

Asia-Pacific's Great Green Opportunity: Production of High-Value Algal Bioproducts through BioInnovation Technologies and Strategic Partnerships

Joel L. Cuello

Department of Agricultural and Biosystems Engineering, The University of Arizona, Tucson, Arizona, U.S.A.

E-mail: cuelloj@email.arizona.edu

Considered to be the world's geographical epicenter of tropical algal biodiversity, the Asia-Pacific region is uniquely positioned to harness the significant economic potential presented by its vast array of algae species, both macroalgae and microalgae. High-value products from macroalgae (e.g., food, feed, fertilizer, hydrocolloids) and from microalgae (e.g., nutraceuticals, pharmaceuticals, cosmetics, food, feed) continue to be in high demand worldwide and are projected to continue growing at a fast pace into the future. The global algae biomass market is estimated to be worth \$6.4 billion in 2014, and this abundant renewable biomass resource in the Asia-Pacific region provides millions of jobs in its emerging and developing economies. Harnessing the full economic potential of algae in the region requires four critical competencies on the part of the region's small/medium enterprises: (1) developing bioinnovation technologies (bioreactors, harvesting, drying, processing, etc.); (2) fostering sustainability and biosecurity (responsible resource use, disease and contamination avoidance, etc.); (3) achieving business scale-up; and (4) obtaining global-market linkages. To help the small/medium enterprises in the emerging economies of the region acquire the foregoing competencies, strategic partnerships are necessary. A recent example is the public-private-academic partnership that makes up the newly established Algae Bioinnovation Global Hub (Algae BIG Hub) in the Philippines, through which solutions are designed by academic partners for the challenges encountered by algae enterprises, often with some form of assistance from the government. The Asia-Pacific region forming a network of such national and subregional algae bioinnovation hubs can significantly catalyze the advancement and expansion of the dynamic algae bioindustry in the region, and is also expected to generate positive ripples of innovation and advancement to the algae bioindustry globally.

Keywords: bioinnovation, partnership, microalgae, macroalgae, high-value products