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Value Addition of Agricultural Production to Meet the Sustainable Development Goals

A. Maria José Palma Lampreia Dos-Santos, ISCTE-IUL, DINÂMIA-CET – Escola Superior de Comunicação Social – Instituto Politécnico de Lisboa, msantos@escs.ipl.pt

Definition

Value addition is the creation of value at different stages, by different actors throughout the value chain by add value of agricultural production. Value added may be related to quality, costs, delivery times, delivery flexibility, innovativeness of agricultural products, among others characteristics. The size of value added is decided by the end-customer's willingness to pay. Opportunities for to add value depend on a number of factors, such as market characteristics, institutional, social, and environmental conditions and technological capabilities of the actors involved in that process.

Introduction

Globalization and expanding international markets, as well as, the fast-growing middle-and high-income classes in many developing countries offer opportunities for developing country agricultural and other producers to operate in emerging national and international markets (Trienekens, 2011). According to this last author that means that producers must gain better control over production, trade and distribution in order to guarantee the quality and value added of their products and to operate in a cost-effective way. But this biggest challenge implies that these producers must adapt to stringent quality and safety standards and regulations in these markets (Dolan and Humphrey 2000; Trienekens, 2011).

Nowadays, besides the important negotiations among developed and countries in development with World Trade Organization (WTO) important trade barriers persist. For developing country producers in this respect are the lack of an enabling environment offering institutional and infrastructural support, availability of resources and efficient and effective coordination in value chains (Trienekens, 2011) and also the new challenges and risks from climatic change.

In particular producers from countries in development are, until now facing institutional and economic and environmental restrictions that conduct to difficulties to fulfil the world agricultural commerce.

From the institutional level the majority of producers from countries in development are small-scale producers are at a disadvantage because they have little capital to invest, use of traditional techniques, depend on family labor and lack contact with (international) market players (De Janvry and Sadoulet 2005; Daviron and Gibbon 2002). Also, the volumes of productions are, in the majority of the cases reduced and the technological support for cooperation is fair. Furthermore, the rules and regulations from developed countries about international trade, mainly in agricultural trade, are very complex and exigent.

The institutional environment of agricultural production from European Union countries (EUC)or United States of America (USA) are, by the other hand completely different. From EUC the Common Agricultural Policy (CAP) protect the farms and the agricultural production in terms of income, risks of production and trade. Similar protections measures occur from USA to agricultural farms. Due this support measures farmers can sell/export the agricultural production by small prices due the protection of CAP/other measures to support farmers income. Also, in all the countries of European Union (EU), as a strategy of add value, since 1992, EU regulations has protected high-quality agricultural products based on geographical origin using

designations of geographical indications (GIs) Babcock, (20015). According to this last author, also in U.S. producers and processors can obtain a type of trademark called a certification mark, which provides similar protections to that of GIs but protects products only within the United States. European Union negotiations with World Trade Organization (WTO) intent to expand the certification among the European Union and other countries in GIs case.

Due these factors farmers from countries in development can just compete with EU/USA agricultural trade in agricultural production in in which they have competitive advantages in production, namely, in terms of natural resources of production/premium products.

But nowadays natural conditions for small producers in particular, and for all the society in general, are changing around the world, due the climatic change (Fleurbaey et al., 2014; IPCC, 2014). So, the agricultural production and farmers environment are facing now new restrictions and challenges. The IPCC Report, (2014) and United Nations Framework Convention on Climate Change (UNFCCC) refers to "dangerous" human influences on climate in terms of whether they would "allow ecosystems to adapt, ensure food production is not threatened, and enable economic development to proceed in a sustainable manner." The extent to which ecosystems, food supplies, and sustainable development are vulnerable or "in danger" depends on their exposure to climate change effects and on the ability of impacted systems to adapt.

Due the limited resources and infrastructures the countries more affected by the climate change are the less developed with agricultural production less developed and, par consequence, more vulnerable and with less adaptative capacity.

Adaptive Capacity

Adaptation to climate change and risks takes place in a dynamic social, economic, technological, biophysical, and political context that varies over time, location, and sector (Smit & Pilifosova, 2003).

Adaptive capacity is the potential or ability of a system, region, or community to adapt to the effects or impacts of climate change. Enhancement of adaptive capacity represents a practical means of coping with changes and uncertainties in climate, including variability and extremes. In this way, enhancement of adaptive capacity reduces vulnerabilities and promotes in the agricultural sector, researchers have for many years highlighted the potential of fostering both mitigation and adaptation by supporting traditional and biodiverse agro-ecological systems around the world (IPCC, 2014). But at institutional level are also necessary some measures of support the less developed countries (Dos-Santos & Mota, 2019).

For systems such as agriculture, forestry, water resources, and coastal zone settlements, the key climatic stimuli are not average conditions but variability and extremes (Fleurbaey et al., 2014). A direct climatic condition prompts adaptation less often than the economic and social effects or implications of the climatic stimuli that are fundamental in triggering adaptive responses. Non climatic conditions are important in moderating and sometimes overwhelming the influence of climate stimuli in the decision making of resource users. Decisions on adaptation are rarely made in response to climate stimuli alone. These findings are important for predicting autonomous adaptations and for improving adaptation assumptions in impact models (Smit, & Pilifosova, 2003; Dos-Santos & Mota, 2019).

On the other hand, in all socioeconomic systems (especially climate-dependent systems such as agriculture, pastoralism, forestry, water resources, and human health) are continually in a state of flux in response to changing circumstances, including climatic conditions. The evidence shows that there is considerable potential for adaptation to reduce the impacts of climate change and to realize new opportunities.

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Adaptation options occur generally in socioeconomic sectors and systems in which the turnover of capital investment and operating costs are shorter and less often where long-term investment is required (IPCC, 2014).

Also, many of the uncertainties surrounding climate change are difficult to quantify and depend on the judgement of experts and on the type of model used to generate future scenarios. Each model produces a distribution over the possible states of nature (for example, cost of mitigation, temperature increase, or economic damage from climate change), and these distributions might differ from model to model (Drouet et al., 2015).

In economic terms the poorest countries have, in general, less economic resources to overdue the institutional and climatic restrictions. That means there are more vulnerable and with highest difficulty to adapt strategies to overcome the environmental and institutional restrictions and more difficulty to create value addition on products of agricultural sector.

Value Addition

Value addition is created at different stages and by different actors throughout the value chain (Trienekens, 2011). Value added may be related to quality, costs, delivery times, delivery flexibility, innovativeness of agricultural products, among others characteristics (Trienekens, 2011). The size of value added is decided by the end-customer's willingness to pay (Trienekens, 2011). Opportunities for a company to add value depend on a number of factors, such as market characteristics (size and diversity of markets) and technological capabilities of the actors (Trienekens, 2011) and economic conditions. Moreover, market information on product and process requirements is key to being able to produce the right value for the right market (Trienekens, 2011). In this respect finding value adding opportunities is not only related to the relaxation of market access constraints in existing markets but also to finding opportunities in new markets and in setting up new market channels to address these markets. These aspects are now cover and are object of finding from Sustainable Development Goals (SDGs) from United Nations (UN).

Sustainable Development Goals and Value Addition

The concept of sustainable development was first formulated explicitly during the Third UNEP Program in 1975. Sustainable development was then defined as "a course of inevitable and desirable economic development that would not materially and irreversibly affect the human environment and would not lead to the degradation of the biosphere and would not undermine the laws of nature, economics and culture" (UN, 1975; Szopik-Depczyńska et al., 2017). Since then various Conferences and summits involving the UN counties and memberships was occurred on the world (UN, 2019; Szopik-Depczyńska et al., 2017). The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. They recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests (UN, 2019).

The SDGs will form the overarching international political vision relating to sustainability during the lifetime of the new Future Earth initiative (Sachs, 2012). Meeting the goals of sustainable development also requires

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finding a combination of conditions that fosters decent work and economic growth (SDG 8) all while eradicating poverty (SDG 1) Dos-Santos e Mota (2019). The Sustainable Development Goal *(SDG) 2 - End hunger, achieve food security and improved nutrition and promote sustainable agriculture* is one of the 2030 Millennium Goals to achieve. Hunger is on the rise again globally and undernutrition continues to affect millions of children. Public investment in agriculture globally is declining, small scale food producers and family farmers require much greater support and increased investment in infrastructure and technology for sustainable agriculture is urgently needed (UN, 2019). An estimated 821 million people – approximately 1 in 9 people in the world – were undernourished in 2017, up from 784 million in 2015. This represents a worrying rise in world hunger for a third consecutive year after a prolonged decline. Africa remains the continent with the highest prevalence of undernourishment, affecting one fifth of its population (more than 256 million people). Consistent with the continued growth in undernourishment, 770 million people faced severe food insecurity in 2017 (UN, 2019). Strengthening the resilience and adaptive capacity of small-scale and family farmers, whose productivity is systematically lower than all other food producers, is critical to reversing the trend of the rise in hunger. The share of small-scale food producers in terms of all food producers in countries in Africa, Asia and Latin America ranges from 40 to 85 per cent, compared with fewer than 10 per cent in Europe (UN, 2019). Government spending on agriculture compared to agriculture's contribution to the total economy has declined by 37 per cent; the ratio fell from 0.42 in 2001 to 0.26 worldwide in 2017. In addition, aid to agriculture in developing countries fell from nearly 25 per cent of all donors' sector-allocable aid in the mid-1980s to only 5 per cent in 2017, representing a decrease of $12.6 billion (U.N, 2019). A continuous downward trend has been observed in export subsidy outlays reported to the World Trade Organization (WTO). The total outlays fell from close to $500 million in 2010 to around $120 million in 2016. This reduction in export subsidies by Governments is leading to lower distortions in agricultural markets (U.N, 2019).

Previous Developments About Value Addition

The majority of approach to analyse value addition refer to increasing value to a specific product on a microeconomic context (Dos-Santos & Diz, 2019). There is a vast example of research on this field where the main goal is to find value addition of agricultural products inside and outside of agricultural sector by the valorisation of the sub-final products by the innovation process. The majority of approach to analyse value addition refer to increasing value to a specific product. Toldrá et al., (2012) analyses the innovations in value-addition of edible meat by-products. These authors conclude there is a large variety of applications of meat by-products. The analysis also concludes that in addition to the usual applications like human and animal foods, rendered fat for cosmetics and chemicals and hides for leather, recent innovative proposals include the use of proteins for better technological or nutritional properties, the generation of bioactive and antimicrobial peptides or the use of animal fats for biodiesel production.

Other contributions refer the certification of agricultural production as geographical indications, property rights as a way to value-added in agricultural products. Since 1992, the European Union has protected high-quality agricultural products based on geographical origin using designations of geographical indications (GIs). U.S. producers and processors can obtain a type of trademark called a certification mark, which provides similar protections to that of GIs but protects products only within the United States. In the current round of the World Trade Organization (WTO) negotiations, the European Union and other countries are seeking to expand protection through GIs. If they achieve the full range of protection they are seeking, many

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U.S. producers and processors could no longer use many product names currently treated as generic Babcock, 2015). In this context GIs serve as a marketing tool that can add economic value to agricultural products by conveying a cultural identity using the region of origin, acknowledging the value of specific human skills and natural resources in the production process, and creating a unique identity for the products (Addor and Grazioli 2002; Babcock, 2015).

Brand protection is another way to protect trade marks from other products from distribution line. According to Goebel (2003), brand protection under existing trademark law serves as "the main communication tool between a manufacturer and the consumer."

On the other hand, many multinationals and companies outside the European Union that have built reputations in part on products that originally came from Europe could suffer under the E.U. proposal if they were required to change the name of their products and if demand for the products were to decrease (Babcock, 2015).

Protecting intellectual property is also a way to value added in the final production according to Babcock, (2015), but according to this author also serves a greater societal goal of rewarding creativity and discovery. Indeed, the lack of protection for intellectual property would decrease monetary incentives for people to engage in activities that lead to invention (Babcock, 2015). Pharmaceutical companies would invest less in discovering new drugs. The recording industry would pay its artists less. And seed companies would invest less in new seed technologies according to Babcock, (2015). Likewise, inside and outside the WTO negotiations, many countries are negotiating GIs in bilateral and multilateral trade agreements to add value to the agricultural products. Saranya et al., (2016) study value addition of fish waste in the leather industry for dehairing.

Khan et al., (2018) explores the feasibility of utilizing enzymes derived from fish wastes as a low-cost depilatory agent. study explores the nexus between agriculture value added, coal electricity, hydroelectricity, renewable energy, forest area, vegetable area and greenhouse gas (GHG) emission in Pakistan using annual data from 1981 to 2015. The Toda and Yamamoto approach used explore that all the explanatory variables showed causality towards GHG emission, agriculture value added, coal electricity, hydroelectricity, renewable energy and forest area. The unidirectional causality was observed from hydroelectricity to GHG emission, renewable energy to GHG emission, forest area to GHG emission, hydroelectricity to coal electricity, forest area to coal electricity, hydroelectricity to the forest area, and vegetable area to forest area.

These economies continue to expand at rapid rates, their growth will translate into increased incomes and upward shifts in the aggregate demand for higher value-added agricultural products, such as processed food. This will generate opportunities for expansion of more complex production and value-addition in the agriculture sector in the region. Secondly, the focus of donors on infrastructure will improve market access of the agriculture sector, leading to economies of scale. By utilizing their comparative advantages, smallholder farmers would be able to specialize and exchange products through markets. Put differently, smallholder farmers would become market-oriented agricultural producers. Finally, since the majority of the poor is engaged in smallholder agriculture, there is need for a better understanding of its contributions to attaining the MDGs and reducing poverty in East Africa.

Due to the rise of global supply chains, gross exports do not accurately measure the amount of value added exchanged between countries. I highlight five facts about differences between gross and value-added exports. These differences are large and growing over time, currently around 25 percent, and manufacturing trade looks more important, relative to services, in gross than value-added terms. These differences are also heterogenous across countries and bilateral partners, and changing unevenly across countries and partners

over time. Taking these differences into account enables researchers to obtain better quantitative answers to important macroeconomic and trade questions (Johnson, 2014).

All these previous references are focus on industrial development that occurs mainly in developed countries. In addition, these strategies of value edition must also be stimulated by subsidies policies and help to development primarily in less developed countries, by the support policies of the developed countries (USA; FAO; UE; Mercosul, etc.). Traditionally, countries in development or less develop countries due the penury of foods and with weak equitable food production and distribution, in general, promotes intrinsically the "domestic value addition of agricultural products/others" to self-survive in difficult environments and have informal knowledge about that. Therefore, international programs for help for development in less develop countries must promotes value addition of production on an explicit way of support.

According to Salami et al., (2017) improved access to input and output markets is a key precondition for the transformation of the agricultural sector from subsistence to commercial production. Smallholder farmers must be able to benefit more from efficient markets and local-level value-addition, and be more exposed to competition Salami et al., (2017).

According to Hall & Martin, (2005) attempts must be made to address the potential unintended and unforeseen consequences of the technology to contribute to value addition, as well as, its potential benefits, if it is to be successfully applied. Using Monsanto's development of agricultural biotechnology as an illustration, these authors suggest an evaluation framework that incorporates stakeholder theory, innovation management concepts and Popper's evolutionary learning methodology of science and its extension to social issues.

Main Challenges for Value Addition

Due the referred characteristics above the creation of value addition in agricultural productions depends not only the producers and the institutional, environmental and economic conditions of the producer but also the capacity of the market valorise the products.

Face to the export and the free trade agreements among regions to change the product scope, the subsidiary has to extend a product line (product modifications) or introduce new product areas. In addition, using the basic value chain framework of Porter (1985), a shift in value-adding scope requires an extension of basic value chain activities, such as an addition of either primary activities (inbound logistics, operations, outbound logistics, marketing and sales, or service) or support activities (procurement, technological development, human resource management or infrastructure). A rational manufacturer will, therefore, develop its value-adding scope by carrying out marketing activities (Dörrenbächer, & Gammelgaard, 2006).

All the previous important contributions to the literature generally refer a partial point of analysis and the majority of them do not evaluate value addition from a baseline of sustainability or strong necessity to feed the humanity, that means without the implicit need to contribute to food security and reduction of waste and improve the environmental conditions.

Of course, these characteristics are far away of desirable in countries of medium and small income. Also, the difficulties to compete with the international market from products are greater for export countries with more vulnerable conditions. This environment is nowadays creating more disparities among farms in countries in middle income. This situation is also exasperating by the reduction of international agricultural policies from support subsidies and commerce policies among the countries involved on WTO.

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To overcome this problem the develop countries need to address the restrictions of countries with weaker structural agriculture in order to promote trade and development in agriculture through the adjusted policies and the promotion of value addition of production.

Other strategy for value addition on agricultural production must be to stimulate the local production and the production with less inputs use and with short supply chains (ex: urban agriculture; aquaponics, etc.,) to promote the consumption of fresh and healthy foods, stimulate local economy, and reduce the emissions of air pollutants by transportation and to increase the income of local farmers (Dos-Santos, 2018). This analysis of be done at the domain of circular economy.

Figge & Hahn (2004), proposes a new approach to measure corporate contributions to sustainability called Sustainable Value Added. Value is created whenever benefits exceed costs. Current approaches to measure corporate sustainable performance take into account external costs caused by environmental and social damage or focus on the ratio between value creation and resource consumption. As this paper will show it is more promising to develop sustainable measures based on opportunity costs. Sustainable Value Added is such a measure. It shows how much more value is created because a company is more efficient than a benchmark and because the resources are allocated to the company and not to benchmark companies. The concept of strong sustainability requires that each form of capital is kept constant. As Sustainable Value Added is inspired by strong sustainability, it measures whether a company creates extra value while ensuring that every environmental and social impact is in total constant. Therefore, it takes into account both corporate eco- and social efficiency as well as the absolute level of environmental and social resource consumption. As a result, Sustainable Value Added considers simultaneously economic, environmental and social aspects (Figge & Hahn, 2004). The overall result can be expressed in any of the three dimensions of sustainability. Sustainable Value Added represents in monetary terms the extra value created by a company adjusted for all changes in eco- and social effectiveness. Compensation in this context does not mean paying victims for accepting external effects, which would imply weak sustainability and thus substitutability of different forms of capital (Figge & Hahn, 2004). This approach should be extensive for assessing value addition in agricultural production with the necessaires adjustment.

Conclusion

The main results highlines confirm that value addition in agricultural production varies across the regions and continents and also are very dependent not just the local resources (land, climatic conditions) but also from institutional and economic national and international agricultural policies.

The main strategies to value addition to agricultural products includes, beyond the certification and protection of trade marks the valorisation of agricultural outputs by circular economy in order to promote the full use of the all the outputs on a sustainable way. That way seems more accurate and more sustainable to protect the products and to contributes to their use and valorisation, protecting at the same time the more vulnerable farmers and contributes to local development of agriculture. In addition, the openness of trade and the good institutional framework to export needs to occurs.

The UN (2019) recognizes the small investment in public national and mainly international agricultural policies that can compromise on the future not just the SDGs 2 but also conduct to the reduction of the value addition of agricultural production, that can also compromise the achievement of other SDGs, and the eradication of poverty and end hunger. In this context the economic measures should concern more the

importance of agricultural sector and the promotion of export measures at international level to support the development and the increase of value addition of agricultural production.

Cross-References

Agricultural production

Sustainable Development Goals 2 - End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Value Addition

Sustainable Development Goals

Short supply chain

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