

## **Mapping Philippine Agro-Ecological Zones (AEZS)**

### **COMMENT 2**

Let me begin with my comments on the conceptual framework of AEZ vis-à-vis the development potential of an area:

First of all I agree that reporting and even evaluating HDI using ecology-based spatial framework in place of the political administrative unit-based approach as used in the previous reports could create opportunities for improvement of the process of assessing the development potential of an area. The challenge however is in identifying the ecological parameters that are most influential in determining development potential. These ecological parameters could be those related to the key elements (i.e., soil, climate, topography) of an ecosystem and those related to the functions and system properties (i.e., productivity, water quality, biodiversity, land capability among others) of an ecosystem. The development potential of an area rests not only on the state of the key ecological elements but also on the quality of ecological functions that are determined by interactions of the various ecological elements.

Referring to the draft report in review, the ecological parameters chosen include soil, climate and topographic parameters all known to be key factors that determine the crop production potential of an area. However AEZ based solely on the suitability of an area for crop production is unable to account for the most beneficial uses of an area. The AEZ does not also take into account the key impacts of using an area for producing crops on ecosystem resources and functions (i.e., impacts on soil and water along with soil productivity and water quality).

Crop production suitability index approach to AEZ assumes that if areas that are suitable for agriculture are used for crop production, the impacts on development is net positive which may not be true in areas that are suitable for producing certain crops but have harmful impacts on ecosystems and the environment. An example of this is in steep and mountainous areas where the soil is fertile yet are prone to soil erosion. Incorporating a soil erosion parameter is likely to improve the representation of the true suitability of an area for sustainable and profitable crop production.

Obviously crop production is not always the most beneficial use of an area even if it is highly suitable for crop production. For instance areas that are rich in biodiversity or are significantly vulnerable to climate and human induced related risks even if highly suitable for crop production are best use for conservation oriented purposes. Insisting on using these areas for crop production can have substantial damaging impacts that can hamper development locally and worse can have impacts that cascade over broader geographical area. In explaining development in these areas the use of suitability to crop production becomes problematic in that the development can be high yet the reason is not because the area is used for crop production but because of using the area for another purpose. On the other hand if the development is slow in these areas it is not because

these areas were not used for crop production but likely due to deficiency in other factors of development.

AEZ based solely on suitability for crop production determined by moisture availability and soil properties will not adequately and accurately show areas that have high development potential since there are other key geographic factors that drive how people use an area be it for agriculture, residential, commercial, industrial and environmental uses. These factors include proximity to roads, natural waterways, and land tenure as indicator of accessibility of an area for crop production purposes among others. The AEZ as a crop suitability index can therefore be improved by incorporating key drivers of land use as parameters for zonation.

Land capability zonation is an alternative to AEZ that is more likely to be able to explain the geographic influence on HDI. Each land capability zone is suitable to a range of land uses including agriculture, forestry, grazing, industrial, commercial, residential, and institutional, and tourism among others. Land capability zonation can better reflect the potential productivity of an area not only for agriculture but also for whatever land use options. When overlaid with actual uses of the land, the conforming and non-conforming uses of the land are revealed. Areas dominated by conforming uses are expected to have higher net productivity (actual gross production less costs) than areas dominated by non-conforming uses. If the framework of the draft AEZ is revised to include other important geographic factors such as accessibility, soil erodibility and geohazards, the utility of AEZ as indicator of the best uses of an area will increase.

Moving on to specific comments on the draft report:

The source of information on and generalization of slope as used in determining the suitability of an area for crop production as proposed, limits the proper use of AEZ for explaining development potential in an area at the regional scale at best. This is because slope is a geographic feature that is easily lost due to scale and due to lumping procedures. To be truly meaningful at the sub regional and even sub provincial scale, generalization and lumping of slope must be held to the minimum possible.

The basis for the use of elevation as a parameter for AEZ is not clear especially with the use of the highly limited broad classification between lowlands and uplands based on DENR definitions. Elevation is important in crop production and it certainly is a factor of crop suitability in an area since temperature regimes vary with elevation. It is also important because biodiversity especially its uniqueness and rarity hence its conservation value normally increases with elevation. If any of these two key influences of elevation is true then there is a need for finer disaggregation of elevation classes since above 100 m the elevation varies widely and conceivably the crop suitability and biodiversity as well.

The agro-edaphic classification is too biased on the type of soil with inappropriate regard for the topographic feature of an area. This imbalance represents my view on the inadequacy of the AEZ as proposed to appropriately consider the impacts of crop production in determining the suitability of an area for crop production. It appears to me that if the soil type (Cambisols-Luvisols and Fluvisols-Gleysols-Vertisols) is very

suitable for crop production, the area is considered very suitable even if the area is hilly and mountainous. If I were to do it, topography (e.g., slope) will be the limiting factor to crop production suitability instead of the soil type for the reason that it normally takes a lot more resources to guarantee sustainability and environmental protection in sloping areas than in flat lands.

One of the big concerns in this proposed AEZ is the generalization procedures adopted. I understand the challenge of keeping the number of categories to what is manageable but there's a big difference between generalizing prior to assessing crop suitability and generalizing after the assessment. If I were to do it I will assess crop suitability first based on detailed climatic and edaphic parameters and perform the generalization afterwards.

The challenge in using the MMI and GDD in classifying agro-climatic zones is showing the value addition it brings into the much simpler but intuitive approach based simply on rainfall and temperature. For one the PET and GDD models used have not been fully tested for many of Philippine crops and site conditions. Another thing is the pervasive absence of locally observed meteorological data which is much more accurate than those available from CRU.

There will be questions on how valid are the crop suitability indices that were used here as bases for delineating AEZ for the country. Is using corn as the base crop a sufficient representation of the comparative crop production suitability across the country? Or is there a need to develop multi-crop indices? A more general question is whether AEZ based on crop suitability the best gage of the geographic influence on the development of an area? These are the questions that we need to answer before we can even use confidently AEZ as a basis for explaining development potential in an area. Correlation between AEZ and HDI for instance will only show us significant or non-significant relation between the two variables and not whether the basis of AEZ captures sufficiently or not the true significant geographic factors that matter to local development.

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