SCHOOL OF AGRICULTURE AND RURAL DEVELOPMENT

Master in Sustainable Agriculture and Rural Livelihood

Handbook

বাংলাদেশ উন্মুক্ত বিশ্ববিদ্যালয়
BANGLADESH OPEN UNIVERSITY

School of Agriculture and Rural Development (SARD)

A Handbook

on

Master inSustainable Agriculture and Rural Livelihood (MSARL)

Bangladesh Open University (BOU)
Gazipur-1705, Bangladesh

Bangladesh Open University
Gazipur-1705, Bangladesh

A Handbook on Master in Sustainable Agriculture and Rural Livelihood (MSARL)

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Deans' Message

Dear Learners,

Congratulations on having the opportunity to attend the Master in Sustainable Agriculture and Rural Livelihood (MSARL) program of the School of Agriculture and Rural Development.

Bangladesh's access to higher agricultural education is limited due to the number of seats at related universities. BOU is the only alternative in the country to allow students to afford the educational cost while maintaining their jobs and other responsibilities. Regular and working people with a minimum Bachelor of Agricultural Education (BAgEd) or Bachelor of Science (BSc) or any graduates in relevant disciplines with no age bar are welcome to the MSARL program of SARD.

Bangladesh is an agricultural country with an area of 147,570 sq. km and a population of 160 million. Over 50% of the total areas in Bangladesh are cultivated. Most of the population depends on agriculture and natural resources for their livelihood. The School of Agriculture and Rural Development (SARD) imparts education through the blended mode comprising formal and nonformal agriculture programs to boost knowledge about different agricultural commodities, including crops, poultry, dairy fish, and rural development.

BOU authority has taken initiatives to produce professionally sound people, emphasizing higher education and agriculture research. Therefore, an Agricultural Research Laboratory with modern equipment and facilities has already been established at the BOU main campus. The main objective of the MSARL program is to provide more skilled human resources for the agriculture and rural sectors of the country for its greater interest. This handbook is designed to help you understand the program's necessity, rules, and regulations.

Thank you again for your interest in the MSARL program of the School of Agriculture and Rural Development. My sincere gratefulness to those who spent valuable time preparing this handbook.

Prof. Dr. Md. Serazul Islam
Dean
School of Agriculture and Rural Development
Bangladesh Open University

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Bangladesh Open University (BOU) at a Glance

Chancellor	Mohammed Shahabuddin Honorable President of the People's Republic of Bangladesh
Vice-chancellor	Professor Dr. A. B. M. Obaidul Islam
Pro-vice Chancellor (Academic)	Professor Dr. Dil Rowshan Zinnat Ara Nazneen
Pro-vice Chancellor (Administration)	Professor Dr. Sayeed Ferdous
Treasurer	Professor Dr. Abul Hasnat Md. Shamim
Established	October 21, 1992
Location	Board Bazar, Gazipur
Area	35 acres
No. of Schools	6
No. of Divisions	11
No. of Regional Centres (RC)	12
No. of Sub-Regional Centres (SRC)	80
No. of Study Centres	1547
Formal Programs	67
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Teachers (Full-time)	147
Teachers/Tutors (Adjunct)	22961

(Source: https://www.bou.ac.bd/About/BOU)

Vision, Mission and Objectives of Bangladesh Open University

Bangladesh Open University strives to ensure education for all in the country through the open and distance learning system and to excel as a caterer of higher education.

The mission of BOU is to spread quality education, both general and need specific, among all sections of citizens of the country irrespective of their age, gender, religion and caste in a flexible manner by using a suitable mixture of educational media and technologies.

The objectives of BOU are to spread multimedialy instruction of every standard and knowledge, both general and scientific, by means of any kind of communications technology, to raise the standard of education and to give the people educational opportunities by democratizing education and to create a class of competent people by raising the standard of education of the people generally.

Educational System of Bangladesh Open University

Welcome to ODL and the blended mode learning system in Bangladesh Open University. Through a wide variety of distance education programs, Bangladesh Open University extends the learning opportunities to the people all over the country. It allows you to choose your home as your campus and integrate the learning into an adaptable, self-determined schedule.

Bangladesh Open University uses a mix of media considering the access and affordability of the students. The choice of media varies from program to program. Both synchronous and asynchronous media are chosen for the effective delivery of the courses. The media used so far

in BOU programs are: print & e-books, lectures, Education Apps, Radio & TV programs, Web TV and Web Radio, Interactive Virtual Class Room (IVCR) supports, Learning Management System (LMS), internet, email, face book, etc. Recently a number of audio and video programs have been uploaded into the YouTube and mobile set compatible memory card containing the e-books and audio-visual materials is being provided to students. Now the students are able to browse their study materials on their mobile set. BOU has implemented Web TV & Web Radio where the students are able to watch the tutorial session live streamed directly from the classroom.

We hope that our commitments to distance learning will facilitate your pursuit of knowledge relevant to your life and career.

School of Agriculture and Rural Development (SARD) at a Glance

Bangladesh Open University (BOU) was established in 1992 with the aim of providing a wide range of formal and non-formal education, effectively meeting the diverse needs of the population. It is evident that agricultural education plays a vital role in the economic and social development of agro-based Bangladesh. Approximately 80% of the total population, mainly residing in rural and remote areas, are engaged in various agricultural activities, making agriculture a national occupation for their livelihood. However, the provision of need-based education, updated practical information, and contemporary technical know-how to the grassroots level is not adequately addressed. To address this need, the School of Agriculture and Rural Development (SARD) was established in 1996. Currently, the school offers a range of programs, including PhD, MS in Agronomy, MS in Entomology, MS in Irrigation and Water Management, MS in Aquaculture, MS in Poultry Science, Master in Sustainable Agriculture and Rural Livelihood (MSARL), Bachelor of Agricultural Education (BAgEd), Diploma in Youth Development Work (DYDW), Certificate in Livestock and Poultry (CLP), and Certificate in Pisciculture and Fish Processing (CPFP).

To support these programs, SARD has set up laboratories and research farms at the main campus of BOU, equipped with sophisticated equipment. In addition to the existing programs, the authorities are working on launching new programs, such as Bachelor of Science in Agriculture (BScAg), Bachelor in Youth Development Work (BYDW), Certificate in Poultry Management (CPM), and Certificate in Fruits and Vegetables Processing (CFVP) to create opportunities for developing skilled manpower in the fields of agriculture and youth work. All academic activities are conducted under the direct supervision of the SARD faculty. They produce students' guides/handbooks, course books, and audio and video programs to support the educational experience. Furthermore, SARD faculty members actively engage in research, with their findings published in both international and nationally recognized journals and proceedings. Notably, SARD publishes the Journal of Agriculture & Rural Development (JARD) twice a year in English, featuring original research articles, short communications, review articles, case studies, and book reviews in the fields of agriculture, distance education, and related areas.

List of Faculty Members

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Sustainable Agriculture and Rural Livelihood: Bangladesh Perspective

Sustainable agriculture is defined as the efficient production of safe and high-quality agricultural products while protecting and enhancing the natural environment, improving the social and economic conditions of farmers and their communities, and safeguarding the health and welfare of all farmed species. On the other hand, sustainable livelihood refers to people's ability to earn a living and enhance their quality of life without compromising the livelihood options of others, both in the present and the future (UNDP). Sustainable agriculture and rural livelihoods are closely intertwined concepts, especially in developing countries like Bangladesh, where a significant portion of families relies on agriculture for their livelihoods.

Bangladesh currently has approximately 170 million inhabitants, with expectations of reaching 200 million by 2025. Around 80 percent of the population resides in rural areas, and the country's economy is heavily dependent on agriculture. However, the sustainability of the conventional agricultural system and rural livelihoods in Bangladesh is threatened by ongoing challenges in social, economic, and environmental sustainability. The issue of sustainable agriculture first gained prominence in Bangladesh in 1976 when an NGO called PROSHIKA initiated its ecological farming program. In the 1990s, several projects with support from various aid agencies were implemented by the government through the Department of Agricultural Extension (DAE). International organizations like CARE were also involved in addressing sustainable agriculture through projects like GOLDA, GOINTERFISH, and NOPEST, with more recent initiatives such as SHABGE, LMP, and Akti Bari Akti Khamar focusing on sustainable agriculture components. Today, the expansion of sustainable agriculture is a deliberate effort, with some NGOs and commercial organizations involved in organic farming and product marketing.

Education and development are closely linked, and a significant number of trained individuals are required to implement various policies in the fields of sustainable agriculture and rural livelihood in Bangladesh. To our knowledge, there is currently no formal educational program specifically focused on sustainable agriculture and rural livelihood in Bangladesh. However, the Bangladesh Open University (BOU) has recently introduced an educational program on sustainable agriculture. Some NGOs, such as PROSHIKA, UBINIG, BARCIK, and CARITAS, have taken limited steps in research and extension of sustainable agriculture (DFID, 2001). Additionally, various local and international NGOs have implemented Farmers Field School (FFS) and FFS-type activities in Bangladesh. The Government's Department of Agricultural Extension (DAE) also operates some FFS initiatives.

In response to the emerging agenda for agriculture and rural development in Bangladesh, the School of Agriculture and Rural Development (SARD) at the Bangladesh Open University (BOU) is launching a new program called the Master in Sustainable Agriculture and Rural Livelihood (MSARL). This proposed program will offer comprehensive knowledge to students, allowing them to adopt global sustainability standards based on agricultural practices in field crops, horticulture, livestock, and fisheries. The program aims to enhance the quality of agricultural production while considering socio-economic factors that impact rural transformation. The curriculum and delivery methods of this program will help students develop analytical, conceptual, communication, and research skills, preparing them for careers in the broader fields of sustainable agriculture and rural livelihood. Additionally, career opportunities will be available within government agencies, agricultural and rural development organizations, local development agencies, NGOs involved in sustainable rural development, as well as donor agencies and international development organizations.

Some Salient Points about MSARL Program

- **Aims and Objectives of the Program**

  The aim of the MSARL program is to provide a comprehensive knowledge to adopt global sustainability standards based on agricultural practices to improve quality production as well as socio-economic factors affecting transformation of the rural society developing analytical, conceptual, communications and research capabilities of the students in the broad areas of sustainable agriculture and rural livelihood.

  The main objective of the program to be offered by the School of Agriculture and Rural Development is to produce more skilled manpower for the agriculture sector in the greater interest of the country.

- **The Number of Courses and Credit Hours of the Program**

  The number of courses and credit hours of the MSARL program are as follows:

Number of semester	:	04 (Four)
Courses	:	15 (Fifteen)
Number of credit per course	:	03 (Three)
Project report based on field work	:	10 (Ten) Credit
Project defense	:	05 (Five) Credit
Total program credits	:	[(15×3)+10+05] = 60 (Sixty)

  Note: Each of the first three semesters carries 15 credits. Another 15 credits shall be earmarked for the project report and defense to be carried out in the 4th semester.

- **Language of the Program**

  The medium of instruction of the program shall be English and/or Bengali.

- **Semester of the Program**

  Each academic year shall be divided into two semesters as January-June and July-December.

- **Application Procedure**

  A candidate as per circular shall apply for getting admission into the program in the prescribed form which may be collected from the BOU website or from the respective RC or SRC and shall submit the duly filled-up application form with necessary papers to the relevant RC or SRC within the stipulated period of time. The RCs and SRCs shall send all the received applications to the Dean, SARD, BOU for necessary action.

- **Requirements to apply for the Admission into the Program**

  Applications will be invited from 'the office of the Dean, SARD, BOU to enroll students into the MSARL program through open competition. BAgEd degree holders of BOU or relevant Science Graduate of any recognized university/institution shall be eligible to apply for admission into the program. Preference will be given to the professionals who are working in NGOs, development organizations or in any private sector organization. The frequency of Admission circular in an academic year will be decided by the Admission Committee of MSARL program.

- **Selection Procedure for Admission into the Program**

  The selection of students for admission into the program shall be done on a competitive basis by assessing academic records and score in admission test (written and/or viva-voce). Activities, formalities and functions relating to the selection of candidates for admission into the program shall be determined by the Admission Committee of MSARL program.

- **Registration**

  (i) A student shall have to complete the registration formalities only for the courses when s/he will take the courses in the relevant semester.

  (ii) The registration of a student in the MSARL program shall remain valid for a period of 04 (four) years since the admission into the program, if s/he is not subject to:

  - cancellation or suspension of registration, or
  - discontinuation, or
  - expulsion for adopting unfair means or, disciplinary action

- **Cancellation of Registration**

  In the event of any misconduct or breach of any of the provisions of the regulations, the University authority may take necessary disciplinary action against the student concerned and may cancel his/her registration.

- **Student Identification Number**

  Each enrolled student shall be given a specific Student Identification (SID) number at the time of getting admission into the program. The student must use complete SID number for all purposes like CAs, examination, communication with the BOU and so on. The SID number shall have to be mentioned on the ID and Registration Card of the student.

- **Distribution of Marks**

  (i) Distribution of Marks of 4 semesters are as follows –

Semester	Details	Total Marks
1st	5 Courses	5 × 100 = 500
2nd	5 Courses	5 × 100 = 500
3rd	5 Courses	5 × 100 = 500
4th	i. Project work and report writing ii. Project defense	400 100
Total		**2000**

  (ii) Distribution of Marks of a Course

  Each course shall be evaluated within 100 (hundred) marks. The break-up of the marks shall be as follows:

Segments	Details	Total Marks
Class attendance	All classes	10
Course assignment	2 / Course	2 × 10 = 20
Semester end examination	1 / Course	= 70
Total		100

  Pass marks shall be 40% in each course.

- **Class Attendance Marks**

  Students shall get proportionate marks based on attendance in the classes.

- **Course Assignment (CA)**

  Student shall submit two assignments to his/her course teacher for every registered course during the respective semester within the specified date. If any student fails to submit CAs in any course of a semester they will be declared fail in that respective course.

- **Semester-end Examination**

  There shall be a semester-end examination. Duration of the examination of each course shall be of three (3) hours. At the end of each semester, students shall be required to appear at the semester-end final examination only for the courses offered in that semester.

- **Evaluation**

  (i) Course Assignment Evaluation

  Course assignment shall be evaluated by the relevant faculty of SARD, other schools of BOU and outside of BOU (if needed).

(ii) Semester-end Examination's Script Evaluation

One examiner shall evaluate the scripts of each course of the semester-end examination.

(iii) Report Evaluation:

Each report shall be evaluated by two examiners. Average of marks given by two examiners shall be the marks for the respective report. If the variation of marks given by two examiners is more than 20% for any report, a third examiner shall be appointed by the Examination Committee from the list of examiners approved by the authority provided that s/he was not an examiner of that report. S/he will evaluate that report and the average of the three marks shall be the marks for the report concerned.

- **Conversion of Marks into Grade Point**

(i) For every completed course, the marks obtained by a student in class attendance, respective CA and semester-end examination shall be totaled and this total marks shall be converted into Grade Point (GP) as per the following table:

Range of Marks	Letter Grade	Grade Point
80% or above	A^+ (A plus)	4.00
75% to less than 80%	A (A regular)	3.75
70% to less than 75%	A^- (A minus)	3.50
65% to less than 70%	B^+ (B plus)	3.25
60% to less than 65%	B (B regular)	3.00
55% to less than 60%	B^- (B minus)	2.75
50% to less than 55%	C^+ (C plus)	2.50
45% to less than 50%	C (C regular)	2.25
40% to less than 45%	C^- (C minus)	2.00
<40%	F (Fail)	0.00

(ii) A Student shall get individual GP for every completed course. In case of the completion of a number of courses, the 'Grade Point Average' (GPA) of those completed courses shall be calculated by using the following formula where the individual GP of every course and the respective credit of those courses will be taken into consideration.

- **Formula to Calculate CGPA**

Upon successful completion of the program requirements, CGPA of the student shall be calculated by using the following formula.

$$\text{CGPA} = \frac{\Sigma(\text{credit} \times \text{grade point})}{\text{Total Credit of the program}}$$

- **Requirements for obtaining the MSARL degree**

  Followings are the requirements for obtaining the MSARL degree

  i. Successful completion of 60 credit hours.
  ii. Secure a minimum 'Cumulative Grade Point Average' (CGPA) of 2.00.

- **Activities to be Considered as Adoption of Unfair means by a Student**

  The following activities will be considered as adoption of unfair means

  i. copying from another student's assignment/script/paper.
  ii. copying from writing on the desk, or palm of a hand, electronic devices or from other incriminating documents;
  iii. possession of any incriminating document whether used or not; and
  iv. unruly behavior or misbehavior with the invigilator(s).

  Adoption of unfair means may result in the punishment of the student as per the Disciplinary Rules of the BOU.

Curriculum Layout of MSARL Program

Courses of 1st Semester

SL. No.	Course Code	Course Title	Credit Hours	Marks
1.	MSARL 1301	Introduction to Sustainable Agriculture and Rural Livelihood	3	100
2.	MSARL 1302	Advanced Technologies for Crop Cultivation	3	100
3.	MSARL 1303	Sustainable Crop Protection	3	100
4.	MSARL 1304	Natural Resource Management	3	100
5.	MSARL 1305	Gender in Agriculture	3	100
Total 5 Courses			**15**	**500**

Courses of 2nd Semester

SL. No.	Course Code	Course Title	Credit Hours	Marks
1.	MSARL 2301	Rural Development	3	100
2.	MSARL 2302	Sustainable Aquaculture and Fisheries Management	3	100
3.	MSARL 2303	Sustainable Livestock and Poultry Production	3	100
4.	MSARL 2304	Climate Change and Disaster Management in Agriculture	3	100
5.	MSARL 2305	Research Methodology	3	100
Total 5 Courses			**15**	**500**

Courses of 3rd Semester

SL. No.	Course Code	Course Title	Credit Hours	Marks
1.	MSARL 3301	Agro Processing	3	100
2.	MSARL 3302	Agricultural Extension	3	100
3.	MSARL 3303	Food and Nutritional Security	3	100
4.	MSARL 3304	Entrepreneurship and Agribusiness	3	100
5.	MSARL 3305	Project Planning and Management	3	100
Total 5 Courses			**15**	**500**

4th Semester/Project Semester

SL. No.	Course Code	Course Title	Credit Hours	Mark
1.	MSARL 4121	Project work and Report writing	12	400
2.	MSARL 4032	Project defense	3	100
	Total		15	500

N.B. 1 course = 3 credits = 100 marks; Each course will carry 70 marks for theoretical examination (semester final), 20 marks for two course assignment & 10 marks for tutorial class attendance.

Syllabus of MSARL Program

Courses of 1st Semester

Course Title: Introduction to Sustainable Agriculture and Rural Livelihood
Course Code: MSARL 1301
Credit Hrs: 3

SustainableAgriculture: Definition and objectives of SARL, Concept on sustainable agriculture, Basic principles and issues, Historicalperspectiveof agricultural development and sustainable agriculture, Indicators of sustainable agricultural development, Difference between modern and sustainable agriculture, Advantages and disadvantages of sustainable agriculture

Managements Issues of Sustainable Agriculture: Agricultural sustainability through farming system, Conservation agriculture, Resource conservation technologies, Integrated nutrient management and organic farming, Indices of sustainability and sustainability coefficients

Technological Change in Agriculture: Theoriesoftechnologicalandinstitutional changeinagriculture, Greenrevolution, Consequencesoftechnologicalchangeand productivityin agriculture

Social Structure and Sustainable Livelihoods: Rural social structures, social change, power structures and good governance;Categoricalinequality, ascription, race, class, gender and otherbasesof inequality; Conceptoflivelihood and food security; Sustainable Development Goals(SDGs);Livelihoodstrategiesofhouseholds; Sustainable livelihoodsframework and agricultural household systems impact on rural livelihood

Agricultural Policy and Development Planning: Characteristics and role of agriculture,Linkagesbetween agriculture andindustry in thedevelopingcountries,Agriculturalpriceand fooddistributionpoliciesinBangladesh; Subsidyandoutputpricesupport,Social safety netprogramsforfoodsecurity, Stepsand strategiesofagriculturaldevelopment planning

Programs in Sustainable Agriculture: Programs related to sustainable agriculture and rural livelihood, Approachesto studysustainableagriculture and rural livelihood issues

Recommended / Supplementary Textbooks

1. Chandrasenkaran, B., Annadurai, K. and Somsundaram, E. 2014. A Text Book of Agronomy. 2014. New Age International (p) Limited Publishers. New Delhi.
2. Chambers R 1983: Rural Development: Putting the last first.
3. HayamiY and Aoki, m2001:Development Economics:Fromthepovertytothewealthofnations,2nd edition.Oxforduniversitypress.
4. HossainM1989:GreenRevolutioninBangladesh:Impactongrowthanddistributionof income.UniversityPressLimited,Dhaka
5. IFAD2009:Gender in Agriculture. Source Book.TheWorld Bank
6. RahmanL1995:SustainabilityofGrowth andDevelopment inAgriculture.BangladeshJournal ofPoliticalEconomy,Vol.XII,No.2, 139-152.
7. Yellamanda Reddy, T. andSankara Reddy, V. 2014. Principles of Agronomy. Kalyani Publishers. New Delhi.

Course Title: Advanced Technologies for Crop Cultivation

Course Code: MSARL 1302

Credit Hrs: 3

Introduction to Advance Technology for Crop Production: Concept, Scope and Importance

Crop Management: Agronomic management for improvement of yield and quality of crops, Water and Fertilizer Management

Orchard Floor Management: Cleaning, Spading and Weeding, Sanitation pruning, Frame working, Manuring, Technique to overcome alternate bearing, IPM / ICM

Quality Planting Materials (QPM): Grafts, Layers, Cuttage, Stionic relations, Compatibility and Top working

Special Cultivation Technologies: Organic farming, Crop production under stress condition (drought, flood and salinity), Farming system, Roof top gardening, Artificial pollination, Earthing up, Vine lifting, Mulching, Zero tillage production of Potato, Garlic and Aroids

Quality Seed Production: Isolation, Rouging, Balanced manuring and irrigation, Harvesting, Curing, Storing and Packaging, Seed policy, Certification and Quarantine

Application of Plan Growth Regulators (PGR): Dormancy breaking, Sex ratio, Flower forcing, Apical dominance, Senescence, Fruit thinning and Parthenocarpy

Post Harvest Technology of Crops: Harvesting, Curing, Sorting, Grading, Packaging and Storage

Cultivation Techniques of Potential Crops: Hybrid rice, Sugar beet, Coffee, Strawberry, Dragon fruit, Rambutan and Orange

Recommended / Supplementary Textbooks

1. Bose, T.K. and S.K. Mitra. 1990. Fruits: Tropical and Subtropical. NayaProkash, Calcutta, India.
2. Hartmann, H.T.; D.E. Kester and F.T. Davies Jr. 1990. Plant Propagation: Principles and Practices. Prentice Hall International Inc, U.S.A.
3. Janick J. 1963. Horticultural Science. W.H. Freeman and Co., U.S.A.
4. Edmond JB, Senn. TL, Andrews FS &Halfacre. RG. 1995. Fundamentals of Horticulture. Tata McGraw Hill Pub., New Delhi, Inida.
5. Rahim, M. A., AKM AsharafulAlam and Others. 2011. Underutilized Fruits in Bangladesh. WorldFish, Bioversity International, BAU-GPC and RDA Korea.
6. Rahim, M. A., AKM AsharafulAlam and Others. 2013. Underutilized Vegetables in Bangladesh. WorldFish, Bioversity International, BAU-GPC and RDA Korea.
7. Singh, C; Singh P. and Singh, R. 2003. Modern Techniques of Raising Field Crops, Oxford & IBH Publishing Co., New Delhi.
8. Chakraverty, A.; Mujumdar, A.S.; Ramaswamy, H. S. 2003. Handbook of Postharvest Technology: Cereals, Fruits, Vegetables, Tea, and Spices, CRC group, Taylor and Francis group.
9. Seed Technology Agrawal oxford & IBH Publishing company Pvt. Ltd. 1995.
10. Principles of Seed Science and Technology (4th Edition) Lawrnence O. Copeland and Miller F. McDonald, Springer Science & Business Media, New York, 1999.

Course Title: Sustainable Crop Protection
Course Code: MSARL 1303
Credit Hrs: 3

Introduction to Pests and Diseases: Pest concepts, Pest and disease management scenarios in sustainable crop protection in Bangladesh, Abiotic and biotic factors of pest outbreak and disease development, Brief bioecology of major insect pests of principal crops, Introduction to fungi, bacteria, virus, nematode and their infection process in plant disease development, Major fungal, bacterial, viral and nematode diseases of important crops

Management of Pests and Diseases: Major control strategies of insect pests and plant diseases: mechanical, cultural, physical, legislative, host resistance, biological and chemical control, Biopesticides in crop protection: tools and methods, Insect interference methods - use of pheromones and sterile insect technique, Principles of IPM, Development of IPM programs, GIS for pest and disease control strategy

Management of Pests in Storage: Mechanism of transmission of seed borne pathogens, Detection and identification of seed borne pathogens and insects, Seed health testing methods, Control of insects, rats and seed borne pathogens, Seed treatment procedures.

Management of Post Harvest Diseases: Factors influencing post harvest diseases**:** maintenance of storage environment, Nature of damage caused by post harvest diseases, harvesting precautionary measures, Management of storage diseases**:** tools and procedures

Mite Pests and Control Options: Phytophagous mites and classification, Influence of main ecological factors for mite infestation in agro ecosystem, Management tools of mite pests in crop field

Vertebrate Pests and Management: Types of vertebrate pests in crop field, Rat species and their extent of damages to crop plants and grains, Rat management practices in the field

Pesticides in Crop Protection: Definition of agrochemicals and their uses, Classification of pesticides, Historical chemical use worldwide and in Bangladesh, Harmful effect of pesticides on health and environment and counteracting measures, Pesticide resistance management, Analysis of pesticide residues in agro products

Recommended / Supplementary Textbooks

1. Alam, M.Z. 1971. Pests of Stored Grains and Other Stored Products and Their Control. Agil. Inf. Serv., Dhaka.
2. Baker, K.F. and R. J. Cook. 1982. Biological Control of Plant Pathogens. American Phytopathological Society, USA.
3. Debach, P. and D. Rosen. 1991. Biological Control by Natural Enemies (2nd Edn.). Cambridge University Press, New York, USA.
4. Dent, D. 1993. Insect Pest Management. CAB International, UK.
5. Dube H. C. 1980. A Text Book of Fungi, Bacteria and Viruses, Bio-Green Book, New Delhi, India.
6. Evans, G. O. 1992. Principles of Acarology, CAB International, Wallingford, UK.
7. George N. Agrios. 2016. Plant Pathology (6th Edn.), Academic Press, California, USA.
8. Islam, Z. and D. Catling. 2012. Rice Pests of Bangladesh: Their Ecology and Management. The University Press Ltd.
9. Singh R. S. 2009. Introduction to Principles of Plant Pathology. Oxford and IBH Publication, India.

10. Tembhare, D.B. 2005. Modern Entomology. Himalaya Publishing House, Delhi, India.
11. Van Der Plank J.E. 1980. Plant Disease: Epidemics and Control. Academic Press, USA.
12. Webster, J. and R.W.S. Weber. 2007. Introduction to Fungi (3rdEdn.). Cambridge University Press. UK.

Course Title: Natural Resource Management

Course Code: MSARL 1304

Credit Hrs: 3

Introduction: Concept of natural resources, Classification of natural resources, Scope and importance of natural resource managements

Natural Resources Conservation and Management: Human life on earth: past, present and future, History of natural resources conservation, Approaches to natural resources management, Basic reason of the depletion of natural resources and their conservation strategies, Haor and hill agriculture

Water Resource Management: Definition and concept of water resources management, Hydrology and its development (water cycle, worldwide supply & national consumption), Uses of surface and groundwater in different purposes, Droughts, Conflicts over water use, Hydraulic structure (dam, weir, barrage, spillways ,etc.): types, properties and uses, Flooding: problems, protection techniques, management in Bangladesh, Sources of water pollution and attenuation techniques of pollution, Water quality and environment pollution

Food Resources: Food supply from agricultural resources (Agriculture, fisheries and livestock), World agriculture system, Climate changes and food security, Food from cereals, fruits and vegetables, Fish from fresh water and marine resources, Issues and challenges for resource supply, Blue economy

Forests and Wildlife Resources: History of plant and animal extinction, Over-exploitation, Deforestation, Endangered species management, Sustainable forest and agro-forestry management, Developing and developed world strategies for forestry, Medicinal plant: benefits, scope, challenges and management

Mineral Resources: Abundances of mineral resources, Key mineral resources in Bangladesh, Processing of mineral resources

Energy Resources: Energy concepts: energy quality, energy efficiency and net useful energy, History of energy resources, Renewable and non-renewable energy resources and it's uses for growing energy needs in Bangladesh

Recommended / Supplementary Textbooks

1. Owen O. S, Chiras D. D and Reganold J. P, 1998. Natural resources conservation-management for a sustainable future, 7th Ed. Prentice Hall, New Jersey
2. Francois Ramade, 1984. Ecology of Natural Resources. John Wiley & Sons Ltd.
3. Harikesh N. Mishra, 2014. Managing Natural Resources- Focus on Land and Water. PHI Lerning Publication.
4. Rogers, Peter P., Kazi F. Jalal, and John A. Boyd, 2007. An Introduction to Sustainable Development. Earthscan.
5. Tiwari, G.N. and M. K. Ghosal, 2005. Renewable Energy Resources: Basic Principles and Application, Narosa Publishing.

6. Bhojvaid P.P, 2008. Bio-fuels towards a greener and secure energy future.
7. Solanki C. S, 2009, Renewable Energy Technologies-A Practical Guide for Beginners, PHI Lerning Pvt. Ltd., New Delhi.
8. West, P.W. Trees and Forest Management. 2004, Springer Publication.
9. Adrian Newton, 2007. Forest Ecology and Conservation: A Handbook Techniques. Oxford University Press
10. Murthy, V.V.N. 2009. Land and Water Management, 5th edition, Kalyani Publishers.

Course Title: Gender in Agriculture
Course Code: MSARL 1305
Credit Hrs: 3

Introduction: Gender related major concepts : gender, role, gender division of labor, gender needs (both practical and strategic), gender position, equality, equity, awareness, empowerment and gender development, gender neutrality, gender balanced approach,Gender based violence, Gender identities of women : social, biological, psychological and cultural interpretation.

Gender as a Development Issue in Agriculture: Women in development (WID), Women and development (WAD), Gender and development (GAD), Gender empowerment measure (GEM), Women, agriculture and development (WAGD).

Gender Roles : Gender equity and equality in agriculture,Women's contribution in agriculture and recognition of their contributions, Women's participation in agricultural activities such as – planting, storing seeds, preparing fertilizer for cultivation, harvesting, drying and processing paddy for marketing, fisheries, livestock-poultry, homestead gardening, indigenous practices

Policies and Legal Dimensions in Gender and Agriculture: Legal rights and gender : formal recognition of women agriculture workers, equity in their labor and payment,Inclusion and women in agricultural activities : distribution of fertilizer and agricultural tools and equipments, access to credit or loan, distribution of agricultural materials, Training and skill development : Developing Women's agricultural skill, diagnosis and remedies for the diseases of firm animals, poultry, fish crops & plants, access to training on preventive measures to save lives, agricultural goods; livestock etc. from different disasters, Gender friendly management and marketing process in agriculture : Marketing of agricultural goods produced by women farmers, protection from harassment & violence, Improving situation of gender based discrimination in different sectors : education,primary health care, reproductive health, food and nutrition, water and sanitation

Gender and agriculture in Bangladesh: Issues and Policy Environment: Policy environment related to gender and agriculture, National policies, programs and issues in gender, agriculture and development, Role of NGOs in gender based participation of women in agriculture, International Conventions: women's rights and empowerment in agriculture, Gender and sustainable development, Women cooperatives

Role of Media in Empowering Women in Agriculture: Rationale of involving of media, Role of media and their functions in assessing the participation/role of women in agriculture, Case studies on media related to women in agriculture

Recommended / Supplementary Textbooks

1. Boserup, Ester (1971), *Women's Role in Economic Development*, London: George Allen and Unwin Ltd.

2. Moser, Carolin O.N. (1994), *Gender and Development-Theory Practice and Training* London, New York: Routledage.
3. Nasreen, Mahbuba, (2017), *Bangladesh National Conservation Strategy : Gender Issues*, Department of Forest, GoB.
4. Duza. Asfia, Hamid A. Begum (1993), *Emerging New Accents: A Perspective of Gender and Development in Bangladesh*, Dhaka: Women for Women.
5. Mahmud, Simeen (1990), *Women and Employment in Bangladesh*, BIDS. Dhaka.
6. UNICEF, The Situation of Women in Bangladesh, Dhaka.
7. Nasreen, Mahbuba, et.al. (2007), *PoribeshSamajbiggan*, Dhaka: TapanProkashon.
8. রহমান, শাহীন (১৯৯৮), জেন্ডার প্রসঙ্গ, ঢাকা: স্টেপস টুয়ার্ডস ডেভেলপমেন্ট।
9. বেগম, মালেকা (২০০২), নারী আন্দোলনেরপাঁচ দশক, ঢাকা : অন্য প্রকাশ।
10. জাতিসংঘ (১৯৯৭), জাতিসংঘচতুর্থ বিশ্ব নারী সম্মেলন, ঢাকা : রাজকীয় ডেনমার্ক দুতাবাস।

Courses of 2nd Semester

Course Title: Rural Development

Course Code: MSARL 2301

Credit Hrs: 3

Introduction to Rural Development: Basic concepts of rural development, History of rural development, Importance and scope of rural development

Rural Community and Institutions: Composites and characteristics of rural communities, Evolution of rural community, Major problem in rural communities, Traditional rural social institution in Bangladesh, Roles and functions of social institutions

Rural Infrastructure and Land Reform: Rural development constructs, Rural infrastructure and development, Land reform and community engagement, Rural Policy, Development avenues for the rural poor

Agrarian Stratification and Social Problems: Agrarian and peasant's society, Agricultural household model, Land tenure system and its function, Characteristics, types and function of agrarian social stratification in Bangladesh, Rural development Issues and social Problems

Rural Development Approach in Bangladesh: Experience in Rural development, Village agriculture and industrial development (V-AID) program, Approaches and strategies of different organization in Rural Bangladesh,Cumilla model, BRDB, RDA, PKSF, BRAC, Grameen Bank etc.

Local Government and Rural Power Structure in Bangladesh: Evolution, structure and composition of local government, Function of local government in Bangladesh, Elements and importance of rural power structure development, Changing rural power structure in Bangladesh

Poverty and SDGs in Rural Development: SDGs and poverty alleviation programs, Integrated rural development program and policy, Aspects of Implementation of integrated rural development program, Women in development program and micro credit, Role of GO and NGOs in Rural development

Recommended / Supplementary Textbooks

1. Chambers R. 1983. Rural Development: Putting the last first.
2. Green GP. 2014. Hand Book of Rural Development. Elger Pub.
3. Singh K. 2009. Rural Development: Principles, Policies and Management. Sage Pub.

4. Maartje van Lieshout, Art Dewulf, Noelle Aarts&CatrienTermeer. 2012. Doing scalar politics: interactive scale framing for managing accountability in complex policy processes, Critical Policy Studies, 6(2), 163-181, DOI: 10.1080/19460171.2012.689736
5. Leeuwis, C. 2004. The management of an interactive innovation process. In Leeuwis C. & A. van den Ban (Eds.) *Communication for Rural Innovation; Rethinking agricultural extension*, pp. 247- 275. Blackwell Science, Oxford
6. Singh. K, (2009) Rural Development: Principles, Policies and Management.http://dx.doi.org/10.4135/9788132108399
7. গ্রামীণ ও শহরসমষ্টিউন্নয়ন (২০১৭), ড. মো: নূরুলইসলাম, তাসমিয়াপাবলিকেশন্স, এলিফেন্ট রোড়, ঢাকা-১২০৫।
8. উন্নয়নেরসমাজবিজ্ঞান (২০১৭), জাহিদ, জুলফিকার, হাজারী, কবীরপাবলিকেশন্স, ৩৮/৩ বাংলাবাজার, ঢাকা- ১১০০।
9. গ্রামীণ ও শহরসমষ্টিউন্নয়ন (২০১৭), মো: শহিদুল্লাহ, গ্রন্থকুটিরপাবলিকেশন্স, বাংলাবাজার, ঢাকা- ১১০০।

Course Title: Sustainable Aquaculture and Fisheries Management

Course Code: MSARL 2302

Credit Hrs: 3

Aquaculture and Fisheries: Importance of aquaculture and fisheries, Comparison of aquaculture and fisheries industries with terrestrial, Agricultural sources of food production, Principles of developing sustainable aquaculture and fisheries in different environments/conditions

Aquaculture Nutrition: Nutritional requirements of key aquaculture species, Assessment of the sustainability of feed production technologies, Relationship between nutrition and fish health & aquaculture productivity

Disease and Health Management Aspects in Aquaculture: Factors that influence disease processes in cultured fishery species including viral, Bacterial, parasitic and non-infectious disease, Importance of operations and management on the development & impact of disease in optimizing welfare & developing sustainable and ethical aquaculture practices

Management, Husbandry and Sustainability in Aquaculture: Production management and business management of modern aquaculture practices, Environmental, social and economic sustainability of aquaculture, Good aquaculture practices (GAP) for sustainability

Fishery Production and Productivity: Current status of fisheries resources and their annual production trends in both inland- and marine-waters, Concepts of sustainable fisheries and different sustainable fisheries models

Sustainable Management of Fishery resources and Livelihood Aspects: Concepts, goals and objectives of sustainability in fishery management, Artisanal and commercial fishery management and their relationships with livelihood aspects

Aquaculture and Fishery Products, Marketing and Food Safety: Markets, Products, Processing and food safety aspects of aquaculture and harvested fishery products, Measures to establish safety and quality of fishery products towards development of sustainable aquaculture and fishery

Local and Global Impacts in Relation to Aquaculture and Fisheries: Environmental and economic impacts of aquaculture and fishing operations on both local and global scales, Impacts of climate change on aquaculture and fishery

Aquaculture and Fishery Policies and Regulations: National and international fishery policies and regulations concerning aquaculture and sustainable fishery management

Recommended / Supplementary Textbooks

1. Hayami Y 2001: Development economics: From the poverty to the wealth of nations, 2nd edition. Oxford university press.
2. Higgins B 1994: Economic Development: Problems, Principles and Policies. UBL, New Delhi.
3. Hossain M 1989: Green revolution in Bangladesh: Impact on growth and distribution of income. University Press Limited, Dhaka
4. Meir GM 2008: Leading Issues in Economic Development. 8th Edition, Oxford University Press.
5. Food Day October 1997.
6. Rahman L 1995: Sustainability of growth and development in agriculture. Bangladesh Journal of Political Economy, Vol. XII, No. 2, 139-152.

Course Title: Sustainable Livestock and Poultry Production

Course Code: MSARL 2303

Credit Hrs: 3

Introduction to Livestock and Poultry: Present status and future prospects, Animal production systems, Breeds of cattle, buffalo, sheep, goat and poultry, Animal behavior vis-à-vis adaptation and production in tropics, Organic farming system, Industrialization of livestock sector

Production and Management of Livestock and Poultry: *Ruminant Animals*: Cattle, buffalo, sheep and goat production trends and factors affecting them; Care and management, feed conversion efficiency, Animal behavior and welfare. ***Poultry*:** Brooding, growing, laying and breeding flocks management, Bio-security and environmental consideration, Cage layer and light management, Hatchery management, Management during stress, Chick sexing, Maintenance of farm records

Feeding of Livestock and Poultry: Nutritional requirements and feeding management, Feed additives, Least cost ration formulation, Systems of feeding, Processing and storage of conventional, non-conventional and agro-industrial feed ingredients and fodder, Production of annual, perennial and hydroponic fodder, Fodder calendar; Utilization of natural, organic, functional and health feed

Reproduction Management of Livestock: Reproductive systems, Climate and nutrition affecting reproductive performance; Heat detection and artificial insemination; Assisted reproductive techniques, Repeat breeding, Infertility and its prevention, Early pregnancy diagnosis, Transgenic livestock, Familiarity with different innovative techniques and technologies for livestock

Shelter of Livestock and Poultry: Housing systems, site selection and lay out of livestock and poultry houses, Space requirements, Housing designs, Construction of cheap livestock and poultry houses, Disposal of animal wastes and carcasses.

Health Management for Livestock and poultry: Preventive measures of diseases, Hygiene and sanitation, Symptoms of ill health, important infectious diseases and their prevention, control and treatment, Vaccination, Parasites and their control, First aid at farms, Segregation and quarantine management

Animal Farming and Environment: Concept, objectives, factors affecting and constraints of integrated livestock farming and climate change, Contribution of livestock to different farming systems, Contribution of ruminant, adaptation and mitigation strategies for methane emission, Environmental implications of livestock production

Economics and Marketing of Livestock and Poultry and their Products: Economic principles, insurance and financing, Project formulation and establishment, Grading, Marketing channel,Transportation, Export of products and by-products, Pricing and marketing, Role of cooperatives in poultry farming

Recommended / Supplementary Textbooks

1. Livestock Production and Climate Change. P.K. Malik, R. Bhatta, J. Takahashi, R.A. Kohn and C.S. Prasad, CABI Pub.
2. Textbook of Animal Husbandry and Livestock Extension, P. Mathialagan, International Book Distributing Co.
3. Handbook of Livestock Management, Battaglia Richard A.
4. Poultry Production in Hot Climates. Nuhad J Daghir, CABI Pub.
5. Principles of Cattle Production, Clive J. C. Phillips, CABI Pub.
6. Livestock Husbandry Techniques, McNitt, J. I., Granada Pub., UK.
7. The Care and Management of Farm Animals, Scott, W. N., BaillliereTindall Pub., UK.
8. Basic Animal Nutrition and Feeding. W. Pond, K. Pond, P. Schoknecht and D. Church, Wiley Pub.
9. Reproduction in Domestic Animals(Fourth Edition), Perry T. Cupps,Academic Press.
10. Ruminant Physiology: Digestion, Metabolism, Growth and Reproduction, Pierre Cronje, CABI Pub.
১১. পশুপালন ও চিকিৎসাবিদ্যা, এম এ সামাদ, লিরিকএপিকপ্রকাশনী, ময়মনসিংহ।

Course Title: Climate Change and Disaster Management in Agriculture

Course Code: MSARL 2304

Credit Hrs: 3

Introduction to Climate and Climate Change: Definition, Basic feature of climate change, Causal factors of climate change, Current context of climate change- The global scenario, Sectoralimpacts of climate change :crop; forestry; fisheries; livestock and poultry

Global Warming and Climate Change: Concept of Greenhouse Gas (GHG), Present scenario of GHG (CO_2, Methane and Nitrous Oxide) emission; Global and Bangladesh context, Nexus of GHG, Global warming and climate change in agriculture

Climate Change Scenario and Agricultural Vulnerability in Bangladesh: Nature and extent of climate change in Bangladesh, Climate vulnerable areas in Bangladesh in relation to agriculture - Hill area, *Haor*area, Coastal area, Barind area and *Char* area, Impacts of climate change on the livelihood of vulnerable groups, marginal and landless farmers, ethnic minority groups, women, children and elderly people

Disaster Risk in relation to Climate Change: Basic concept of hazard and disaster; Definition, types of hazard and disaster, History of hazard and disaster, Component of hazard and disaster, Dimension and phases of disasters, Occurrence and impact of different types of hazard and disaster in Bangladesh and its impact on agriculture, Linking climate change : hazards, disaster and agriculture

Climate Change Impact Mitigation in Agriculture: Basic concept of mitigation, Mitigation measures in agriculture: Adaptation of Climate Smart Agriculture (CSA) for crops, fisheries and livestock, Community based climate change impact mitigation- Bangladesh context, Indigenous

knowledge, practices and their integration with advanced science and technology for climate change mitigation

EIA (Environment Impact Assessment) and SIA (Social Impact Assessment) as tools in Mitigation in Agriculture: Basic concept of EIA and SIA, EIA as a process, screening, assessment of environmental consequences of a plan, policy, program or actual projects, EIA as a mitigation tool, technique and method, Basic concept and feature of SIA, SIA as a framework of for assessing the impact of climate change on agriculture.

Agricultural Insurance: Role of Insurance as a means of financial protection and risk coverage against loss of or damage of standing crops, livestock, fisheries, forestry, household & items etc. due to extreme climatic and human induced disasters Role of government, NGO's, INGO's, financial institutions and corporate social services in providing the finance to the affected farmers with micro insurance support with payment index.

Disaster Risk Reduction and Risk Management: Assessing Disaster Risk: disaster risk and damage potential of disaster (some case studies on major disasters in the context of agriculture and livelihood), Assessment of disaster risk : CRA, CVA (Capacity and Vulnerability Assessment), Disaster risk reduction mechanism: Preparedness, Mitigation and Prevention, adaptation and rehabilitation, Disaster Risk Management (DRM) plan: preparing hazard, profiling vulnerability, Analysis of the role of different stakeholders vulnerability, Preparedness, Mitigation and prevention plans in agriculture, Implementing DRM plan : Role of government, NGOs, Development partners, Private sector and Community people.

Regulatory and Policy Frameworks for Disaster Management in Agriculture: Legal and policy frameworks and their roles and responsibilities : IPCC, UNFCC, UNCCD, UNISDR, CBD, CDM, AFOLU, Sendai framework for action, Kyoto Protocol, COP, Bangladesh Climate Change Strategic Action Plan, NAPA, Disaster Act, SOD (Standing Orders on Disasters)

Recommended / Supplementary Textbooks

1. Alka Chauhan et al.: Climate Change, Disaster Management and Environment, Discovery Publishing House Pvt. Ltd., India, 2016.
2. Allen, K.M.: Community-based disaster preparedness and climate adaptation: local capacity-building in the Philippines. Wiley, 2006. Disasters, vol. 30, no. 1, pp. 81-101.
3. Coppola, D. P.: Introduction to international disaster management. Oxford: Butterworth-Heinemann (Elsevier)., 2007.
4. Enander, A.: Human needs and behaviour in the event of emergencies and social crises. Swedish Civil Contingencies Agency, Karlstad., 2010. In Fredholm, L. &Göransson A-L (Eds) Emergency Response Management in Today's Complex Society.
5. Handmer, J. and Dovers, S.: Handbook of Disaster Policies and Institutions. Routledge. 2013.
6. IFRC: Contingency planning guide. International Federation of Red Cross and Red Crescent Societies, Geneva, Switzerland., 2012.
7. IPCC, Summary for Policymakers, in Climate Change: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, et al., Editors. Cambridge University Press: Cambridge. 2007.
8. Perry, R.W. and Lindell, M.K.: Preparedness for Emergency Response: Guidelines for the Emergency Planning. Blackwell Publishing, Oxford, UK., 2003. Disasters, vol. 27, no 4.
9. Prizzia, R.: Climate change and disaster management. Sentia Publishing Co. Ltd., University of Hawai. 2015.

10. Solomon, I., Compensating for Climate Change: Principles and Lessons for Equitable Adaptation Funding. 2007. Washington D.C, Action Aid USA.

Course Title: Research Methodology

Course Code: MSARL 2305

Credit Hrs: 3

Fundamentals of Research: Research: Basic concept, objectives, steps and importance, Major areas of research: Agriculture, Social Sciences, Business, Health and population, Types and approaches of research: Pure and applied; Quantitative and Qualitative, Research Hypothesis, Research questions and research objectives, Ethics in Research

Review of Literature, Theoretical and Conceptual Framework: Review of literature: Purposes and key features; Developing theoretical and conceptual framework and their usefulness; Sustainable rural livelihood framework **Research Design:** Concepts, types and steps

Conducting and Formulating Research Proposal: Identification of research problem,steps in developing of research proposal; setting research questions: Objectives and Hypotheses, formulation of research problem

Sampling Methods: Basic concept on population, Sample, Sampling, Sampling framework, Parameter, Statistics, Sample survey, types of sampling techniques and tools, Determination of Sample Size

Data Collection Tools and Methods: Data and Information; Different Types of Data; Quantitative and Qualitative; Different Tools, Techniques and Methods of Quantitative Research; Differences between Quantitative and Qualitative Research Methods; Different Tools, Techniques and Methods of Qualitative Data Collection : Case Study, Ethnography; Content Analysis; Focus Group Discussion (FGD); Key Informants Interview (KII); Field Observation, DND etc; preparation of Research questionnaire

Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA): Concept of Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA); Principles of RRA and PRA; Differences between RRA and PRA; Differences between Survey and PRA; Essential Attitude for Conducting PRA; Tools of PRA: Transact Walk, Social and Resource Mapping, Seasonal Calendar, Venn Diagram, Timeline, Wealth Ranking, Problem Identification and Prioritization; Application and Implementation of RRA and PRA tools

Level of Measurement and Techniques of Data Analysis: Different Levels of Measurement; Reliability and Validity of Measurement; Different Scaling Techniques; Data Analysis Techniques: Data Editing, Coding, Classification, Tabulation and Analysis; Measures of Central Tendency, Measures of Dispersion, Correlation and Regression analysis; Experimental Design and analysis of Variance

Test of Hypothesis: Test of hypothesis, parametric and non-parametric tests, Normal (Z) –test, t-test, F-test, Chi-square test and Sin-test

Report Writing: Report and thesis Writing, Data analysis software; Rules for preparing references, Bibliography and annotated Bibliography

Recommended / Supplementary Textbooks

1. Zahid, S.J.A. and Biswas, T.K. (2016). Research Methodology, SamannoyProkashani; Bangla Bazar, Dhaka.
2. Gomez, K.A. and Gomez, A. A. (2015). Statistical Procedure for Agricultural Research, International Rice Research Institute; New York, Chichester, Brisbane, Toronto and Singapore.
3. Sufian, A.B.U.J. M. (1998). Methods and Techniques of Social Research, The University Press Limited: Dhaka.
4. Gujarati, D. N. (2003). Basic Econometrics, McGraw-Hill Companies: New York.

Courses of 3rd Semester

Course Name: Agro processing
Course Code: MSARL 3301
Credit Hour: 3

Harvesting, Handling and Preparation for Marketing: Introduction of major foods (crops, animal and fish) in Bangladesh; chemical composition and nutrient content of selected foods (crops, animal and fish); maturity and maturity indices; harvesting and postharvest handling system for various commodity groups; curing, washing, sorting and grading

Packaging, Transportation and Storage of Agricultural Commodities: Post-harvest factors influencing quality of Agricultural Commodities; packaging and packaging materials, transportation system; waxing and irradiation; refrigeration and cold storage; blanching and drying; quality deterioration of stored foods and methods for protection

Processing and Preservation of Horticultural Crop: Principles and methods of food preservation; effect of process parameters on quality of end products; manufacturing of fruit and vegetable drinks; manufacturing of jam, jelly and chutney; manufacturing of pickles, sauces and chips; processing of spices; postharvest management of flowers

Processing and Preservation of Cereal Crops: Modern parboiling, drying and milling of rice; storage of paddy and milled rice and cooking quality of rice; processing of sugar crops; formulation and manufacturing of baked products; milling and processing of pulses; fermented and traditional products

Processing of Fish and Fish Products: Introduction to fish processing; general principles of fish preservation, storage and transportation; fish processing at low temperature (deep freezing/icing); fish curing (drying and dehydration, salting, smoking); fish canning

Processing of Egg, Meat and Milk & Their Products: Quality identification of shell eggs; functional properties of eggs in foods; steps of poultry processing; essential of slaughtering and slaughtering methods; postmortem changes and aging of meat; preservation of meat and meat products by smoking, drying, canning and freezing; different milk processing methods (filtration, clarification, standardization, pasteurization, homogenization); different processed milk (sterilized, UHT, flavored, standardization, reconstitution, recombined, condensed and low fat milk); egg, meat and dairy products manufacturing procedure (Mayonnaise, sausage, nugget, meat balls, cheese, dahi and ghee)

Food Safety Practices: Food safety; quality control; food regulation and compliance; good manufacturing practices (GMP); food adulteration and contamination; sanitary and phytosanitary (SPS) measures; hazard analysis and critical control point (HACCP)

Recommended / Supplementary Textbooks

1. Post Harvest Technology of Horticultural Crops, Dr. K.P. Sudheer, Dr. V. Indira
2. Food Chemistry, Edited by: Lillian Hoagland Meyer
3. Food Science, Fifth Editon: Norman N. Potter, Joseph H. Hotchkiss
4. Food Preservation and Processing, Edited by: ManoranjanKalia, SangitaSood
5. Text Book on Food Storage and Preservation, Edited by: VijayaKhader
6. Food Hygiene and Sanitation in Food Industry, Edited by: S. Roday
7. Egg Science and Technology; (4th Edition); W.J. Stadelman and O.J. Coterill; CBS Publishers and Distributors, New Delhi-110002, India; 2002.
8. Advanced Technologies for Meat Processing. Edited by Leo M. L. Nollet and Fidel Toldra. Published by CRC, Taylor & Francis Group. New York, USA; 2006.
9. Dairy Science and Technology; P.Walstra, T. M. Wouters& T.J. Geurts; 2nd ed.;CRC press;2006
10. Modern Dairy Technology; Vol.-1 & 2. Advances in Milk Processing. R. K. Robinson; Blackie Academic & Professional; 1996.

Course Title: Agricultural Extension

Course Code: MSARL 3302

Credit Hrs: 3

Concept of Agricultural Extension: Definition, objectives and principles of agricultural Extension; Genesis of agricultural extension; Approaches of agricultural Extension; System approaches of agricultural extension.

Education and Learning: Concept and types of education; Definition of learning and learning process; Theories of learning; Laws of learning and their implication in agricultural extension.

Extension Teaching Methods and Aids: Concept of extension teaching; teaching methods and teaching aids; Classification of extension teaching methods and aids; Criteria of choice of extension teaching methods, Participatory extension teaching methods.

Communication in Agricultural Extension: Concept and impotence of communication in agricultural extension; Elements of Communication process; Models of communication process; Credibility of communication in agricultural extension; Feedback in communication process; Barriers in communication and effective solution; Communication and social change

Group Dynamics and Leadership: Meaning of group and group dynamics; Type ofgroup dynamics; Principles of working with groups and their mobilization; Group formation and why group fails; Concept, types and impotence of leadership in agricultural extension; Theories of leadership; Determinants of effectiveness of leadership function; Duties and responsibilities of professional and local leader; Selection and recognition of local leaders.

Motivation: Concept of need and motivation; importance of motivation in agriculture extension, Theories of motivation and their implications.

Transfer of Technology: Concept of transfer of technology and technology generation; Diffusion process and innovation-decision process; Models of technology transfer process; Innovativeness

and adopter categories; Measurement of adoption of innovation; Opinion leadership and diffusion network.

Extension Program Planning & Development: Concept and importance of program planning; Principles and steps of program planning;Peoples' participation in program Planning.

Program Monitoring and Evaluation: Meaning, types and purpose of monitoring and evaluation of a Program; Procedure for monitoring of demonstrations and field days; farmer's training & So on; Steps of evaluation of extension Program.

Extension Training: Meaning and types of training; Training schedule for training of extension agents and farmers. **Organization:** Meaning and concept of extension organization; Duties and responsibilities of different categories of personnel in DAE (Department of Agricultural Extension).

Decision Making: Concept & steps in decision making, factors affecting decision making process.

Recommended / Supplementary Textbooks

1. Adams, M.E., 1982. Agricultural Extension in Developing Countries. Longman Group Limited, Longman House, Essex, UK.
2. Bhuiyan,M.H., M.A.M. Mia, M.G.R. Akanda and M.A. Bashar, 2014. Agricultural Extension Education. G-Science Implementation and Publication, Dhaka.
3. Bhuiyan, M.H., 2012. Generation and Diffusion of Agricultural Innovation. Gurpukur Research Institute, Dhaka.
4. Bhuiyan, M.H. and M.A.M. Mia, 1999. Extension Psychology (in Bengali). KrishiLekhok Forum, KrishibidSomoby Society Ltd. Khamarbari, Dhaka.
5. Berlo, D.K., 1960. The Communication Process. Holt, Rinehart and Winston, New York, London.
6. Dahama, O.P., and O.P. Bhatnagar, 1985. Education and Communication for Development (second Edition). Oxford and IBH Publishing Company, New Delhi, India.
7. Department of Agricultural Extension, 1999. Agricultural Extension Manual. Ministry of Agriculture, Govt. of the People's Republic of Bangladesh.
8. Kashem, M.A., 2004. Fundamentals of Extension Education. Published by Mrs. Sultana Kashem, Staff Quarter, BAU, Mymensingh.
9. Rogers, E.M., 1983. Diffusion of Innovation (Third edition). The Free Press, Collier, Macmilan Publishers, London.
10. Wilson, M.C. and G. Gallup, 1969. Extension Teaching Methods (Reprint). Federal Extension Service, USDA.

Course Title: Food and Nutrition Security

Course Code: MSARL 3303

Credit Hrs: 3

Key Concepts of Food and Nutrition Security: Concept of food and nutrition security, importance & outlines; Framework and dimensions of food and nutrition security; Factors affecting food and nutrition security, food chain and food entitlements, role of production and trade in food and nutrition security; Food security in Bangladesh: Present status and future challenges

Food Systems: Food systems- Food types, production, distribution and uses, food value chain and market linkages, dynamics in food system and food security; Drivers of food system-Factors affecting food availability, access and utilization at household, community and national levels

Food Security Measurements: Measurement of food security and nutritional status; Role of crop, livestock and fisheries sectors for food and nutrition security of the people of Bangladesh

Food Policy Options: Food as basic right, access to food and public policies, citizen participation and the governance of food system, social inclusion, representation and civil society organizations. Different food safety net programs at government and non-government levels in Bangladesh

Food and Nutrition Situations in Bangladesh: Concept of nutrition and nutrients,Classification of nutrients and their physiological role in human health, Dietary requirement of macro and micro nutrients at different ages, pregnancy and among professional groups,Present status and situation analysis, stakeholder analysis of food and nutrition of the people of Bangladesh,Common hazards and diseases related to foods-causes of food contamination and adulteration,Public awareness and control of food and nutrition related diseases in Bangladesh

Nutrition Sensitive Agriculture: Nutrition specific and sensitive interventions for food production and manufacturing; Measures to reduce post-harvest losses of foods of plant, animal and other origins, Food fortification and eradication of malnutrition, Food fortification at growers' and factory level

Food Safety and Quality Issues: Concepts of food safety and quality, Factors affecting food safety and quality: raw materials, water, sanitations, malpractices, adulteration during food preparation, Food processing, preservation and value added products preparation from crops, animals, fishes, and other products, Food borne diseases and their control measures, Hazard Analysis and Critical Control Points (HACCP), Good Agricultural Practices (GAP) for production of crops, livestock and fish and post-harvest management, Good Manufacturing Practices (GMP), Good Hygienic Practices (GHP), International Organization for Standardization (ISO), Codex Alimentarius, Food safety act-2013 of Bangladesh and related rules & regulations

Field and Industry Visit: Field and industry visit for practical exposure about GAP, GMP, GHP and HACCP implementation in food processing, preservation and value added products preparation, Case study, assignments and presentation on GAP, GMP, GHP and HACCP implementation by the food processing industries

Recommended / Supplementary Text Books and Journals

1. Bansal V., Siddiqui M.W., Rahman M.S. (2015) Minimally Processed Foods: (eds) Food Engineering Series. Springer, Cham
2. Badu, S., Shailendra, N., Gajanan and Sanyal, P. 2009. Food Security, Poverty and Nutrition policy Analysis: Statistical methots and application. Academic press, Burlington: Elsevier.
3. Craig S. Tucker, John A. Hargreaves Editors(s): 2009. Environmental Best Management Practices for Aquaculture. John Wiley & Sons, Inc
4. Lawrence, G, T. Wallington and K. Lyons. 2013. Food Security, Nutrition and Sustainability.
5. Magdoff F 2012: Food as Commodity. http://monthlyreview.org/2012/01/01/food-as-a-commodity/ Monthly Review
6. McDonald, B.L.2010. Food Securty (1st Edition). Polity press, Cambridge, UK
7. Morrison FB 1954: Food and Feeding. The Morrison Publishing Co. Ithaca, N. Y.
8. Quasem MA 1997: Intervention towards attaining food security in Bangladesh. A keynote paper presented in the seminar on World Food Day October 1997.
9. Van Esterik P 1999: Right to food; right to feed; right to be fed. The intersection of women's rights and the right to food. Agriculture and Human Values, 16: 225–232.

Course Title: Entrepreneurship and Agribusiness
Course Code: MSARL 3304
Credit Hrs: 3

Basic of Entrepreneurship: Evolution of concept of entrepreneur, Characteristics of entrepreneur, Distinction between entrepreneur and manager, Types of entrepreneur, Functions of entrepreneur, Concepts of entrepreneurship, Entrepreneur vs Entrepreneurship, Role of entrepreneurship in economic development, Intrapreneur, Entrepreneur versus investor, Women entrepreneur, Ruralentreprenur

Environment for Entrepreneurship: Schematic of the new venture's environment, Process of business environment analysis, Political and governmental, Stakeholder, Macroeconomic, Technological, Sociodemographic, Ecological, Competitive and Competitor analyses

Start-up Business: Business plan, Elements of the business plan, Creativity and the business idea, Methods of generating ideas, Flow chart for SME establishment, Obtaining trade license, Export and import flow chart, Process flow chart to be an entrepreneur, Critiquing the business plan

Financing theNew Venture: Sources of capital, Informal risk capital and venture capital

Size, Scope and Forms of Agribusiness: Concept of agribusiness, Evolution of agribusiness, Role of agribusiness in economic development, Sectors of agribusiness, Trend in agricultural production, Prospects of agribusiness, Agricultural inputs market, Agricultural products markets and competition, Preparing for the new venture launch, Different forms of business entities

Business Strategy for Agribusiness: Different forms of business strategy, Blue ocean strategy, Venture capital, Angel investment, Business incubator

Fundamentals of Supply Chain and Value Chain: Concepts of supply chain and value chain, Difference of supply chain and value chain, Major supply chain agricultural commodities: paddy/rice, vegetables, dairy, aquaculture,Upgradation and governance in agricultural value chain, Porters value chain analysis, Preserving agricultural commodity in value chain, Major constrain and potential of value chain, Political economy and agribusiness

Understanding and Reaching Bottom of Pyramid Market; and Inclusive Market Development (IMD): Understanding BOP markets, Nature of BOP markets, Challenges in BOP markets', Steps to reach BOP markets, Understanding IMD, Key guiding principles for IMD facilitation, IMD in agribusiness

Government Initiatives for Entrepreneurship Development: SME foundation, SCITI, BCSIR, BSCIC, PPE, E-entrepreneurship, E-commerce, E-business,Some successful case study

Recommended / Supplementary Textbooks

1. Barringer, BR and Ireland, RD. 2009. Entrepreneurship: Successfully Launching New Venture. 3rd Edition. Prentice Hall.
2. Beierlein, JG and Woolverton, MW. 1991. Agribusiness Marketing – The Management Perspective, Prentic Hall, Englewood Cliffs, New Jursey.
3. Dollinger, MJ. 2008. Entrepreneurship: strategies and resources, 4thed, Marsh Publications Lombard, Illinois
4. Hisrich RD, Peters, MP and Shepherd, DA. 2011. Entrepreneurship. 6th Edition. McGraw-Hill/Irwin.

5. Khan, MAS (edt.). 2013. Handbook of Entrepreneurship Development, Dhaka Chamber of Commerce and Industry (DCCI).
6. Rickets, C and Rawlins, O. 2001. Introduction to Agribusiness, Delmar, Thomson Learning.
7. Roy, Roy, R.2013. Entrepreneurship, 2nd ed., Oxford University Press, New Delhi, India.

Course Title: Project Planning and Management

Course Code: MSARL 3305

Credit Hrs: 3

Concept and Nature of Project: Definition, characteristics, classification of project

Project Planning and Preparation: Different aspects of planning, Project feasibility study (Technical, economic, financial, social, environmental, institutional), Tools and techniques, Logical framework, Project concept paper, TPP & DPP format for project preparation

Project Cycle: The phases of project cycle, Pre-identification, Identification, Preparation, Appraisal, Approval, Implementation, Operation, Evaluation

Project Management–Monitoring and Evaluation (M&E): Basic principles, Different approaches of M&E, Different indicators (output, outcome & impact), Information - methods of collecting information, Designing monitoring and evaluation process, Results based information (RBM), Information analysis, Reporting

Exercise on Project Preparation: Steps involving project planning: Title selection, introduction and rationale of project, objective, research questions, hypothesis, project methodology, review of literature, theoretical and conceptual framework, budget, implementation process

Recommended / Supplementary Textbooks

1. BRRI, 2001. Poverty Elimination through Rice Research Assistance (PETRRA), Project Cycle Management Training, BRRI, Training Division, Gazipur.
2. FAO, 1988. Participatory Monitoring and Evaluation – Handbook for Training Field Workers. Regional Office for Asia and Pacific (RAPA), Bangkok, Thailand.
3. Gudda, P. 2011. A Guide to Project Monitoring and Evaluation, Amazon.com
4. Kusek, J. Z. and R. C. Rist (2004): Ten Steps to a Results-Based Monitoring and Evaluation System. The World Bank, Washington D.C.
5. REFPI, 2000. Tools and Techniques. Department of Farm Power Machinery, Bangladesh Agricultural University, Mymensingh-2202.
6. Shapiro, J. (2010): *Monitoring and Evaluation*. www.civicus.org (email: nellshap@hixnet.co.za)
7. Singh, M. K. 1990. Project Evaluation and Management Discovery Publishing House, New Delhi, India.
8. Smith, P. 1984. Agricultural Project Management- Monitoring and Control of Implementation. Elsevier Applied Science Publisher, London and New York.
9. The UN ACC Task Force on Rural Development (1984): *Guiding Principles for the Design and Use of Monitoring and Evaluation in Rural Development Projects and Programs.* Rome.

Sample of Assignment Cover Page

Assignment No.

Master in Sustainable Agriculture and Rural Livelihood (MSARL) Program

Assignment

on

(Assignment Title)

Course Name & Code:_____

Submitted by	**Submitted to**
Student Name: ID: Semester: Study Center:	Course Teacher's Name: Designation: Address:

SCHOOL OF AGRICULTURE AND RURAL DEVELOPMENT
BANGLADESH OPEN UNIVERSITY
GAZIPUR-1705

Assignment Acknowledgement Form

Collect the signature of the concerned Course Teacher ON THIS PAGE upon submission of your assignment

কৃষি ও পল্লী উন্নয়ন স্কুল

School of Agriculture and Rural Development
Bangladesh Open University

Name of Student……..……..

Student ID Number: .....*Semester: 1st/2nd/3rd*

Assignment Acknowledgement I received the Assignment #1& 2 for the course MSARL 1301 of Jan-June/July-Dec. 20 ..... Name & Signature of the Course TeacherDate:	**Assignment Acknowledgement** I received the Assignment #1& 2 for the course MSARL 2301 of Jan-June/July-Dec. 20 ..... Name & Signature of the Course TeacherDate:	**Assignment Acknowledgement** I received the Assignment #1& 2 for the course MSARL 3301 of Jan-June/July-Dec. 20 ..... Name & Signature of the Course TeacherDate:
Assignment Acknowledgement I received the Assignment #1& 2 for the course MSARL 1302 of Jan-June/July-Dec. 20 ..... Name & Signature of the Course TeacherDate:	**Assignment Acknowledgement** I received the Assignment #1& 2 for the course MSARL 2302 of Jan-June/July-Dec. 20 ..... Name & Signature of the Course TeacherDate:	**Assignment Acknowledgement** I received the Assignment #1& 2 for the course MSARL 3302 of Jan-June/July-Dec. 20 ..... Name & Signature of the Course TeacherDate:
Assignment Acknowledgement I received the Assignment #1& 2 for the course MSARL 1303 of Jan-June/July-Dec. 20 ..... Name & Signature of the Course TeacherDate:	**Assignment Acknowledgement** I received the Assignment #1& 2 for the course MSARL 2303 of Jan-June/July-Dec. 20 ..... Name & Signature of the Course TeacherDate:	**Assignment Acknowledgement** I received the Assignment #1& 2 for the course MSARL 3303 of Jan-June/July-Dec. 20 ..... Name & Signature of the Course TeacherDate:
Assignment Acknowledgement I received the Assignment #1& 2 for the course MSARL 1304 of Jan-June/July-Dec. 20 ..... Name & Signature of the Course TeacherDate:	**Assignment Acknowledgement** I received the Assignment #1& 2 for the course MSARL 2304 of Jan-June/July-Dec. 20 ..... Name & Signature of the Course TeacherDate:	**Assignment Acknowledgement** I received the Assignment #1& 2 for the course MSARL 3304 of Jan-June/July-Dec. 20 ..... Name & Signature of the Course TeacherDate:
Assignment Acknowledgement I received the Assignment #1& 2 for the course MSARL 1305 of Jan-June/July-Dec. 20 ..... Name & Signature Of the Course TeacherDate:	**Assignment Acknowledgement** I received the Assignment #1& 2 for the course MSARL 2305 of Jan-June/July-Dec. 20 ..... Name & Signature Of the Course TeacherDate:	**Assignment Acknowledgement** I received the Assignment #1& 2 for the course MSARL 3305 of Jan-June/July-Dec. 20 ..... Name & Signature Of the Course TeacherDate:

Tutor Evaluation Form

Confidential

কৃষি ও পল্লী উন্নয়ন স্কুল

School of Agriculture and Rural Development
Bangladesh Open University

Express your opinion about the Tutors of different courses

Semester: 1st/2nd/3rd (Jan-June/July-Dec. 20.....)

Course code	Surname of Tutor	Tutor assessment through Student				
		Presentation Skill	Capacity to understand the students problem	Depth of knowledge on the course	Sincerity and punctuality	Personality
MSARL						
MSARL						
MSARL						
MSARL						
MSARL						
N.B. You can give your opinion using the following letters: **A** – Excellent; **B** – Very Good; **C** – Good; **D** – Not Satisfactory						

- Please feel free to fill up this form and give back to the Program Coordinator after completing the tutorial session of respective semester
- Your evaluation form will be treated as top secret and boost us to improve the tutorial services.

YOU CAN USE THE REPLICA OF THIS FORM

Instructions for Project Report Writing

A. Guidelines for the Soft Binding of Project Report

The structure of soft binding of project report should include the followings:

- Cover Page (without Student Name, but SID must be mentioned)
- Inner Cover Page (without Name of Student, but SID must be mentioned)
- Signatory Page (without Name of Supervisor and Chairman, Student ID must be mentioned)
- Original Literary Work Declaration Form (without Name of Student and Supervisor but their Signatures must be present)
- Abstract (Project Title must be included at the Top of the Page)
- Table of Contents
- List of Figures
- List of Tables
- List of Abbreviations
- List of Appendices
- Chapter 1: Introduction
- Chapter 2: Reviewof Literatures
- Chapter 3: Methodology
- Chapter 4: Results and Discussion
- Chapter 5: Conclusion
- References (APA style)
- Appendices

B. Guidelines for the Final/Hard Binding of Project Report

The structure of final/hard binding of project report should include the followings:

- Cover Page
- Inner Cover Page
- Signatory Page
- Acknowledgements
- Abstract (Project Title with Student Name must be included at the Top of the Page)
- Table of Contents
- List of Figures
- List of Tables
- List of Abbreviations
- List of Appendices
- Chapter 1: Introduction
- Chapter 2: Review of Literature

- Chapter 3: Methodology
- Chapter 4: Results and Discussion
- Chapter 5: Conclusion
- References (APA style)
- Appendices

Printing Quality

a) 1.5 spacing for all sections. Single-spacing can be used for footnote, appendices, tables and diagrams.
b) Font type: Times New Roman
c) Font size: 12 for all text and 8 for footnotes
d) The intends of pages are as follows:

Top	: 2.0cm	Right	: 2.0cm
Bottom	: 2.0cm	Left	: 4.0cm

e) Document should be printed at one side using A4 size offset paper.
f) Page Numbering
   i. Font size 8 is recommended for page numbering.
   ii. All page numbers should be printed 1.0 cm from the bottom margin and placed on the right-hand side.
   iii. Roman numerals (i, ii, iii etc) should be used in the Preface section.
   iv. The Title Page and the first page of the Preface should not be numbered. Numbering begins on the second page with 'ii'.

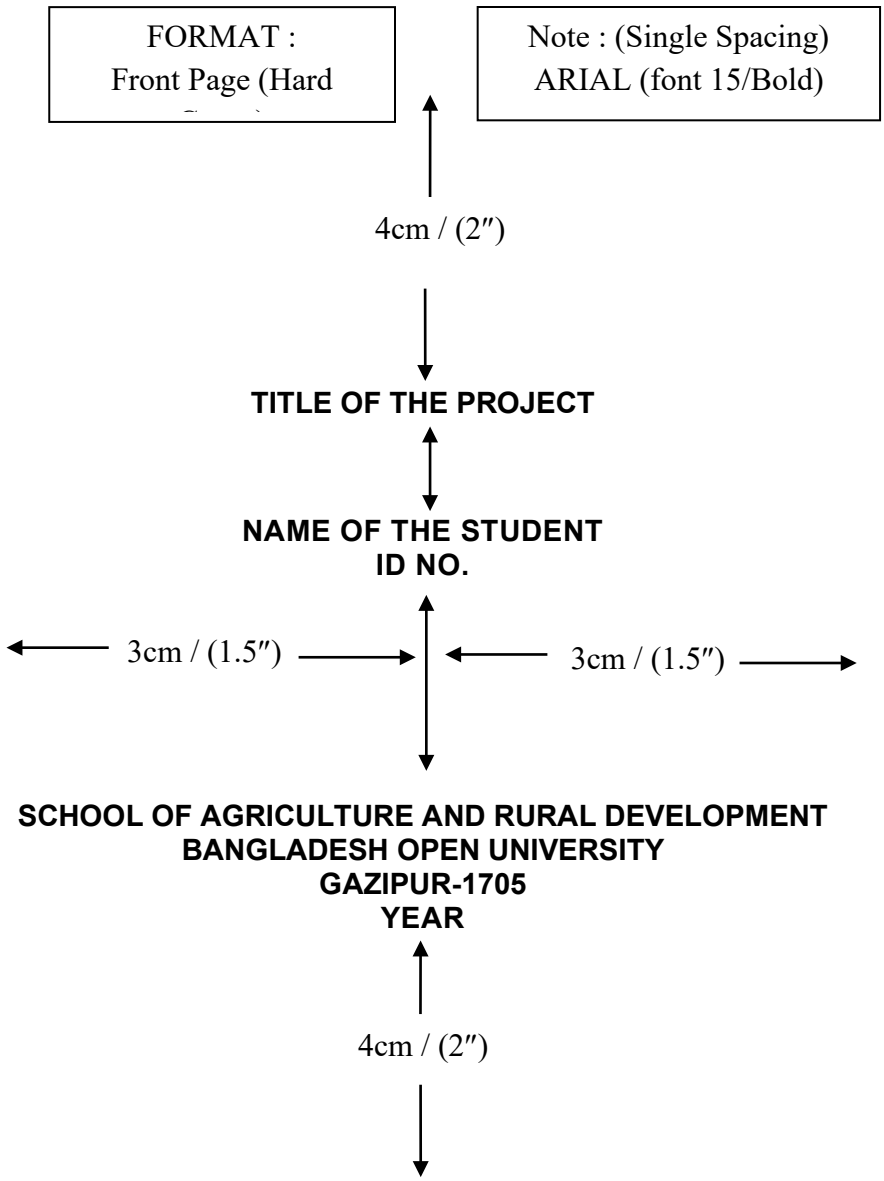
Submission of Project Report for Examination

- Student shall submit three (03) soft bounded copies of the project report to the chairman of the respective examination committee for examination.

- After examination, the student shall correct the project report accordingly and submit four (04) hard bounded copiesto the chairman of the respective examination committee and one softcopy in PDF format for final submission.

- Any corrections or re-examination required for the report must be submitted before expiry of the prescribed period. Failure to do so shall be deemed a failure in the examination of the report unless an extension to the prescribed period is approved. Student shall not be allowed to withdraw from an examination for a report where the report has already been submitted for examination.

Sample of Cover Page of Project Report



Sample of Inner Cover Page of Project Report

FORMAT : Title Page
First Page (Inside)

Note : (Single Spacing)
TIME NEW ROMAN (font 15/Bold)

4cm / (2″)

TITLE OF THE PROJECT

NAME OF THE STUDENT
ID NO.

Report submitted to the School of Agriculture and Rural Development in partial fulfillment of the requirements for the degree of

← 3cm / (1.5″) → ← 3cm / (1.5″) →

MASTER IN SUSTAINABLE AGRICULTURE AND RURAL LIVELIHOOD (MSARL)

SCHOOL OF AGRICULTURE AND RURAL DEVELOPMENT
BANGLADESH OPEN UNIVERSITY
GAZIPUR-1705

YEAR

4cm / (2″)

Sample of Signatory Page of Project Report

FORMAT : Title Page Second Page (Inside)	Note : (Single Spacing) TIME NEW ROMAN (font 15/Bold)

TITLE OF THE PROJECT

Submitted By

Name of the Student

ID No. ……

Semester: January-June/July-December, Year

Approved as the style and contents by

.....

(Name of the Supervisor)

Supervisor

.....

(Name of the Chairman)

Chairman

Examination Committee

School of Agriculture and Rural Development

Bangladesh Open University

Gazipur-1705

Month and Year

Where to be Touched?

1.	**Any query**	**Prof. Dr. Md. Serazul Islam** **Program Coordinator** School of Agriculture and Rural Development Bangladesh Open University, Gazipur-1705 Email: serazsard@bou.ac.bd Phone: +88 09666730730/680 Cell: +88 01716798945 (Office time only)
2.	**Study Center Changing**	Student Support Services Division, BOU
3.	**Correction of Identity Card**	Examination Division & Computer Division, BOU
4.	**Correction of marks sheet, transcript and certificate**	Examination Division, BOU
5.	**Any further information**	Dean School of Agriculture and Rural Development Bangladesh Open University, Gazipur-1705 Phone: +88 02 9291110 Fax: +88 029291110

For more information visit www.bou.ac.bd/School/SARD

Master in Sustainable Agriculture and Rural Livelihood

Handbook

About the Program

The aim of the Master in Sustainable Agriculture and Rural Livelihood (MSARL) program is to provide a comprehensive knowledge to adopt global sustainability standards based on agricultural practices. To improve quality production as well as socio-economic factors affecting transformation of the rural society developing analytical, conceptual, communications and research capabilities of the students in the broad areas of sustainable agriculture and rural livelihood.

The main objective of the program to be offered by the School of Agriculture and Rural Development is to produce more skilled manpower for the agriculture sector in the greater interest of the country.

SARD
SCHOOL OF AGRICULTURE AND RURAL DEVELOPMENT
কৃষি ও পল্লী উন্নয়ন স্কুল