Chapter 2
Bio-Economy at the Crossroads of Sustainable Development

José G. Vargas-Hernández
University Center for Economic and Managerial Sciences, University of Guadalajara, Mexico

ABSTRACT

This study aims to review, analyze, and systematize the knowledge created on bio-economy to develop a conceptual and theoretical framework based on the transdisciplinary study of biology and socioeconomy to be used in further research. It begins from the questioning of the benefits that bio-economy has compared to the neoclassical economy. The methods employed are critical analytic, descriptive, deductive-inductive, and it suggests holistic and transdisciplinary approaches. As a result, the core of the study presents the principles under which this new scientific paradigm in sustainable development can continue creating more scientific knowledge to be used in the formulation and implementation of strategic choices for the bio-production, bio-distribution, and bio-consumption processes.

INTRODUCTION

Any nation of the World faces major environmental, economic and social challenges to be addressed to change for sustainable development and the better the way to live and work. Bio-economy is a 'greener' alternative that have impacts on natural and environmental resources, food, soil, land and livelihoods. Bio-economy has a relevant impact in important bio products such as textiles, cosmetics, bioenergy,

DOI: 10.4018/978-1-5225-9562-5.ch002

biofuels, building products, and other byproducts and bio power. Bio-economy serves a market of environmentally sustainable satisfactors, products and services and to keep in pace in the long term to become global, it requires more research and development. Bio-economy is globally influencing biotechnological research and development, business models and market structure.

Bio-economics is considered as a more advanced scientific development than economics because it relies on the evolutionary process of humanity and nature. The advance of economic science extends to consider biological evolution, biology and thermodynamics as important foundations of the economic process. The bio-economy connects and expands economics and biology to anchor in its empirical prediction to give it the power of regeneration and sustainability to the activities of the socioeconomic and biological systems.

This study analyzes the recent developments on bio-economy. It reviews the conceptualization of bio-economy, green economy and ecological economics to analyze the deficiencies of classic economy leading to present the bio-economics as the new epistemological paradigm inextricable linked to sustainable development. From this framework, there are derived at the core of the subject and object of study some principles offered as the basis for further research: Circular economy, sustainable development, holistic and transdisciplinary approaches, innovation culture and capacity creation, knowledge-based economy, global ethics, social capital and culture of peace.

Finally, the study considers the importance of formulation and implementation of the bio-economy as a strategy to enable and ensure results in terms of contributions for the sustainable development of renewable resources. Also some concluding remarks are offered.

CONCEPTUALIZATION OF BIO-ECONOMY

The concept of bio-economy is relatively new to name those economic activities derived from the biosciences advances and surge in the scientific knowledge in biotechnology, genetics, genomics, etc., to achieve practical applications from biological processes. The term *bio-economics* was coined by Georgescu-Roegen to explain the biological origin of the economic process and thus spotlight the problem of mankind's existence with a limited store of *accessible* resources, unevenly located and unequally appropriated (Georgescu-Roegen 1977: 361). Bio-economy is the sustainable production and conversion of biomass into a range of goods and services, among others food, health, fiber and industrial products and energy. The term 'bio-economic' is used to indicate both economic and biophysical components (Knowler 2002).