

BUSINESS MODEL PROFILES: NUTRIENTS

SUMMARIZED FROM THE FORTHCOMING PUBLICATION
RESOURCE RECOVERY FROM WASTE



RESEARCH PROGRAM ON
Water, Land and
Ecosystems



Nutrient Recovery from own Agro-industrial Waste

Business characteristics

Geography	Regions with significant livestock production and/or agro-processing enterprises
Scale of production	Medium scale: 5-40 tons per day; Large scale: 1,000-2,000 tons per day
Type of organization	Public, private or public-private partnership (PPP)
Investment cost range	USD 45,000 to 2.5 million, depending on scale and technology
Key costs	Capital investment (land, machinery, infrastructure), operation and maintenance, and laboratory and product certification costs
Revenue stream	Sale of organic fertilizer to segmented markets (bulk sales to parent company and large-scale farmers at a lower price, and sales to smallholder farmers at a higher price) and fees received from parent company for waste management

Business model

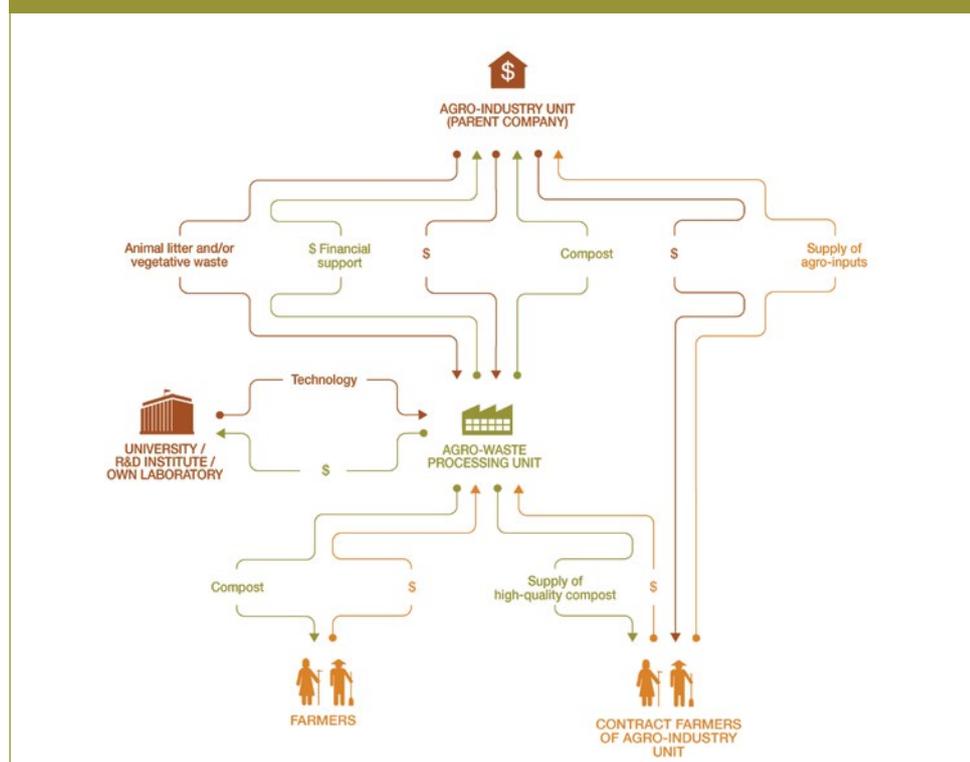
The business model involves an agro-industrial entity setting up a subsidiary business to convert the agro-waste (sugar mill waste, livestock waste, etc.) generated from its operations into organic fertilizer. In this way, the business provides the parent agro-industrial company with a sustainable waste management service (collection and treatment) and increased revenue streams (through nutrient recovery). It also provides affordable, high-nutrient organic fertilizer for agricultural production.

The business can be initiated by a public or private entity, or a PPP seeking to address an internal business waste management challenge and generate additional revenue by diversifying their business portfolio. Although this business model is typically geared towards cost savings, it can generate significant revenue from compost sales primarily to the agro-industrial parent company and local farmers. It sources its waste input primarily from the parent company and its affiliates

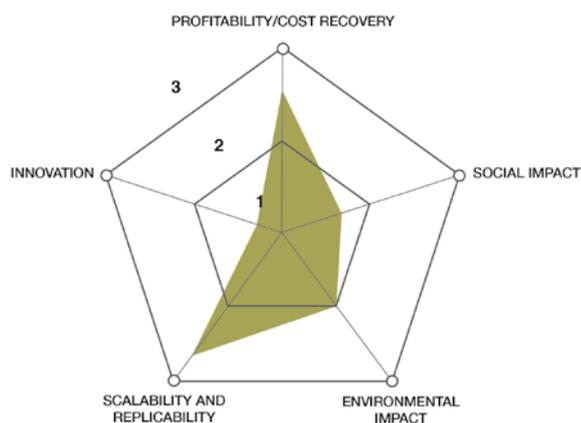
(contract farmers), thus ensuring a consistent supply of resources, often free of charge or at a lower cost. Quality monitoring and research can also be performed by a local university

or research and development (R&D) institute at a fee or by the company's own laboratory in order to improve the technology used and the compost product.

BUSINESS MODEL VALUE CHAIN



Business performance



The business model has a high potential for replication and up-scaling due to the increase in agro-industrial businesses and limited waste management options available, especially in developing countries. It scores low on innovation as the technologies are simple, low cost, and easily available in the market.

Main risks

Market risks: The main market risk is related to the business's strong focus and dependence on the launching customer (parent company). This can induce the business to lose touch with the market and limit its opportunities for growth.

Political and regulatory risks: Stronger political support and policies for chemical fertilizer use, and a lack of specific government guidelines for the certification of compost can represent a significant risk to the sustainability of the business model.

Safety, environmental and health risks: Workers involved in all activities along the compost production value chain (waste collection, separation, compost production, etc.) can be potentially exposed to waste-related diseases (e.g., livestock), if technology performance is not up to par.

Case study: Mexico

Created in 2003, ProBio Humibac (ProBio) is a private company that manages the animal waste generated by SuKarne – the largest beef producer and marketer in Mexico. It maintains a strategic partnership with SuKarne by providing pen-cleaning services in return for their animal waste. The company then processes the waste - 350,000 tons per year - to produce compost and vermi-compost - 296,000 tons per year (79% compost and 21% vermi-compost).

ProBio operates in four locations around the country, supplying low-cost, high-quality soil conditioner to the vegetable and extensive crop sectors. It implements

a commodity-value based business model by using innovative technologies to add value to their product. This has allowed the company to garner significant market demand through third-party certification and the tailoring of their products to the customers, making them the largest producer in Mexico.

In 2013, ProBio made an estimated profit of USD 1.9 million. Its operations have also had a strong impact on society and the environment, as its activities contribute to the reduction of greenhouse gas (GHG) emissions, on-site waste odor, groundwater and surface water contamination, and local air and land pollution.

Key performance indicators (as of 2015)

Capital investment:	USD 2,112,544 (land – USD 603,584; infrastructure – USD 377,240; machinery – USD 1,131,720)	
Labor:	80 employees	
Operation and maintenance cost:	USD 4.6 million/year	
Output:	296,000 tons of organic compost and vermi-compost per year	
Social and environmental impact:	Job creation, reduction of methane and carbon dioxide (CO ₂) emissions, reduction of waste odor, groundwater contamination, local air and land pollution, fertilizer requirements, and improvement in waste management	
Financial viability	Payback period: 5 years	Gross margin: USD 1.9 million

For more information on the business model and related cases, see Chapter 10 of **Otoo, M.; Drechsel, P. (Eds.). 2017. Resource recovery from waste: Business models for energy, nutrient and water reuse in low- and middle-income countries. London: Earthscan/Routledge. In press.** The book has been produced by the Resource Recovery and Reuse subprogram of the International Water Management Institute (IWMI), under the CGIAR Research Program on Water, Land and Ecosystems (WLE) and its Rural-Urban Linkages Research Theme. The support of the Swiss Agency for Development and Cooperation (SDC), the International Fund for Agricultural Development (IFAD), and CGIAR Fund Donors (www.cgiar.org/about-us/our-funders/) is gratefully acknowledged.