

Title

Systems Analysis Approach for Carbon Science Economics Convergence Research for Mid-Latitude Ecotone

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Abstract

The mid-latitude zone can be broadly defined as part of the hemisphere between 30° - 60° latitude. In terms of demographics and level of economic development in the mid-latitude region, approximately 50% of population live in this region, and the scope of research is adjusted to the area particularly between 20°N - 40°N. A number of countries in the mid-latitude region host most of the world's development and poverty related problems (Varis et al., 2011).

According to climatic predictions, ongoing climate change reveals substantial increase in temperature and simultaneous decrease in (basically summer) precipitation across vast continental regions. These tendencies will increase during the 21st century will likely increase the frequency of droughts and water stress of vegetation. Even small changes of climatic indicators (temperature, precipitation) may provide substantial impacts on ecosystems in this zone since the land cover of a number of countries within the mid-latitude region are comprised mostly of dryland or desert.

In order to tackle the complicated problems arising in the mid-latitudes, a newly initiated project—Carbon Science Economics Convergence Research—will use the systems analysis approach. The crux of this initiative is to examine the social benefits and costs of different strategies for facing climate change while taking into account carbon use. Tackling climate change requires better knowledge of regions and processes, and research findings should consider the benefits, in terms of damages averted, and propose alternative policies, which can be used to design strategies to deal with complex problems coupled with climate change.

Carbon Science Economics Convergence Research for Mid-Latitude Ecotone

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The mid-latitude zone can be broadly defined as part of the hemisphere between 30° - 60° latitude (Figure 1). In terms of demographics and level of economic development in the Mid-Latitude region, approximately 50% of population live in this region, and the scope of research is adjusted to the area particularly between 20°N - 40°N. A number of countries in Mid-Latitude region host most of the world's development and poverty related problems (Varis et al., 2011).



Figure 1. Mid-Latitude Zone

According to climatic predictions, ongoing climate change reveals substantial increase of temperature and simultaneously decrease of (basically summer) amount of precipitation across vast continental regions. These tendencies will be enforced during the 21st century which will likely to increase the frequency of droughts and water stress of vegetation. Even small changes of climatic indicators (temperature, precipitation) may provide substantial impacts on ecosystems in this zone since the land cover of a number of countries within the Mid-Latitude region are comprised mostly of dryland or desert (Figure 2).

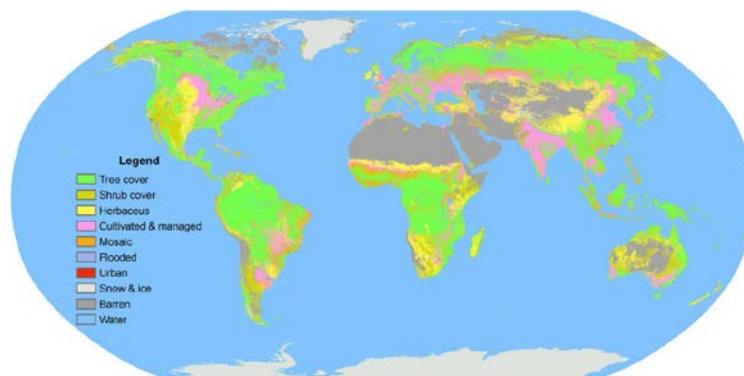


Figure 2. Land cover map showing desertification in Mid-Latitude (See et al., 2014)

In order to tackle complicated problems arising in the Mid-Latitudes a newly initiated research - Carbon Science Economics Convergence Research – which is to embed systems analysis approach in its scheme seems valid. The crux of this initiative is to examine the social benefits and costs of different strategies facing climate change while taking account for the use of carbon (Figure 3)

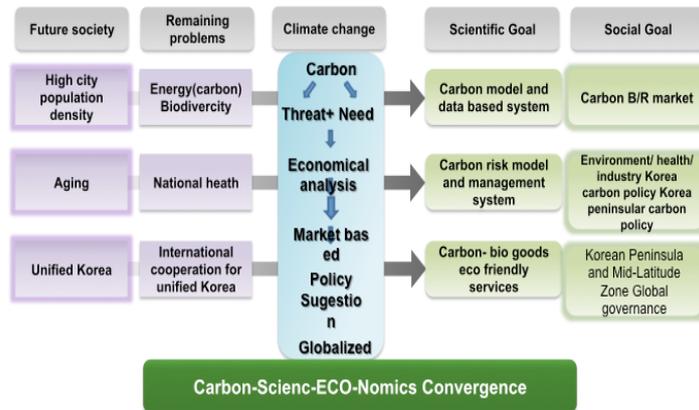


Figure 3. Convergence Research Scheme

An approach to climate change requires better knowledge of regions and processes, and research findings should be directed in a way to consider the benefits, in damages averted and proposing alternative policies, which all in all can be used to strategize in dealing with complex problems coupled with climate change.