

THE IMPACTS OF THE UKRAINE WAR ON GLOBAL FOOD PRODUCTION CHAINS

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RESUMO

O Sistema Estuarino de Santos (SES), localizado no sudoeste do Brasil, apresenta importância econômica estratégica para o país devido à presença do maior porto brasileiro e por ser uma das áreas mais industrializadas. Por outro lado, este ambiente é prejudicado pelas atividades industriais e de dragagem, que podem causar o aumento de poluentes ambientais e a biodisponibilidade de compostos potencialmente perigosos. Neste contexto, os hidrocarbonetos policíclicos aromáticos (HPA) foram avaliados em quinze estações de amostragem distribuídas ao longo do estuário. As concentrações de HPA foram analisadas em amostras de sedimentos superficiais e em tecidos de duas espécies bivalves (*Crassostrea rhizophorae* e *Perna perna*). Além disso, analisou-se a salinidade da coluna d'água, a matéria orgânica dos sedimentos e o tamanho dos grãos para verificar sua influência sobre o acúmulo de contaminantes. As concentrações totais de sedimentos HPA variaram entre N.D. e 1711,79 ng g⁻¹ de peso seco (p.s.). Os níveis de hidrocarboneto bivalve variaram entre 88,38 e 988,76 ng g⁻¹ (p.s.). As taxas de HPA calculadas revelaram que os compostos de HPA encontrados na área estudada têm origem petrogênica e pirolítica. Uma comparação das concentrações de HPA encontradas neste estudo com aquelas listadas nas diretrizes de qualidade de sedimentos (SQGs) indicou que os efeitos biológicos adversos sobre a biota são eventualmente esperados.

Palavras-chave: Hidrocarbonetos Policíclicos Aromáticos; Contaminação; Atividades industriais.

In the last thirty years, the global economy has faced an intense globalization process, marked by a major change in the international production model (Gaspar, 2015). In particular, concerning the dynamics of production and the commercial network resulting from the process of capitalist globalization, the traditional model was replaced by “*international outsourcing*”, which began to take into account mainly the minimization of financial costs and increased productivity, based on what, until now, was considered solid and with a certain degree of security.

Under the control of the transnational chains, productive outsourcing and offshoring processes materialized. Thus, the industrial production process was sectioned, from the idealization of the product, components involved in its production, to its transportation, distribution and final consumption. This process became known as global value chains (GVCs). The philosophical legitimacy for this new model was based on the distribution of benefits to a larger group of nations involved in this network, integrating these actors into an international economic community. Thus, liberalism gained support in a large part of the world’s nations, resulting in a policy of commercial and financial openness, integrating global value chains.

Given this scenario, certain fragilities were not immediately foreseen, and now the most recent major events on a global scale have contributed to highlighting a not so unshakable system. Examples such as the global pandemic of COVID (Preiss *et al.*, 2020) and the invasion of Ukraine by Russia (HASSEN and BILALI, 2022) have brought the global economic outlook to a severe setback. The impacts of these events, however, have a particular character, depending on the productive and commercial vocations of each country (Boubaker *et al.*, 2022). Still, the interdependence of nations, due to established production chains, have unanimously impacted negatively (Wiseman, 2022). Russia and Ukraine together account for about 30% of global wheat exports, 20% for corn, mineral fertilizers and natural gas, and 11% for oil. In addition, supply chains around the world are also significantly dependent on metal exports from Russia and Ukraine (Orham, 2022).

The war has resulted in an immediate and far-reaching cascading effect of impacts on global food security. For example: the war has short and long term implications on Ukraine’s ability to export agricultural products. In addition, local battlefronts between nations, as well as farmers’ own recruitment and displacement of the most vulnerable populations, prevent jobs in the fields, causing labor shortages. This situation has been compounded by limited access to key agricultural supplies, such as fertilizer, among other weaknesses.

Thus, the global food production model must be reviewed so that alternative and emergency measures can be put for-

ward in extreme cases, such as in war scenarios. According to Jagtap *et al.* (2022), despite the crisis on a global scale, some countries, such as Europe and Africa, are more vulnerable to the chaotic situation. In this sense, the formation of new production chains with countries in the Americas, regions of Asia and Africa presents itself as an alternative solution.

On the other hand, the producing countries considered as “*alternatives*” suffer from the dependence on fertilizers in the agricultural sector. Thus, sustainable solutions for soil enrichment, both from a financial and ecological perspective, must be encouraged to neutralize the impacts resulting from global emergencies. A clear example is the use of microorganisms in agriculture, the so-called biofertilizers (Rouphael and Colla, 2020), used for some years now in Brazil in crops such as coffee and rice, making it a world leader in organic production. Finally, the production model itself, excessively dependent on global production chains, must be adapted through internal diversification of production activities.

In any case, the current models must be reassessed. The risks of globalization should not be ignored, and its weaknesses should be addressed through preventive, not remedial, strategies.

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