

metals in soil were measured in nearby agricultural lands. Ten land lots were selected for each industrial complex: five within 500 m from the boundary line of the industrial complex and five between 500 m and 1,000 m from the boundary line of the industrial complex. Three samples were taken at regular interval from each lot by using auger and these samples were composited and mixed. The collected samples were air-dried and sieved with a 2 mm sieve. These samples were acid-digested by using aqua regia and the concentrations of As, Cd, Cu, Ni, Pb, and Zn were analyzed by ICP-OES (8300DV, Perkin Elmer, USA) and that of Hg was analyzed by a Hg analyzer (DMA80, Milestone & T Cl, Ltd). The results of analysis showed that only one sample exceeded the concern level of arsenic (25 mg kg^{-1}) among the determined seven heavy metal(loid)s (i.e., As, Cd, Cu, Hg, Ni, Pb, and Zn) and the seven heavy metal(loid)s in all other samples were below the concern level. This study used the integrated pollution index (IPI), which is one of the methods for evaluating heavy metal pollution in soil. The reference concentration was the heavy metal(loid) mean content proposed by the soil measurement network of the Ministry of Environment in 2014. IPI of 15 industrial complexes ranged from 0.07 to 2.86 and the results indicated that only three of them were polluted.

Keywords: Agricultural land, heavy metals, industrial complex, and pollution index

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(8489 - 2748) Brazilian Family Agriculture: a small guide family from farmers to researchers

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Brazilian Family Agriculture has been recognized as a force economic and social. Because of this, several academic works in different areas (mainly in health and environmental sciences). Therefore, the State Center for Research in Vegetables is reactivating its experimental field, laboratory and extension actions. This region has priority for the concentration of teaching and research agencies and the target of numerous researches of a decade of 1990. However, as local micro-basins as a target of scientific and international speculation. This situation shows the violation of ethical issues that weaken the strategies of implementation of agroecological transition systems or of Good Agricultural Practices. They are strategic as effective partnerships between scientific research and family farmers for the strengthening and efficiency of activities constructive relations. This work presents the preparation of a guide for researchers, through the experience and perspectives of the producers. This guide intends to support professionals, especially research, with an interest in developing studies in a participatory way in these communities. Purpose of this extension activity is to support the training of young professionals on the problems of family farming and their complexities. Results are intended to guide the preparation of research proposals in an effective partnership with rural communities. In this first stage we are making visits to the rural property to follow the routine of the producers in their activities in the fields, such as commercial transactions, such as meetings of associations of farmers. In the sequence, we have interviewed extension workers, health agents and doctors. Surveys of the scientific and technical publications related to the studies developed in the region. It is observed that the theme most discussed by the researchers is related to the use of pesticides and health. Tomatoes, zucchini, coriander, parsley and chives are the most grown by farmers. Biodiversity is longer because the investment focuses on foods that are more profitable. It is evident the absence of an appropriated support for property management and pesticide use. However, farmers know about the poor management of the soil and

about the risk of their health and pockets. This information represents a challenge to achieve a sustainable environment and soil health.

Keywords: The socio-economic-cultural dynamics of rural life. Agroecology. Agrochemicals and Health. Producer participation. Extension.

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(7084 - 2659) Cadmium, copper and chromium, pseudo-total concentration and available to soil in long-term experiment

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Knowing the distribution of heavy metals in the soil as its pseudototal and available contents is of paramount importance for the evaluation of environmental impacts, as well as knowing the contents associated with soil particles. The objective of this work was to evaluate the pseudototal and available soil content of the cadmium, copper and chromium metals in eutrophic Red Latosol fertilized with sewage sludge for fifteen consecutive years at three depths. The experiment was installed in field conditions, in randomized blocks, in a Red Latosol eutroferic submitted to four treatments with different dosages of sewage sludge (dry base) in five blocks. Soil samples were collected from the superficial layer, 0.00-0.05; 0.05-0.10 and 0.10-0.20 m, and the pseudo-determinations were made and available for determination of the cadmium, copper and chromium contents. The analyzed cadmium, copper and chromium contents did not present variations in the analyzed depths. The concentration of cadmium was higher in the treatment with mineral fertilization when compared to the treatment fertilized with different doses of sewage sludge, this can be attributed to the chemical constitution of the minerals. On the other hand, copper and chromium metals presented higher levels in the treatments with 10 and 20 Mg ha, at depths 0 to 5 and 10 to 20 m, it is important to note that the sewage sludge used in the 15th year experiment did not have high concentrations of these metals, this shows that the contents presented may be associated with the quantity of metals remaining from another year, that is, residual quantity.

Keywords: Availability, determination, heavy metals

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(3623 - 2712) Can the Quick Diagnosis of Soil Structure (DRES) method describes the soil quality of Brazilian pastures?

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Soil structure is related to many soil ecosystem services and has been used as manageable property in evaluating soil quality in agricultural areas. From this perspective, Quick Diagnosis of Soil Structure (DRES) shows up as an efficient soil structure assessment in field. It was first developed to no-tillage crop systems but it may be well fit to others productive systems such as pasturelands. Brazilian cattle herd is one of the largest in the world, occupying around 159 million hectares. However, about 50% of this area is estimated being under some degradation level. Hence, strategies to pasture recovery demand previous diagnosis to stablish appropriated rehabilitation technics and pasture management. This work intends to distinguish pastures degradation levels by visual evaluation of soil structure (DRES), soil surface cover (forage and weed vegetation characteristics) and the following soil attributes: mean weight diameter, soil C concentration and stocks. The experimental area are rural farms, in Valença Municipality, Rio de Janeiro State, Brazil. The region is known as "Mar de Morros" due

its rugged relief, and the local soil is classified as Cambisols. A previous visual classification of degradation levels reaches four treatments defined as N1-light, N2-moderate, N3-severe, and N4-very severe degradation. Three areas of each level were selected and soil samples were collected in 0.0-0.2 meters depth. The Spearman correlation was applied ($p < 10\%$). Previous results confirmed pastures degradation levels since worse soil structure described by lower DRES grades (N3= 2.4; N4= 2.7) were associated to lower soil C concentration and C stocks, smaller aggregates and higher occurrence of exposed soil. The opposite occurs to N1 and N2 (N1= N2= 3.9). Results show positive correlations between the DRES index and soil C stocks ($r= 53.1\%$, $p= 0.079$) and concentration ($r= 40.6\%$, $p= 0.193$), mean weight diameter ($r= 56.6\%$, $p= 0.0059$) and soil cover percentage during rainy season ($r= 79.0\%$, $p= 0.004$). Negative correlation between DRES index to exposed soil percentage during rainy season ($r= -79.0\%$, $p= 0.004$) were estimated. Thus, results reveal the DRES as a feasible assessment method to soil quality in pasture, able to distinguish degradation levels. Well manageable pastures got higher DRES grades and better soil quality, due to higher biomass production (above and belowground) and soil protection.

Keywords: Soil structure, DRES, pastures degradation.

Financial support: CAPES, Rural Sustentável, Rede ILPF.

(1295 - 1087) Changes of soil chemical quality index in according to time in paddy soils by long-term application of soil amendments

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The changes of soil chemical quality index in paddy soils applied of soil amendments were assessed from data of long-term experiment plots which were operated from 1969 to 2016 by the National Academy of Agricultural Science, Suwon, Korea. The treatments were inorganic fertilization (NPK), inorganic fertilizer plus soil amendments (rice straw compost, NPK+C; silicate fertilizer, NPK+S; lime, NPK+L; mixing rice straw compost and silicate fertilizer, NPK+CS). The quality index of soil for chemical properties was analysed by method suggested by Yoon et al. (2004), and divided into by 4 periods (Period I : 1969 ~ 1978, Period II : 1979 ~ 1985, Period III: 1986 ~ 2001, Period IV: 2002 ~ 2016). The order of magnitude of soil chemical quality index was NPK+CS > NPK+S > NPK+L > NPK+C > NPK. The quality index of soil chemical properties of NPK, NPK+C and NPK+S treatments ranged from 70 to 74 in period I, from 64 to 71 in period II, and to 75 to 82 in period III and IV. Especially, the decrease of the chemical quality index value of NPK, NPK+C and NPK+S treatments in Period II was attributed to the decrease of the soil pH value below the optimum range of rice growth due to irrigation water. NPK+L treatment increased from 71 ~ 72 to 76 during the period I, II and III due to the increase of pH by the lime application. The NPK + CS treatment increased to the highest value from 82 to 82 in period, but tended to decrease at period III and IV. It showed that this was caused by the accumulation of silicate fertilizer, resulting in a decrease of the chemical quality index value of the soil. When a constant amount of soil amendments was continuously applied for 48 years, the soil chemical quality indexes were improved. But after that period, the soil chemical quality index was decreased because of excess accumulation of soil amendments. In order to determine the quality of paddy soils that meet the agricultural environment conditions in Korea, the soil quality including physical and microbial properties as well as chemical characteristics should be evaluated at a later stage.

Keywords: Long-term application, paddy soil, soil chemical quality index, rice straw compost, silicate fertilizer, lime

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(7234 - 1796) Characterization and valuation of soils with potential investigative and productive in the Bogota's Savannah, Colombia.

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Latin America is considered one of the most diverse regions in relation to natural resources. This area offers 31% of the world's fresh water, and has approximately 23% of land considered high productive potential. Rapid population growth has increased the demand for ecosystem services offered by soil. This is causing greater anthropogenic intervention, reflected mainly in the conversion of natural ecosystems to agricultural soils, which affects their quality. In recent decades, productive activities have been directed towards sustainability, ratifying the need to guarantee food security at a global level. In this context, agriculture faces the challenge of producing food and raw materials in a sustainable manner, which favors the reduction of pollutant emissions, in order to maintain soil quality and face the threats posed by climate variability and change. In Colombia, a large percentage of agricultural activity takes place in the central zone of the country, where the department of Cundinamarca occupies the seventh place, producing vegetables, fruits, potatoes, flowers, among others. These crops, in many cases, are produced intensively, without considering the impact they can have on the productive capacity of the soil. Hence the importance of the participation of future professionals in the discipline in relation to sustainable production. The purpose of this work was to characterize and evaluate the current state of the soil at free exposure (1218 m²), in the investigative and productive unit El Remanso, which is located at coordinates 4° 47'58.93"N and 74°2'48"W, in the savannah of Bogotá, Cundinamarca, Colombia. For this, we use quality indicators, following the standard USDA methodologies, such as apparent density, real density, porosity, texture, humidity and pH. The results obtained, led to establish that the evaluated soils have influence of volcanic ash, which improves some properties such as moisture retention, accumulation of organic matter, among others. Likewise, they have textures C, SiC, CL SCL, SiCL and SiL, pH between slightly acid and moderately alkaline (6.5-8.2), average apparent density of 0.73 g/cm³. The surface horizon allowed identifying two activities that can influence the loss of soil quality. Otherwise, the loss of structure is associated with conventional tillage practices, a condition that makes compaction probable. On the other hand, the loss of nutrients, structure and humidity is related to intensive production.

Keywords: Soil health, sustainable production, tropical soil, soil quality.

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(3712 - 1503) Chemical characterization of soils adjacent to a wastedump of the Stella Maris polymetallic mine Paso de Indios, Chubut. Argentina.

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The main environmental problem associated with the exploitation of metallic deposits is related to the presence of polymetallic waste dumps. If they are not managed properly, once the exploitation is finished, they become environmental liabilities. Depending on the mineralogy of the exploded deposits and the climate of the region, they can produce acid drainage and as a result, they will affect the properties of the surrounding soils. The objective of this work is to characterize the chemical properties of the soils adjacent to a Stella Maris polymetallic