Interlinkage of Poverty-Hunger-Health-Wellbeing As Critically Seen For Effective Policy Anticipation on the Need for Wetland Ecosystem Reclamation: “An Argument on the Importance of Truly Sincere & Much Intense International Cooperation to Tackle Future Regional Economic Shortcoming”

F Sjarkowi
Agribusiness and Natural Resource Management, Faculty of Agriculture, The University of Sriwijaya, Palembang, and also Rector of The University of Musirawas, South Sumatra
Email: fsjarkowi13@gmail.com, fachrurrozie_sj@fp.unsri.ac.id

Abstract. Every country with a large number of population but has got a limited stock and deposit of natural resources must always anticipate domestic problems of poverty, hunger, poorer health and declining wellbeing. However, such a classic chain of problems is no longer to be faced alone by a country, as human environment has become so borderless. Neighbouring nations of densely populated countries may frequently have to face sequence of such problems especially in years when the world undergoing an extreme condition. Anticipative collaboration among them could presumably overcome the problems in more elegant way with effective resource utilization and efficient use of funds, while all stakeholders across borders getting mutual benefit with just and pride. The countries have to determine 2-starting points of concern: 1) Focus on the most challenging problem that urgently needs solution (e.g. potential problem of hunger); 2) Focus on particular natural resource base (e.g. a portion of remaining wetland ecosystem) that each country ready to allocate. Subsequent collaborative efforts should be focused on innovative science-tech inquiry and planning appropriate programs to tackle root of the main problem as trigger to overcome all other problems.

1. Introduction
A chain of problems about poverty, hunger, health and wellbeing is certainly classics. It repeatedly occurred to challenge nation after nation, and for that matter it could force domestic human resources to seek for internal recipes towards an effective solution. Nowadays, however, such a classic chain of problems is no longer closely isolated to be faced alone by a country, as human environment has become so borderless. Regional cooperation is a necessity, as countries of closer neighbourhood may have to face common problems within decades to come. Therefore, a kind of common strategy would be needed in order to make efficient & effective use of resources and scientific recipes of innovation. Indeed, neighbouring nations need to identify common targets of economic development (e.g. AEC-2015) in anticipation of economic shortcoming in years to come. A set of identified programs to tackle future potential problems using common recipe and the relevant natural resources of each country, out of which output mainly to meet each national demand as well as regional deficit. As development target is aimed at solving problems of poverty, hunger, health and wellbeing, then more land resource is certainly required. Unfortunately, the only remaining land resources are those potential acreages of...
wetland ecosystem. Moreover, with current state of the art only a small portion of the existing wetland forest landscape that could be safely opened for effective food production, job creation, eradicate hunger, health support, and uplift wellbeing. Out of each particular wetland ecosystem, the largest portion of the landscape is supposed to be conserved and protected.

Each unit of wetland ecosystem entity is pretty much location specific as perceived in terms of its ecological character[1], [2]. Hence, proper development and wise use of its natural resources have not been fully understood by inter-disciplinary scientists. The associated ecological functions and attributes very much depend upon the existence and characteristics of two main rivers which pinch around each landscape basin. Each basin should have received much influence from the rivers inundation, and over an extremely long time frame then the natural process would form a specific ‘hydrological unit of wetland ecosystem’ (HUWE) which is typical in size and also location specific in ecological character. Of course, there are success stories of wetland agro-ecosystem development, and the success apparently achieved due to best site of an HUWE was still easy to select in order to meet project purpose [3]. However, more records of failures were reported especially due to project inability to cope with various technical constraints inherent with the use of wetland ecosystem. The 1-million HAs project of peatland reclamation (1989) in Kalimantan was completely failed and halted in year 2000[4], [5], [6]. The Ha Tien plain of the Mekong Delta as another bad record experienced in Vietnam [7].

| No. | Name of 8 Out of 11 Countries of ASEAN | Remaining Wetland in Hectares |
|-----|---------------------------------------|-----------------------------|
| 1.  | Indonesia                             | 17,700.360                  |
| 2.  | Malaysia                              | 81,050                      |
| 3.  | Myanmar                               | 13,694                      |
| 4.  | Philippines                           | 8,513                       |
| 5.  | Singapore                             | 50                          |
| 6.  | Thailand                              | 111,803                     |
| 7.  | Vietnam                               | 16,795                      |
| 8.  | Brunei Darussalam                     | 87,500                      |

Source: Sustainable Management of Peatland Forests in Southeast Asia

2. Result and Discussion

Wellbeing Vicious Cycle in Wetland Development

Clearly, that each HUWE entity is necessarily location specific, and it must be treated with special techno-ecological method and wise socio-ecological touch. At first in a sparse population area only a relatively small size of ecosystem landscape being opened for food agriculture by local people, and they still had much opportunity to select the suitable landscape to match their limitation in equipment and cash to finance the endeavor. Nowadays such an easy step to utilize a portion of landscape of wetland ecosystem is no longer prevailed, and even much difficult for a large scale wetland use in order to meet the need of huge amount of food stuff for millions of people.

An effort to utilize natural resource certainly mean making up the ecosystem of target to experience moment of ecological dis-equilibrium. Apparently the law of Thermodynamic #1 & #2 and Newtonian Law #3 already remind development actors about this logical consequence. In particular, severe disequilibrium could have been implied when divergence instead of convergence cycle of homeostatic response occurred as a set of field actions taking place in a wetland ecosystem. As a matter of fact, the divergence cycle cannot be easily tackled by making drainage canal blocking, because ecosystem disturbance would automatically transmitted the physical change towards 3 (three) other important factors namely the food web due to change in behavioral pattern of fauna & flora interaction; susceptibility of peat layers with its Carbon stock, and also the characteristic of existing peat layers (sapric or hemic or even much worse is the fibric type of peat soil). Furthermore, in every resource based development a kind of area source of water and air pollution (e.g. smoke and haze coming from an incident of peatland forest fire) is to some extent unavoidable. The transmission process could
spread negative impact across ‘borderless’ nations of nearby countries. In anticipation of such a situation, surely a regional cooperation is badly needed to establish.

Severe disequilibrium could happen especially on peatland ecosystem due to development activities that severely changed sub-surface level of water table. This would subsequently destroy homeostatic capacity that is normally supported by intensely wet and high humidity condition of the natural system. A prolonged dry season could facilitate peatland-forest fire coming along with human negligent and also bad practices being conducted on purpose. Once severe damage occur it would take much longer time to recover, and prolonged bad situation could further result in a vicious cycle of welfare problems[8], [9].

Given the fact that a particular HUWE has been presumably failed to provide the acting human resources with economic welfare, then the situation will trigger those actors to do illegal logging in another HUWE entity.

A set of wetland based programs that might wrongly take a portion of an ecosystem zone could result in a vicious cycle of problems. Instead of creating 4-main components of welfare improvement as described in Figure 1, such an achievement might happen in a newly opened portion of an HUWE landscape. Unexpected outcome could occur following unusual climate condition that might trigger serious ecological disaster. Although HUWE of target is ecologically location specific, however, negative primary and secondary impacts would likely be complained by people across nations of the neighbouring countries. Unhealthy wetland agro-ecosystem due to unwise management in forest ecosystem conversion and its resource development could be followed by various socio-ecological and socio-economic set back. The unexpected outcome might eventually ruin the functions and attributes of the wetland ecosystem and then destroy all potential quality of the existing natural resources [10]. In that case, there would be various local or domestic lost and complaints from many business communities and people of neighbouring countries. For example, heavy smoke and haze of wetland and forest fire problems in 2015 impacted people health negatively, disturbing food security, lacking job availability and triggering more poverty that would eventually followed by stagnant well-being improvement [11], [12]. In concern with such a possible poor performance then one may also compare the ASEAN vision 2020 [12] with current situation impacted by Covid19 and see how serious is the socio-economic set back.

A vicious cycle of problems must be avoided directly and indirectly by all likely affected parties. Various collaboration should be developed by the neighbouring nations, so that any future shortcomings could be minimized even fully avoided. Certainly, the human resources must be fully aware of how important for a wetland development plan to be provided with bio-geophysical accounting as well as socio-ecological engineering by way of environmental impact analysis; a scientific prescription to get a set of environmentally sound programs. In particular, a plan to use sensitive part of a HUWE’s landscape should anticipate any action that might destroy the associated

Figure 1. Reduce Hunger, Eliminate Poverty, Establish Health, and Enhance Well-Being: A relevant theme on collaborative net working among densely populated countries
ecological function & attributes. It is good for actors not to waste time and energy simply for amending the negative things which are essentially avoidable right from the very beginning.

Of course, several reasons perceivable here to be the cause of economic short-comings in the future. It relates especially to availability of wetland ecosystem as the very basic natural resource that could be used in the future to support the overall welfare among people in the neighboring countries (say the ASEAN). It may also relate to various types of mismanagement of improper designed of development activities. In that people in general and the private sectors in particular, instead of using wise strategy of low carbon development some greedy investors and field operators might easily dismiss the LCD principles. On top of all this, un-integrated plans of development within a country and various environmental negligent in designing and executing overall development programs in each nation are likely to cause loss of mutual trust among the target nations

Concerning wetland, and the largest remaining wetland resource called peatland in particular, scientists have confirmed that partial allocation of wetland ecosystem into agro-ecosystem landscape is quite possible to happen in the coming decades [13]. However, the policy decision and action must be carefully conducted for 3-factual reasons that could be found in the field:

a. A wetland ecosystem is the kidney of the landscape, and this natural attribute (good ecological function and undisturbed environmental quality) ought to be maintained sustainably healthy[13];

b. A wetland ecosystem has an essential function as a biological super-market, connecting food chains; and so any activity must not destroy natural complexity of the food web[13], [14], [16];

c. A peatland ecosystem in Indonesia can be regarded as a natural ATM to people living nearby, who are coming in and out of the forest to get certain species of fauna-flora & other resources for cash.

Indeed local people usually taking advantage a nearby HUWE’s natural resources in a variety of ways to support their family livelihoods. This is an important reason for which the existing symbiotic mutualistic between them should be managed in a holistically integrative way. Taking into consideration all those 3-reasons into a THIS-plan of a wetland based development could then be expected to maintain function and attribute of the remaining area of an HUWE entity. Meanwhile, the allocated agro-ecosystem zone ought to be carefully managed to remain systemically alive, socio-ecologically productive, socio-economically beneficial, socio-culturally harmonious, and socio-psychologically conducive over time so as to support overall programs of sustainable development.

The significance of the above mentioned advice relates to the fact that all living and non-living activities and their interactions within the ecosystem are complex. Hence, one must take into consideration the socio-anthropological dimension of peatland as part of total complexity of the ecosystem. Human intervention might cause a change from complexity A to become B, or even much worse than B, namely from A to C where a much simpler but harsher natural interaction may be created within a new wetland agro-ecosystem. The B type of wetland (peatland) ecosystem conversion is considerably better than C, but then a much better way than type B conversion might be technically found in the future due to intensive research collaboration among nations as stake-holders. Basic research as well as R and D action research collaboration would be scientifically very fruitful [15], [16].

So far according to [18] there are 4-main interacting components of a peatland ecosystem, namely living organisms (flora, fauna and micro-organisms), peat chemical and physical characteristics, peat-C stock, and peatland hydrology. Any change in one component will influence the others. A physical disturbance to one component triggers responses from the others that will bring the system sooner or later back to an equilibrium status owing to the natural homeostasis capacity of the ecosystem. However, only by practicing so-called low-Carbon development strategies and the wise use of taking advantage of local wisdom, then a spot disturbance could be followed by functional reaction leading to a convergence natural process[18], [19].

Therefore, a proposal to use an area of peatland might be possible. For example, ecosystem conversion from condition A to B may be considered acceptable considering the fact that organic matter from outside an agronomic landscape (such as livestock urine and dunk including compiled weeds) to some extent may slow down decomposition of the existing organic matter in the peat layer.
On the other hand, a change from A to a poorer condition C (with only recycling of leaves & twigs described as dotted lines in the system) would sooner or later cause divergent disequilibrium, leading to catastrophic failure and socio-economic tragedy. Peatland forest fire, causing extremely high temperature and loss of peat soil is a case in point, bringing economic disaster to a region and its community.

Given the fact that various types of ecosystem, wetland forest in particular, are getting more vulnerable while the associated natural resources are getting much scarce, then a set of LCD principles of resource development is extremely important to be applied. The 2020 Covid-19 tragedy has shed some lights on this important issue. In every ecosystem development there would be a set of intrinsic principles that require a status quo to be sustained naturally. The best way to approach that intrinsic principle is to apply scientific principles of LCD, which conceptually consist of 9-positive (with uppercase) versus 9-negative (with lowercase) technical approach in order to maintain natural process of Carbon abatement and minimize any action to waste Carbon element out of its bio-chemical compound. A 3x3 matrix table consist of 3 types of action (action C1,2,3 or c1,2 &3) and 3 categories of land use management (1.Bio-geophysical, 2. Socio-anthropological, and 3. Political-economiy aspects). Precisely; they are as being classified in this paper, the 9-positive actions are 1.1)C-Sequestering; 2.1) C-Up grading; 3.1) C-Storing; 1.2) C-Collaborating; 2.2) C-Harmonizing; 3.2) C-Recycling; 1.3) C-Economizing; 2.3) C-Certifying; and 3.3) C-Trading; just as the 9-negative actions are 1.1) C-burning; C-entropying; C-dissipating; C-scrambling; C-converting; C-dispersing; C-competing; C-punishing, and 3.3) C-down grading. The C-Uppercases are considered to be a set of LCD actions. By doing so, in accordance with LCD principles, wetland agro-ecosystem could be maintained sustainably productive, and visa-versa,

A natural system could be enriched every day by sunshine nurturing food web and strengthening role of biodiversity within the ecosystem. Conversely speaking, as an ecosystem has lost much of its ecological function and natural attributes, some of the existing food chains are being destroyed likewise. As a logical consequence of such negative phenomena then species dominance would occur, and that is how millions of, say, grasshoppers suddenly appeared. Almost at the same time later certain population of micro-organism is ready to act as decomposer of the eventual dead grasshoppers, and that is a reason on how a kind of Corona virus would possibly born; but this local C-virus might any time ready to be in contact with the imported Wuhan Covid19 to form a less lethal new strain of local Covid19. In the future the situation will be much more sensitive and so such a pandemic disease must be well anticipated.

3. Conclusion

Partnership among nations is clearly needed for effective and efficient efforts to tackle future SDG’s problems leading to enhancing nations well-being as the ultimate goal. Assuming that millions of wetland ecosystem in some ASEAN countries needed in larger portion to be converted into agro-ecosystem landscape, then the countries have to determine 2-starting points of concern: 1) Focus on the most challenging problem that urgently needs solution (e.g. potential problem of hunger); 2) Focus on particular natural resource base (e.g. a portion of remaining wetland ecosystem) that each country ready to allocate. Subsequently, 3) Collaborative efforts should be focused on innovative science-tech inquiry and appropriate programs planning to tackle root of the main problem as trigger to overcome all other existing problems.

Partnership among nations is clearly needed to tackle future SDG’s problems by way of effective and efficient collaboration leading to enhancing nations well-being as the ultimate goal. Assuming that millions HAs of wetland ecosystem in some ASEAN countries needed in larger portion to be converted into agro-ecosystem landscape, then the countries have to determine 2-starting points of concern: 1) Focus on the most challenging problem that urgently needs solution (e.g. potential problem of hunger); 2) Focus on particular natural resource base (e.g. a portion of remaining wetland ecosystem representing types of HUWE) that each country ready to allocate.
References

[1] R. C. O’Reilly, “Biologically based computational models of high-level cognition,” *Science (80-. ).*, vol. 314, no. 5796, pp. 91–94, 2006.

[2] S. Rajagukguk, S. Yang, C.-A. Yu, L. Yu, B. Durham, and F. Millett, “Effect of Mutations in the Cytochrome b ef Loop on the Electron-Transfer Reactions of the Rieske Iron–Sulfur Protein in the Cytochrome bc1 Complex,” *Biochemistry*, vol. 46, no. 7, pp. 1791–1798, 2007.

[3] L. R. Rambo, “Current research on religious conversion,” *Relig. Stud. Rev.*, vol. 8, no. 2, pp. 146–159, 1982.

[4] S. E. Page, R. A. J. Wüst, D. Weiss, J. O. Rieley, W. Shotyk, and S. H. Limin, “A record of Late Pleistocene and Holocene carbon accumulation and climate change from an equatorial peat bog (Kalimantan, Indonesia): implications for past, present and future carbon dynamics,” *J. Quat. Sci.*, vol. 19, no. 7, pp. 625–635, 2004.

[5] F. Sjarkowi, “Social-entrophy system approach (SESA) towards sustainable management of a peatland forest ecosystem in Central Kalimantan (Indonesia),” 2002.

[6] F. Sjarkowi, “Socio-Entropic Controlling Interface (SECI) An Applied Theory On Social Partnership Endeavor.” Penerbit: Baldad Grafiti Press, 2017.

[7] H. H. Nguyen, “A Study of the Drivers of Land Use Change in the Ha Tien Plain,” 2017.

[8] M. Gharibreza, J. K. Raj, I. Yusoff, Z. Othman, W. Z. W. M. Tahir, and M. A. Ashraf, “Land use changes and soil redistribution estimation using 137Cs in the tropical Bera Lake catchment, Malaysia,” *Soil Tillage Res.*, vol. 131, pp. 1–10, 2013.

[9] J. A. Greenwood, J. M. Landwehr, N. C. Matalas, and J. R. Wallis, “Probability weighted moments: definition and relation to parameters of several distributions expressable in inverse form,” *Water Resour. Res.*, vol. 15, no. 5, pp. 1049–1054, 1979.

[10] M. Colin and C. L. Sien, *Too rapid rural development: perceptions and perspectives from Southeast Asia.* 1982.

[11] R. Severino, *ASEAN Rises to the Challenge.* ASEAN Secretariat, 1999.

[12] R. C. Severino Jr, “ASEAN Faces the Future,” *Collect. Speaches Rodolfo C. Sev. Jr*, p. 240, 2001.

[13] E. B. Barbier, M. Acreman, and D. Knowler, “Economic valuation of wetlands: a guide for policy makers and planners,” 1997.

[14] F. Sjarkowi, “Agro Ekosistem Lahan Basah Lestari.” Baldad Grafiti Press, Edisi I. Palembang, 2014.

[15] F. Sjarkowi, “Public and Private Partnership for Sustainable Resource Use Initiative (Strategically Comprehensive Management To Back Up Formal Status of The ‘Cagar Biosfir Berbak-Sembilang’as Another Targeting Site for The World Biosphere),” in *IOP Conference Series: Earth and Environmental Science*, 2019, vol. 298, no. 1, p. 12037.

[16] S. M. Fatika, S. Fachrurrozie, and S. S. Novita, “Chayanov’s Syndrome As Faced By ‘Bap’agribusiness Corporation And The Peasant Communities Living In And Nearby The Forestry Estate Concession,” *Russ. J. Agric. Socio-Economic Sci.*, vol. 78, no. 6, 2018.

[17] J. Jauhiainen, J. A. Conesa, R. Font, and I. Martin-Gullón, “Kinetics of the pyrolysis and combustion of olive oil solid waste,” *J. Anal. Appl. Pyrolysis*, vol. 72, no. 1, pp. 9–15, 2004.

[18] F. Sjarkowi, *Manajemen Niagaperta Kerakyatan : Mempertautkan Hubungan Organik Kinerja Orang Tani Pedesaan dan Kinerja Pengusaha Agribisnis Maju di Bumi Nusantara*, 1st ed. Palembang: Unrsri Press, 2020.

[19] F. Sjarkowi, *Ekonomi Sumber Daya Alami dan Lingkungan*. Baldad Grafiti Press, Edisi I. Palembang, 2004.