Challenges in Sovereignty and Food Security: Using Stonemeal as an Alternative and Sustainable Source

Luana Bispo de Assis[1]
Nayra Thaís Ferreira Batista[2]
Vilmar Antonio Ragagnin[3]
Claudia Adriana Görgen[4]
Éder de Souza Martins[5]
Antonio Alexandre Bizão[6]
Lucas Ferreira de Morais[7]
Eduardo Hack[8]
Andrea Luiza Görgen Marques[9]
Raquel dos Santos Carvalho[10]
Evanielle Clerici Arruda[11]
Carla Bosco (translator) and V. Miranda Chase (proofreader)[12]

Abstract

The creation of more sustainable systems has become an environmental, economic and juridical imposition, highlighting the premise of development and use of alternative sources of nutrients to crops, like biofertilizers and natural mineral sources. The stonemeal technique, which is the use of rock dust to efficiently manage soil fertility, presumes that the slower dissolution of nutrients secures soil productivity and fertility for longer periods. Hence, the by-products of the gravel industry would have a more noble use. The use of rock dust promotes an increased cation-exchange capacity (CEC) in the soildue to the formation of new clay minerals, as well as the availability of macro- and micronutrients absent in soluble chemical fertilizers providers of NPK.

Keywords: Food quality, sustainability, soil remineralization, stonemeal.

[1]Masters candidate in Agracultural Law – UFG. luanabispoadvogada@gmail.com; [2]Masters candidate in Agronomy (Vegetal Production). UFG - Campus Jataí. nayrathais88@gmail.com; [3]Agronomy Professor. UFG - Campus Jataí. vilmar.ragagnin@gmail.com; [4]Agronomist Engineer- Master's degree in Agronomy. claudiadrianagorgen@gmail.com; [5]PhD in Geology – Embrapa Cerrados. eder.martins@embrapa.br; [6]Masters candidate in Agronomy. IF – Rio Verde. aabizao@gmail.com; [7]GBachelors cadidate in Forest Engineeering, UFG - Campus Jataí. [8]Business manager. agrodudas@hotmail.com; [9]Agricultural technician and Bachelors candidate in Chemistry, UFG - Campus Jataí. andrealuizagorgen@ gmail.com; [10] Biologist with Master's degree in Agronomy (Vegetal Production) UFG - Campus Jataí. raquelbioufg@yahoo.com.br; [11]Graduate candidate in Agronomy (MBA Agroenergy). evanielle@hotmail.com; [12]Remineralize the Earth (http:// remineralize.org/)

Introduction

Countless studies show the transformations in food production, especially in relation to products that are present in consumers' everyday meals. Consequently, there is an increased preoccupation with food security - the quality and quantity of food. Food security management goes beyond fighting hunger and poverty; it also encompasses public policies to the agricultural food system, so the issue should be thoroughly approached, from production to consumption. The complexity of the issue leads to a series of discussions of paramount importance, encompassing topics that range from the definition and conceptualization of intense use of agricultural inputs, to the farmers dependence in managing soil fertility, and the pursue for food sovereignty. There is a need to develop and employ new techniques in agriculture where the use of natural resources, including fossil fuels, is more sustainable. Food sovereignty entails a search for regional self-sufficiency to produce what the local population needs or desires to consume.

It is estimated that approximately 816 million people in the world are in a situation of food insecurity, so almost a sixth of the population still cannot feed itself with dignity. This was the conclusion reached by the delegates who participated in the World Food Summit organized by the World Health Organization in Rome in 1996. In the event many countries, including Brazil, made a commitment to reduce by half famine within their territories by 2015. The stonemeal technique, which is the use of rock dust, can be seen as smart fertilizing, since it supposes that the slower dissolution of nutrients enables soil productivity and fertility for longer periods. This would be a noble use of the by-products of the gravel industry (Theodoro et al., 2010).

Despite not being spread in Brazil, the use of stonemeal as a source of nutrients is not new. According to Gilman et al. (2002), in the 1930s european researchers achieved good results in the use of residues from basalt mines for treating degraded areas and growing forests. According to Melamed et al. (2007), the use of rock dust increases the cation-exchange capacity (CEC) due to the formation of new clay minerals during its modification process, as well as the availability of macro and micronutrients unavailable in chemical fertilizers suppliers of NPK (Van Straaten, 2006). Another factor of great interest is the natural availability of trace nutrients present in rocks.

To revert the current scenario of little use of rock dust and understanding of the subject, the adoption of sustainable technologies based on agroecology, stonemeal, and biofertilizers is the viable solution to soils of low fertility due to weathering, a common situation in Brazil that contributes to the low sustainability of the agricultural practices in the country (Theodoro and Leonardos, 2006).

With so many benefits, the use of stonemeal should be widely spread in Brazil. It is assessed that the technique is not yet employed due to reasons such as: lack of public policies that support alternative forms of fertilization, lack of information from farmers, lack of credit access for the acquisition and transportation of rock dusts, and especially the lack of regulation for the commerce of rock dusts. There still is no clear regulation on usage, technical specifications, guarantees, limits, and fiscalization of stonemeal.

Methodology

Over the last decade there has been significant changes in Brazil's positioning within the global scene, resulting from multiple initiatives that favoured the creation of jobs and income, with Brazil becoming a member of BRIC, a group of emerging nations formed by Brazil, Russia, India, and China, and leading talks related to trade and international politics[12]. According to data from the Ministry of Mines and Energy[13], Brazil is the world's fourth largest consumer of fertilizers, although it represents only 2% of the world's production, being a large importer of agricultural inputs.

[12] Disponível em: http://anpege.org.br/revista/ojs-2.2.2/index.php/anpege08/article/viewFile/158/RAE19

[13] Disponível em: http://www.mme.gov.br/sgm/galerias/arquivos/plano_duo_decenal/a_mineracao_brasileira/P29_RT53_Perfil_do_Fosfato.pdf

Food sovereignty, according to Ferrante & Whitaker (2008), entails the complete independence of countries or well delimited regions to produce what the local population needs or desires, with no need to rely on transnational corporations for the production of seeds, agricultural technology viable only to large-scale crops, and expensive food transportation that increases food prices and makes it sterile.

On its turn, the agricultural food system appears as a tool to break paradigms and direct actions for combining modem agriculture and food sovereignty, focusing on food security through agricultural techniques.

Sonnino & Marsden (2006) open the way to a new perspective when viewing the agricultural food system as a combination of local markets and institutions with the goal of serving local market niches. With this perspective, the authors see an opportunity for "rooting", i.e. the use and support of local products.

According to art. 4 of the Food and Nutrition Security Bill (or LSA, for the acronym in Portuguese), Law n. 11.346, from September 15th, 2006, the conditions of access to food should be sought after through production, especially in connection to traditional and family-based agriculture, aiming exports and the creation of jobs and income redistribution. Art.5 of the LSA reinforces the idea that achieving the human right to adequate nutrition and food security requires respect to sovereignty, which "... gives countries primacy over their decisions on food production and security".

In light of this, the creation of the National Council for Food and Nutrition Security - CONSEA (acronym in Portuguese) - is an instrument of articulation between civil society and State for advisory, helping the government in formulating public policies and in orientations so that the country can guarantee the human right to adequate nutrition. Moreover, to ensure that this right is pursued, the National Food and Nutrition Security System - SISAN - was created through the aforementioned Law n. 11.346/2006 with the primary objective of monitoring and evaluating food and nutrition security in the country, stimulating the integration of efforts between government and society. The current scenario demonstrates the will of legislators to decentralize the National Food and Nutrition Security System, favoring the integration of various bodies and entities of the Union, states, Federal District, and municipalities. However, SISAN is a new system of public policies, and is still in the process of regulation. Regulation is sought to ensure future agreements

among different sectors and members of the Federation, which is necessary to the System organization.

Moreover, Brazil is a great food exporter and minerals producer, with wide availability of sources for the extraction of minerals, and therefore the possibility to use rock dusts to manage soil fertility. This process is known as stonemeal. Among the main rocks used in agriculture, we can name carbonatites, phonolites, basalts, kamafugitic rocks, schists, phyllites, marls, and phosphates among others. These rocks are generally composed by minerals like olivines, amphiboles, pyroxenes, micas, feldspars, and apatites that are chemically formed by compounds of carbon, silicates, and phosphates, with calcium, magnesium, potassium, phosphorus, and a wide range of microelements.

The creation of more sustainable systems has become an environmental, economical, and juridical imposition, highlighting the premise of development and use of alternative sources of nutrients to crops, like biofertilizers and natural mineral sources. The stonemeal technique, which is the use of rock dust to efficiently manage soil fertility, presumes that the slower dissolution of nutrients secures soil productivity and fertility for longer periods. Hence, the by-products of the gravel industry would have a more noble use. The use of rock dust promotes an increased cation-exchange capacity (CEC) in the soil due to the formation of new clay minerals, as well as the availability of macro- and micronutrients absent in soluble chemical fertilizers providers of NPK.

Results and reflections

In Brazil there still is a lot of famine and misery. To change this, we must take actions leading to the creation and construction of new economic relations. Stonemeal and biofertilizers are a viable solution to soils of low chemical fertility, a common characteristic in Brazilian soils, which leads to low sustainability of the agricultural practices in the country. The stonemeal technique has not yet spread due to reasons such as: lack of public policies that support alternative forms of fertilization, lack of information from farmers, scientifical research still in its early stages, lack of credit access for the acquisition and transportation of rock dusts, and especially the lack of regulation for the commerce of silicate rocks. There still is no clear regulation on usage, technical specifications, guarantees, limits, and fiscalization of stonemeal. All these facts rely on public policies development, researchers actions, farmers experiences, and product development from miners.

Conclusões

One can see that the interdependence among these factors is complex and cannot be approached by one sector alone. Actions from each sector - agriculture, research, mining, public management - do not necessarily converge. Formulating a coordinated strategy represents a great challenge, and the sectors involved do not yet share a management strategy.

To revert the current state of agriculture, the adoption of sustainable technologies based on agroecology, stonemeal,and biofertilizers is the viable solution to soils of low fertility due to weathering, a common situation in Brazil,which leads to low sustainability of the agricultural practices in the country (Theodora and Leonardos, 2006).

The use of stonemeal as an alternative mineral source in the agricultural food sector has both an environmental impact, because rock dust is considered a natural mineral fertilizer, and an economical impact, because it would decrease the pressure for fertilizers imports, on which Brazil depends. Therefore, the use of stonemeal implies environmental gains and lower costs.

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