Bangladeshi one: a place where research is a priority for faculty and students alike; where practical skills are imparted, not just theories memorized; which is gender-sensitive and makes gender-inclusiveness part of everything the graduates do; where students are recruited by their passion, interest, and belief in the subject, not just examination results.

If PSTU's CSA Institute can be constructed as such an institution, it will be a different thing than one sees in Bangladesh's tertiary sector, its graduates will have a much higher employment percentage than that of most tertiary institutions in Bangladesh, with unbeatable competitive advantages, and it will be a trend-setter. It may be the best University in Bangladesh by international standards.

CSA is a new subject for new times. It is one of the most important subjects for the survival of the world. Perhaps it needs the best University in Bangladesh. It is worth a try.

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LIST OF ABBREVIATIONS AND ACRONYMS

BADC	: Bangladesh Agricultural Development Corporation
BARC	: Bangladesh Agricultural Research Council
BARI	: Bangladesh Agriculture Research Institute
BRRRI	: Bangladesh Rice Research Institute
BSDB	: Bangladesh Sericulture Development Board
BSRI	: Bangladesh Sugar crops Research Institute
BWMRI	: Bangladesh Wheat And Maize Research Institute (BWMRI)
CIMMYT	: The International Maize and Wheat Improvement Center
COVID	: Corona Virus Disease
CPI	: Country Plan Implementation
CSA	: Climate Smart Agriculture
DAE	: Department of Agricultural Extension
FAO	: Food And Agriculture Organization
FGD	: Focus Group Discussion
GO	: Government Organization
IPCC	: Intergovernmental Panel on Climate Change
KII	: Key Informant Interview
MS-CSA	: M.S. degree on CSA
NGO	: Non-Government Organization
PSTU	: Patuakhali Science and Technology University
RDA	: Rural Development Academy
RU	: University of Rajshahi

SAU : Sher-e-Bangla Agricultural University
SRDI : Soil Resource Development Institute
TMSS : ThengamaraMohilaSabujSangha
UGC : University Grants Commission
WUR : Wageningen University and Research

Chapter One: Introduction

1.1 General Background

Bangladesh is a country that has been experiencing extreme heatwaves, hurricanes, drought, famine, and floods for a long time. The State is treated as one of the climate change hotspots by the report published in "the Guardian" (Vidal, 2017; The Dhaka Tribune, 2018; The Dhaka Star, 2018). The average temperature of the country will increase by around 1°C by 2030 and by about 1.4°C and 2.4°C by 2050 and 2100, respectively (IPCC, 2007).

Since the country lies in the low delta of the Bay of Bengal, it is particularly susceptible to climate change consequences. The country's more-impooverished people are increasingly vulnerable to climate change. Many families have migrated to urban areas to improve their chances of employment, as agricultural incomes shrink due to climate change. Climate change is estimated to displace about 20-30 million people in the country by 2050 (Zaman, 2018).

Not only do these climatic changes have a dramatic effect on trends of food production, but they also affect the consistency of production and access to food. They may also increase environmental problems and produce a dangerous cycle of poverty, malnutrition, and disease.

FAO reported a steady rise in the global hunger rate since 2014, from 804 million in 2016 to 824 million in 2017 for under-fed populations. Therefore, it is urgently essential to develop food and agriculture policies to reduce the impacts of climate change.

FAO's idea of a climate-smart agriculture system can be applied for this purpose. These involve the production of robust plant variant types to withstand abrupt temperature and precipitation stresses and the introduction of biotic and sustainable farming methods such as the application of bio-inoculants/biofertilizer, reduction in dependence on conventional fertilizers and pesticides, etc.

In Bangladesh, farmers already use a range of traditional adaptation practices to address climate variability and change. However, these steps are no longer enough to guarantee a growing population's food security. Climate-intelligent agricultural intervention is necessary to improve agricultural systems' resilience and profitability. According to the Food and Agriculture Organisation (FAO), Climate-Smart Agriculture (CSA) seeks to boost farm production and income sustainably, adjust to climate change and develop climate change resilience and reduce agricultural exposure to climate change.

In recognition of these facts, the Dutch Embassy in Bangladesh and the Government of the Netherlands, through their Ministry of Foreign Affairs, launched a project grant in March-April 2019. This project is intended to have an impact on food security and agricultural stability on the coast of Bangladesh. Implementing the Country Plan (C.P.) in Bangladesh was also a critical development strategy for climate-smart agriculture in the country.

Patuakhali Science and Technology University (PSTU), together with the Wageningen University and Research (WUR) as a leading international institution for the building of smart climate and capacity, Acacia Water, Salt Doctors, and CIMMYT are implementing the project jointly based on the agreement to develop a Climate-Smart Agriculture (CSA) Institution at PSTU to increase the quantity and quality of CSA education in coastal Bangladesh and to build climate-change resilience by this means. Initially, an M.S. degree on CSA is planned (MS-CSA).

1.2 The Goal and Purpose of This Report

The principal goal of the report is to evaluate potential graduates' employment opportunities, whether they will be, on graduation : (i) ready to enter the existing job market and whether there are jobs for them there, or (ii) what additional skills they need to develop to obtain the jobs they want, (iii) gender-aware in the process, the competitive advantages of the CSA graduates in the labor market will be evaluated, and the demand for CSA graduates as employees in agriculture and other areas of development in Bangladesh will be evaluated.

1.3 Preparatory Work of this Report

The principal tasks of the consultant in preparing this report have included but are not limited to:

[1] **Data collection:** the consultant primarily carried out key informant interviews, in-depth interviews, and other detailed qualitative and quantitative data collection on the prospects for future employment of graduates of the CSA program. The data are gathered from government agencies, NGOs, and other organizations, which are the best prospects to become the employers of CSA graduates.

[2] **Desk review:** A desk review of the data was conducted after the data collection.

[3] **Data analysis:** All the primary and secondary data, both qualitative and quantitative, collected were analyzed according to the goals and purposes of this report and using standard social science or statistical methods, according to the case.

[4] **Data presentation and draft report preparation:** Based upon client requirements and suggestions, reacting to a draft submitted to the client, a final report was prepared.

[5] **Preparation of the final report:** This report, containing the findings of the data analysis and conclusions and recommendations, was then prepared.

1.4 Summary of Outputs

This is the complete report submitted to the project authority according to their contract with the consultant. Thus, the major outputs in the report are summarized as follows.

The data show clear evidence of the employers' (Govt., private, NGOs) expectations of the CSA graduates employed in their organizations. Person description variables include:

- Ø Knowledge of the graduate required for the task
- Ø The skill required for the position

- Ø Gender awareness and gender-sensitive education
- Ø The study also ranked-out the name of influential employers organizations.
- Ø Comparison of the CSA degree with a traditional agricultural degree from other major institutions.

Bearing these variables in mind, the future demand for CSA graduates in Bangladesh has been assessed.

1.5 Consultancy Contract

On May 15, 2020, the "Labor Market Assessment For The Future CSA Graduates Contract for Professional Consulting Services" was signed. The scheduled date of completion of the task was September 15 2020 but, due to the COVID 19 pandemic, this deadline was extended, by agreement between the parties, by 20 days. .

1.6 Challenges and Limitations

The following challenges and limitations in carrying out the said contract (para. 1.5 above) were encountered.

- Ø As a result of the COVID 19 pandemic, visits to organizations were difficult to arrange and often delayed: however, all intended visits were carried out successfully
- Ø Some interviews were done virtually, rather than in-person, due to limitations of access to interviewees' organizations during the COVID 19 pandemic.
- Ø Some baseline information proved unavailable.
- Ø In many Bangladeshi organizations, inadequate record-keeping facilities prevented the acquisition of some quantitative data, which might have been helpful.

Chapter Two: Methodology

The methodology for this report was mostly qualitative, including comprehensive interviews with potential employers of the CSA graduates and Key Information Interviews (KIIs). First, relevant literature was surveyed. Then Key Informant Interviews were done with persons having special knowledge or expertise in the employment of agriculture graduates. The range of key informants was expanded by snowball sampling, as interviewees identified other potential key informants in the field.

2.1 Review of Literature

In every study, a literature review is a crucial task. According to Cavana et al. (2001), reviewing the literature is a necessary step to solve the problems of research. The literature review informs CSA graduates of their current and future scope for employment

2.2 Interview and Sampling of Key Informants (KII)

Some individuals, because of their position, experience, or wisdom, have better information about a particular subject than other ordinary members of society. Key informants are sources of valid and comprehensive data. The appropriate key study informants will be searched by snowball sampling. The hidden sample that can not be found otherwise, which easily found in snowball sampling (Mack et al. 2005). By using their social networks, participants usually identify other effective and suitable participants.

2.3 Scoring Employers' Perceptions of Job Market For Future CSA Graduates

From KII, ten categories of jobs that the CSA graduates are qualified for have been identified. Fifty respondents from different employer organizations were asked to rank suitable job types. To score the first category was assigned a higher rating or "weight." The total scores of each class are the total perception score for a job type (X).

Table 1: represents the scoring procedure for the job qualifications of the graduates from the respondents' perceptions

Ranking		Weight		Score
Rank 1 Count	x	10	=	
Rank 2 Count	x	9	=	
Rank 3 Count	x	8	=	
Rank 4 Count	x	7	=	
Rank 5 Count	x	6	=	
Rank 6 Count	x	5	=	
Rank 7 Count	x	4	=	
Rank 8 Count	x	3	=	
Rank 9 Count	x	2	=	
Rank 10 Count	x	1	=	
			+	Total Score (Answer Option X)

For example, the weighted sum for an alternative in the first place (1) is ten, and the tenth place is one as there are ten options.

Chapter Three: Present Status of the Job Market for Graduate in Bangladesh

According to the Bangladesh Bureau of Statistics (BBS), Bangladesh's unemployment rate is 4.37%, which corresponds to the U.S. rate (Neazy, 2019). From the most recent Labor Force Survey (LFS), the unemployment rate among people with tertiary education has increased significantly. University graduates are approximately 46% of the total unemployed young people (Jashim, 2020). The Centre for Political Dialogue (CPD) also noted that the relatively more-educated are, more and more, joining the ranks of the unemployed.

In Bangladesh, the British Council also funded a study on South Asian graduate unemployment, published earlier in 2020. In terms of the employability of local graduates, Bangladesh ranked below India, Pakistan, and Sri Lanka. In Bangladesh, about five in ten students are unemployed (against three out of ten in India and Pakistan) (EIU-BC.). The report attributes the high level of graduate unemployment in Bangladesh to low-quality private education and the use of obsolete curricula in public universities.

Graduate unemployment is not uncommon in other places in the world. For many years, Japan has been experiencing increased unemployment among graduates. In South Korea, a country with a comparatively high university enrollment rate, there are over 3 million economically-inactive graduates. Unemployment for graduates in Singapore peaked at 3.6% in 2013, relative to a total rate of unemployment of about 2%. But in Bangladesh, the graduate unemployment rate is 47% against the total unemployment rate of 5% (Asadullah, 2015).

In our developing economy, every year, over two million young people are joining the labor market, creating three times more unemployed. Among the unemployed graduates, the employment prospects for women are worst.

From the World Bank data (ILO-modeled estimation), educated women are most likely to become unemployed, as shown in Figure 1 (World Bank, 2020). In Bangladesh, both educated and non-educated females are the most unemployed.

Inadequate work opportunities for women in the workplace and lack of policies and sensitivity to assure equal opportunity are the main reasons for this result.

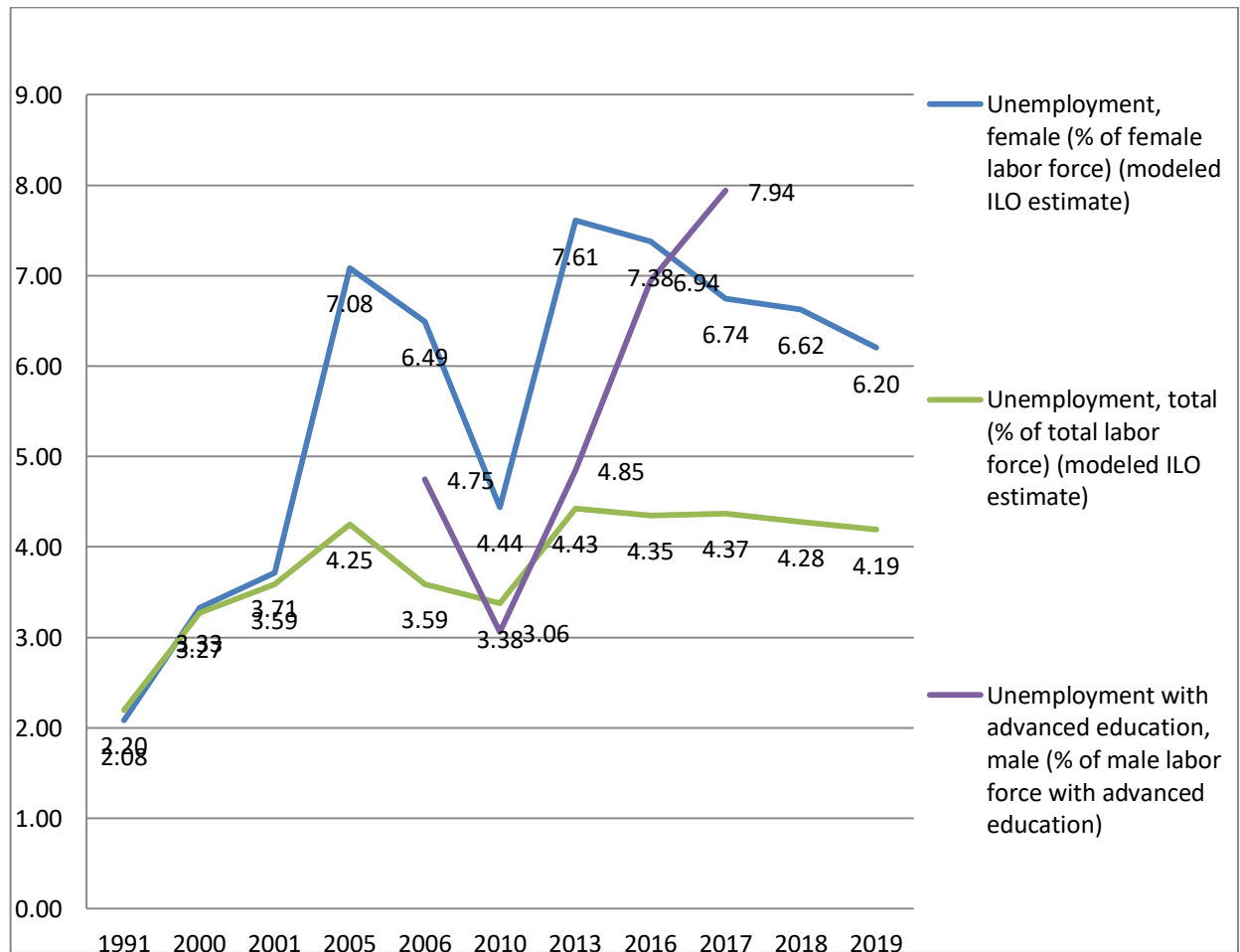


Figure 1: Unemployment percentages of male and females in Bangladesh

Source: Authors' calculation based on World Bank (2020)

In Bangladesh, the main reasons for high unemployment among graduates are:

- < the lack of policies to promote employment-creating investment
- < the lack of systems to encourage employment-related skills
- < the lack of education focused on employment-related knowledge and skills in areas where there is a demand for employees
- < student assessment policies which do not concentrate on employment-related skills

- ◁ an overemphasis of both State policy and graduate job search on State sector employment, such that unemployed graduates believe that State sector employment (with its high social status and seemingly-unlimited income from corruption) is the only proper reward for their years of study: thus, they remain unemployed for years sitting civil service and other State sector examinations year after year rather than take a private-sector job
- ◁ Lack of policies for the development of the private sector as a reliable and attractive source of employment, even though the State can only employ a small fraction of the job-seekers each year.

Excessive admissions to tertiary education, as if everyone needs a tertiary degree, have produced inflation of qualifications seen even in western countries.

Bangladesh needs a State human resource development policy where we get people the education they need for employment, promote the private sector, not State sector, employment, and knock the status-seeking . and bribe-seeking - out of job search. Perhaps abandoning the generalist approach to State sector recruitment and requirement of specific job-related education for each State sector job would help. Under the traditional school framework, we do not support skill-based learning. India, our neighboring nation, established a separate Human Resources Department and evaluated human capital needs in current and future industrial sectors. It is a good model.

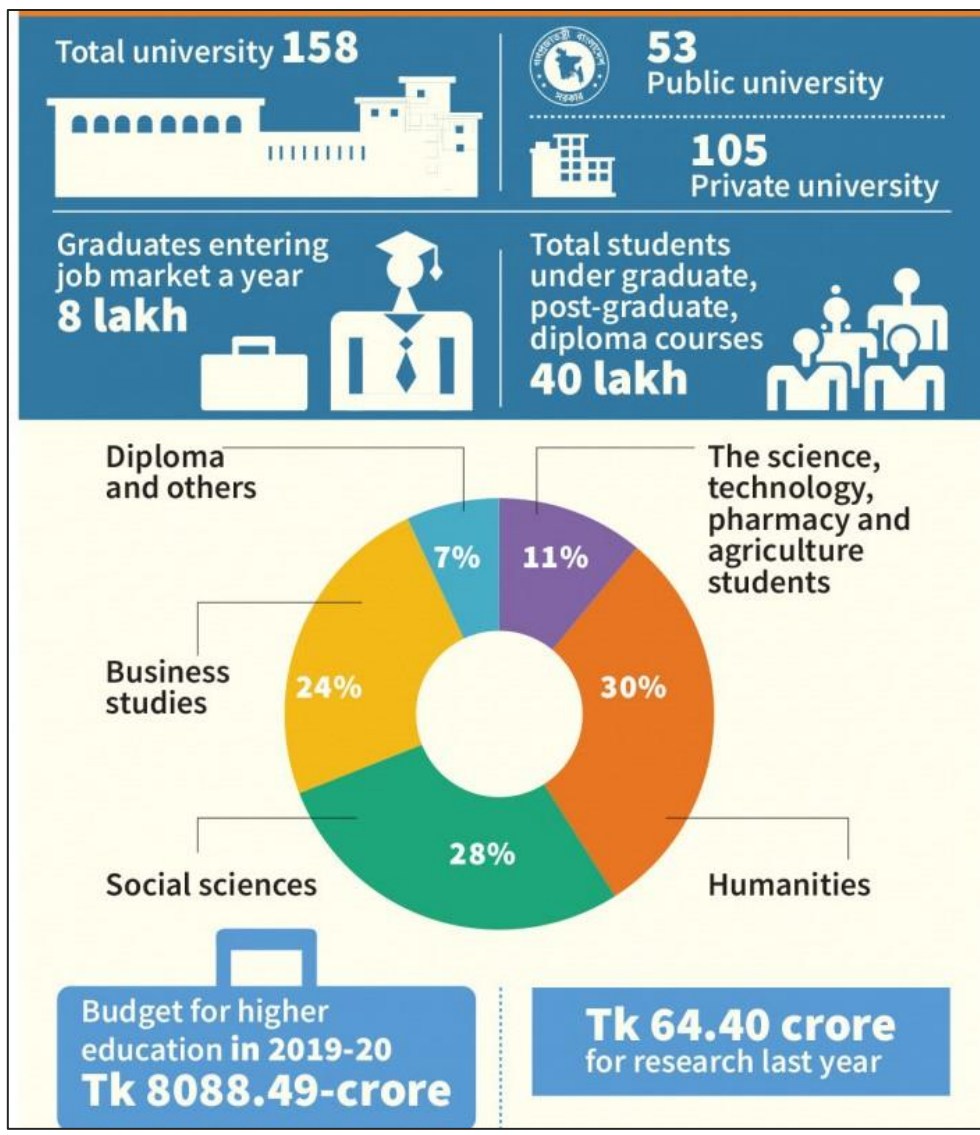


Figure 2: Present scenario of educated graduates in Bangladesh

Note: Tk= Bangladeshi currency called as taka, 10 lakh= 1 million, 100 Crore= 1 Billion

Source: Jashim, 2020

Chapter Four: Prospect of CSA Institute in Bangladesh

Climate change is increasingly recognized as a global problem of public health and as a significant threat to 21st-century wellbeing (Lancet, 2011). As a result of global warming, the effect of climate change on the world's developing nations will be worse, and poverty will increase.

Water quality deterioration will have a massive impact on our lives. Water supply deterioration threatens agriculture, along with rising temperatures and extreme weather. Each day, climate change has an extremely significant impact on agriculture around the world, as agriculture mainly depends upon variables that will be altered by climate change: like temperature, sunlight, and precipitation.

In terms of climate change and variability, Bangladesh is one of the most vulnerable nations globally. Agriculture and food security are in severe danger. Climate change has limited formerly-high crop yields in the Government. All three rice seasons in Bangladesh are influenced dramatically by climate change (Sarker et al. 2014). A climate model has been shown to decrease yields of maize, rice, and wheat by around 38.6, 67.9, and 47.6 percent with an increase of temperature to 5.32C (Rahman et al. 2018).

For the coastal area of Bangladesh, salinity is a critical problem. In 1973, salinity damaged 83.3 million hectares of crops in Bangladesh, and by 2009, that figure had risen to 105.6 million hectares (SRDI 2010). Significant adverse effects have been noted on wheat, fish, and cattle production due to high coastal salinity (Alam et al. 2017). Worsened by climate change, Bangladesh is now being affected by a significant disaster once in every three years (GoB 2008). Consequently, agriculture and food development in Bangladesh need to become resilient to climate change if it is even to survive, let alone thrive as the high and growing population demands.

Although Bangladesh agriculture has been suffering from the adverse effect of climate change, the country has not established any research institute related to climate-smart agriculture yet. Most Universities in Bangladesh are doing some research into climate change, but still, there is no institute with the concentration of

focus and resources needed to make a difference in the nation's agricultural performance. Therefore, the PSTU's CSA project received a warm welcome when introduced to experts in the field in Bangladesh as part of the preparatory work for this report: almost a sigh of relief.

This is important for PSTU's CSA graduates: as they go out into Bangladesh to try to take their places in the battle against climate change in agriculture, they will face a certain amount of goodwill and welcome. All PSTU needs to do to make them successful is to convince the experts and potentially-employing institutions that PSTU CSA graduates have something real and valuable to contribute to the battle on the side of farmers and consumers in Bangladesh. That may not be easy, but it is certainly possible because the agriculture industry wants to believe it.

A senior executive of the Department of The Environment, Peoples'Republic of Bangladesh, typified the reaction to PSTU's new CSA degree:

Of course, it will be an excellent opportunity for agriculture graduates to study climate change in agriculture. Climate change is a burning issue in Bangladesh as well as in the world. And the graduates from this Institute will have had opportunities to learn about the present climate condition of the country and the world [in a way that few other Bangladeshi graduates will have had]. (July 20, 2020)

A research fellow from the Bangladesh Institute of Development Studies (BIDS) stated :

[In our struggle] to achieve the Sustainable Development Goals (SDGs) in Bangladesh, climate change is the main obstacle.. [PSTU's CSA Institute and organisations like it] could play a vital role in research. Thus, I believe the proposed organisation can play a significant role in achieving the SDGs, but we need more similar organizations. (August 25, 2020)

Das (2010) also confirmed that climate change spoiled many efforts to achieve SDGs in Bangladesh, which we can foresee will apply, post-2015, to DGs. The challenges to achieving these goals due to climate change are described in the following table.

Table 2: Climate-related threats for Bangladesh to achieve SDGs

MDGs	Challenges
Eradicate extreme poverty and hunger	Low-level livelihoods lack economic development, and food security has been under trends
Achieve universal primary education.	The lack of an economy, deprivation of jobs, requiring children to work, and the unemployed families reduced the capacity for children to engage in full-time education.
Promote gender equality and empower women	Insufficient opportunities to share in decision-making and income production.
MReduce child mortality; improve maternal health; combat HIV/AIDS, malaria, and other diseases availability of potable water	Increased incidence of vector and water diseases and decreasing food stability, maternal wellbeing, and drinking water supply
Ensure environmental sustainability	Natural habitats of plant and animals have been adversely influenced

An agricultural scientist, professor, and chairman of a department under the Faculty of Agriculture from the University of Rajshahi also understands the need to establish an institute in Bangladesh like PSTU's CSA Institute. He believes this kind of Institute can play a vital role in agricultural development in conditions of climate change. He stated :

It is our bad luck that we still have not developed a similar institute in Bangladesh, although it has been demanded for a long time. Bangladesh is one of the most vulnerable countries due to climate change, so we have to develop a similar organization from our funds. First, we need to meet our own needs. It is unfortunate for us that our Government is not providing sufficient resources and leadership in areas like research and development. If PSTU develops such an

organization, I will welcome it because I believe that there is a massive prospect for research and development under this Institute.
(September 13, 2020)

Therefore, the pervasive feeling amongst key informants that PSTU's CSA Institute will be the right thing at the right time: almost too late. That feeling can be an excellent asset for PSTU's CSA graduates: everyone will be curious about them. They will be welcomed. However, there is a common thread among the key informants which PSTU must note: the key informants are not rejoicing about the tremendous human resources that they will recruit from the CSA Institute. The key informants are looking forward to the outstanding research they will see from the Institute. Probably the best asset that PSTU can give its CSA graduates is the Institute's reputation for high-quality and climate-change-problem-solving research. If they develop that reputation, it will translate over to the Institute's graduates when they come looking for jobs, making their search that much easier. If PSTU's CSA Institute fails to develop a reputation in the industry from their research, CSA graduates will come to job interviews carrying that burden. In such a case, the initial reaction of potential employers to PSTU CSA graduates will be to wonder, with grave doubt, what the PSTU CSA graduates could ever do of importance for them.

Chapter Five: Job Market for CSA Graduates: The Advantages and Limitations

In Bangladesh, graduates always prefer State sector appointments over any private-sector job. This problem was referred to in Chapter 3 of this report. The image of the civil service as a place of lifelong employment, the respect and deference from everyone they meet, which comes from high social status, with few rigorous work demands and unlimited, unimaginable income from corruption is like a form of addiction for south Asian youth. They will stay unemployed literally for decades, sitting the civil service examination year after year, until the "dead year" of 30, when they are no longer admissible to the Civil Service Examination. The more talented and wealthy they are, the worse the addiction.

The worst problem for CSA graduates will not be the job market but, like most graduates in Bangladesh, their attitudes. The civil service will never be able to employ more than a tiny fraction of the applicants who gather they're admit cards like trophies year in, year out. And that proves their dream of civil service appointment to be the hopeless addiction that it is for most afflicted by it.

The issue is security in a job market, which is poorly-developed and a private sector which is often lacking in the capital so that employers can fail and disappear at any moment. Job applicants know that, like the poor, the State ye will always have with ye. It is the one employer that will always pay on time and never go bankrupt. If it fails to pay, you have lots of other income sources of dubious kinds. Most importantly, you will keep the position unless you do something outrageous.

Thus, graduates from all disciplines, even from highly-technical fields like medical, engineering, agriculture, etc. want to join in public administration, police, customs, or taxes Bangladesh Civil Service cadres (the most corrupt and thus the most lucrative). Very few graduating students want to enter the private job market. Like it or not, this is one of the significant reasons that Bangladesh has remained a developing country for so long. The private sector is the sector of wealth creation and economic growth. A country gets the results that it puts in. And if it puts its best minds into the State sector, it does not get growth and development but excessive

regulation, corruption, and unbridgeable gaps in income distribution. In Japan, young people want to enter "*bikkumpani*" ("big company" as a Japanese word). In America, the best minds go into business and become millionaire inventors and entrepreneurs. In Germany, brilliant researchers have become scientists and engineers. Compare Bangladesh: if we do not confront this reality, our plans for the PSTU CSA graduates will become fantasies as the graduates go off to years of civil service coaching and unemployment.

PSTU's Master of Climate-Smart Agriculture degree-holders will qualify to sit the Bangladesh Civil Service Examination, as, for State sector appointments jobs, around 99% require only a Bachelor's Degree. A Master's degree is not mandatory, so that the CSA graduates will be overqualified for a civil service appointment: but that will not even slow them down in a rush to grab their admit cards. Most Civil Service appointees are Master's degree-holders and equally overqualified.

However, the Public Services Commission cannot give any preferences to the MS-CSA Graduates. A Bachelor of Arts in Bengali Literature will have an equal chance of being appointed to some Departments with a MS-CSA graduate, so long as the Government continues the policy of generalist recruitment that the British left in 1947 (and have since abandoned in their civil service). However, a senior executive (Deputy Secretary, Ministry of Disaster and Relief) said that MS-CSA graduates could have an advantage in the *viva* examination if they (MS-CSA holders) can pass the preliminary generalist test and written examination. :

As a CSA graduate is positively related to environment and disaster management, they will get an advantage to be referred for the jobs in a similar Department when they get into the *viva* stage. Still, they have to pass all the previous examinations successfully. You know that all government officers are appointed by the Public Services Commission(PSC). They have a standard recruitment policy that will apply to all candidates. In Bangladesh, there is no right for any graduate to enter public service because he/she has a master's degree related to the subject matter of the position. With a Bachelor's degree in

Agriculture, they can apply for every public job, including the technical cadre in the Ministry of Agriculture, but they will not directly benefit from their Master's degree in CSA. But I believe the *viva* board may give the MSCSA graduates some advantages during the *viva* process if the graduate provides a lot of answers suitable to the work of the Department because of his/her specialized knowledge. (July 30, 2020)

Bangladesh Civil Service (BCS) recruitment is a lengthy procedure, where there are a series of examinations. Most of the questions on those examinations have nothing to do with what the MSCSA graduates will have studied. Even in the final examination, which is called *viva voce*, an oral interview, there may be no one on the examining board who knows or cares anything about CSA. So the MS-CSA will not help graduates to enter the Bangladesh Civil Service.

Yet the Bangladesh Civil Service may not be the best place for MS-CSA graduates anyway if the test is "What job will best utilize the graduates' skills and help to save Bangladesh from climate change-induced hunger?" It would be most consistent with its purpose that the new CSA Institute should consciously decide not to pander to the graduates' bribe hunger and addiction to getting civil service positions as the only way to find meaning in their lives. Instead, as the degree will not help them achieve such goals anyway, it is better to try to educate these goals out of the graduates while they are at the Institute. The Institute should build in the graduates a passion for making Bangladesh agriculture climate-resilient in place of the desire to sit in air-conditioned offices and collect stuffed envelopes for signing their names on documents, to be true to its purpose.

In Bangladesh, there is no such institute related to climate-smart agriculture. Thus CSA graduates have nowhere to apply to become a University Lecturer in the subject. Yet the day when they can so apply is probably coming. CSA is a burning issue in Bangladesh. Climate change is coming, more and more, to Bangladesh, not going away. PSTU will be the first University to start a CSA Institute, not the last, and it will be a trend-setter. There is every reason to believe that, over time, MSCSA graduates will find opportunities to be appointed to faculties in PSTU and

elsewhere in Bangladesh. Indeed, if the PSTU CSA Institute focuses on publishable research as recommended here and works on the students' English skills, they may be appointed in Universities overseas.

5.1 Present Job Market For Bachelor of Science in Agriculture, Graduates

The agriculture sector is becoming more modern, scientific, and technology-oriented. Changing climate, shifting farm structures, changing demographics in the food production system, evolving biotechnology strategies, resource management strategies, and ICTs are playing a significant role in the food production and management systems. Specialization in agriculture opens up a world of possibilities for students who have chosen to pursue an education in this field.

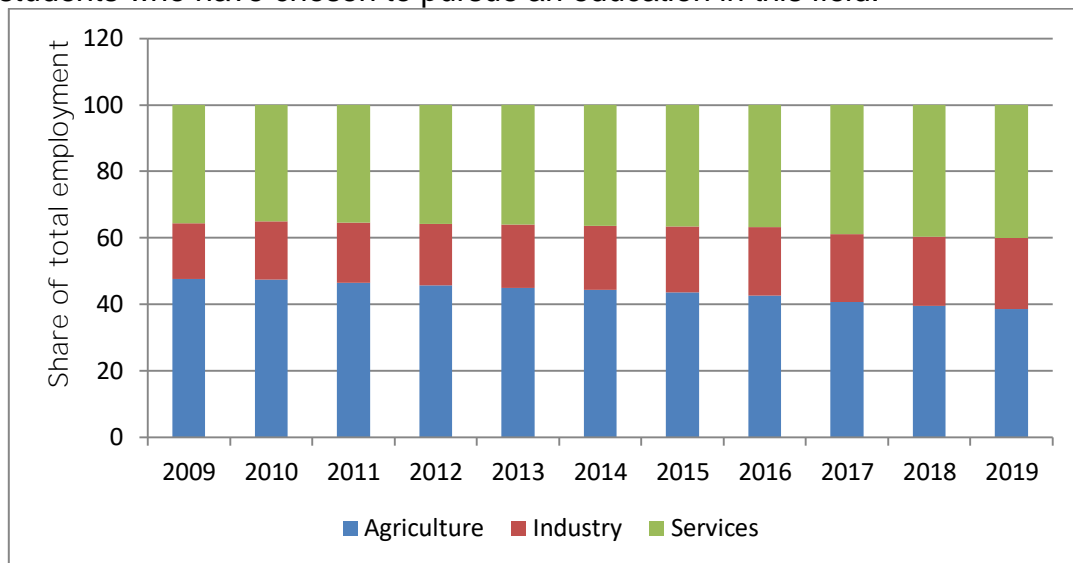


Figure 3: The Barr Chart above shows the distribution of employment in Bangladesh by the economic sector from 2009 to 2019.

In 2019, 38.58 percent of the employees in Bangladesh were in the agricultural sector, 21.26 percent in industry, and 40.16 percent in the service sector¹. But from 2009 to 2018, agriculture remained the largest employment sector in Bangladesh.

A student completing a **4-year** undergraduate professional course in agriculture (**B.Sc. Agriculture**) is called an agricultural graduate. This degree is offered by

¹<https://www.statista.com/statistics/438360/employment-by-economic-sector-in-bangladesh/>

various government agricultural, science & technology, and private universities in Bangladesh.

A student pursuing B.Sc. in Agriculture can study a wide variety of subjects including agronomy, soil sciences, horticulture (fruit science & vegetable, floriculture), plant breeding and genetics, entomology, plant pathology, animal sciences, extension education, plant biochemistry, agriculture economics, basics of biotechnology, etc. The syllabus is as per the guidelines of the respective University. It is designed to train students to understand ways of improving crop production sustainably and to provide overall knowledge related to agriculture and allied disciplines.

Currently, Agriculture graduates can enter the following jobs:

1. Government Jobs:

Agriculture graduates are getting the scope of application as a technical and general category in the Bangladesh Civil Service (BCS) examination. The Ministry of Agriculture and the Ministry of Fisheries and Livestock are the apex bodies to employ the agricultural graduates in their various organizations through BCS exams. The Ministry of Environment, Forest, and Climate change is also using agriculture graduates in its' different divisions. Besides those, many Agriculturists are working at the development organizations under various ministries. For example, agriculturists are working in Bangladesh Rural Development Board, Bangladesh Academy for Rural Development, Rural Development Academy, Bangladesh Scientific and Industrial Research Council, Sugar mills.

2. Private Jobs

Those who've done their graduation in B.Sc Agriculture can find many jobs in the private sectors. They are working in the fertilizer factories, Seed companies, pesticide factory, BRAC, the British American Tobacco Company, Agricultural Products Marketing companies, Agriculture Machinery Industries, Food processing

industries, etc. A vast number of agriculture graduates are also entering different NGOs operating throughout the country.

3. Teaching

There are seven public agricultural universities, 14 science and technology universities, and two private agricultural universities in Bangladesh. Besides, the University of Rajshahi has the Faculty of Agriculture. Students with good academic records could absorb in the teaching profession in those universities.

4. Banking and Finance sector jobs

Currently, there are 60 scheduled banks in Bangladesh. There are 6 state-owned commercial banks (SOCBs) entirely or majorly owned by the Government of Bangladesh. There are also 03 specialized banks (SDBs). A total of 42 Private commercial banks (PCBs) in Bangladesh are in operation right now. They are majorly owned by private entities and classified into two type's, e.g., conventional PCBs (34) IslamiShariah based PCBs (8). There are also 09 Foreign commercial banks (FCBs) and 05 Non-scheduled banks in Bangladesh.

So, graduates in Agriculture are also employed at the public and private banks. One can join the public banking sector by appearing in BRC (Bankers Recruitment Committee) exams. Agriculturists are getting better access to employment in different specialized, commercial, and non-scheduled banks regularly. Also, they are serving in various non-bank financial institutions.

5. Consultancy:

Candidates who've done their graduation in B.Sc Agriculture may work as independent consultants after gaining some years of work experience or retirement from the government jobs in farming, poultry, dairy, etc. They also have the opportunity to serve in international agencies.

6. Agri-entrepreneurs:

Some students of agricultural sciences opt to become entrepreneurs. They can solve their unemployment to themselves and can also generate employment

opportunities for others. Thereby, they can provide unique solutions to agricultural problems in the country.

7. Higher Education:

Taking up M.S. and Ph.D. is another option after B.Sc. in Agriculture. Pursuing a Ph.D. could create more excellent opportunities to enter teaching jobs, research works, and consultancy. Various scholarships are also available at home and abroad for postgraduate studies.

8. Hired jobs

The highly qualified graduates can also be hired as a researcher, teacher, scientist, and development officer abroad.

5.2 The Advantages of MS-CSA Graduates in Bangladesh's Job Market

In Bangladesh, currently, there are many projects to alleviate and adapt to climate change with a vast number of NGOs, regional and multi-national organizations. The Delta Plan 2100, funded by the Netherlands, is a strategy for mitigating the effects of salinity in the coastal area through flooding and tidal rivers. In Bangladesh, many international organizations such as the International Rice Research Institute (IRRI), International Maize and Wheat Improvement Center (CIMMYT), WorldFish, the International Food Policy Research Institute (IFPRI), CARE Bangladesh, etc. are working on climate change and risk reduction.

National NGOs like Bangladesh Rural Advancement Committee (BRAC), Community Development Centre (CODEC), Bangladesh Rural Advance Committee, Palli Karma-Sahayak Foundation (PKSF), Bangladesh Environment and Development Society, Bangladesh Center of Advanced Studies (BCAS), and many NGOs have been working under different project related to CSA. For example, In the southern districts of Bangladesh, BRAC is conducting CSA activities to encourage sunflower production to recover saline soil. A project called Salt Solution is running by CODEC and ICCO Corporation (Netherlands-based NGO). 35 NGOs currently are in Bangladesh working with CSA goals, i.e., adaptation, productivity, and climate risk reduction. These organizations are working

to deliver CSA technologies, livelihood options for the people, WASH, climate-resilient sanitation, etc. They have been linking people and growing awareness about climate change, focusing on involving our future leaders (young people) in the battle against climate change..

CSA graduates thus can see a vast tapestry of potential employers in all this work being done now: and there will be far more in the future. Many respondents during data collection have complained that they have been searching for graduates with the knowledge and skills that MSCSA graduates will have but that they cannot find them. For example, an agricultural specialist of ICCO Corporation, currently working in the Salt Solution project, said:

'We lack graduates having CSA degree. If we find any CSA graduate, of course, we will provide them the chance to work in our organization. Currently, agricultural graduates with any sort of experience in climate change or CSA are being put into these posts because that is as close as we can get to what we need (August 30, 2020).

Similarly, the Coordinator of a national NGO, working in the coastal area, with three climate-related projects, also shows their interest in recruiting CSA graduates:

If PSTU produces CSA graduates, we will, of course, welcome them to work with us. Most of the NGOs using in the coastal area will show their interest in recruiting the graduates from this CSA institute. (September 03, 2020)

Many State-supported projects are working in the agriculture sector in Bangladesh, creating even more opportunities for future CSA graduates. Bangladesh Climate Change Resilience Fund (BCCRF), the center of development projects related to climate change, is a good example. The Memorandum of Understanding was signed by BCCRF, formed in May 2010 by the Bangladesh Government, development partners, and the World Bank. This innovative solution will allow the Government to allocate 170 million U.S. dollars for grants to millions of people in

Bangladesh to boost their resilience to climate change. The BCCRF aims to facilitate the Climate Change Policy and Climate Change Action Plan (CCSAP) of Bangladesh. CCSAP has identified six key areas for action : (i) food security, social safety and welfare; (ii) disaster management; (iii) climate-proof technology; (iv) Research and development; (v) low carbon development; (vi) capacity development. Of course, (i), (iii) and (v) relate directly to CSA.

Another fund is called Bangladesh Climate Change Trust Fund (BCCTF) has been developed with a three-year allocation from the budget (totaling 300 million dollars).. The BCCSAP Priority Projects and Programme will be implemented with 66% of this Fund. Funds of BCCTF may be used to finance public sector projects and NGOs, and total grants. Of that amount, US\$ 95,36 million was spent on 58 projects, mainly for agricultural research, mitigation, adaptation, and disaster risk reduction. Thus every year, a lot of employment will be created for CSA graduates. A Deputy Secretary from the Ministry of Environment, Forest, and Climate Change stated:

We have been creating a lot of Funds for adapting to climate change. Many projects are currently running. Shortly, many new projects will be implemented, but we lack graduates with relevant. If we find graduates with CSA education, they will get preference, but the main problem is who will be the teachers of the course? Is there sufficient experience of the teacher in this field? We should also consider that the teacher must have proven experience in this field. Before enrolling students, we have to develop teachers and their training in this aspect.

Similarly, an Additional Director of the Department of Agricultural Extension (DAE) stated:

We have many projects related to CSA, and we are planning to introduce a new similar project. For example, Environment-Friendly Safe Crop Production Through Good Agricultural Practices (GAP) for Food Security Programme, Char Development & Settlement Project-4, Integrated Agricultural Approach for Ensuring Nutrition and Food

Security Project (IANFP), Enhancement Of Crop Production Through Improved On-Farm Water Management Technologies, Safe Crop Production Project through Integrated Pest Management (IPM) Approach, Agrometeorological Information System Development, Construction of Rubber Dams in Small and Medium Rivers for Increasing Food Production Project, etc., where we need specialized people. If PSTU can produce relevant graduates, they will get a chance. In this regard, the organization should ensure the quality of graduates. They should train the graduates properly to fit with the changing situation. For this, they should be keen on faculty development: first, develop those who will teach to develop those who will learn.

So we can see here that, while MSCSA graduates may not benefit from their degree in seeking Bangladesh Civil Service positions, there will be many State-funded projects that will need them.

Chapter Six: Core Course Design

Although the Climate Smart Agriculture Institute will be established in the coastal area in Bangladesh, most of the respondents in the study recommended designing core courses based on the needs of the whole country. A Chief Scientist from Bangladesh Wheat and Maize Research Institute (BWMRI) stated :

I think it will not be sustainable thinking to design the courses and curricula for the proposed CSA institute to face the problems of the coastal area only; we should consider the issues in other regions of Bangladesh. For example, drought in the northern area, flooding in the eastern part, the intensity of cyclone winds and precipitation, heatwaves, etc. are also problems in the country. Therefore we should design the course and curricula based on the whole situation of the country. This is mainly because a graduate of a Bangladesh institution must be able to work in any part of the country. If an employee joins the Bangladesh Rice Research Institute (BRRI), the organization can post him to any part of Bangladesh. He can work three years in Rangpur and then transfer to the southern part if the organization requires. (September 02, 2020)

Therefore, we need to teach MS-CSA students that climate change is a single problem that may cause cyclones and salinity on the coast, drought in the north, floods in the east and temperature extremes in the west. We must also teach them that climate-smart agriculture is a set of strategies which is the same whether the rice is planted in Teknaf or Tetulia, although they need to adapt to whatever local conditions and problems that they find. They need to understand the many interrelationships amongst these various symptoms of the problem. Then they will be able to help people to fight climate change wherever they are. Some major issues due to climate change in different parts of Bangladesh are described below.

Coastal Part

Land degradation, including productivity and physical destruction, is a significant problem for coastal farming due to the influx of salinity and increasing sea levels. The latest estimate found that in addition to the currently flooded regions, nearly 13 percent additional region (469,000 hectares) inundated by the monsoon would increase the sea level around 62 cm. Areas such as Patuakhali, Bhola, Barguna, Pirojpur, Barisal, Jhalakati, Bagerhat, Khulna, Satkhira or Noakhali are the most susceptible regions. The floods would rise by nearly 16 percent (551,500 ha) due to higher precipitation above 62 cm. On the other side, in the dry season, the raise of 62 cm in the sea level would inundate an extra 364,200 hectares (10 percent) in 2080 (Khanom, 2016).

The southwestern area is expected to be prone to extreme drainage congestions of around 25 polders because of the 62 cm rise in the sea, and 13 polders will be flipped because of the elevated water levels in peripheral rivers. About 120,200 hectares of these polders were submerged while the entire region underwater is 42,200 hectares. Apart from the overtopping of the ground, about 32% more land would be inundated (Khanom, 2016).

Due to the increase of the sea level, salinity is more introduced mainly in the dry season. As a consequence of this breakwater field, the sea level of 27 cm rises by 6 percent to 6 inches, relative to the simple State. A further surface region of 327,700 ha is projected to become a high saline water region (> 5 ppt). About 6% of the sweet water (276,700 hectares) is destroyed (Khanom, 2016).

Noth-Eastern Part

The north-east is characterized by high rainfall and relatively low temperatures as compared to the annual average of the country. This area has yearly cumulative precipitation of 4130 mm, about twice the world average. Sylhet indicates a growing trend of an average temperature of 0,039°C per year. The lowest peak temperature was recorded in 1977, 28.5 ° C, and the maximum in 1998, 31.25 ° C.

In the region of Sylhet, floods, heavy rains, and earthquakes are highly probable. Only *T Aman* is grown during the *Kharif* season. Floods in every alternative year ruin this crop. Flooding in this region is on the rise. The tornado and the hailstorm are two weather disasters that damage crops, houses, plants, and deaths of citizens. Heavy rainfall creates landslides and erosion of hills. Soil depletion is mostly attributed to the reality that arable land is sanded.

North-Western Part

In the northwestern region, there is a high temperature, low rainfall compared to the usual situation in Bangladesh. The area is most prone to droughts. In addition, it is essential to note that erratic occurrence and distribution of rainfall, along with elevated temperature, cause the fluctuations in the drought cycle. As a result of lower winter precipitation and enhanced evapotranspiration, the moisture content of the topsoil may be significantly decreased. *Aman* crop would have an adverse effect during ripening time at the end of *Kharif* season in December. The early dryness of *Rabi* season influences wheat and other *Rabi* crops affecting both germination and planting phases (Karim et al 1998.). Moreover, increasing moisture stress would significantly affect output at the beginning of *Kharif* Season.

The Central Part

Floods now occur in the central part of the country, and the situation will be aggravated by rising precipitation and the loss of the Himalayan glaciers over the short to medium term. In a 'standard' year, around one-fifth of the earth is inundated. The catastrophic flood will now occur once every 4 to 5 years, covering over 60 percent of the nation and contributing to life loss and significant harm to buildings, houses, agricultural goods, and livelihoods due to the last 25 years' experiences. These devastating floods and increasing backwater effects would raise the emissions and weaker irrigation capacity in climate change. The *Aman* planting seems to be continuing with long-term flooding, with the consequence that *Aman's* potential is being substantially reduced, as shown in 1998 and 2007. The 1988 flood saw a 45 percent decline in agricultural production

(Karim et al., 1996), and crop failure or partial damage of almost \$1.2 million was recorded in 2007, and more than \$1 billion in damage was expected.

Therefore, it is essential to design the course related to smart agricultural technologies to cope with all agrarian challenges due to climate change in Bangladesh. Many employers, during data collection, mentioned that the M.S. in CSA course should be designed in a way so that graduates of degrees other than BSc Agriculture can enter. For example, students who have completed the bachelor's degree from fisheries, veterinary, or environmental sciences should have access. In this regard, a development officer from the WorldFish (Scientist, Resilient) said :

Agriculture does not mean crop production only; fisheries and veterinary sciences are also part of agriculture. The CSA M.S. course should be designed so that graduates other than in Agriculture can again enter the course. Due to climate change and variability, not only crops are affected but also other sectors like fish and livestock. We need to research in those fields again.

Based on the consultation with key informants, the following curriculum is proposed for the M.S. in Climate-Smart Agriculture

Table 2: Proposed courses and contents for the MS-CSA program at PSTU

Course title	Course content	Comments
Agro-ecological zones of Bangladesh	Agro-ecological Types, Climate and topography of crops, fisheries, and livestock, and weather cycles, Climate change and its effects on agriculture	
Climate-smart Agriculture	Basic Principals of CSA, The central pillar of CSA, e.g. (a) Sustainably preserve and improve efficiency (b) Adaptation (c) Mitigation/ risk reduction and removal of greenhouse gas emissions, Main CSA	

	Characteristics, how CSA fights climate change, how CSA combines different priorities and regulates trade-offs, How CSA manages facilities for the environment, how CSA is domain-specific in the sense of Women and disadvantaged communities	
Impact of Climate change on Crop/ fisheries/ livestock farmers	The adverse effect of temperature rising, Irregular / erratic rainfall, rising sea level, Flood and Drought, Intrusion of salts, Harm to and inability to harvest crops in times	
Application of CSA technologies	Application of CSA technologies in food production and climate change risk reduction, CSA technologies for the management of soil, microorganisms in the soil, Climate-smart Productive Land and Land Conservation, Soil erosion management / Wind erosion, Soil Organic Matter Control	A similar course can be offered for fisheries and veterinary aspect as an option for the student
Conservative Agriculture (C.A.)	C.A. meaning and function, principles Soil management through crop rotation, mulching and cultivation with minimum tillage	A similar course can be offered for fisheries and veterinary aspect as an option for the student
Soil health and biomass recycling . Concept	Soil organic matter, management of soil microorganism, biodiversity, and environment management	
Integrated farming	Integrated agriculture definition, principles, types, components and indigenous technical knowledge and practices, Revolution of organic matter,	

	waste recycling, efficient fertilization use etc.	
Crop production and management	Crop production with CSA, procedure, and operations	A similar course can be offered for fisheries and veterinary aspect as an option for the student
Use of diverse varieties in CSA	Drought, slant, flood-tolerant varieties intention technologies and production technologies	A similar course can be offered for fisheries and veterinary aspect as an option for the student
Crop diversification and livelihood modification	Crop diversification, Integrated farming, inter, mixed, crop production	A similar course can be offered for fisheries and veterinary aspect as an option for the student
Organic farming (OF)	Principles and practices of OF, Standards of Organic Production (crop, livestock & Fisheries), management of resources	
Participatory seed production	Usage of standard seed and well-adapted planting materials, traditional varieties and relevant issues, natural selection of plant genetic material, development of crop variety creation of village seed bank	A similar course can be offered for fisheries and veterinary aspect as an option for the student
Water and water resources management	Strategies of weathering and drying (AWD) Methods of water collection and saving Vegetable Micro Irrigation technique	
Market Value Chain	The sustainable value chain of crop, animal, and fisheries , Analyzing the performance of the supply chain Analyzing the chain actors	

Harvesting and Post-harvest Management	Care of harvest & post-harvest Limited field machines to conserve moisture Timely harvest mechanization, systems of post-harvest, security of food and agriculture after harvest, Factors that impact post-harvest adaptive capability	
Insurance in Agriculture	Insurance in Agriculture in Bangladesh, Context , Present scenario, Lessons obtained from other nations	
Integrated Pest Management (IPM) in Agriculture	Resistance varietal development, Strategy to focus on an ecosystem, ecosystem approaches, Disaster management due to pest, Analyze the essence of outbreaks of pests, Reduce insecticide use / Pesticide alternatives	
Climate information services and management	Data on the environment services, The history of the Meteorological & Hydrological Department, Traditional climate prediction methods	
Agricultural Policy and Management	Environment Smart Agricultural Strategy, CSA's primary goals: adaptation, mitigation, the establishment of a climate-smart village	
Extension Approaches in CSA	Challenges and Viewpoints, demonstration plot, Farmer Field School / Participatory Process, farmer to farmer technology adaptation, Food protection, food security, market place	
Gender Equality And Social Inclusion	Impacts of climate change distinguished between the sexes; in agriculture, the gender gap and its gender representation and other classes of drawbacks	

Along with the theoretical courses, many practical classes or field attachments should be required for this degree. A climate expert in FAO in Bangladesh also explained the necessity of these valuable experiences:

We have many students with some good certificates, but they have no practical experience to work in the field. I believe this course should emphasize not only theoretical knowledge but also practical experience. I think that attachment with different organizations, including NGOs, should be a part of this program; otherwise, the student will not acquire any practical knowledge.

(September 8, 202

Chapter Seven: Employers' Perception of Preferred Job Market for Future CSA Graduate

Key Informant Interviews (KIIs) has identified ten categories of jobs that the CSA graduates will be qualified for. Chapter 2, section 2.2 of this report, explained how key informants' perceptions of CSA graduate employability were ranked and scored.

Among the fifty respondents, 12 from different research organizations, ten from NGOs, or development organization. Details of the respondent shown in Table 3

Table 3: Type of organizations and their number of participants in the survey for ranking

Sl. No	Types of organizations	Number	Percentage
1	Universities	8	16.00
2	Research organizations	12	24.00
3	Private companies	5	10.00
4	Extension organizations	8	16.00
5	NGOs/ Development organizations	10	20.00
6	International Organizations working in agriculture and climate change	7	14.00

From the perceptions of the respondents, the most suitable jobs for CSA graduates will be in: NGOs/ Development Organisations, International Organisations working in agriculture and climate change, and consultancy in agricultural organizations.

Other ranked possibilities are shown in the Table and Figure below.

Table 4: Categories of jobs for CSA graduates in different organizations, employers' perceptions and rank

Job Types	R ₁	W ₁ = R ₁ ×10	R ₂	W ₂ = R ₂ ×9	R ₃	W ₃ = R ₃ ×8	R ₄	W ₄ = R ₄ ×7	R ₅	W ₅ = R ₅ ×6	R ₆	W ₆ = R ₆ ×5	R ₇	W ₇ = R ₇ ×4	R ₈	W ₈ = R ₈ ×3	R ₉	W ₉ = R ₉ ×2	R ₁₀	W ₁₀ = R ₁₀ ×1	Total Score Σ K _i - W ₁₀	Final Rank
1. Government jobs (including research organizations)	5	50	3	27	3	24	3	21	6	36	3	15	5	20	4	12	8	16	10	10	231	8
2. Private sectors jobs (except NGOs)	4	40	3	27	5	40	2	14	7	42	8	40	6	24	4	12	6	12	5	5	256	7
3. Teaching in universities	2	20	1	9	1	8	2	14	5	30	4	20	7	28	8	24	10	20	10	10	183	10
4. Banking and Finance sectors	1	10	3	27	4	32	4	28	4	24	4	20	4	16	7	21	9	18	10	10	206	9
5. Agri-entrepreneurs	5	50	5	45	6	48	8	56	1	6	6	30	6	24	4	12	4	8	5	5	284	5
6. Consultancy	5	50	8	72	4	32	7	49	6	36	6	30	5	20	4	12	2	4	3	3	308	3
7. Higher education	3	30	8	72	4	32	5	35	8	48	6	30	5	20	7	21	2	4	2	2	294	4
8. Hired jobs	2	20	7	63	5	40	4	28	5	30	6	30	7	28	5	15	6	12	3	3	269	6
9. NGOs/ Development organizations	16	160	9	81	10	80	7	49	2	12	2	10	1	4	1	3	1	2	1	1	402	1
10. International Organizations	7	70	3	27	8	64	8	56	6	36	5	25	4	16	6	18	2	4	1	1	317	2

Note: R= Rank, W= Weight

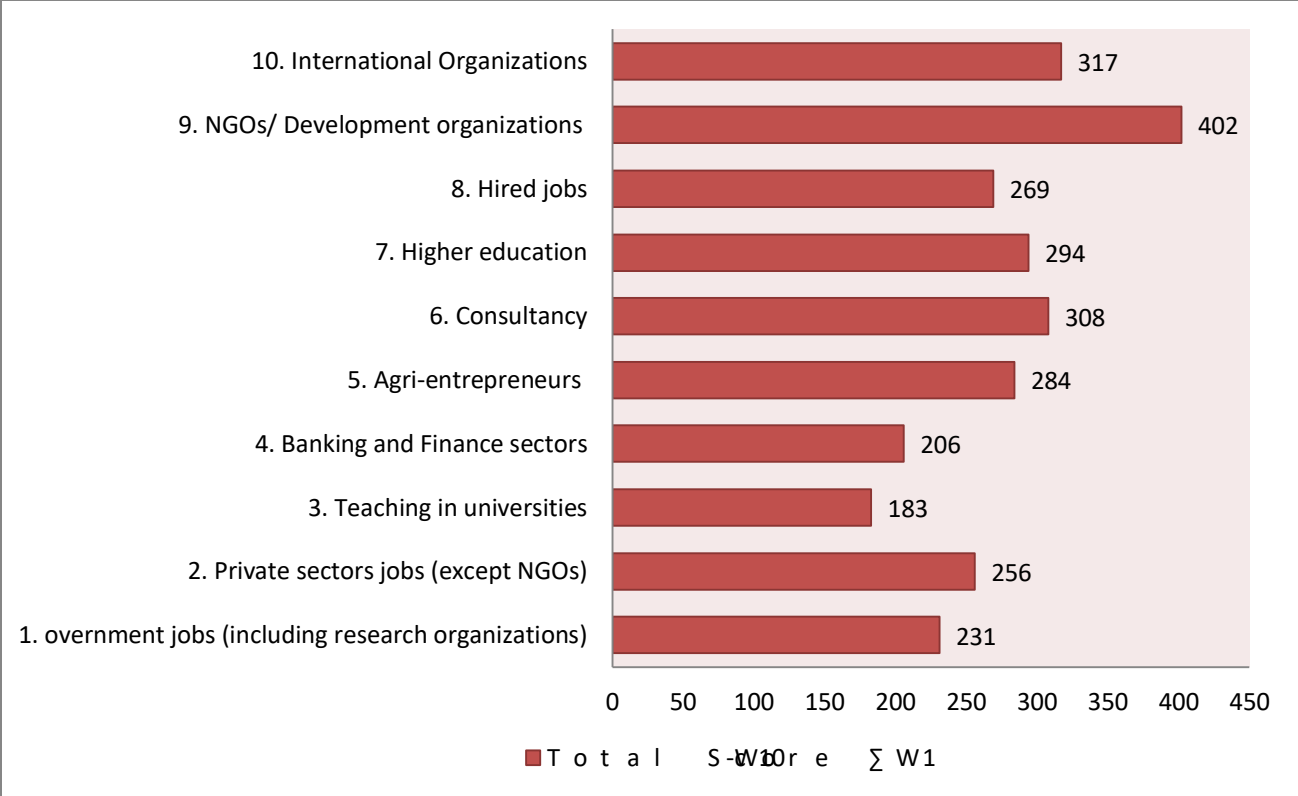


Figure 4: Ranked Preferences for Employment Possibilities for CSA Graduates from Key Informant Interviews

Chapter Eight: Practical Knowledge and Skills Required for Employability of Future CSA Graduates

Climate change is a crucial issue in Bangladesh, and the country regularly suffers from various climatic hazards, as explained in Chapter 1 of this report. To address these issues of climate change, the graduates and postgraduates in the climate-smart agriculture course need comprehensive practical knowledge and skills related to them. A balance between theoretical (soft skills) and practical experience (hard skills) is needed.

A short survey conducted among students at the Ban Ki-moon Institute for Sustainable Development at KazNU found that 74 percent of respondents believe that "soft skills" are essential for success in professional life after graduation, while 26 percent believe that "hard knowledge" is more essential.

From the opinions of experts, including academics, scientists, agricultural extension workers, and development experts, the students in the field of CSA need to be well-equipped with practical knowledge and skills in the following areas:

- I. Variety Development/Breeding program
- II. Communication skills
- III. Extension Approaches for CSA
- IV. Advanced digital skills
- V. GIS and remote sensing
- VI. Statistical techniques and modeling (Python program, big data analysis)
- VII. Instrumental knowledge
- VIII. Hydrology
- IX. Analytical chemistry
- X. Gender sensitivity

8.1 Variety Development/Breeding Technologies

Climate change consequences in Bangladesh are location-specific based on climatic parameters. For example, salinity intrusion in the southern part of the country, drought in the northern region, waterlog in *Haor* areas, floods in the riverine areas, landslides in hilly areas, etc. To combat these consequences, varietal improvement in agriculture is essential. We need a location- and problem-specific crop variety/breeds to increase and sustain productivity. An expert from BARI (Chief Scientist) working in the Southern region commented on the salinity issue as:

"Present salinity concentrations have already threatened crop production in the coastal area. The introduction of drip irrigation systems may go a long way in alleviating soil salinity problems. There is also a need for educating farmers about varied salt tolerance levels of different crops so that they could choose appropriate crops for cultivation. Development and adaptation of salt-tolerant rice and other crops and fish species seem to be necessary steps for combating salinity problems in coastal Bangladesh before its complete inundation by sea-level rise. He praised the idea of an M.S. degree in CSA to be initiated at PSTU and suggested graduates should be skilled in handling breeding programs more efficiently as we need more specific varieties. (September 15, 2020)

Hence, besides theoretical knowledge, graduates must gain practical knowledge and skills in various development aspects. In this regard, students must be well-aware of the practical skill of crop breeding technologies. Students can engage with breeding research in the regional stations of research institutes in Bangladesh, for example.

8.2 Communication skills:

Strong communication skills have become essential to stay competitive in job markets today and will be more so tomorrow. A graduate may have good academic results but, if he lacks communication skills, he will not work effectively with other people, which is necessary for agricultural support services. Then his knowledge and experience will have few outputs. Students with modern, practical communication skills can significantly boost success in technology dissemination and adaptation.

A climate change expert from a leading NGO (BRAC) stated:

"The agricultural graduates always lack communication skills compared to graduates in other social sciences. But they need such skills, as they are dealing with farmers, local people, researchers, development partners, and policymakers. You can have the brightest and most innovative idea, but if you fail to communicate it to the farmers, friends, and colleagues, the idea will be lost. To achieve these skills, students be given practical training in field attachments with farmers and farmer groups during their course".

(August 30, 2020)

American billionaire Warren Buffett highlighted "learning communication skills such as public speaking" among the top skills for success, not only in the world of business but also in every other field. Business and agriculture are both about doing things, not merely thinking or studying. Doing things, in most cases, requires working with other people. Effective communicators simply work with other people more effectively.

So, comprehensive communication skills are required by the graduates of CSA courses so that they can turn scientific knowledge into progress on the ground.

7.3 Extension Approaches for CSA

GFRAS (2012) argues that new global challenges such as declining water availability, increasing soil degradation, and changing and uncertain climate and markets mean that today's agricultural extension systems are very different from those in the past. Today, the extension comes "in many sizes and shapes," and a distinction between the extension approaches as such (e.g., participatory training approach) or the main underlying principles of the advice (e.g., organic production) is not absolute (Davis, 2009). However, all extension systems share the common challenge of how to best respond to climate change. This is amplified by the fact that CSA considerations in extension strategies can still be considered as new.

A Professor in Extension Education from Hajee Mohammad Danesh Science and Technology stated:

"There are several ways that extension systems can contribute to CSA. The choice of approach combinations by the graduates in CSA can influence the ability of extension services to contribute to food security and income, adaptation and resilience, and climate

change mitigation. They have to learn practical knowledge about innovative extension approaches to deal with the adverse impacts of climate change" (September 15, 2020).

Table 5: Different Extension Approaches Which Can Be Used In Climate-smart Agriculture

S.I. No	Approaches
1	Climate Awareness programmes/ Campaigns/Exhibition
2	Climate pieces of training
3	Climate Workshops
4	Plant Clinic
5	Plant Health Rallies
6	Climate Field School
7	Contingency Crop Planning
8	Exposure visits
9	Appointment of Climate/monsoon manager in villages
10	ICT supported Network
11	Demonstration
12	Climate-Smart Villages
13	Farmer-to-Farmer Extension (F2FE)
14	Agro-metrological Advisory Service Centres

CSA graduates need to acquire intensive and practical knowledge of all of these methods such as when to apply each, which is best in which circumstances and how to apply them when and as needed.

7.4 Advanced Digital Skills

Advanced digital skills e.g. social media, computer software, artificial intelligence, etc. have become increasingly important in this present technological era. Every day and in every sphere of life, people are dependent on current and new technologies. Many of the largest companies, reputed corporations, international organizations, even different government agencies, have already incorporated information and communication technologies (ICTs) as their primary mechanism. Other institutions are also adopting

various digital devices to conduct regular activities. For example, in the pandemic COVID-19 situation, all official work, educational and other activities have been going on via digital media as people could not gather to work together and had to work together virtually.

In Europe and across sectors, more than 80% of employees and professionals need digital skills. In large workplaces, at least 50% workforce is required to have specialist digital skills. A professor from PSTU commented:

"In this work environment, basic knowledge of computers is not sufficient. Employers demand recent graduates to be capable of doing everything in digital form. For such a specialized field (CSA graduates) digital skills will be essential to perform their jobs in the future." (September 15, 2020)

7.5 GIS and remote sensing

To work with climate-smart agriculture (CSA), practical knowledge of GIS and remote sensing is essential. GIS is a computer-based tool used for mapping and analyzing future events on the globe. It helps to collect information, analyze spatial data, and present various statistics e.g., types of vegetation, population characteristics, economic development opportunities, etc. Remote sensing is, on the other hand, measurement on the earth by airplanes or satellites using sensors. These sensors collect data in the form of images and provide specialized capabilities for manipulating, analyzing, and visualizing them. Remote-sensed imagery is integrated within a GIS.

A research expert from Centre for Climate Change and Environmental Research, Khulna University, said:

"Every field and every profession has its own set of particular and narrowly-defined essential skills. For coming CSA graduates, competent skills in GIS and remote sensing are mandatory for describing events, predicting outcomes, and planning strategies on climate change issues. It's my pleasure to hear that PSTU will open a course on CSA, and I would request the concerned authority to be aware of this matter, so that graduates can get the opportunity to receive hands-on training and gain capabilities to work in field-level" (August 25, 2020).

CSA graduates should be competent in application of remote sensing techniques, through which they can perform activities like crop identification, crop stress detection, yield forecasting, soil moisture, air temperature assessment, drought monitoring, wasteland identification, management & monitoring of crop disease and pest infestation, etc for agricultural applications.

7.6 Statistical Techniques And Crop Modeling

Besides theoretical knowledge on statistics, graduates in CSA must be virtuosos in the practical application of statistical techniques and crop modeling, e.g., crop weather models, growth and yield prediction models, crop simulation models, etc. Without reasonable knowledge and skills on these issues, they cannot be successful in field-level actions. They must have software knowledge for climatic data generation and management. E-management of data is also essential from a practical point of view. By developing and training these skills and abilities, graduates can solve environmental-parameters-related problems.

7.7 Instrumental knowledge

Graduates in CSA may have to work in Agro-meteorological observatories where they have to use various instruments to measure temperature, rainfall, evaporation, atmospheric pressure, sunshine duration, solar radiation, wind direction, wind speed, and relative humidity. They may even have a leadership role in site selection and installation procedures for meteorological instruments to set up meteorological observatories.

A Chief Scientist from the Bangladesh Wheat and Maize Research Institute (BWMRI) stated :

We taught students many theories in the undergraduate and graduate courses. How much can they practically apply from all that? When fresh graduates join the BWMRI, they even do not know how to operate a simple machine, how to take rainfall and sunshine data. This is a horrible feature of our education system. We have to think about it. We must include practical skills in our courses" (September 10, 2020).

Chapter Nine: Gender Awareness and Competency Needed for the CSA Students

The accepted procedure for addressing the gender gap in agriculture is by adopting a gender-responsive approach. In practice, this means that the differentiated needs, priorities, and realities of men and women are recognized and adequately addressed in the design and application of climate-smart agriculture, so that both men and women can equally benefit (World Bank, 2011; FAO, and IFAD, 2015).

Natural disasters, including droughts, landslides, floods, and hurricanes, are the main consequences of climate change. Due to climate change, women are becoming more vulnerable in the decision-making and labor sectors, which compounds discrimination. Sometimes, the combination of discrimination and greater vulnerability hinders women from contributing fully to climate change preparation, policymaking, and execution.

However, women should play their role in response to climate change because of their local experience and involvement in strategic land use and sustainable initiatives at the household and community level. The inclusion of women in contributing to climate change leads to a more robust response to people's needs. At a local level, women's engagement can help effectively to promote initiatives and strategies about climate change. If policies or services are introduced with women's participation, existing inequalities will decrease proportionally over time.

In Bangladesh, women are innovators, creators, and advocates in coping with climate change every day. They use their local knowledge of natural capital in changing household and neighborhood environmental practices to adapt to the effects of climate change. Thus, strategy and procedures should include an inclusive and well-thought-out role for women. For example, in Dacope, Bangladesh, where the source of water is environmental-fragile, and water is highly saline, children and adults of the areas have been suffering from skin diseases, stomach disorders, and waterborne infections. Their only water sources are the ponds and canals, which are contaminated with seawater.

Women in this area started recycling water, removing impurities as they recycled, using their local technologies. Around 1,300 inhabitants of the village are now using safe water for drinking at a low price. Thus a climate expert from FAO, Bangladesh reported :

In Bangladesh, women have been using some indigenous technologies to face climate change effects for a long time. Women developed this expertise inherently as an adaptation technology. Therefore, I believe the students in the CSA program must know about the rural technologies that are being used by rural women. I think a course related to gender studies and social inclusion should be mandatory in the CSA Institute (September 01, 2020).

A Director from ASA (an international NGO based in Bangladesh) also provided a similar statement:

Gender and development should be an introductory course in every bachelor's degree in Bangladesh. We face many practical fields, as many students did not learn about this in their studies. Particularly students who studied science do not know about it. I believe it should be a compulsory course for all subjects in Bangladesh tertiary education. CSA students must work with all levels of people in the rural area. Therefore, they should be taught proper sensitivity about gender issues" (July 20, 2020).

Climate-Smart Agriculture is a kind of integrated approach to address the consequences of climate change. The entirety of humanity is affected by the adverse effects of climate change. Hence, women, comprising around 50% of the population in Bangladesh, cannot be overlooked or left out of the process. Understanding gender issues is crucial to deal with climate change and achieve climate-smart agriculture effectively. If CSA graduates lack in this aspect, their strategies for climate-smart agriculture in Bangladesh can only do half the job. A Professor from the University of Rajshahi, a gender specialist, explained:

Due to different gender roles and the related constraints, men and women may have different ideas, perceptions, and knowledge about the climate risks, e.g., how it may affect their livelihoods and how to respond to this challenge. They also have differential access to the resources and services needed to adopt climate-smart practices. So, graduates in this field should look at gender-specific vulnerabilities

and manage them through a gender-responsive approach in climate-smart agriculture." (September 05, 2020)

In Bangladesh, women always get lower wages than men (almost half), and gender productivity gaps exist in agriculture. Due to gender discrimination, women have fewer privileges, entitlements, and empowerment. They frequently face more challenges than men in accessing, using, and controlling productive resources and services, such as land, water, credit, inputs, technologies, information, knowledge, education, extension services, markets, and weather and climate information. Such discrimination often makes them more vulnerable and stifles their adaptive capacity to adjust to different climate threats. A professor from PSTU mentioned:

"Gender-specific strategies should be taken in the context of climate-smart agriculture. Women can equally access natural resources such as land or livestock, services (Government & private), and business opportunities and thereby make a significant contribution to productivity and income generation. (September 09, 2020).

It has been estimated that closing the gender gap in agriculture would reduce hunger by 100. 150 million people in the world (FAO, 2011). Therefore, interventions like CSA must be gender-responsive to bring about sustainable and resilient rural livelihoods. A gender specialist from UNICEF Bangladesh commented:

CSA initiatives to be established in PSTU need to be gender-responsive, and the curriculum should include gender awareness courses that could make the graduates competent in the conceptualization, design, and implementation of CSA programs and projects. CSA initiatives need to mean respect for gender and equity by focusing on women's access to resources and in development processes from top to bottom. (September 15, 2020).

Besides, fundamental changes in the institutional structures and policymaking processes through which CSA activities will be implemented should be carried out. By doing this, the implementers of CSA approaches will give full effect to their potential role

in addressing existing gender inequalities through their work. A Professor in Environmental Science emphasized:

"An Institute seeking to produce CSA graduates should implement comprehensive plans for incorporating gender into development projects. This planning requires allocation of resources, in the form of finances, and of skilled technical human resources, to develop plans and activities to equip CSA implementers with the skills to successfully include gender in their own plans and activities."
(September 05, 2020).

Hence, CSA initiatives should concentrate on gender-inclusiveness capacity-building programs for the CSA students through proper training and practical classes in mainstreaming gender into program/project activities. A common understanding and general awareness by the graduates in CSA of applying technical approaches for gender inclusion can improve the outcomes and sustainability of CSA initiatives.

Necessary steps and plans should be taken to ensure that both men's and women's needs and voices are taken into account in CSA projects from the very beginning. Further, institutions also need to pay attention to gender in CSA initiatives supported by donor agencies, development partners through the financial backup, and a Government with strong political will and commitment to address gender discrimination. CSA has to achieve resilient and sustainable technologies and livelihoods. A Development Officer, working an NGO in the coastal area, commented:

CSA has a great opportunity to help smallholder female farmers achieve food security as they are mostly engaged in post-harvest crop processing, livestock, and poultry-rearing in their homesteads. So, they could be the target group in adapting CSA technologies and mitigating further climate change. Besides, they also have vast knowledge and experience of indigenous technical knowledge (ITK), which is essential to mitigate climate change dangers." (September 15, 2020)

The strategic relationship between partnerships, engagement, and gender needs to be understood, emphasized, and fostered to make it fruitful. It is assumed that a team of diverse gender perform better than a gender alone can do. Therefore, the future graduate who will work internationally with people of different sex, race, ethnicity, and special needs must be gender sensitive. Lack of gender sensitivity sometimes leads under-participation, dissatisfaction and even violation of human rights. On the other hand it is matter of learning how to be gender sensitive or what is meant by gender blind.

PSTU's CSA course must not fail to address gender and make graduates gender-sensitive and gender-inclusive because this issue was raised by so many of the key informant potential employers. It is on their minds, and CSA graduates who do not know how to address gender issues effectively in crafting CSA activities and solutions will profoundly disappoint them. The CSA graduates need to be a dynamic source of expertise and skills to make positive changes among the farmers and other stakeholders for better problemsolving which fully involves and respects women. It is another reminder of an obvious fact which environmentalists must never gloss over: CSA is about the climate but must never forget the people involved.

Chapter Ten: Conclusions and Recommendations

We come back to the basic truth, where we started this report: Bangladesh is one of the most climate-vulnerable countries in the world. The proof is everywhere, and we know well about it. On the agriculture side, a 4°C rise in temperature would give Bangladesh a 28% decline in rice production and a 68% fall in wheat production: the simple meaning of that is mass hunger. According to the National Adaptation Program of Bangladesh, the sea level on the shore of Bangladesh grows at about three millimeters a year. Salinity penetration increased by 27% from 1973 to 2009. Approximately 30-50% of farmland is uncultivated due to salinity, sewerage, and drought. The rising salinity levels are creating a problematic situation in rice production and an irrigation water shortage. Should Bangladesh have an Institute focusing on CSA? No one said that we should not, and almost all experts warmly welcomed the idea. The question is now a no-brainer. The critical question is not the CSA Institute's existence but whether it can be designed in a way that meets the needs of those working to create climate change resilience in Bangladesh. So that they will welcome the graduates with the same enthusiasm as they now welcome the idea which creates them.

Ask the experts, as your consultant did, and they are clear and vocal about what they need to help spread the usage of climate-smart agriculture in Bangladesh to the point where it significantly strengthens the climate resilience of Bangladesh agriculture:

- (1) First, mainly, they need a CSA Institute which is an engine of research, giving them new knowledge and new ideas which helps them to make CSA work in Bangladesh: if they get that, the benefits will rebound on to the CSA graduates; if they do not get that, the CSA graduates will also be affected when they seek jobs but in the worst way. To the extent that graduates can have been involved in that research, it must help them look more competent.

- (2) Second, they need an efficient sort of graduate, who knows the field and has had a lot of experience there, who understands and can

communicate with people in the area, who knows the technical side of how to monitor the weather and how to use the machines he/she will encounter. Practical skills should take up much more of the MS-CSA's study time than it usually does in Bangladesh if the Institute wants its graduates to be assets in the war for climate resilience.

- (3) They want graduates need to be gender-sensitive and to understand how to fully involve women in their solutions with respect and impact: this may start with a compulsory paper in gender and development but must permeate the course and all the theoretical and practical experiences the students get.
- (4) They want graduates with diverse backgrounds, not just BSc Agriculture, so BSc Fisheries, BSc Veterinary Studies, and BSc Environmental Studies graduates, among others, should be welcomed on to the course, because CSA is inherently interdisciplinary.
- (5) Although PSTU is on the coast, they want CSA graduates who have been educated to work anywhere in the country and understand the climate problems of every Division, nor should all the practical work be on the coast and about salinity.
- (6) They want CSA graduates with some passion and belief that CSA is the most important job they could be doing, whether in the State sector, the private sector, or the NGO/IO sector, not disappointed Civil Service wannabes taking the best they could get, which must come by careful, targeted recruitment of students, not just assessing BSc results.

What the experts and fighters for climate resilience in Bangladesh want and need is a CSA Institute which is more like a Dutch University than a Bangladeshi one: a place where research is a priority for faculty and students alike; where practical skills are imparted, not just theories memorized; which is gender-sensitive and makes gender-

inclusiveness part of everything the graduates do; where students are recruited by their passion, interest, and belief in the subject, not just examination results.

If PSTU's CSA Institute can be constructed as such an institution, it will be a different thing than one sees in Bangladesh's tertiary sector, its graduates will have a much higher employment percentage than that of most tertiary institutions in Bangladesh, with unbeatable competitive advantages, and it will be a trend-setter. It may be the best University in Bangladesh by international standards. CSA is a new subject for new times. It is one of the most important subjects for the survival of the world. Perhaps it needs the best University in Bangladesh. It is worth a try.

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11.0 LIST OF ORGANIZATIONS INTERVIEWED

11.1 Government and autonomous organization

The intended interviews with government and autonomous organizations are as follows :

- < Bangladesh Agricultural Development Corporation (BADC)
- < Bangladesh Agricultural Research Council (BARC)
- < Bangladesh Rice Research Institute (BRRI)
- < Bangladesh Agriculture Research Institute (BARI)
- < Bangladesh Sericulture Development Board(BSDB)
- < Bangladesh Sugar crops Research Institute (BSRI)
- < Department of Agricultural Extension (DAE), Ministry of Agriculture (Bangladesh)
- < Rural Development Academy(RDA)
- < Bangladesh Wheat And Maize Research Institute (BWMRI)
- < University of Rajshahi
- < Sher-e-Bangla Agricultural University
- < Bangladesh Water Development Board
- < Khulna University
- < PSTU

4.2 NGOs

The intended interviews with NGOs are as follows

- < BRAC
- < ASA
- < ThengamaraMohilaSabujSangha (TMSS)
- < CODEC

4.3 International Organizations

- < Caritas . Bangladesh
- < CARE- Bangladesh
- < FAO Bangladesh
- < ICCO Corporations

- < WorldFish
- < UNICEF Bangladesh
- < World Vision Bangladesh

Appendix

Appendix-I: Key Informant Interview Guide for the employers

(e.g. Research organization/ Extension agents/ Academic organizations/ Marketing organizations/ NGOs)

Title: Assessing Labour Market for the Future CSA Graduate

Name of the key informant-----Designation-----

-

Address-----

Contact-----Date of interview-----

I am thankful to you for allocate me some time from your busy schedule. I am Dr A.K.M. Kanak Pervez, Associate Professor, Dept. of Agronomy and Agricultural Extension, University of Rajshahi, Rajshahi-6205, Bangladesh. Currently, I am conducting a study titled **Assessing Labour Market for the Future CSA (Climate Smart Agriculture) Graduate**. The work is basically for the assessment of the prospect for the graduates of the forthcoming degree, M.S. in CSA, planed by PSTU through CSA Institute. In this study, you are one of the key informants. In this regard, I am seeking some information related to the title. Your information will be used only a study purpose, the information that you will give will keep anonymous. Please answer my questions as follows:

1. What is your opinion about the future CSA Institute at PSTU?
2. Do you think it will be beneficial for the student to get a degree from the CSA Institute particular the present job market in Bangladesh?
3. Why? Explain Please.
4. Do your organization needs such kind of graduate? Why?
5. Can you explain what will be the core course for this program?
6. Please explain what level of knowledge of the graduate require for the task.
7. Please explain the level of skill you wish to see as an employer.
8. What kind of gender awareness as a competency you suggest to work in your organizations or other relevant organizations to work successfully work with group of peoples?

9. How the education program should takes care of different needs of male and female students?

8. Please also rank-out the name of significant employers organizations.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

9. Please explain the competitive advantages and disadvantages of CSA degree with the general agricultural degree.

Sl. No.	Advantage of CSA graduate in Job Market than general MS degree in agriculture	The disadvantage of CSA graduate in Job Market than general MS degree in agriculture
1.		
2.		
3.		
4.		
5.		
6.		

7.		
8.		
9.		
10.		

10. What will be the future need of CSA graduates in Bangladesh.

Why? Explain please.