

Research: PIASS SW 2018

Together for the survival of our planet: our contribution to mitigate global warming and climate change

Is our planet under serious menace? If yes, to what extent? Whose responsibility is it? And what to do? Are developing countries in general and high learning institutions, churches and civil society organizations concerned by climate change and global warming? This was the issues under investigation by the 7th PIASS Scientific Week which came to close on Sunday 22 July 2018 by 12.30. The three day conference concluded one year long research that focused on the theme: “Together for the survival of our planet: our contribution to mitigate global warming and climate change”. The question under investigation is a global concern; about the survival of our planet given continuous greenhouse gas emission that trigger rapid warming of our planet cause to many catastrophes and disasters with millions of human loses.

Closing the event, the Vice chancellor of PIASS, Rev Prof Elisee Musemakweli, told his happiness to the audience for a successful organization, a better attendance and hugely relevant presentations and discussions of the major topic and subtopics. Global warming and climate change, he said, “is not only academic or professional but practical and concerning our existence”. During the three day conference 12 papers were presented by PIASS academic staff and external scholars. Four scholars gave critical academic discussion to all papers presented. The papers include:

- a. *Bible: the rest of land and environment* by Rev Prof Viateur Ndikumana discussed by Rev Dr Viateur Habarurema [see summary]
- b. *Community Resilience to climate change* by Dr Claudette Uwimana discussed by Dr Elysee Ntiranyibagira [see link]
- c. *Nyungwe National Park community participation in management*, by prof Tharcisse Gatwa and Gloriose Umuziranenge – discussed by Mr Marshall Banamwana [see link]
- d. *Gender Justice in community Management of Nyungwe National Park* by Gloriose umuziranenge and Jacqueline Muhawenayo discussed by Mrs Fortune Bayisenge [see Link]
- e. *Threatened habitat: Nyungwe and Mukura National Parks* by Mrs Gloriose Umuziranenge, Methode Majyambere and Fabien Muhirwa discussed by Dr Elysee Ntiranyibagira
- f. *Landscape in the Rusizi National Park [Burundi] from 1980 to 2015* [a model for monitoring the environment degradation of protected areas] [see link].
- g. *Global Warming and climate change: a Global Challenge*. By prof Tharcisse Gatwa and Prof Viateur Ndikumana- discussed by Dr Elysee Ntiranyibagira[see ppt].
- h. *A dichotomy amended by nature: flowers of Reconciliation from Umucyo Nyanza* by Dr Penine Uwimbabazi and Murekatete Shukulu [see link].

- i. *Bioethanol production from agro wastes* by Dr Isaie Mushimiyimana & Mr Leonidas Manariho, paper discussed by Dr Elysee Ntiranyibagira.
- j. *Analysis of environmental education in Rwanda basic education. Suggestions* by Abel Dufitumukiza; Jacqueline Mukanziza and JB Ndikubwimana, discussed by Marshall Banamwana [see link].

All three accompanying devotions resourced in the Bible teachings that established the human being mandate to care for the environment. Experts on environment and climate have persistently voiced about the menaces global warming constitutes to our planet; the guil-up of greenhouse gases risk to reach an irreversible state. Drought conditions jeopardizing access to clean drinking water, fuel out-of-control wildfires, resulting in dust storms, extreme heat events flash flooding; heavier acid rains cause of destructive streams, rivers, and lakes to overflow which damage life and property, contaminates drinking water, creates hazardous material spills, promote mold infestation and unhealthy air whilst lack of water is a leading cause of death and serious disease.

PIASS Scientific Week

The Protestant University of Rwanda annual Scientific Week is an annual research event gathering to discuss findings from a topic adopted by the university academic Senate. The activity is conducted during the academic year under the supervision of the directorate of research culminating in a three days conference. The research of the Scientific Week are mandatory to all university faculties; and attract external scholars both to present papers and to be critical academic discussants. All the papers presented at the Scientific Week are edited and published in a now peer reviewed Protestant University of Rwanda Publications Series, today at its 12th Issue.

Links mentioned above: papers presented at SW [see corresponding title]:

- a. *The rest for the land: the reading of Leviticus 25, 1-7 in biblical theology of environment* .By Rev Prof Viateur Ndikumana

Abstract

One of the challenges with a huge environmental impact that the world is facing today is the land misuse and overexploitation. Due to different reasons especially a galloping demography, the exploitation of natural resources and agricultural activities have increased. Large areas of the region's cropland, grassland, woodland and forest are now seriously degraded.; water tables have been over-exploited; soil fertility has been reduced; and where mangrove forest has been cleared for aquaculture

or urban expansion, coastal erosion has been a common result. In short, the land is suffering and exhausted.

Nethertheless, the Bible presents it as the first gift given to the humanity by God since the creation. The first human being was placed in Garden and given the first responsibility of keeping and cultivating the land (Gen 1: 28). In the Deuteronomic Code, the gift of the land is the materialization of God's promises and blessings(Dt 8; cf .Gen 12: 1ss). However, one can ask himself why in the Code of Holiness the land gets a holy and personified dimension. According to Lev. 25:1-7, it receives the sinaitical commandment to keep the Sabbath from Moses as the Israelite people (Cf. Ex. 20. 8-12; Dt 5: 12-15). Can we suppose that in 7th centuries BC, the biblical writers were already aware of the consequences of land overexploitation? This paper intends to conduct a synchronical and diachronical interpretation of the text of Lev. 25 1-7 in order to respond to that question and draw out some practical lessons which can help people to change some of their behaviors towards the land misuse and overexploitation.

b. Building community resilience to climate change effects

By Dr Claudette Uwimana

Since the 1970s a new concern about unusual and rapid changes in the world's weather started among scientists discussions. Our Globe today is getting warmer and warmer, due to the increment of greenhouse gas emissions. The consequences of this include climate change and disasters that continually destroy lives with lot of budgets spent to manage effects. Although the issue of global warming and climate change became a global concern calling upon discussions of government leaders, scientists, humanitarians and development activists, this continue to constitute a threat and challenge at global level but also at local level where communities are facing effects like; severe weather events resulting in droughts and floods, effects on agriculture, animals and sea life, water shortage and effects to human health caused by vector-borne diseases and water- borne diseases. Then it is seen that communities are much exposed to climate change with associated ecological effects that have a devastating impact to people's lives in different parts of the world, particularly in poorer countries. Two main responses are available to respond to climate change. The first response is about reducing greenhouse gas emissions to limit further climate change. This is "Mitigation" which involves cutting greenhouse gas emissions of wealthy and rapidly developing countries. It also involves enabling poor countries to develop in a sustainable way without high greenhouse gas emissions. The second response is "Adaptation" which is about helping communities to cope with the impact of climate change. This means communities are required to be enough equipped with knowledge, information, skills and resources for them to be able to identify and use different techniques and mechanisms for an appropriate preparedness and response to climate change.

Our intention to write this paper comes for the purpose of awareness creation and a contribution to the response on climate change. Our focus will be on the second response available which engage community empowerment for resilience to climate change effects. Even though the problem is a global one, the study will be limited to Rwandan communities with possible references from other countries. This is a desk study. We will use different resources such as international and national reports on climate change, previous research reports, official speeches, community members' quotes and testimonies, and other

secondary data to introduce the main ways in which communities in Rwanda can build their resilience to climate change effects.

c. Community Participation in the Nyungwe National Park Management

By Prof Tharcisse Gatwa and Mrs Gloriose Umuziranenge

Erected into protected forest in 1903, the Nyungwe forest reserve was elevated to national park status in 2005. Up until then it was managed by the American based World Life Conservation Society [WCS]. Challenges- The NNP is under population pressure, a high rate of poverty of surrounding population, a high reliance on natural resources for livelihoods in the communities surrounding the park, forest fires (fires in 1997 consumed 5 to 8 per cent of the park), hunting pressures (particularly for large mammals), artisanal and industrial mining, deforestation for firewood and construction materials. Approximately 1,019 square kilometers, the park in southwest Rwanda Nyungwe Forest with a high-altitude, mountainous sole rainforest forest for Rwanda, and the region along the Albertine Rift is also the center of the major hydrography, sources of the two main African river's basins, Nile and Congo. NNP is the largest mountainous forest remaining in Africa and home to 20 percent of all African primates, including 13 primate species, as well as 280 bird species (including 25 endemic species), 43 species of reptiles, and 85 mammal species

From 2005, the governance system of Rwandan parks adopted a new approach which integrates local communities in conservation and development implemented through integrated conservation and development projects around protected area. The ICDP advocate a full participation of local community in all aspects of conservation and development. Various ICD projects have been implemented including, revenue sharing of income from tourism activities and thus reconcile conservation and development¹. Local communities play a big role in the successful natural resources conservation due to their indigenous knowledge in the area; therefore for the conservation and preservation of the park to be successful and sustainable, the population must be fully involved to participate in each process as well as to benefit from

¹Blomley, T. et al., (2010). *Development AND gorillas? Assessing fifteen years of integrated conservation and development in south-western Uganda* Natural Re., London: IIED.

activities and projects undertaken in conservation and development projects.

The research examined how the principles of good Governance are taken into consideration for the benefit of the community participation around Nyungwe Protected area and how those principles are implemented in the Nyungwe Park Management. Qualitative data collection was collected among the conservation NGOs, community leaders, associations involved in tourism and conservation activities, government institutions concerned, former ex-miners, former poachers, artisans, beekeepers association involved in conservation around Kitabi zone in Nyamagabe District, Ruheru zone in Nyaruguru District and Rusizi District.

d. Gender Justice in community Management of Nyungwe National Park.

By Gloriose Umuziranenge [PIASS] & Jacqueline Muhawenayo[PIASS]

Involving different actors to participate in the decision making process and the implementation of those decisions to manage natural resources in a transparent way by considering the voice of everyone and eliminating unequal distribution of environmental costs is the only way of ending existing environmental injustice.

In Rwanda like other societies, women are the ones who especially face negative impacts of poverty and environmental degradation as they are mostly involved in household activities and this position makes them more vulnerable to the negative effects of environmental degradation than male. It is assumed that for women from the impoverished communities surrounding the Nyungwe National Forest, their social-economic situation deteriorated from the erection of the Park into the “protected area”. Hence engaging sustainable development initiatives without involving women is an empty gesture. Therefore increase women participation and empowering them reach to better conservation outcomes and they have privileged knowledge and experience of working closely with the environment. Despite the government efforts in considering community development initiatives among other things, little is known about women perceptions towards community participation in natural resources management. Therefore, the study seeks to assess women participation in natural resources Management around Nyungwe National Park. More specifically, it intends to assess the role and level of women participation in natural resources management with the case of women handicraft in Kitabi sector and to identify constraints that women face by involving themselves in Natural Resources Management.

e. Threatened habitats and the conservation challenges :Nyungwe and Mukura Natural forests

By Methode Majyambere, [UR Biology]; Gloriose Umuziranenge, PIASS; Fabien Muhirwa, Tutorial Assistant [PIASS]

Terrestrial habitats are important ecosystems from which people derive different ecosystem services mainly classified into four types: provisioning, regulating, supporting, and cultural services. All of such services can be found in natural habitats and in human-exploited habitats. The Rwandan history and the structure its current population mean that the pressure on forests and arable lands is harnessed because of a growing population, struggle for a livelihood, and development strategies. The pressure on natural resources such as fuel wood, mines, water, and biological resources is also increasing. Most remaining quasi pristine habitats including natural forests have been protected under the status of protected areas such as National Parks. Under that management strategy of natural resources and vulnerable ecosystems, the Nyungwe and Mukura natural forest reserves became legally National Parks in 2005 and 2017 respectively.

f. Global Warming and Climate change: A world challenge

By Prof Tharcisse Gatwa and Rev Prof Viateur Ndikumana [ppt]

g. Landscape in the Rusizi National Park [Burundi] from 1980 to 2015

Dr. Ir. Elysee Ntiranyibagira

Nowadays, adaptive management of protected areas is lacking objective and integrated indicators for rigorous assessment of their evolutionary trends and the effectiveness of the conservation methods on the basis of conservation objectives and landscape dynamics. The study provides a methodological approach for determining trend indices and historical evolutionary trends which describe the developments of the Rusizi Park known to be the most threatened protected area in Burundi. The study is based on the diachronic analysis of land cover using multi-date Landsat images from 1984, 1990, 2011, 2000 and 2015 and field data. The supervised classification of the images made it possible to identify 9 to 10 land cover classes with contrasting evolutions. The park's matrix, which was made of wooded savannah in 1984 with 43.78%, consists of shrub savannah and cultivated areas occupying 25.87% and 25.40% by 2015. The results showed that during the periods 1984-1990, 1990-2000, 2000-2011 and 2011-2015, the park experienced alternating positive and negative evolutions whose trend indices are $T_i [(38, 6); 2D]$; $T_i [(65, 22); 3D]$; $T_i [(78, -82); 4a]$ and $T_i [(58, -36); 3c]$; the second and the third periods being the most devastating and beneficial ones for conservation. Finally, between 1984 and 2015, the park undergone a negative evolution of trend index $T_i [(77, -64), 4b]$ characterized by "a very strong evolution (4)" with "a strong negative trend (b)" which is represented by spatial transformations affecting 77% of the park,

consisting of 82% degradation and 18% increase, resulting in a negative balance sheet of 64%. During that time, the park lost 29.9% of the vegetation cover and 31.2% of water resources in favor of anthropized areas, which increased by 94.5%. The decline of the vegetation cover is dominated by savannah and forest loss dynamics. Land cover changes are mainly caused by anthropogenic pressures and the variability of climatic conditions. They are due to six spatial processes which are dominated by patch creation and patch attrition. The results also revealed a high degree of coherence between spatial processes, class dominance and trend indicators. In general, class dominance decreases are linked to patch degradation processes and vice versa. Patch degradation processes such as fragmentation lead to negative evolutions if they affect vegetation and positive developments when they affect anthropized zones and vice versa, for patch development processes like enlargement.

h. A Dichotomy Amended by Nature: Flowers of Reconciliation from Umucyo Nyanza

By Murekatete Shukulu & Uwimbabazi Penine

This article presents two links, one, on the energy that the nature has on human connection and two, the interdependence that exist between nature and human. The study connects these ideas from the field of peace education to indicate how they could be built on to enhance sustainable reconciliation and a holistic environmental safety. The interesting thing about these links is that they exist on the pragmatic side of the individual and social responsibility. The paper builds its argument from the case of Umucyo Nyanza project, a project started and owned by a group of women who have been inspired by flowers to go beyond what divide them. This project is composed of women victims of 1994 genocide against Tutsis and women whose husbands are in prison due to crime committed against the genocide. From their choice and experiences on growing and maintaining flowers, we learn from these women that, there is a strong connection between human and nature, when our cognitive abilities are alert and ready to be in use. To understand this experience a participatory voluntary period of one month was dedicated. Thereafter two focus group discussions were organized with all 14 women who are in the project and two interviews with field specialists who stated with these women in the flower gardening activities. With qualitative analysis of data collected, the study presents a social constructed meaning of flowers in the process of reconciliation. Using a small symbol of flowers as determined by this study, a call for individual and social responsibility for nature protection becomes both an obligation and contextually defined.

i. Analysis of Environmental Education Curriculum its Delivery in Rwanda

By Dufitumukiza, A. and Mukanziza, J. & JB. Ndikumbwimana

Intense environmental afflictions are among the big problems facing the humanity in 21st century. Human activities and behaviours are classified as the instigators to these environmental problems. The later through inundation, intense lightning thunders, erosion, global warming, epidemic etc. have attracted attention of individuals and governments for putting in place strong environmental protection mechanisms and mitigation strategies including forestation, reducing CO₂ emission... However, a number of research findings have insisted that the environmental related problems could not be alleviated remarkably unless people change their attitude and activities in favour of environmental protection. Behavioural change theories as well as modernization theory put forward education as a best tool necessary for shaping existing and bringing new values and behaviours in protecting environment. It could be that the more people are exposed to environmental education, the more they become responsible to the environmental protection. Through an explanatory research design, head-teachers, teachers and learners from 12 selected schools located in Huye and Karongi districts will provide primary data by using questionnaire, interview and focus group discussions in addition to documentary data so as (i) to explore the extent to which the current basic education curriculum integrate environmental education, (ii) to investigate the extent to which the curriculum delivery address awareness, knowledge, attitude, skills and participation problems (iii)to find out teaching and learning challenges facing environmental education in basic education. The analysis of quantitative data was delimited to descriptive statistics whilst thematic analysis was applied to qualitative data.

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