Date: *December 2024*

Country: State of Palestine
Position Paper title: "Chemical Pesticide - From Legislation to Implementation: Bridging Gaps in Pesticide Policies, Laws, and Strategies with a Gender Perspective Approach in Palestine"
Program: Environmental and Climate Justice Program - Palestine

The intensive and improper use of chemical pesticides poses significant risks to health, the environment, and socio-economic systems. The WHO identifies pesticides as a leading cause of self-poisoning deaths, particularly in low- and middle-income countries, emphasizing the need for stricter regulations, controls, and regular monitoring. The WHO and FAO has raised concerns about the misuse of pesticides in Arab countries due to its significant impacts on food, health and the environment[i]; with emphasis on Palestinian uncontrolled use, and unsafe handling in a proliferating range[ii].

The growing reliance on pesticides in Palestine underscores efforts to boost agricultural productivity, a sector vital to the nation's economy, food security, and livelihoods[iii]. Agriculture contributes approximately 5.2% of the GDP[iv] and supports nearly 6.2% of the workforce[v], and agrifood processing estimated at 2.8%[vi1]. Valued at nearly USD 980 million in 2021[vii], where women play a significant role making up about 30% of the agricultural workforce and 13.1% of all employed women[viii]. The sector sustains thousands of families, highlighting its economic and social importance.

However, in Palestine, 62% of the total 140,568 agricultural holdings across all types utilize chemical pesticides[ix]. Furthermore, pesticide use in Palestine is approximately 9.2 kg per hectare, which is higher than the average consumption rate seen in other Arab countries[x]. Alarmingly, many substances are internationally banned or hazardous[xi]. Studies reveal that 4% and 6% of the consumed pesticides are classified under the WHO guidelines as extremely and highly hazardous chemicals, respectively. In addition, 36% are moderately hazardous. Persistent pesticides account for 66% and 72% of soil and water pesticide use, respectively, leading to long-lasting environmental contamination[xii]. This reflects a significant reliance on chemical inputs in agriculture, raising concerns about sustainability and environmental impact, which can pose health risks and harm the environment, underscoring the need for alternative agricultural practices and better pest management strategies[xiii]. Organic farming practices, on the other hand, reduce pesticide residues and enhance soil quality, thereby promoting environmental sustainability and food safety[xiv].

All pesticides in Palestine are imported as there is no pesticide factory in Palestine[xv]. However, it is also common that diverse types of pesticides enter Palestine through illegally trafficking coming from Israel which are distributed through local merchants and sold in the black market, with limited regulatory oversight especially with the absence of effective monitoring system on traders and farmers[xvi]. Political challenges, including Israel's refusal to enforce Palestinian law, lack of border control for Palestinians and insufficient action against illegal trade, hinder Palestinian efforts to control pesticide use. This has led to a significant illegal pesticide trade, particularly in Area C and the Jordan Valley and in areas located out of the Palestinian State control[xvii]. Despite better enforcement in Area A under international conventions such as the Stockholm Convention on Persistent Organic Pollutants (POPs), the Basel Convention, and the Rotterdam Convention (PIC), accession to these conventions will be vital to combating the main issues

[1] The value added of all economic activities in Palestine dropped in the fourth quarter of 2023 compared to the same quarter of the previous year, where agriculture activity had a decline of 38%.
https://www.pcbs.gov.ps/site/512/default.aspx?lang=en&ItemID=4672

in the pesticide supply chain. The illegal trafficking of expired and illegal/restricted pesticides from Israel into Palestine shall be addressed[xviii]-[xix].

The Council of Ministers Resolution No. 9 of 2012 regarding the pesticides regulation system and the Council of Ministers Decision No. (16) of 2018 regarding the agricultural fertilizers regulation system both serve as the foundation of Palestine's pesticide management framework, regulating the import, export, registration, licensing, inspection and use of agricultural pesticides. It mandates a scientific committee to approve pesticides, ensure quality, and maintain a registry of approved products. The resolution prohibits pesticides banned locally or internationally and enforces licensing, Arabic labeling, and record-keeping for traders to ensure compliance. Complementary laws, including the Agriculture Law No. (2) of 2003, Palestinian Environmental Law (1999), Consumer Protection Law, and Public Health Law, and others focus on regulating pesticide production and use, imposing penalties for violations, and providing clear consumer guidelines. Import restrictions require licensing for pesticides approved by international organizations like WHO and FAO[xx]. Nevertheless, the Ministry of Agriculture's last pesticide guide, issued in 2014, includes 12 pesticides banned in the EU. The situation arises from the committee's failure to fulfill its duties for over a decade. As per regulations, pesticide licenses should be renewed every three years, but this process has not been adhered to[xxi]. Limited availability of organic pesticides persists, as the MoA cannot compel importers to prioritize safer options[xxii]. Inadequate penalties, a lack of enforcement power over agricultural holdings (with inspections limited to stores), and the MoH's minimal, if any, pesticide residue testing fail to deter improper pesticide use and exacerbate the situation, continuing to threaten public health and the environment [xxiii].

Young children and women (especially pregnant) are more vulnerable to these pesticides due to the harmful effects of pesticides due to their carcinogenic effects[xxiv]. Current pesticide management frameworks in Palestine overlook gender-specific vulnerabilities and roles, contributing to health inequities, and social inequality, such as women's exposure to chemicals during planting and harvesting. Women have limited access to extension and training on safe pesticide use and lack decision-making power in pest management, particularly in small-scale farming which is the prevailing type of agriculture in Palestine. Enforcement of pesticide regulations is weak, especially in rural areas where women are heavily involved in agriculture. Noting that MoA's pesticide licensing does not differentiate between the use of pesticides in home gardens and farms, increasing risks for women working in home gardens.

Palestine's pesticide regulatory framework is fragmented and trade-focused, overlooks safe usage, storage, and disposal. Limited oversight allows toxic substances like carbamates, organophosphates, and endosulfan to remain in use[xxv-xxvi], contributing to significant produce contamination[xxvii-xxviii], with studies showing up to 72.4% of tested items exceeding international pesticide residue limits[xxix]. Loopholes in enforcement enable banned pesticides to re-enter the market under new trade names (noting that licensing of pesticides comes based on trade name and not chemical composition), while reliance inadequate monitoring of soil and water contamination exacerbate the problem[xxx]. Unsafe handling practices, lack of proper labeling in accessible languages, outdated equipment, leaking sprayers and failure to calibrate sprayers lead to overuse, groundwater contamination, and health risks[xxxi]-[xxxii]-[xxxiii]. Most farmers cannot afford or access soil testing, despite recognizing pesticide harm to microorganisms primarily due to financial constraints and limited support and resources available to farmers[xxxiv]. Weak penalties and corrective measures further jeopardize community health.

Education on pesticide safety is inadequate, and most farmers rely on personal experience or advice from pesticide sellers, rather than formal guidance from agricultural extension agents. Few farmers read product labels, and most of them make decisions without consulting agricultural extension agents, primarily due

to a high farmer-to-agent ratio[xxxv]-[xxxvi]. In addition to neglecting pre harvest interval (PHI), warning of hazardous symbols, and complying with rules[xxxvii]. Considering barriers to adopting sustainable alternatives include: (a) Policies lack adequate support or incentives for the adoption and promotion of eco-friendly solutions, and (b) the economic constraints as a result to the high costs of safer pesticide alternatives discourage adoption, with women disproportionately affected due to limited access to financial resources.

Bridging gaps in Palestinian pesticide policies with a gender perspective requires coordinated action among government bodies, international organizations, and local communities and other strategic steps:

1. Strengthen Legal Frameworks: (a) Harmonize and update laws through ensuring alignment with international standards such as WHO and FAO guidelines while explicitly incorporating gender-sensitive provisions in pesticide management laws, (b) Prohibit harmful substances by advancing the ban on internationally restricted pesticides (based on constituent chemicals) and prioritize registration of safer alternatives, including organic options, (c) The committee is requested to ensure the issuance of a list of permitted pesticides on an annual basis. (c) Enforcing stringent controls on the import of pesticides to ensure only those approved by global standards, local specifications are allowed, and comprehensive registration system[xxxviii], (d) Agreement on designated pesticide disposal locations, ensuring they are adequately prepared, safe, and do not pose risks to soil or public health, (e) Enforce effective penalties for pesticide violations, establishing significant fines, suspensions, or bans for individuals or entities involved in improper handling, unsafe application, or use of unapproved pesticides, and penalizing non-compliance with safety protocols, such as exceeding prescribed doses or ignoring recommended safety intervals.

2. Capacity Building with a Gender Focus: (a) Provide gender-sensitive training for farmers, pesticide retailers, and agricultural workers, focusing on safe use, handling, disposal of pesticides and the impact of toxins on the human body and the environment using practical training sessions and smart media, (b) develop technical guidelines on pesticides storage, stock control, evaluation of residues and pollution, and hazards, etc., (c) Develop programs to educate farmers (focus on women) on sustainable agriculture practices such as IPM, agroecology and access to organic alternatives, (d) Promote female leadership through encouraging women's participation in related decision-making roles, (e) Create platforms for women farmers and rural stakeholders to contribute to the design and oversight of pesticide policies.

3. Improve Access to Safer Alternatives: (a) Promote the production and local distribution of organic and biological insecticides in Palestine, coupled with raising awareness about their effectiveness and benefits compared to chemical pesticides, (b) Subsidize organic pesticides through offering financial incentives to importers and farmers for adopting eco-friendly pesticides, (c) Support initiatives to produce organic pesticides domestically, reducing reliance on imports, (d) Protective equipment should be available in the market, including pesticide-resistant clothing to encourage safe farming practices.

4. Establishing Effective Monitoring and Data Collection: (a) Optimize MoA's resources for thorough laboratory examinations of soil and crops and equipping the Central Health Laboratory with necessary capabilities, (b) Upgrade the practical guide that organizes the work of the "Scientific Committee", (c) Periodic evaluation of the work of the Scientific Committee by its jurisdiction, work tasks and monitoring adherence, (d) Engaging local communities, including women's groups, in monitoring pesticide use, and (e) implementing pesticide stock management and proper pesticides container disposal systems, would further strengthen the approach.

5. Raise Awareness and Responsive Training: (a) Increasing public awareness about the penalties and their role in protecting health and the environment, fostering community compliance, (b) Ensure pesticide labels are available in Arabic and include warnings accessible to all, particularly women, (c) Training inspectors and officials to identify violations effectively and enforce penalties without bias.

6. Foster Intersectoral Collaboration: (a) Cross-ministerial cooperation to strengthen coordination between the Ministries of Agriculture, Health, EQA, and Women's Affairs to integrate gender perspectives into pesticide policies. Coordinate with the EQA to organize the destruction of illegal pesticides in a safe way, and to continuously monitoring for the environment safety (groundwater, soil, solid waste and sanitation) and with MoH for food safety, (b) International partnerships through leveraging support from global organizations (WHO, FAO, and UN Women) to align strategies with best practices and secure funding for gender-focused initiatives.

7. Support Research and Innovation: Gender-sensitive studies through funding research on how pesticide exposure uniquely affects men and women, and analytical research on pesticide residue and innovation technologies in pest control and reduction of reliance on chemicals. This includes the utilization of traditional knowledge to apply safe applications, and biological control and best methods for introducing and shifting to sustainable agriculture practices to assist policy-makers in reformulating the current pesticide management and controlling system and adopting the safer sustainable methods.

Conclusion: The government must take decisive and focused actions to address critical gaps in pesticide policies through a gender-sensitive approach. This includes harmonizing and strengthening pesticide laws to align with international standards, banning harmful substances, and promoting safer alternatives such as organic pesticides through subsidies and incentives. Strict enforcement of regulations, including annual updates of approved pesticide lists and penalties for violations, is essential. Empowering women through gender-sensitive training, leadership opportunities, and equitable access to resources will ensure inclusive agricultural development. Establishing a centralized pesticide database platform with enforcement authority and a robust monitoring system, supported by gender-disaggregated data, will enhance oversight and accountability. Finally, fostering inter-ministerial collaboration, particularly between the Ministries of Agriculture, Health, EQA, and Women's Affairs, will ensure sustainable pesticide management and protect public health and the environment. These targeted actions demand the government's leadership and commitment to create a safer, more equitable agricultural sector.

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