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Integrating education with consumer behaviour relevant to energy efficiency and climate change at the Universities of Russia, Sri Lanka and Bangladesh (BECK)

Partner report on current state of higher education and its relationship with consumers'behaviouron energy efficiency and climate change

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1 INTRODUCTION

The purpose of thisseries of country reports is to obtain general philosophical, pedagogical and practical understanding on the status of higher education and its impact on consumer behaviour relevant to energy efficiency and climate change in BECK partner and European partner countries. It will also provide a basis for understanding and evaluating the capabilities of partner institutionson integrated educationfor energy efficiency and climate change. The results of these reports willinform a capacity building framework, which will form the basis for development of modules on energy efficiency and climate change during the BECK project.

The reporting approach isbased on the Capacity Needs Assessment Methodology (CAPNAM)proposed by the United Nations (2013).

The report includes chapters on the following:

- Methodology. This section describes the methodological approach used to collect and analyse the data that informs the findings presented in this report.
- Context. Provides an overview of the regulatory, socio-political, and cultural factors that shape policy on the consumer behaviour relevant to energy efficiency and climate change in the country in general, and education in particular.
- Scope and coverage of education policies onconsumer behaviour relevant to energy efficiency and climate change by the Higher Education Institution (HEI). Examines the illustrative policy and planning issues relevant to integrated education on consumer behaviour relevant to energy efficiency and climate change.
- Description of capacity types. Evaluates the existing state of capacities of HEI in the field of integrated education on consumer behaviour relevant to energy efficiency and climate change. As defined by the CAPNAM analytical framework, the four types of categories are institutional, organizational, individual, and the knowledge base.

2 Methodology

Please describe the methodological approach used to collect and analyse the data that informs the findings presented in this report. For example, this may include focus groups, interviews, document reviews and literature reviews.

- Workshops and focus groups were organized in frames of the ASCENT project meeting (14-01-2019) in Colombo, attended by 18 participants, and the BECK kick-off meeting (28-02-2019 – 01-03-2019) in Colombo, attended by 38 participants. Needs, gaps and possibilities for common curricula development identified.
- An extensive literature review was conducted to gather information on education system, education policies, educationalgaps and needs, staff trainings, curriculum development which are the required/ identified informations based on the Capacity Needs Assessment Methodology (CAPNAM) proposed by the United Nations (2013) in levels of country, organizational and individual.
- Based on the requirements for the report, many web sites were referred including websites which are belonged to government ministries, different universities, University grant commission, non-government organizations etc.
- Interviews and rounded table disscussions were conducted in the institutional level according to requirements of informations for the report and academic staff (including professors, senior lectures, lectures), nonacademic staffs (including deputy registers, senior assistant registers academics/examination, scientific assistants, industrial placement officers, derectors of units),technical staff (including research assistants, demonstrators, technical staff) and students were interevied through the process.
- The collected informations were used to develop the report by the reporting committee with the consultants who are engaged with the project.

3 CONTEXT

This section provides an overview of the regulatory, socio-political, and cultural factors thatshape policy on the consumer behaviour relevant to energy efficiency and climate change in the country in general, and the education in particular. Please answer following questions.

3.1 Socio-political and cultural context

What are the socio-political and cultural contexts providing the framework foreducational policy planning in the field of consumer behaviour relevant to energy efficiency and climate changein the country? Are there any regulations, plans, etc.?

Sri Lanka enjoys a remarkable progress, in terms of basic education indicators, compared to many other developing countries in the world. Education is generally state-funded and it is free to all from Kindergarten up to the University education (Liyanage, 2014).In the national constitution, it states that everybody has an equal right to access all levels of education. It helps topromote democracy, moral, physical and spiritual aspects , and engage with lifelong learning. Sametime It also helps to develop deeper understanding of the environment, culture and rich religious heritages of Sri Lanka. Accordingly skills necessarytomeet thecountry's needs ismet bytheFreeEducation(www.justlanded.com, 2019). Currently Sri Lanka has a literacy rate of 92%. This is higher thanelsewhere in South Asia. Education is regulated by the ministries devoted to National Ministry of Education for Primary and Secondaryschools and the ministry of Higher Education for Universitiy Education(www.justlanded.com, 2019).

Sri Lanka is fully committed on mitigation strategies to reduce global worming, to reduce disasters and ratified the United Nations Framework Convention on Climate Change (UNFCCC) in November 1993(Silva, 2009). Over the last two decades Sri Lankamadea significant contribution towards the improvement of national policy and strengthening of legal and institutional capabilities to implementat undertakings and obligations. As an action Sri Lanka established a Climate Change Secretariat under the Ministry of Mahaweli Development and Environment. A national Climate Change Policy has been adopted in 2012 adopted (Ministry of Mahaweli Development and Environment, 2016). A National Adaptation Plan for Climate Impacts in Sri Lanka 2016-2025 was draftedto"mainstream climate change issues within the overall national effort towards sustainable development, to create the conditions necessary to overcome the existing major gaps(Athula Senaratne and Perera, 2017). The issues pertaining to the country's vulnerability to climate change, multifaceted issues of climate change on the society, and capacitybuilding to make prudent choices in decision making are looked after by this plan. Public awareness on conservation and sustainable use of resources to mobilize commitment and participation of all stakeholders are looked after by the plan.(Ministry of Environment & Natural Resources, 2007).

The National Council for Sustainable Development was formed in 2009 under the chairmanship of the HE the President of Sri Lanka to provide leadership and guidance for

sustainable development(National Council for Sustainable Development, 2009). The Council is responsible to produce an integrated policy, for overseeing and guiding the implementation.The development of education to address climate change, as an objectivefor national climate change policy to enhance knowledge on the multifaceted issues related to climate change in the society is much in line with the capacity building for decision making to address the climate change issues effectively and efficiently(Climate Change Secretariat, 2012)..

Achieving inclusive and quality education for all is one of the most powerful and proven vehicles for sustainable development(United Nation Development programme, 2019). The government's "Vision 2025" provides the overall vision and the Public Investment Program. The National Budget 2018 focuses on "Blue Green Economy" envisaged to create an eco-friendly environment(United Nations, 2019).The Sustainable Development Act enacted in October 2017 helps to formulate a national sustainable development policy and strategy. The President has appointed the Sustainable Development Council to implement the Act.

The governmentalso adapted aprogram onmainstreaming SDGs into institutional plans. Among SDGs, Quality Education (Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all), Climate action, Responsible consumption and production, Industry innovation and infrastructure, sustainable cities and communitiesare directly integrated with education to address the climate change. This helps Sri Lankan youth to be actively work as sustainable development lead to assist the country progress (UNDP Communications Unit, 2016).

Sri Lanka has also developed the National Action Plan for the Haritha (Green) Lanka Program. This plan is the product of the concerted effort of all relevant ministries who actively participated indevelopment programs. Achieving sustainability rests on national efforts to a large extent. Under the National Action Plan following strategies / actions are taken toaddress the climate change by intergrading it with the education system.

- Identify key subject areas in the curricula of all technical education courses to integrate sustainable production and consumption practices
- Incorporate identified special subject areas in relation to the environmental education for sustainable development to the current syllabuses.
- Take steps to ensure all educational institutions in the general education system to adher to predefined environmental safeguard policies and ascertain a learner friendly greener environment at the school.
- Integrate physical, ecological and other environmental sensitive policies and practices within the school education system.
- Expand and develop relevant education and awareness programs.(National Council for Sustainable Development, 2009)

3.2 Status of education

What is the current state in education on consumer behaviour relevant to energy efficiency and climate change? Is it important at your country? Please specify.

Education is an essential element of the global response to climate change and Climate Change Education as an entry point for promoting the principles and practice of sustainable development(WWW.UNESCO.ORG, 2014). Importance of addressing the climate change identified by all the stakeholdersengaged with education system. Itpromotes young people to understand and address the impact of global warming, and encourages changes in their attitudes and behavior changes. It also helps themto adapt climate change-related trends(WWW.UNESCO.ORG, 2015).

Sri Lanka is a highly vulnerable country, the main economical domains and livelihood activities suchasagriculture, forestry energy production are directly linked to environment(Sangakkara and Nissanka, 2011).Currently Sri Lanka has been experiencing frequent climatological, meteorological, and hydrological disasters with the potential to set backagriculture, fisheries and even services such as tourism(SLCDMP, 2018). The Government has adapted some measures in these fields to promote better environmental management. First and most important of all, lies on education and public awareness. Education has two obvious effects on the fight against climate change. Firstly, it impacts citizens' general awareness of the issue, and secondly, it determines how enabled they are to develop the necessary solutions and innovations to overcome the problem(Lionel Wijesiri, 2019).

According to the global statistics, Sri Lanka has not fared well in handling the climate change. In a new global index, Sri Lanka has been ranked second among the countries most affected by extreme weather events in last 20 years since 1998. Therefore, climate change is a major issue of concern for Sri Lanka(Lionel Wijesiri, 2019).

Climate change education has to be a major part of the school and university education Number of Universities are now offering subjects and courses based on Climate Change, Disaster management etc.However, at tertiary level education, Climate Change and DRR related issues are incorporated to science streams and there is a clear gap in including these aspects in to social sciences and humanities related streams(Sri Lanka Stakeholder SDG Platform, 2018).Sincetheseprogram aims to help people to understand the impact of global warming, and increase "climate literacy" among young people, the strengthening of the capacity to provide quality climate change education by encouraging innovative teaching approachesis much needed. Integration ofclimate change education in school and by raising awareness about climate change as well as enhancing non-formal education programs through media, networking and partnerships.

3.3 Funding

Is funding sufficient for integrated education on consumer behaviour relevant to energy efficiency and climate change at your country? Please specify.

Education is generally state-funded and offered free of charge at all levels, including the university level. Sri Lanka currently devotes a comparatively small percentage of its government expenditure towards education. Sri Lanka's public expenditure on education liesbetween 2-3 % of GDP (2.8 % in 2017) (Knoema, 2018). The General education which includes basic and secondary levels absorbs the largest share of total expenditure followed by higher education, technical and vocational education.The School allocation Barely adequate to meet the recurrent expenditure such as teachers'

salaries and the cost of expansion of schools to increase the new enrollment rate. The share of expenditure comes on higher education is 14% and 80% of which allocate towards recurrent expenditure with salaries for teachers(Liyanage, 2014). Since the sector suffers from severe funding limitations, the administrators are unable to meet entire capital requirements. Moreallocationis to be diverted tocurriculums development, policy making activities, administrativeservices,infrastructure development facilities, technology upgrading and incorporation,conductrelevant trainings and workshops, teaching material development and many more. To fulfill those requirements HEIs needs sufficient funds and resources. Due to above mention reasons funding is not sufficient for integrated education on consumer behavior relevant to energy efficiency and climate change at HEIs.

3.4 Educational needs

What are the needs in integrated education on consumer behaviour relevant to energy efficiency and climate change (please list up to 5 major needs at country level)?

I. Energy budgeting andconservation strategies
II. Green thinking and Energy options (Internal and External energy concentration)
III. Capacity building towards energy and behavioral options
IV. Create effective education platform for both students and professionals.
V. Develop new UniversityIndustry collaboration platforms

3.5 Educational gaps

What are the gapsin integrated education on consumer behaviour relevant to energy efficiency and climate change (please list up to 5 major gaps at country level)?

I. Lack of available funding and resources
II. Barrier in administration support in managing Research and developmentactivities in HEIs.
III. Issues on policy planning and implementation and evaluation procedures in education system
IV. Inadequate technical capacity of HEIs
V. Lack of initiatives todevelop new programs and curricula for capacity building of academics and students

4 POLICIES RELEVENT TO HIGHER EDUCATION, AND THEIR RELATIONSHIP WITH CONSUMER BEHAVIOUR ON ENERGY EFFICIENCY AND CLIMATE CHANGE

This section examines the illustrative policy and planning issues relevant to integrated educationon consumer behaviour relevant to energy efficiency and climate change. Please answer following questions.

4.1 Policy and planning

Please describe policy and planning issues currently being addressed by the HEI in the field of integrated education on consumer behaviorrelevant to energy efficiency and climate change.

University policies are formulated to tally with the national policies to reflect the Govt policies University act has been created in 1978, Which has been revised several times. Any changes to the act have to go through the parliament which is the legislative constitution of the country.The policies of Sri Lanka have been changing due to political influences. Various structural changes, curriculum development, changing examinations and teacher training of HEIs have not adequately addressed the real needs of the country and just to implement the 'political agendas'(Liyanage, 2014). Asa result, very low attention has been given on policy formulation relevant to energy efficiency and climate change. The policies has been identified to attend on, Energy Security, Providing Access to Energy Services, Providing Energy Services at the Optimum Cost to the National Economy, Improving Energy Efficiency and Conservation, Enhancing Self Reliance, Caring for the Environment, Enhancing the Share of Renewable Energy, Strengthening the Governance in the Energy Sector, Securing Future Energy Infrastructure and Providing Opportunities for Innovation and Entrepreneurship(Ministry of Power and Energy, 2017).

There is a lack of policies to enhance the collaboration among universities as well as schools and other higher education institutions towards sharing of resources, knowledge, skill and technologies in a collaborative way to transform the education on climate change among institutions.Cross sectoral and inter agency collaboration and institutional arrangements. The issues pertaining to implementation and monitoring need a great deal of restructuring.The inability to establish a monitoring and evaluation mechanism for educational policies in the country has left a wide gap on stock taking and honest reporting. The lack of adequate data to evaluate the progress also stems from the continued failure to address the policy issues in Higher education.

4.2 Gaps in policy and planning

Please describe other, if any, policy issues that are not currently being handled by theHEI but should be considered.

The process of policy implementation is weakened due to insufficient allocation of funds for educational policy. Moreover, due to mismanagement of the resources atadmirative level, policy planning and implementation procedures are affected.

There are many gaps in evaluation procedure of education policies and reviewing or updating for effective implementation and monitoring actions, so local jurisdictions can

continuously monitor their plan to evaluate its success and ensure that the plan remains up to date as conditions evolve.Whereas monitoring focuses on changing conditions and updated standards to identify the gaps between educational planning and applications.

The lack of lateral coordination between ministries is a constraint exacerbated by the lack of effective coordinated outcomes from the three institutions/line departments of non-formal education.

Lack of proper understanding of the educational policies in general amongst the administrative and political leaders has led the destructive development process in the country; the political commitment to transformation is yet to be secured.

Training and development initiatives for research and innovation have not incorporated to national level policies.

N.B. The responses to these questions do NOT require describing each policy and planning issue butonly the identification of the type of issues being addressed and those not being addressed. Thequestions are only meant to understand the scope of coverage of important issues by the HEI.

5 CAPACITY TYPES

This section aims at assessment of the existing state of capacities in the HEI forintegrated educationon consumer behaviour relevant to energy efficiency and climate change. As defined by theCAPNAM analytical framework, the four types of categories areinstitutional, organizational, individual, and the knowledge base.

5.1 Institutional capacities

This part describes the institutional capacities at HEI level. Please answer following questions.

1. Please provide brief presentation of the HEI.

University of Ruhuna (UoR) is one of the leading Universities in Sri Lanka functioning since 1978. It's vision to be the prime intellectual thrust of the nation. It is a multi-campus University with 10 faculties scattered in southern provincial cities of Matara (Faculties of Science, Humanities &Social sciences, Marine Resources, Management & Finance, and Graduate Studies), Galle (Faculties of Medicine,Allied and Health Science and Engineering) and in Kamburupitiya (Faculty of Agriculture and Technology). During the 40 years of the existence, university has expanded its horizons to be an entrepreneurial University, by developing and upgrading teaching, research and extension programs through international collaboration with many higher educational institutions around the world and linking with reputed industries.

The University offers basic degree programs in their respective disciplines. Depending on the facilities available, MA, MBA, MSc, MPhil and PhD degrees are also offered. In addition, diploma and certificate courses are offered in various disciplines.

The Faculty of Agriculture, the partner of this project, is one of the pioneering faculties of the University, Faculty has seven academic Departments of study, namely,

Agricultural Biology, Agricultural Economics and Extension, Agricultural Engineering, Animal Science, Crop Science, Food Science & Technology and Soil Science. The Faculty offers 3 undergraduate degree programs, BSc Agricultural Resource, Management and Technology, BSc Agribusiness, Management and BSc Green Technology all being of 4-year duration. The annual enrollment of the faculty for undergraduate programs are around 250, making the population of undergrads in the faculty towards 1000 while identifying itself as the leading center for agricultural research, extension and teaching in the southern Sri Lanka(Faculty of Agriculture University of Ruhuna, 2019).

2. Please describe general model of studies according to different levels (bachelor, master, PhD).

The University offers basic degree programs in their respective disciplines. Depending on the facilities available, MA, MBA, MSc, MPhil and PhD degrees are also offered. In addition, diploma and certificate courses are offered in various disciplines.

These are full time courses consisting of a number of course units organized as two semesters per academic year. The general degree programs run through six semesters while the special degree programs run through eight semesters. Examinations and evaluations are held throughout each semester. At this level, start studying a course or program in a subject area that doesn't require previous university studies. It is for beginners to higher education. Most programs offered at the bachelor's level in Sri Lanka are 3 years or 4 years of full-time studies in length and award 90 credits for 3 years general degrees and 120 credits for 4 years special degrees.

In order to study a program at the master's level, student must have successfully completed a 3 year or 4-year bachelor's degree from a university. Masters with course work award 30 credits and conducted 1-year time period. Next level of Master degree which contain a research component with the course work and its award 60 credit and research component should be minimum 15 credits. Minimum 2 years of fulltime or equivalent time of original research required for Master of Philosophy.

The enrolment requirement for the Doctor of Philosophy (PhD) degree is the completion of a Master's degree, or completion of an Honors Bachelor's degree. Minimum 3 years of fulltime or equivalent time of original research after honors degree.

Source : (Ministry of Higher Education, 2015)

3. Please provide key facts and figures about the HEI:**University of Ruhuna**

3.1. Number of students: 9201

3.2. Number of academic staffs: 546

3.3. Student/Academic staff ratio: 17

3.4. Number of Faculties (please specify): 10 Faculties

I. Faculty of Agriculture
II. Faculty of Engineering
III. Faculty of Fisheries and Marine Sciences & Technology
IV. Faculty of Graduate Studies
V. Faculty of Humanities & Social Sciences

VI. Faculty of Management & Finance
VII. Faculty of Medicine
VIII. Faculty of Science
IX. Faculty of Technology
X. Faculty of Allied and Health Science

3.5. Number of graduates: 31739

3.6. Number of study programs: 40-degree programs

3.7. Number of international academic partners: 145

3.8. International rankings of the HEI (if any):

- world Ranking – 2701
- Presence rank – 1840
- Openness rank – 1321
- Excellence rank – 2164

Source:(www.webometrics.info, 2019)

4. Please describe main education and research areas of the HEI.

UoR cover a wide spectrum of specialized education and research within and between disciplines in medicine, agriculture, biological sciences, engineering, science, management, fisheries and marine science, computer science and information technology, social science and the arts and humanities.

Agricultural biology, agricultural economics and extension, agricultural engineering, animal science, crop science, food science &technology and soil science can be identified as main education and research areas of the Faculty of Agriculture.

The Department of Agricultural Engineering is covered education and researches on fallowing areas, Sustainable resource management, sustainable environmental designs, sustainable environmental technology, sustainable energy, farm machinery, green building, waste management and recycling, environmental management, irrigation and water efficiency management, smart farming technologies, non-distractive monitoring techniques, post harvesting, Hydrology and meteorology, green technology, precision agriculture.

5. Is there any strategic priorities given to integrated education on consumer behaviour relevant to energy efficiency and climate change at HEI level? Please specify.

Since the AgricultureSector is more vulnerable to disasters, Faculty of Agriculture redesigned degree programs and courses to address the Climate change and mitigation issues. Faculty of Agriculture introduced a BSc and MSc programs on Green Technology in 2012 to address the issues pertaining to consumerbehavior on energy efficiency and climate change. This program along with other programs offered by the University is now in a high priority area.

6. What are the needs at HEI in integrated education on consumer behaviour relevant to energy efficiency and climate change (please list up to five major needs):

I. Proper support from government and educational stakeholders
II. Develop new programs and curricula for education on consumer behavior relevant to energy efficiency and climate change
III. Develop training programs for academic and technical staffs and students on capacity building on use of new technology
IV. Develop new partnerships with industry and stakeholders to accelerate learning and increase knowledge creation by enhance the university industry collaboration.
V. Development of Infrastructure facilities in HEIs

7. What are the gaps at HEI in integrated education on consumer behaviour relevant to energy efficiency and climate change (please list up to five major gaps):

I. Lack of available funding and resources
II. Lack of trained professionals who are specialized in these subject areas
III. Technical capacity of HEI is not sufficient
IV. Lack of Motivation to academic and non-academic staffs and students for these subject areas
V. Lack of a substantial inter-agency coordination mechanism and lack of institutional support for Strategic Planning and Management of HEI

5.2 Organisational capacities

This part describes the organisational capacities pertinent to integrated education on consumer behaviour relevant to energy efficiency and climate change at HEI. Please answer following questions.

1. Is integrated education on consumer behaviour relevant to energy efficiency and climate change sufficiently included in the curricula of HEI? Please specify according to different levels (bachelor, master, PhD):

1.1. Study programme level (Please list relevant study programmes):

Bachelor level

- Green Technology
- Agricultural Resource Management and Technology
- Agribusiness Management
- Fisheries and Marine Sciences
- Civil and environmental engineering
- Business Administration

Master level

- Master of Science in Green Technology

- Master of Science in Crop Production Technology
- Master of Science in Agribusiness Management
- Master of Engineering in Civil Engineering
- Master of Engineering in Structural Engineering
- Master of Science in Agri Business Management
- Master of Science in Agricultural Economics and Resource Management
- Master of Science in Animal Science
- Master of Science in Crop Production Technology
- Master of Science in Food Science and Technology
- Master of Business Administration

PhDs are conducted by research on climate change and climatology related studies, sustainable agricultural production, Integrated water resource management, green technology, natural resource management etc.

1.2. Study subject level (Please list relevant study subjects/modules):

- Agroecology and Sustainable Agriculture,
- Agro-meteorology and Applied Hydrology
- Forest Management
- Postharvest Technology
- Applied Green Technologies in Agriculture
- Land Resource Management
- Irrigation and Water Resource Engineering
- Protected Agriculture
- Advanced Climatology and Reservoir Hydrology
- Land use and Environmental Quality
- Environmental Impact Assessment and Valuation Techniques
- Natural Resource Management

- Environment and Pollution
- Atmospheric Pollution and Prevention Natural Resources of Sri Lanka
- Environmental Biotechnology
- Biodiversity Conservation
- Virtual Water and Water Foot Print
- Renewable Energy
- Climate Change and Carbon Balancing
- Environmental Economics
- Biomass Energy Technology
- Energy Analysis and Budgeting
- Sustainable Crop Production Technology
- Water Resource Management
- Sustainable Solid Waste Management
- Green Buildings Designing
- Cleaner Production
- Organic Food Production and Preservation
- Life Cycle Assessment
- Green Productivity

- Composting Technology
- Environmental Evaluation
- Disasters and Green Solutions

- Green Chemistry
- Climate change and oceans
- Environmental Impact assessment
- Water treatment technology
- Waste water treatment technology
- Marine diversity conservation and management
- Wetland management
- Water resource management
- Water governance and policy
- Aquatic pollutions

1.3. Study topic level (Please list relevant study topics):

- Global and Domestic energy demand
- Energy inputs and Outputs in Agricultural Products
- Energy sources
- Energy flow in production process
- Energy auditing
- Energy conservation
- concepts of green technology
- Application of green technology to agriculture towards sustainability
- Concepts of sustainability
- Green technology and rural environmental concerns
- Inputs in agriculture
- Selection of technology
- solar energy
- Wind energy
- Bio mass energy
- Hydro power energy
- Geo-thermal energy
- Environmental pollution and agriculture
- Impacts of wastes
- Classification of wastes
- Properties of agricultural wastes
- Effect of agricultural wastes on natural resources
- Effect of agricultural wastes on environmental pollution
- Objectives and planning of agricultural waste management (AWMS)
- Different methods of organic waste management
- Composting technology
- Biogas technology
- Impacts of green technologies
- architecture of green building
- planning and management of green building
- cleaner production

- Importance of cleaner production
- Steps of cleaner production
- Material balances
- Energy balances, Cost assignments, Review process
- generating cleaner production opportunities
- Identifying and screening of environmental impacts of development projects
- Methods of quantification and valuation of environmental and social impacts of development projects
- Environmental tools
- Initial environmental evaluation
- Concept of Environmental impact assessment

- Sources and types of aquatic pollutants
- chemical and biological indicators for estimation of aquatic pollutions
- Issues on virtual water
- Virtual water footprints
- Virtual water cycle and calculator
- Virtual water in food production and trade
- Virtual food consumption; food storage as reservoirs of virtual water
- Virtual water value
- Concept of marginal virtual production site
- principles in assessing virtual water
- applications and features of virtual water
- computing virtual water trade at global level
- applying the principle of marginal gain in estimating virtual water
- virtual water imports generate real water savings
- Concept of Energy, Units and Measurement
- Types of energy, Energy and Power
- Energy demand, History of fossil fuels
- Environmental Science and technology
- Media and people, decision making and applications of Environmental Science.
- Environmental ethics
- Global and national environmental issues
- Human impact on environment and its consequences
- Weather, climate, factors affecting for climate change
- Greenhouse gases
- Greenhouse effect
- Impact of climate change on natural resources
- Ecological footprint
- Life Cycle Assessment (LCA)
- Carbon footprint of products, persons
- Feature of carbon offsets
- Carbon credits
- Carbon trading.
- Air Quality standards
- Emission standards
- Criteria pollutants
- Air pollution and meteorology

- Atmospheric stability
- Atmospheric dispersion
- A line source dispersion model
- Area-source models, Indoor air quality
- Indoor air quality model
- Emission control
- Emission controls for vehicles
- Energy flows and suppliers
- Basic concepts of biodiversity and conservation
- Influence of geological
- hydrological and climate factors on diversity in flora and fauna among
- Management of ecosystem & agroecosystem
- Sustainability of farming system
- Introduction to Sustainable Agriculture
- Management of sustainable ecological farming

2. Is funding sufficient for integrated education on consumer behaviour relevant to energy efficiency and climate change at HEI? Please specify.

Government funding is not sufficient for in depth program of integrated education on consumer behavior relevant to energy efficiency and climate change at HE due to the facts mentioned in earlier sections. Since Govt funds are shrinking additional funds are to be raised to introduce an efficient program.

3. What are the needs at HEI in integrated education on consumer behaviour relevant to energy efficiency and climate change related to organization of study process (please list up to five major needs):

I. Support from government and educational stakeholders
II. Develop training programs for academic and technical staffs on capacity building
III. Allocate sufficient budget for HEIs for research and innovation activities
IV. Implement policies to support HEIs for researches and capacity building strategies for academics
V. Development of infrastructure facilities

6. Please list up to five major gaps in integrated education on consumer behaviour relevant to energy efficiency and climate change related to organization of study process:

I. Lack of technical capacity of the HEI
II. Lack of academic professionals in this subject area
III. Lack of funding and infrastructure facilities
IV. Lack of organizational policies and management strategies
V. Lack of university industry collaborations

5.3 Individual capacities: Staff skills

This part describes the individual staff capacities pertinent to integrated education onconsumer behaviour relevant to energy efficiency and climate change at HEI. Please answer following questions.

1. How many academic staff work at your unit? (which implements the project)

64 permanent academic staff including 15 Professors and 39 PhD scholars specialized in wide range of disciplines. (Faculty of Agriculture)

2. Is there sufficient number of teachers who specialize in integrated education on consumer behaviour relevant to energy efficiency and climate change? How many?

2.1. At university level:95

2.2. At your unit/department:Faculty: 20, Department: 10

3. Is there sufficient number of researchers who specialize in consumer behaviour relevant to energy efficiency and climate change? How many? 10

3.1. At university level:125

3.2. At your unit/departmentFaculty:25

4.Please describe the current state of the staff training in HEI. Is it sufficient?

When consider about current context on training for the staff of the universities is not sufficient for capacity building and maintain the quality of university education. Lack of trainings for both academic and non-academic staffs resulting low level of improvement in university education. Many employees assigned into university staff after completion of university education as bachelors and they should be incorporate with trainings to train as academic professional to increase their effectiveness.The skills of academic staff for student-centered learning are being upgraded, but the pool of faculty staff is still insufficient; learning opportunities have been significantly increased, but the availability of such courses (Dundar et al., 2017).Training on supplementary skills such as orientation as a university teacher, personal development and counselling, teaching and learning methods, assessment and evaluation, curriculum design and revision, ICT skills in higher education, teaching practice, research in higher education, university administrative procedures, strategic planning and management for universities are very essential for university staff. Those training are conducted every year for the new recruits of the academic staff. It is needed to be improved and continuous training program for all the staff with allocating sufficient funding and resources. Deficit of experienced and qualified cadre for the newly degree programs is can be identified as a one of the major issue in the univercity.

To overcome the gaps in training of staffs, University Grant Commission has declared that successful completion of an orientation program is compulsory for all academic recruits to obtain confirmation. Accordingly, the Staff Development Centers (SDC) of several Universities, based on the broad guidelines given by the UGC have commenced

offering induction programs to the new recruits of their own members as well for members from other universities. Through the SDCs UGC carried out following activities,

- Initiate actions on policy directions issued by the UGC periodically and take steps to implement prescribed initiatives, programs and activities at the UGC/ University/ Institute levels.
- Engage in facilitating in designing and introduction of Staff Development activities in Universities.
- Guide, co-ordinate and review activities of the Human Resources Development Unit at the UGC, Staff Training Centre of the UGC, and SDCs in Universities with regard training activities, management and finances and report to the Commission and make appropriate suggestions for improvement.
- Frame guidelines for planning for staff development programs
- Facilitate and contribute to the evaluation of proposals submitted by Universities and institutes.
- Function as a catalytic unit to promote new initiatives and reforms to improve the efficiency, productivity of academic and non-academic staff(UGC, 2019).

5. Please describe the current state of the staff training on consumer behaviour relevant to energy efficiency and climate change. Is it sufficient?

As mentioned in previous section (3.3), current state of staff training is not sufficient for consumer behavior relevant to energy efficiency and climate change. At institutional level lack of professionals in this subject area is major issue when intergrading these subjects into education system. Mechanism should be developed for the trainings and capacity building activities on these subject areas in institutional level such as orientation as a university teacher, personal development and counselling, teaching and learning methods, assessment and evaluation, curriculum design and revision, ICT skills in higher education, teaching practice, research in higher education, university administrative procedures, strategic planning and management for universities is very essential for university staff. Required trainings was unable to conduct due to low level of funding and resources allocation and low attention on capacity building activities.

6. Does the academic staff have flexibility in designing its own skill development plans or does it have to follow a centrally determined package?

The staff has the flexibility and capability to initiate the skill development program. However,it would be a necessity to jointly work with the other colleagues of the consortium to frame out an appropriate program.

7. Is there staff stability, or does it suffer from high turnover among suchprofessionals?

The staff stability is not a major problem in Sri Lankan Universities.Job security is the one of major factor for the attracting academic professionals to the universities. Generally, professionals who are working in universities have higher prestige with comparatively high salaries with professional freedom compare to the other government institutions. Academic freedom, higher wages and incentives, financial and other facilities offed by the government are at satisfactory level when compare to

others. Due to those reasons, professionals arenot willing to turnover from their organizations.

8. What staff skills are required for integrated education on consumer behaviour relevant toenergy efficiency and climate change(please list up to five major needs):

I. Skills on teaching abilities and Learning methods
II. Patience, adaptability and mentoring skills
III. Communication and presentation skills
IV. Technical knowledge, skills and capacity building
V. Group facilitation techniques,leadership and organizatinal skills

9. Please list up to five major gaps in integrated education on consumer behaviour relevant to energy efficiency and climate change related to staff skills:

I. Lack of policies to support HEIs for researches and capacity building strategies for academic
II. Technical konwledge of staff is not adequate
III. Issues in strategic planning and management at national and institutional level
IV. Lack of systametic procedure for managing and mortivation of academic staff
V. Lack of training programs for academic and technical staffs on capacity building
VI. Lack of assessment and evaluation procedures for academic and technical staff

5.4 Access to Information, Knowledge and Technology

Access to information, knowledge and technology is becoming increasingly critical for sustaining long-term growth and development of education. It relates to the capacity to enable academic staff and students to mobilize, access and use information and knowledge, including access to and effective use of internet. Please answer following questions.

1. Do students and teachers have access to the novel educational resources on consumer behaviour relevant to energy efficiency and climate change? Please specify:

The Library of University of Ruhuna being a central research library in the southern region of Sri Lanka caters for vast variety of communities in the country. In addition to the Main Library, the Ruhuna University library has four branch libraries at different faculties. (Agricultural,Allied Health Sciences, Engineering and Medical) The resource collection consists of more than two hundred thousand books and 200 titles of periodicals related to courses and staff requirements of the university. The library service intends to cater to a large body of users and more services will be provided through a distributed library system using modern communication technologies.

It is the only library that maintains an Online Public Access Catalogue (OPAC) to search the contents and provides reference facilities for patrons to continue their scholarly work. Legal deposit of University of Ruhuna contains a copy of all the publications made since 1990 in the country which is about 160,000 publications. This collection will receive about 5000 new publications annually.

All departments of the all faculties are facilitated with internet facilities for staff and students with purpose of giving access to online educational sources. Libraries contain books and learning materials with different languages such as mainly English, Sinhala, Tamil.

1.1. Printed learning materials in national language:

Learning materials in Sinhala and Tamil language learning materials are availablein main libraries, faculty libraries, and department libraries

1.2. Printed learning materials in English or other languages:

Learning materials in Sinhala, Tamil and English language are available in main libraries, faculty libraries, and department libraries

1.3. Online learning materials (open-source videos, simulators (calculators and software), case studies, text material) in national language:

Online learning materials which are in Sinhala language are available in all faculties and can be access using computer units, faculty libraries, university and faculties web sites and library and learning management system of the university.

1.4. Online learning materials (open-source videos, simulators (calculators and software), case studies, text material) in English or other language:

Online learning materials which are in Sinhala and English language are available in all faculties and can be access using computer units, faculty libraries, university and faculties web sites and library and learning management system of the university.

2. Does HEI use MOODLE for educational purposes?

Yes, MOODLE is used in all faculties of the university as a learning platform, a tool to strengthen the learning management system of the university and integrated system to create personalized learning environments.

3. Does HEI use computer-based intelligent systems, MOOCs, computer learning systems, big data mining for educational purposes? Please specify:

All faculties facilitated with the learning management system which can be access and used for academic staff of relevant faculties and students for their education purposes. MOODLE is used as a learning platform for students.

The university of Ruhuna has a Distance and Continuing Education Unit (DCEU) which is one of the premier Open and Distance Learning (ODL) hubs located at Wellamadama

complex. Learning Management System in DCEU support to online learning external degree for all registered external degree students.

The University of Ruhuna currently does not facilitate/used the computer-based intelligent systems, MOOCs, computer learning systems, big data mining for educational purposes.

4. Does HEI use software forintegrated educationon consumer behaviour relevant to energy efficiency and climate change? Please specify:

Wide range of software used for education on consumer behaviour relevant to energy efficiency and climate change, which are covered many disciplinaries in the education and research areas and mainly, used software are more relevant to the agriculture sector and climate change. For crop modeling DSSAT, CropWat, APSIM and for climate modeling Envi-Met software are used. Geographic Information System (GIS) software (ArcGIS), remote sensing software (EARDS software) are used in mainly precision agriculture applications. Solidworks and AutoCAD software are used for computer allied drawing which is most important and essential in engineering works. Carbon Footprint calculators, Life Cycle Assessment software also used for different applications/purposes.

5. What Information/Knowledge/Technology is required for integrated education on consumer behaviour relevant to energy efficiency and climate change(please list up to five major needs):

I. Support from educational stakeholders
II. Develop new programs and curricula for education on consumer behavior relevant to energy efficiency and climate change
III. Develop training programs for academic and technical staffs and students on capacity building on use of new technology
IV. Allocate sufficient budget for HEIs for research and innovation activities
V. Develop new partnerships with foreign universities and organizations for share knowledge and technologies for capacity building activities.

6. Please list up to five major gaps in access to information, knowledge and technology pertinent to integrated education on consumer behaviour relevant to energy efficiency and climate change:

I. Technical capacity of HEI not adequate
II. Lack of trained professionals who are specialized in these subject areas
III. Lack of funding and infrastructure facilities
IV. Lack of motivation to academic and non-academic staffs and students for these subject areas
V. Lack of communication in inter and intra institutional level

VI. Lack of access to data sources for research and innovation activities

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