23rd International Conference on
NANOTECHNOLOGY
June 27-28,2024 | London, UK

Nanotechnology and human health: Regulation for the implementation of sustainable development

Figueiredo Ailene O
State University of Mato Grosso do Sul, Brazil

This article aims to correlate nanoelement technologies and legal regulation in the use and disposal of such materials. With the purpose of supporting a critical reflection on the economic development model, added by arguments derived from the area of Research, Development and Innovation (PD&I), the precautionary principle is beacon of corporate management and sustainable instruments for the protection of the environment and human health. Socially sustainable development was initially anchored to the social, economic and environmental tripod. Sustainability refers to the guarantee of survival of the Earth's natural resources, in which strategies are implemented that enable ecological development solutions.

Methodology and Theoretical Orientation: Through the qualitative approach, bibliographic procedures were adopted, with a survey of theoretical references published by electronic and documentary forms. To this end, the methodology of bibliographic and documentary research was used to verify the legal framework of nanotechnological products in the Brazilian legal system, whose theoretical orientation is based on a new definition of sustainability was proposed as follows: [...] to meet the interdependent needs of living beings, while increasing the capacity of future generations of all species to satisfy their own needs [...], and the title 'multispecies sustainability' (RUPPRECHT et al, 2020, p. 3). And it designates the interdependence of living things, increasing multispecies ethnography and cybernetic perceptions, i.e., sustainability is meeting the interdependent needs of living things, while increasing the ability of future generations of all species to satisfy their own needs. And they are potentially applicable to enable human-wildlife coexistence, and to rethink the structure of urban and rural green space and public health perceptions.

Findings: The globalized economic development was provided by the technological development of industrialized countries, based on massive investments in research (PCAST, 2014). According to Rocco et al (2011, p. 428), from 1999, the U.S. led the research and development initiative through Research & Development & Innovation (PD&I) programs. Which resulted in the development of more advanced nanomaterial production techniques and can be used in a myriad of high technology products, with physical and chemical properties of a unique nature when compared to conventional materials Other countries have also started to promote government projects and programs (DE NIGRI, 2017, p. 25). The initial expectation in relation to these numerous materials is due, initially, to the need to replace the human labor in tasks that the acuity and dexterity of the human being does not reach. The nanoscale, according to the British Standarts Institution (BSI), such materials must be sized below 100 nanometers for classification as nano. And its importance is established in the potentiality and variability of applications that transit, from the energy area to information technology, and human health (ROCCO et al, 2002, p. 22). It is the result of the observation of the alterations of physical-chemical and electrical property of particles that are around one hundred nanometers. With the deepening of research, it has been shown that nanomaterials tend to have better performance in numerous applications, compared to conventional materials, or play, and/or have unique properties, that no conventional material could have. They have applications in almost all economic sectors – primary, secondary, tertiary and quaternary. Its diffusion among sectors, in the production and commercialization of agricultural, human and industrial remediation, is a worldwide concern due to human and environmental exposure to such materials. Because precisely because of its greatest characteristic, it also reveals

to be the greatest concern, which is the size of the particles, since they are elements outside of any human perception, and they can be inhaled, ingested, or even absorbed by the skin, which can trigger a series of diseases or effects still unknown to health. (POPE et al, 2008). At this point, the best known material and proven mortality stand out: asbestos (CHENUT, SALDANHA, 2016, p.144). Depending on the size of the inhaled particulate, this material is deposited in the human respiratory system, generating chronic inflammations in the tissue and fibrosis. A new nanomaterial that has also aroused concern is graphene. As a relatively new nanomaterial, it comes from chemical synthesis the physical u, from graphite or by chemical vapor deposition from graphite. Looking at the ongoing studies on safety for its use, the Graphene Flagship Project (www.graphene-flagship.eu)project of the European Commission Future and Emerging Technology (FET), launched in 2013 for a period of 10 years, whose objective is to evaluate safety in the environment and human health, with no results on its effects are known. It is a nanomaterial manufactured, still on a small scale, without conclusive knowledge about its effects on human health, and with little efforts to regulate, classify and standardize. The concern would be the systematic inhalation of graphene nanoparticles, which could occur in the thesis with the workers of these industries, or with people who did the recycling of the material. Niobium is also being used in various products for tooth whitening, cosmetics, seed protection for agriculture, fungicide that fights Asian rust. All made with niobium nanoparticles. Tests should be carried out to assess the effects on humans in the ingestion, inhalation or other means of contagion of these nanoparticles, even in small amounts. Thus, it is imperative that the tests advance, and that the manufacture and marketing of these nanomaterials are better analyzed. New technologies must be the subject of exhaustive research and testing to reduce uncertainty as to their safety, both for humans and the environment, before they are put into circulation. As a result, the persistent lack of regulation was found, emphasizing the need for business management tools, which are being carried out through standard technical standards, in the guise of no regulations. Opening legal and technical loopholes for improper application of nanomaterials that may have harmful impact on human health or the environment. In this context, the safety and restrictions on the use of any product that uses nanoparticles comes to research on this type of product, to be carried out by certified producers or outsourced companies and at the end , are and verified through various agencies that regulate the sector and that will ensure minimum safety to the population. In the field of regulation, the Federal Constitution of Brazil of 1988 establishes in article 225, items II, IV and V, § 1, the environment raised the status of fundamental law. Having been maintained as the attribution of the State the supervision and control of biosecurity areas and the like. The National Environment Policy Act, Law No. 6,938 of August 31, 1981, gave the State the duty to regulate the management of these materials, requiring environmental licensing to protect and compensate the environment and its workers from harmful actions still unknown by science. In this sense, Dallari and Ventura (2002, p. 57), affirm: [...]in a context of scientific uncertainties and the risk of serious and irreversible damage, it induces the formation of the precautionary principle. It is also clear that this principle aims to contain innovation by reorienting unlimited scientific progress and revaluing the research for those who are genuinely responsible for reckless behavior." As can be seen, the constitutional link between the development and safety of any activity that produces environment and/or human impact, such technology, is situated in the principle of Human Dignity, inclusions in art. 1 and 170 of CF/**. It should be noted ythat economic order is based on sustainable and socially responsible economics policies. Since 2010, the International Labour Organization (ILO) has been issuing warning reports that indicate the risks arising from the work environment due to the production processes of new technologies. The Environmental Protection Agency (EPA), the U.S. agency, and the European Parliament (SCHLYTER, 2009, p.3-7), maintain a mapping of the desti-

nation of these materials and which are also used by the final consumer. Included in this list are cosmetics, food packaging (which can be food contaminants by simple contact,(e.g., the well-known "plastic pots" that go to refrigerator on a day-to-day basis), etc. And are used daily worldwide, with little or no control as to production, supply and disposal. In the wake of sustainable economic development, the United Nations Environment Program (UNEP) has developed from 2008 the definition of the green economy as "an economy of human well-being and social equity, while significantly reducing environmental risks and ecological scarcity" (UNEP, 2011, p. 16). This definition translates into the initial framework of transition to an ecological economy, which proposed new regulatory frameworks aligned with the change in consumption. It became necessary to implement the Green Growth Strategy, opting for the terms of the proposal of the Organization for Economic Cooperation and Development (OECD).

Conclusions & Significance: Opening legal and technical loopholes for the inappropriate applications of nanomaterials that may have a harmful impact on human health or/and environment can lead to irreversible environmental and human health impact. The law that will regulate these materials - The Nanotecnology Law has been stalled in Brazilian National Congress since 2015, awaiting regulation. In the wake of sustainable economic development, the United Nations Environment Programme (UNEP) developed, as of 2008, the definition of a green economy as "an economy of human well-being and social equity, significantly reducing environmental risks and ecological scarcity" (UNEP, p. 16). This definition translates into the initial framework for the transition to an ecological economy, which proposed new regulatory frameworks aligned with the change in consumption. It became necessary to implement the Green Growth Strategy, opting for the terms of the Organization for Economic Cooperation and Development (OECD) proposal. In the wake of sustainable economic development, the United Nations Environment Programme (UNEP) developed, as of 2008, the definition of a green economy as "an economy of human well-being and social equity, significantly reducing environmental risks and ecological scarcity" (UNEP, p. 16). This definition translates into the initial framework for the transition to an ecological economy, which proposed new regulatory frameworks aligned with the change in consumption. It became necessary to implement the Green Growth Strategy, opting for the terms of the Organization for Economic Co-operation and Development (OECD) proposal.

Biography

PhD in Law, Master in Environment and Sustainable Regional Development, lawyer, professor of methodology during Public Administration and Management at the State University of Mato Grosso do Sul. Reviewer for Brazilian and international journals. Reviewer of the Annals of |Bioethics & Clinical Applications, Michigan-USA, and Global Scientific Journals - Australia. Founding member of the International Social Capital Association - ISCA - Dunedin-New Zealand. He is a member of the Brazilian Society for the Advancement of Science, an associate member of the National Council for Research and Graduate Studies in Law. She has experience in Law, with an emphasis on Law, working mainly on the following topics: labor, fundamental rights, gender, health and indicators for sustainable development.