

**Benchmarking Undergraduate Curriculum for Agrotechnology Discipline at Khulna University of Bangladesh****Md. Sarwar Jahan<sup>1)</sup> Sonia Khatun<sup>2)</sup> Jannatul Ferdous Mim<sup>3)</sup> Mohammad Bashir Ahmed<sup>4)</sup>**

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**Keywords**

Agrotechnology Discipline, Khulna University, Undergraduate OBE Curriculum, Benchmarking, Criteria.

**Abstract**

Benchmarking is an instrument for appraisal, development plus performance enhancement. This research aimed to assess the effectiveness of the Bachelor of Science in Agriculture (Honours) curriculum of Agrotechnology Discipline and to conduct a comprehensive analysis for understanding the implementation of benchmarking as a competing tool for perfection. To examine the research questions, a descriptive-analytical method was used. The research revealed that the newly developed OBE curriculum of Agrotechnology Discipline follows UGC template, BAC standards and BNQF, provision of both summative and formative assessments strategies are in place. However, the PLOs and CLOs are more in numbers with huge curriculum load. In addition, it is evident that the curriculum had well-articulated course structure with ISCED code for all the courses. But provision of lesson plan was missing and poor assessment strategies were used. The results stressed the importance of developing a curriculum that embraces inclusivity and diversity. Furthermore, it should be updated to address the demands and complexities of the 4.0IR. For enhancement, improvement and transformation, a review of curriculum content is crucial. This can be accomplished by arranging pedagogical training for the faculties by integrating hands-on activities that prompt students to think critically and address challenges in the modern era..

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## INTRODUCTION

An altering condition of tertiary education in recent times has created additional burdens and anxieties for higher education institutions worldwide. Growing student figures and a decline in state backing have generated more competitiveness in the tertiary education sector regarding quality and effectiveness (Meade, 2007) of graduates it produces. Tertiary level education in Bangladesh also witnessed a remarkable growth in student number that was counted to 4.7 million (UGC, 2021a). Still, this vertical increase isn't harmonious with quality in terms of exploration and education as well as labor request applicability. Graduates from the Science, Technology, Engineering and Mathematics (STEM) education are vital for making Bangladesh to a developed country, particularly in an environment of the fourth artificial revolution (4.0IR). The poor quality instructors, curriculum, and teaching mark science and mathematics subjects 'tough' for the learners making them inferior in quality. It's therefore pivotal to reform the existing curriculum and teaching-learning practices embedded with critical thinking, ability to constantly acquire and acclimatize, and stay inclined to select required key competence. To take alongside the program of advanced education to encounter various difficulties and grasp numerous opportunities of 21st century, our government has commenced a number of initiatives standing on the verge of the 4IR. The Ministry of Education has also accepted way to ameliorate the excellence as well as compass of advanced study by making it globally viable through applicable syllabus improvement, backing for Science and Technology (S&T), stimulant to exploration, and offering extraordinary teaching to make and furnish the coming cohort to fruitfully bump into the risks of free trade economy and participate in overall growth of our country (GED, 2020). Lately, UGC has handed a template to prepare an outcome based education (OBE) curriculum to be followed for all programs at the tertiary position (UGC, 2020) for perfecting the graduates countrywide.

The curriculum functions as the ultimate source of knowledge for students in any setting. Consequently, confirming a high-quality curriculum that discourses learners' needs is vital. Assessing the curriculum is crucial to guarantee its alignment with learners' needs and its usefulness in attaining desired learning outcomes (Balushi, 2024). OBE curriculum is a learner-centered approach to education that focuses on what a student should be able to do in the real world upon completion of their program. Davis (2003) defined OBE as an education approach which the curriculum grounded on the exit learning issues that the learners must achieve at the end of the course to become successful in their unborn lifespan. Spady (1994) ruled out spelling out the objects for this learner-centered approach. Rather he delineated the several fundamental principles for his OBE approach which is worth noting *viz.* learner-centered, clarity in focus, design down, deliver up, surpassing expectations and expanded opportunities.

Benchmarking is a process that enables comparison of inputs, processes or staff between institutions (or corridor of institutions) or within a single institution over period of time (INQAAHE Glossary, [www.inqaahe.org](http://www.inqaahe.org), accessed on 07 December, 2022). Benchmarking helps universities to judge their performance and ameliorate practice regularly encompassing both quality assurance and improvement (Oliver, 2011). It provides a formal exchange of substantiation in an independent structure and timeline (Meade, 1998) rendering stresses on literacy (Wilson & Pitman, 2000; Wilson et al., 2000). In addition, it is a methodical, nonstop progression (Camp, 1994; Zairi, 1994; Cook, 1995; Murphy, 1995) to detect quantity, relate, borrow and involve stylish activities. Literacy is regarded as the most pivotal and significant dependence of benchmarking (Nazarko et al., 2009).

Benchmarking is getting a vital tool for perfecting the enactment of innovative academic institutes where utmost benchmarking compares named pointers or criteria among analogous organizations to estimate comparative efficiencies (Levy & Ronco, 2012). As Epper (1999) states, "when considered truly and stationed duly, it might assist academic institutions place them in a novel viable terrain which is complete enough with enormous possibilities". Bender (2002) opines that "benchmarking may be tremendously valuable toward impact by shaping organizational opinions".

Benchmarking is most effective when it is continuous and a portion of the yearly analysis option (The Association of Commonwealth Universities, 2012). It hints to constant program upgrading (Amin & Amin, 2003) in reply to emerging global concern about educational quality (Dunn et al., 2007). Eight general scholastic magnitudes provide the outline for benchmarking undergraduate program: curriculum, evaluation issues, student's learning results, program resources, learner development, faculty features, program environment, and administrative care (Dunn et al., 2007).

Benchmarking is a novel idea to majority of the universities in Bangladesh. A very few study has been performed to investigate the applicability of benchmarking in advanced education institutes for framing a context to support university schemes and universities in planning and utilization of benchmarking in Bangladesh. Objectives of our study are to analyze the undergraduate curriculum of Agrotechnology Discipline and to determine the performance level of curriculum. In addition, the study emphasizes to find out the lacking of our curriculum and suggest options for improvement.

## METHODOLOGY

The research study explores quality of the undergraduate curriculum of Agrotechnology Discipline, Khulna University, Khulna of Bangladesh and stresses on the application of benchmarking as a tool for progress. The main goal is to reveal the configuration of the curriculum for quality assurance in Agrotechnology Discipline. The prime objective of this section is clarifying the many instruments and procedures used for data gathering, analysis, and interpretation. Section followed with a description of the study procedure and a brief introduction to the data gathering techniques. This section goes through each of them in detail.

**Research Design:** Understanding the features of the research is critical for selecting an acceptable research design. The aim of this study is to investigate of benchmarking the undergraduate curriculum for Agrotechnology discipline of Khulna University, Bangladesh. Considering to this investigation target, the research character is exploratory.

**Study Area:** The current study was conducted at Agrotechnology Discipline of Khulna University.

**Population:** The study population contained the undergraduate curricula of Agrotechnology Discipline (Agrotechnology Discipline, 2022), Khulna University (KU), Khulna, Bangladesh. In addition, two self-assessment reports (Agrotechnology Discipline, 2014a, 2017a) and external peer review reports (Agrotechnology Discipline, 2014b, 2017b) from Agrotechnology Discipline were also collected to include in the research process. Information from some other sources like thesis, undergraduate ordinance from KU (KU, 2022), OBE template from University Grants Commission of Bangladesh (UGC, 2020) and Bangladesh National Qualifications Framework (BNQF) developed by University Grants Commission of Bangladesh and implemented by Bangladesh Accreditation Council (BAC) (UGC, 2021b) were also gathered.

**Sample Size:** The inquiry used the whole population as a sample population.

**Data Collection and Analysis:** Critical evaluations were carried out of the aforesaid curriculum manually. Comparisons were made among different criteria of the standard curriculum (BAC, 2021) were made to identify the best practices considering the outline of OBE template. Nine benchmarks as suggested by IUCEA (2017) for Bachelor of Education Program were also considered: program objectives, program intended learning outcomes, transforming the learning outcomes into the program, learning outcomes and curriculum alignment matrix, modularization and the use of credit points, course profile, role of internship and project work, internship and project work.

Each benchmark has the following format (Rezić et al., 2014): Scoping statement, Good Practice Statement, Performance Indicators and Performance Measures.

**Scoping statement:** Describes what is measured in this benchmark.

**Good Practice Statement:** Indicates what achievable practice would look like if it is being done properly.

**Performance indicators:** Detect the key performance areas that would specify recognition of the good practice statement.

**Performance measures:** Descriptions of an indicator with more than one element denoting advancement toward good practice. In the present study a five point scale was used for assessing different benchmarks.

A SWOT analysis was performed to identify the strengths, opportunities, weaknesses and threats of the existing curriculum of Agrotechnology Discipline. Based on the findings of SWOT analysis recommendations were given to address in future.

## RESULTS AND DISCUSSION

### Vision of the PoE

Vision denotes a prospect to which an organization desires that is receptive to necessities and anxieties (WMO, 2016). An institute's vision articulates the appearance during its full prospective period. A vision statement clarifies an anticipated upcoming event which does not exist at the moment. Visioning is just to assemble a conceptual picture in mind of a superior and diverse future - one that bits, dares and instigates prime participants.

An evaluation of the vision of Agrotechnology Discipline is given in Table 1. It is evident that the vision statement is well written and is good enough to guide the PoE in the future. However, there are generous opportunities to improve the vision statement further.

**Table 1. Benchmarking vision of the PoE**

Benchmark No.	01				
Area	Vision of the PoE*				
Scoping statement	Futuristic view regarding the ideal state or conditions that the PoE aspires to change or create.				
Good Practice Statement	Vision of the PoE is defined and is in accordance of those of the HEI and demonstrates the way that will serve the purposes of the stakeholders and society at large.				
Performance Indicators	<ul style="list-style-type: none"><li>• Does the vision statement provide a clear picture of the PoE’s future?</li><li>• Is the vision statement challenging and inspiring?</li><li>• Is the statement believable?</li><li>• Is the statement aspirational and motivational?</li><li>• Is the statement memorable and concise?</li></ul>				
Performance Measuring Levels					
1	2	3	4	5	
No statement	Limited with only one or two indicators	Moderate with three indicators	Considerable with four indicators	Comprehensive, statement contains all indicators	
Rating of AT** curriculum	03				

\*PoE: Program Offering Entity, \*\*AT: Agrotechnology

### Mission of the PoE

The mission statement guides the activities of the department; makes clear the program's overall objectives, gives a logic of direction, and directs decision-making and supports in curriculum decisions. The mission defines PoE's tenacity, individuality, beliefs, and motive for existence. A mission statement clearly

communicates to learners and other stakeholders what the PoE ensures, which facilities and programs it delivers, why and how does it offers, and for whom they are valued purpose (WMO, 2016).

The mission statement of Agrotechnology Discipline, Khulna University is described well with day to day activities that will help to achieve the vision (Table 2). It seems that the values and beliefs of different stakeholders were not judged properly in framing the mission that indicates that improvement of the statement deems necessary.

### Program Objectives

Program objectives are related to the combined impact of the curriculum, the pedagogy and the assessment of the various elements. An objective is a specific, measurable, time-bound result that supports the achievement of a goal (WMO, 2016). The Bachelor of Agriculture (Honours) program objectives are designed in such a way that they address the apprehensions of different stakeholders. This can be gained by focusing on academic ability, employability and personal development (IUCEA, 2017) during framing program objectives. Objectives are viewed from a teacher's perception and typically are framed considering of their coaching plans and explain what content they want to complete through integration of tutoring, syllabuses, and activities (Knaack, 2015).

Objectives usually are designed from the viewpoint of the PoE. It is observed that Agrotechnology Discipline objectives postulated in connection with the mission and vision of the PoE (Table 3). Objectives are fair in number and will certainly help to attain goals of the Discipline. However, resource limitation may hinder the process.

**Table 2. Benchmarking Mission of the PoE**

Benchmark No.	02			
Area	Mission of the PoE*			
Scoping statement	The PoE’s purpose; what the PoE does and why.			
Good Practice Statement	Mission of the PoE is well defined and is in accordance of those of the HEI and demonstrates the way that will serve the purposes of the stakeholders and society at large. It may help to achieve the vision. It seems that it reflects the values and beliefs of the stakeholders fairly.			
Performance Indicators	<ul style="list-style-type: none"><li>• Is the program mission vibrant and pithy?</li><li>• Is the declaration concise and describe PoE’s routine activities?</li><li>• Is the statement impressive?</li><li>• Does it explains why, what and how the PoE works?</li><li>• Whether the mission statement reflects the values and beliefs of the stakeholders?</li></ul>			
Performance Measuring Levels				
1	2	3	4	5
No statement	Limited with only one or two indicators	Moderate with three indicators	Considerable with four indicators	Comprehensive, statement contains all indicators
Rating of AT curriculum	03			

### Graduate Attributes (GAs)

The GAs indicates those potentials and capabilities of a learner like gathering and application knowledge, job and livelihood skills, ethical and social values. These usually cover competencies to support graduate's gained capabilities for broadening existing levels of several skills, guiding further studies in any context, acting innovatively in a preferred occupation, and eventually make him/her as a publically accountable person (SSU, 2021). Our country approves four skills as the Learning Outcome Domains (Fundamental, Social, Thinking and Personal Domains) in BNQF (UGC, 2021b). These are associated to the skills suggested by the World Economic Forum, i.e., problem solving skill, thinking ability, innovation and creativity, public managing, harmonizing with others, emotive aptitude, decision making, Service placement, Mediation and cognitive elasticity (WEF, 2016).

Graduate attributes/profile of the PoE is well structured and is developed considering the BNQF and is mapped with program learning outcomes (PLOs) and four learning domains (Table 4). However, resource limitation and absence of skill development mechanism might create complexities in application of graduate attributes appropriately.

**Table 3. Benchmarking Program Objectives**

Benchmark No	03			
Area	Objectives of the Program			
Scoping statement	The program objectives are what PoE wants to achieve. They refer to cognitive levels, abilities; morals, etc. anticipated from progresses and are pertinent to the program mission and the vision of the HEI.			
Good Practice Statement	Objectives of the PoE are well demarcated and are formulated according to of those of the HEI. These are designed in such a way that will satisfy stakeholders and societal needs, and are matched with the vision and mission of the PoE. Objectives are adequate in numbers, clear, specific and appear achievable. However, adequate resources are inevitable to get maximum benefits.			
Performance Indicators	<ul style="list-style-type: none"><li>• Are the objectives measurable?</li><li>• Are the objectives sufficiently specific?</li><li>• Are the objectives compatible with the daily activities and future goal of the program?</li><li>• Are the objectives realistic and attainable?</li><li>• Are resources available to make the objective achievable?</li></ul>			
Performance Measuring Levels				
1	2	3	4	5
No statement	Limited with only one or two indicators	Moderate with three indicators	Considerable with four indicators	Comprehensive, statement contains all indicators
Rating of AT curriculum	03			

### Program Educational Objectives (PEOs)

PEOs refer broad narratives that define the livelihood and career endeavors that a program is making learners to succeed (Rogers, 2020). These are quantifiable depending on the qualities and deeds of students, preferably within 3 to 5 years graduation and are intended to prepare graduates professionally eligible after completion of their graduation and are consistent with the mission statements of the PoE and the institution (BAETE, 2017). PEOS of every program must be flawless, brief, reckonable, convincing and available resources reliant. Those ought to be in line with the Department's vision and mission. There should be a

mechanism to judge the attainment level of each PEO to estimate the efficacy of any educational program. Proper documentation and record maintenance are necessary in providing support for achieving of a PEO.

PEOs help describe professional behavior of graduates within few years of graduation. It is worth noting that PEOs are good in number, structured well and are linked to HEI's mission (Table 5). But the constituencies (alumni, academic staff, employers, etc.) of the program are not considered properly and there is a deficiency of skill development tool.

Table 4. Benchmarking Graduate Attributes of the PoE

Benchmark No	04			
Area	Graduate Attributes of the PoE			
Scoping statement	The “talents, abilities and understandings any institute authority admires its learners should grow during their study period and, accordingly, figure the impact they are able to make in their profession and every day life.			
Good Practice Statement	Graduate attributes are developed based on recognized necessities asked by different parties and four domains in BNQF for tertiary level. Fair constructive alignment of graduate profile to PLOs noticed. Skill development mechanism missing.			
Performance Indicators	<ul style="list-style-type: none"><li>• Are the graduate attributes well defined?</li><li>• Do the graduate attributes cover four learning domains?</li><li>• Are the graduate attributes compatible with the mission and vision of the program?</li><li>• Are all graduate attributes aligned with PEOs and PLOs?</li><li>• Are appropriate resources available to make the objective achievable?</li></ul>			
Performance Measuring Levels				
1	2	3	4	5
No statement	Limited with only one or two indicators	Moderate with three indicators	Considerable with four indicators	Comprehensive, statement contains all indicators
Rating of AT curriculum	03			

### Program Learning Outcomes (PLOs)

PLOs are clear learning results that an instructor wants students to demonstrate at the end any program and are activities and performances that embody and reflect learner competence in exhausting taught materials, evidence, thoughts, and tools fruitfully (Spady, 1994). These are specific, measurable, realistic, and attainable statements that explain what a learner is able to show at the completion of a program. These outcomes involve three domains of learning i.e. knowledge (cognitive), skills (psychomotor) and attitudes (affective behavior). PLOs should number fewer than a dozen and ideally five to ten. As assessment decides student accomplishment in each outcome, devising too many outcomes virtually pledges that the assessment strategy will be clumsy and dearth concentration, and should contain the minimum number of outcomes that instructors consider to be necessary for any graduate of their program.

The PLOs were designed in a comprehensive way following best practices and are SMART (specific, measurable, achievable, realistic and time-bound) (Table 6). PLOs are well mapped with PEOs, learning domains, courses and CLOs. Bloom's action verbs of three educational domains were used judiciously. Conversely, constructive alignment of PLOs with graduate attributes and program objectives deems essential to improve the sustainability of the program in upcoming years.

**Table 5. Benchmarking Program Educational Objectives (PEOs)**

Benchmark No	05			
Area	Program Educational Objectives (PEO) of the PoE			
Scoping statement	The PEOs are the statements that describe the expected achievements of graduates in their career, and also in particular, what the graduates are expected to perform and achieve during the first few years after graduation.			
Good Practice Statement	PEOs are well defined and appropriate in number. Inclusive constructive alignment of PEOs to HEI mission, four learning domains of BNQF noticed. PEOs justify graduates competence for initial years but skill development appliance missing.			
Performance Indicators	<ul style="list-style-type: none"><li>• The objectives should be broad.</li><li>• The objectives should be measurable.</li><li>• The objectives should drift out of the communities of the program.</li><li>• The objectives should describe the abilities and accomplishments of students after completing a program.</li><li>• The objectives should relate to the mission of the program and institution</li></ul>			
Performance Measuring Levels				
1	2	3	4	5
No statement	Limited with only one or two indicators	Moderate with three indicators	Considerable with four indicators	Comprehensive, statement contains all indicators
Rating of AT curriculum	04			

### Curriculum Structure

The arrangement way of curriculum including the courses, time of study and 'pattern' in which they are studied make the curriculum structure. Both core and elective subjects along with cross-cutting issues constitute a curriculum (Vlăsceanu et al., 2004). The learning objectives need to be reflected into the program. In this connection, a program is seen as a coherent set of courses leading to a degree (IUCEA, 2017). The courses names vary among institutions. Importance ought to be given in accomplishing results including analogous composition in lieu of heading.

Agrotechnology Discipline developed the undergraduate curriculum following standard protocol and procedures. The curriculum is well-structured and the guidelines of UGC, BAC, IQAC, KU were addressed logically (Table 7). It is well to mention that proportion of GED courses was calculated based on total available credits instead of graduating credits. GED courses should be general in nature. Moreover, minimum credits for graduation is also high (161 instead of 140) that will impose extra burden to learners. There is also uneven distribution of credits in different semesters.

**Table 6. Benchmarking Program Learning Outcomes (PLOs)**

Benchmark No	06
Area	Program Learning Outcomes (PLOs)
Scoping statement	PLOs are broad statements of what the learners are likely to do, learn, or develop as values as a result of their program under study. PLOs are important because they let learners know the broad knowledge, skills, and abilities they will have after completing the program.



Good Practice Statement	PLOs are fair in number and look SMART. Constructive alignment of PLOs with PEOs, learning domains, all courses and CLOs documented but alignment with program objectives and graduate profile missing. PLOs articulated properly using appropriate action verbs emphasizing BNQF's learning domains as well as Bloom's educational domains.
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Performance Indicators	<ul style="list-style-type: none"><li>• The PLOs should be SMART.</li><li>• The PLOs should be articulated properly (not more than 25 words in each PLO) using Bloom’s action verbs.</li><li>• The PLOs are aligned with program mission, learning domains of BNQF, graduate profile, courses and CLOs.</li><li>• The PLOs should consider Bloom’s cognitive, affective and psychomotor domains.</li><li>• The PLOs be usually 5-10 in number.</li></ul>			
Performance Measuring Levels				
1	2	3	4	5
No statement	Limited with only one or two indicators	Moderate with three indicators	Considerable with four indicators	Comprehensive, statement contains all indicators
Rating of AT curriculum	04			

### Course Structure

Structure offers to components of the course's plan, such as learning goals, exercises, assignments, assessment (Moore & Kearsley, 2005). It offers learners the idea about management of teaching-learning procedure, counting lesson plan, delivery styles, types of exercises, and evaluation procedures. Instructional method plan contemplations when combined with structure infer the establishment in creating a syllabus (Bazluki, 2015). Based on solid platform, participants identify precisely about their roles with the place and time for actions. If it materializes, objectives of learning are satisfied.

Courses in the curriculum of Agrotechnology Discipline were arranged judiciously maintaining International Standard Classification of Education (ISCED) code, rationale, credits, CLOs, etc. CLOs are aligned well with teaching-learning strategy, assessment methods and PLOs (Table 8). Complexity of courses was defined based on progression. Lack of harmony in course contents is being identified. In addition, redundancy of course contents was documented that creates negligence of the learners. As suggested by the education specialists, emphasize should be given on the attainment of the learning outcomes rather than the contents. A thorough revision is inevitable to reduce the redundancy of contents to minimize extra load on learners.

**Table 7. Benchmarking structure of the curriculum**

Benchmark No	07
Area	Curriculum Structure
Scoping statement	The overall extents of a curriculum, since it is often useful to divide the whole into component parts for planning processes.

Good Practice Statement	The curriculum contains compulsory, elective, GED (25%) and capstone courses as suggested by BNQF. ISCED code maintained to designate the courses and fulfill the minimum credits (140) requirements for the undergraduate degree with the maximum available of 214 credits. The courses are split in 8 semesters of 4 years having the maximum provision of 7 years. Credits of each course are well defined based on BNQF and semester duration (22 weeks with 14 weeks class) is in accordance to BNQF. Necessities of thesis/project/field work, etc. are also incorporated.
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Performance Indicators	<ul style="list-style-type: none"><li>• ISCED code is followed for courses.</li><li>• The curriculum satisfies the minimum credit requirement as directed by BNQF.</li><li>• The program contains all sorts of courses as directed by UGC.</li><li>• Semester duration is according to BNQF.</li><li>• Credit of each course is supported by BNQF's credit calculation.</li></ul>			
Performance Measuring Levels				
1	2	3	4	5
No statement	Limited with only one or two indicators	Moderate with three indicators	Considerable with four indicators	Comprehensive, statement contains all indicators
Rating of AT curriculum			04	

### Teaching-Learning Strategy

**Teaching strategies** are the **techniques** and **methods** that any instructor utilizes to help **student learning**. A **learning strategy** is a learner's way to **shape** and use a particular variety of **skills** to learn curriculum material or finish other tasks more proficiently and effectively in both an **academic and in non-academic settings**. Teaching-related activities embrace the strategy and arrangement of teaching-learning practices, various tools and plan, assessment methods, tutorials, etc. Learning-focused activities cover execution for instructional guidelines, observing and taming students' mastery of literacy, receiving feedback from all stakeholders, and evaluation for recurrent upgrading of curriculum.

How one organizes for teaching and learning, what teaching strategies one chooses, how one interacts with learners, and how one ultimately evaluates student learning is intimately connected to the goals, objectives, and outcomes one has identified for his/her course or program. Learning activities ought to represent a balance among various modes of learning: reading, analyzing, conducting research, observing, writing, investigating, controlling and fashioning. Different teaching-learning activities need to be designed properly for resolving complex issues in crop science (BAETE, 2017). Student participations have to be encouraged in teaching and learning initiatives. There must be a final year thesis for a period of one year that represents a culminating demonstration of the program learning outcomes in solving complex agricultural issues.

**Table 8. Benchmarking structure of the courses**

Benchmark No	08
Area	Course Structure
Scoping statement	It indicates selection of themes, arrangement, and positioning of course materials. Various topics collection and their arrangement need to continuously support the desired results for any program.

Good Practice Statement	The PoE preserves standard course structure with lesson plan, credit value, and rationale, instruction and judgment strategies. CLOs are mapped with PLOs, teaching learning strategies and assessment methods.			
Performance Indicators	<ul style="list-style-type: none"><li>• ISCED code is followed for courses.</li><li>• Each course is provided with rationale.</li><li>• Course nature is well defined.</li><li>• CLOs are mapped with PLOs, teaching-learning strategy and evaluation methods.</li><li>• Credit of each course is supported by BNQF's credit calculation.</li></ul>			
Performance Measuring Levels				
1	2	3	4	5
No statement	Limited with only one or two indicators	Moderate with three indicators	Considerable with four indicators	Comprehensive, statement contains all indicators
Rating of AT curriculum	04			

An instructor picks the **teaching strategy** most suited to the existing level of **knowledge** of the learners, the **topic** being studied, and the **phase** in the learning voyage of the learners. However, there is no single best teaching strategy that to be followed by a teacher. An effective teacher uses the most innovative and creative teaching-learning strategies to explain various academic concepts and meet the specific requirements of scholars. We all have our favorite teaching approach but it is imperative to discover evidence-based pedagogical concepts that have the potential to enlarge our collection in the classroom. Keeping the above idea in mind, teaching-learning strategies of bachelor curriculum of Agrotechnology Discipline were formulated. It is worth noting teaching-learning strategies are diverse incorporating a wide range of methods in the curriculum (Table 9). Some of the methods are lecture, demonstration, presentation, assignments, group discussion, debate, field visit, field experimentation, video show, case study, etc. Teaching-learning strategies are aligned with CLOs and assessment strategies. Teaching-learning strategies must be directed focusing on HOTS of students. It is recommended that teaching-learning strategies should emphasize on the enhancement of critical thinking and problem-solving abilities that can better equip learners with the skills and knowledge necessary to thrive in the era of 4.0IR. The strategies that intend to improve critical and philosophical thinking capabilities, research and computational skills will certainly support learners to take constructive activities to defend, increase and sponsor for their own and other's wellbeing and safety. When learners relate personal and societal ability to perform collaboratively in a team develop a variety of interpersonal skills e.g., communication, cooperation, leadership and an indebtedness of diverse perceptions.

**Table 9. Benchmarking teaching-learning strategy**

Benchmark No	9
Area	Teaching-learning strategy
Scoping statement	Teaching-learning events are methodical, inventive, fact driven and exciting to care for fulfilling learning objectives, creating wisdom of accountability including ethics.

Good Practice Statement	Teaching-learning strategies are diverse and interactive covering from lecturing to brain storming. The strategies intend to promote critical thinking and research skills that will help learners to take constructive measures to defend, enrich and sponsor for their own and other’s wellbeing and safety. However, stress ought to be given to 4.0IR skills like creativity and innovation, active learning, complex problem solving, critical analysis, leadership development, technology integration, stress tolerance and resilience, etc.				
Performance Indicators	<ul style="list-style-type: none"><li>• Teaching-learning practices include practical evidences to inspire students think critically and motivate them to relate attained understanding in everyday situations.</li><li>• Teaching-learning activities in a course cover all the CLOs.</li><li>• Students get course plans to be aware of CLOs, topics of a course and teaching-learning strategies.</li><li>• Teaching-learning strategies are formulated based on learning styles of students.</li><li>• There are provisions of tutorial classes.</li></ul>				
Performance Measuring Levels					
1	2	3	4	5	
No statement	Limited with only one or two indicators	Moderate with three indicators	Considerable with four indicators	Comprehensive, statement contains all indicators	
Rating of AT curriculum			03		

#### Assessment Strategy

Assessment includes one or further processes that diagnose, assemble, dissect, and report information which is applied in gauging accomplishment of literacy results (CMO, 2012). There is no single best way of evaluation. It is noteworthy that evaluation ought to be suitable for measuring students' achievements even though the purpose is to coordinate, circuitous, quantifiable, subjective, developmental, or collective. The purposes are categorized as evaluation for learning, appraisal as learning and assessment of learning. Appraisal of learning is utilized in making summative choices (WCNP, 2006). All learners keenly screen and judgmentally survey their progress for applying various criticisms from this checking to alter, adjust, and finally sort out major changes in getting better outputs. Both instructor and student utilize various opportunities for learner's advancement in accomplishing outcomes when it is employed for learning. Above mentioned learning's happen all through the education progression and are considered developmental. Appraisal of learning occurs during the end of a course, making it always summative. A range of evaluation strategies are utilized whatever the reason of appraisal. To judge outcomes attainment, test tools ought to empower the students in illustrating more profound experiences as well as HOTS. It is too imperative to keep in mind that in assessing capstone courses, rubrics must be clear (Commission for Higher Education, 2014) and be transferred to the learners well ahead after formulation.

**Table 10. Benchmarking assessment strategy**

Benchmark No	10
Area	Assessment Strategy
Scoping statement	A technically designed process for evaluating student learning outcomes and for improving student learning and development as well as teaching effectiveness.

Good Practice Statement	Both formative and summative assessment methods are in place emphasizing the summative. Assessment methods are aligned with CLOs and teaching-learning strategies. Formative assessment techniques are in accordance with credit values of each course. Students get irregular feedbacks from teachers. Summative assessments usually focus on LOTs and the use of rubrics is almost missing.				
Performance Indicators	<ul style="list-style-type: none"><li>• Assessment practices involve practical evidences focusing on HOTS.</li><li>• Appraisals and credit value of a particular course associated and conceal all CLOs.</li><li>• Rubrics are applied to measure achievement of learning objectives.</li><li>• Timely feedback is provided to understudies on their enactment in every regular evaluation.</li><li>• CLOs, teaching-learning initiatives and assessment methods are appropriately matched for every course.</li></ul>				
Performance Measuring Levels					
1	2	3	4	5	
No statement	Limited with only one or two indicators	Moderate with three indicators	Considerable with four indicators	Comprehensive, statement contains all indicators	
Rating of AT curriculum			03		

The purpose of assessment is to measure the attainment of learning outcomes. Considering this concept, assessment strategies of undergraduate curriculum of Agrotechnology were designed. It is well to note that both summative and formative assessment strategies were incorporated in the curriculum (Table 10). Formative assessments are multimodal. Assessment strategies are well-linked with CLOs and teaching-learning strategies. Care must be given to provide regular feedbacks of formative assessments to learners to improve their progression. For assessing assignments, reports, presentations, theses, etc. use of rubrics may be introduced. Distribution of marks in both formative and summative assessments may be provided according Bloom's cognitive domain. Finally, summative assessment tools may be prepared focusing on HOTS.

### SWOT Analysis

A SWOT analysis identifies to the strengths and weaknesses, and the opportunities and threats of the program. SWOT can help the PoE face its greatest challenges and find its most promising new alternatives. The technique is credited to Stanford University in the 1960s and 1970s. The first two factors (strengths and weaknesses) are controlled by the internal environment of any organization, while opportunities and threats cover a wider context and are controlled by the environment outside any organization (Collins-Kreiner & Wall, 2007). A SWOT analysis always provides support academic staff in instigating substantial transformation in a program for enhancement (Orr, 2013). This is a meaningful tool in any undergraduate or postgraduate program. Adjustments to curriculum, internships, learning activities, education policies, etc., are justifiable if strengths and weaknesses are identified based on a SWOT analysis of a program.

Strategic Analysis (SWOT) was performed in the present study to detect the commands, faults, prospects and risks exist in undergraduate curriculum of Agrotechnology Discipline through internal analysis. Information on external environment was also done reviewing various documents and assessing the external environment. Based on the SWOT analysis the following attributes were identified:

### **Strengths**

- Newly developed OBE curriculum following UGC template and BNQF.
- Vision, mission, objectives, graduate attributes, PEOs, PLOs and CLOs are in place with constructive alignments.
- Curriculum contains core, optional, GED (>25% of total available credits) and capstone courses.
- Graduate attributes and PLOs are framed considering four learning domains of BNQF.
- Well articulated course profile using ISCED code for courses.
- Both summative and formative assessment strategies are in place.
- Medium of instruction is English.

### **Weaknesses**

- PLOs and CLOs more in number.
- Huge curriculum load.
- GED courses are mostly interdisciplinary.
- Resource limitations to attain PLOs, PEOs, graduate attributes and program objectives.
- Capstone course conduction may be limited by poor institutional support.
- More weightage given to summative assessment.
- Summative assessment tools mainly cover LOTs.
- Assessment strategies poorly uses Bloom's learning domains.
- Irregular feedbacks of formative assessment.
- Erratic use of rubrics.
- Provision of lesson plan is missing.
- Poor need assessment.
- Feedback given to students irregularly.
- Course evaluation by students occurs less frequently.
- Insufficient number of field visit hampers student's progression.
- Weak PoE-research-extension linkage.
- Minimum training facilities for teachers.
- Poor physical facilities to run the program efficiently.

### **Opportunities**

- Well defined procedure of program management is documented.
- Alumni support in running the program.
- OBE Curricular options as suggested by UGC, BAC and KU.
- Wider scope of visit to GOs and NGOs
- University-Industry linkage option as directed by the government.
- Extensive use of ICT.
- MoU with other HEIs in home and abroad.
- Pedagogical training options for faculties.
- Multimode of assessment strategies as suggested by UGC and BAC.
- Reputation of PoE in home and abroad.

### **Threats**

- Competitive HEIs (e.g. Khulna Agricultural University, KAU).
- Poor funding for postgraduate research compared to other HEIs offering degree in agriculture.
- Less diversity among students.
- UGC regulation in faculty numbers may hamper in attaining excellence.

## CONCLUSION

There is a growing agreement that internal benchmarking can be an essential tool in helping to create tertiary level education suitable to meet 21st century demands. Due to the profits associated with the application of benchmarking, HEIs would benefit from a reliable method to guide the planning. Its implementation provides as safeguard in achieving of better efficiency. To be successful university executives need to think honestly and benchmark the actual institution instead of portraying the institution for media coverage. In the present study we benchmarked the undergraduate curriculum of Agrotechnology Discipline using ten benchmarks. In addition, a SWOT analysis of the curriculum was also carried out. Based on the above activities the following recommendations may be provided:

- The vision statement should be articulated signifying the global issue.
- The opinion of stakeholders needs to be judged properly in framing the mission in future.
- Skill development mechanisms must be designed accurately to increase the competence of the graduates.
- Number of PLOs and CLO may be kept to minimum.
- GED courses should be general in nature.
- It is essential to minimize minimum credits for graduation.
- Credits should be distributed evenly in different semesters as far as possible.
- Course (s) on contemporary issue may be incorporated in the curriculum.
- Establishment of a research farm is the demand of time and must be considered with the maximum importance to enhance the efficacy of the capstone course.
- A thorough revision is inevitable to reduce the redundancy in course contents that will obviously relief the learners from extra load.
- Care must be given to provide regular feedbacks of formative assessments to learners.
- For assessing assignments, reports, presentations, theses, etc. use of rubrics may be introduced. - Distribution of marks in both formative and summative assessments needs to be provided according Bloom's cognitive domain.
- Summative assessment tools may be prepared focusing on HOTs.
- PoE must develop a mechanism to provide lesson plan and to use course evaluation.
- Pedagogical trainings for the faculties needs to be encouraged and arranged regularly.

However, the recommendations proposed in this investigation is considered primary. Therefore, it is highly suggested that future researchers do further study to explore its efficacy.

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