

Water Pollution from Agricultural Practices and Mitigation Measures in Nepal



POLICY BRIEF

KEY MESSAGES

- » Overuse of chemical fertilizers, pesticides, and herbicides pollute rivers, lakes, and aquifers with harmful chemicals and excess nutrients.
- » In Nepal, water pollution from agriculture is an increasingly severe problem associated with the rise of commercial farming, but policies and programs to control agrochemical use are lacking.
- » The government, donors, and other actors should create policies and programs that: (1) encourage alternatives to agrochemicals; (2) punish misuse/ overuse of agrochemicals; and (3) promote further research for mitigating water pollution from agriculture.

INTRODUCTION

In recent decades, increasing global population has amplified food demand and caused an intensification of agriculture through the use of chemical inputs like fertilizers, herbicides, and pesticides (Beddington 2011; FAO 2011; Holden, 2015; Winson 2013; Giri 2012). These in turn have contaminated water bodies like rivers, lakes, aquifers, and oceans with harmful chemicals and excess nutrients like Phosphorus (P) and Nitrogen (N). Such agricultural pollution is considered “non-point source” because it is difficult to pinpoint or measure, but it is nonetheless a serious threat to aquatic ecosystems and human health (Carpenter et al., 1998; Delkash et al., 2017; Holden, 2015; Tian et al. 2010). Water pollution from

agriculture can cause eutrophication, loss of aquatic biodiversity, and chemical poisoning of fishes, birds, and ultimately humans. It can contribute to water-borne diseases and acidification of water bodies.

In Nepal, water pollution from agriculture is an increasingly severe problem. More scientific research is needed (Shrestha et al., 2006), but existing studies suggest that excessive agrochemical use is a significant contributor to the problem (Giri et al., 2012). As farmers transition from subsistence to commercial agriculture, they often over-spend on agrochemical purchases and use excessive doses

on their crops. National pesticide consumption has increased from 142g/ ha in 1995 to 396g/ ha in 2019 (Diwakar, 2008; Sharma, 2019), while pesticide imports have increased from approximately 56 tons in 2001/02 to 574 metric tons in 2015/16 (Ramesh, 2017). A study in Rupandehi District in 2017 found 14 kinds of pesticide residue with concentrations four times higher than the threshold permitted by the European Union (EU) (Sapkota, 2019). At the same time, policies and programs to control agrochemical use are lacking, leading to increased contamination of water bodies.

FINDINGS

LI-BIRD conducted a case study in Jhiku River, Panchkhal – an area where commercial potato and vegetable production is widespread — that demonstrated the severity of water pollution from agriculture. Most farmers lacked knowledge about proper pesticide and fertilizer use: only a small minority (33%) had received any sort of training on proper pesticide application. Rather than getting advice from agricultural technicians, most farmers depended on advice from commercial agro-vets who, as purveyors of chemical inputs, have a vested interest in maximizing their use. As a result, farmers routinely overused chemical inputs. A water sample from the area showed contamination with the synthetic group of pesticides at the concentration of 195 micrograms/ liter.

LI-BIRD also conducted a detailed review of government laws, policies, and budgets¹ from 1966 to 2017 related to agriculture and water use. Significantly, the review found no policies or strategies aimed at controlling non-point source pollution, like pollution from agrochemicals.

Nepal's water policies focus on the expansion and physical availability of water with little regard to sustainability or pollution. Responsibility for controlling water pollution falls between various government authorities — such as the Ministries of Water Resources, Agricultural Development, and Industry, as well as provincial and local bodies — requiring cross-sectoral collaboration. However, collaboration has been lacking. Where water policies do address pollution, they only address point-



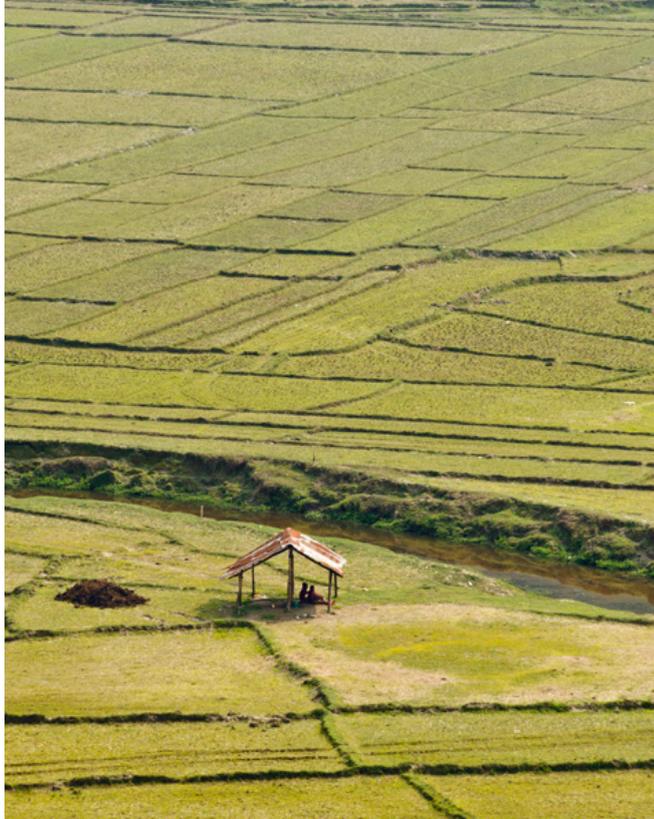
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based pollution – such as from industry – and they are vague and ineffective. For example, the Aquatic Animal Protection Act (1960) uses the ambiguous term “safe poison,” but there are no regulations determining the safety of chemicals. Similarly, the Water Resource Rules (1993) state that water resources should be utilized “without causing harm to the environment,” but it does not define what this means. The fine for noncompliance is only NPR 5,000 (USD 50)— a nominal amount, insufficient to deter polluters today.

Likewise, Nepal's agricultural policies prioritize commercialization and productivity while largely ignoring the problem of water pollution. Policies such as the Agriculture Development Strategy (2014), Agri-business Promotion Policy (2006), Agriculture Extension Strategy (2007), National Agriculture Policy (2004), national periodic plans, and the Prime Minister Agricultural Modernization Project lack cross-sectoral linkages between ministries to promote judicious application of fertilizers and pesticides. Some policies, such as the Agri-business Promotion Policy and the Agricultural Bio-diversity Policy (2007) contain language about promoting organic agriculture and Integrated Pest Management, but they fail to take concrete steps to promote alternative options to agrochemicals. Although DADO offices in the past have implemented some programs to sensitize farmers about organic and IPM methods, most lack sufficient staff or plans to reduce agrochemical use. There is also a dearth of

¹ *Materials reviewed included Nepal Water Tax Act 1966; Soil and Watershed Conservation Act 1982; Nepal Water Supply Act 1989; Nepal Pesticide Act 1991; Water Resource Act 1992; Environmental Protection Act 1997; National Water Supply Sector Policy 1998; Local Self Governance Act 1999; Water Resource Strategy 2002; Nepal Irrigation Plan 2003; National Wetland Policy, National Agriculture Policy 2004; National Water Plan 2005; National Water Supply Management Board 2006; National Urban Water Supply and Sanitation Sector Policy 2009; Solid Waste Management Act 2011; Agriculture Development Strategy 2015; Nepal Land Use Policy 2015; Irrigation Policy 2016; Nepal Urban Development Strategy 2017; Local Government Operation Act 2017.*





Encouraging Alternatives to Agrochemicals

Better agricultural extension services are essential to encourage the use of alternatives to agrochemicals. More government extension agents and demonstration farms should be deployed to promote judicious use of agrochemicals, such as through IPM, organic methods, and pest- and disease-resistant crop varieties. Sensitization materials like booklets, brochures, and audio-visual documentaries may be useful to explain to farmers the link between agriculture and water pollution. In addition, the government can promote organic inputs like bio-pesticides and commercially produced compost through subsidies, support for producers, and establishment of production facilities. In this regard, the budget allocation for bio-pesticide labs in all seven provinces in the fiscal year 2075/76 (2018/19) budget is highly encouraging. Finally, the government should reconsider existing subsidies for chemical fertilizers, which incentivize overuse of these agrochemicals.

Punishing Misuse/Overuse of Agrochemicals

While policies that promote good behavior are essential, punishments are also needed to deter bad behavior. The government can discourage agrochemical overuse by establishing an effective system to test residues on agricultural produce. In this regard, more laboratories at major market centers (such as the one that already exists at Kalanki in Kathmandu) are needed. At the same time, it is necessary to amend the Agriculture Development Strategy and water-related legislation to avoid ambiguities and contradictions, and to recognize the significance of non-point source water pollution. Fines for polluters should be increased to effectively deter pollution.

Further Research

The government and other actors should promote further research to develop bio-fertilizers and organic pesticides that are effective against locally significant pests and diseases, which are constantly evolving. Action-based research that combines extension activities with experiments can help scale-up IPM and organic agriculture, thereby reducing water pollution. The government should consider creating an inter-disciplinary panel with experts from agriculture, water resources, sanitation, environment, forestry, and public health to further study the problem of water pollution from agriculture and develop policy recommendations. The creation of such a panel would demonstrate the government's commitment to this increasingly serious problem.

laboratories to test for chemical residues on agricultural products, meaning there is little monitoring for overuse. Meanwhile, other government policies actively promote the use of agrochemicals. For example, the Fertilizer Policy (2002) and its latest Amendment (2008) subsidize the price of chemical fertilizers, contributing to over-application.

POLICY RECOMMENDATIONS

In order to mitigate water pollution from agriculture in Nepal, LI-BIRD recommends the government, donors, and other actors create policies and programs that:

- » Encourage alternatives to agrochemicals
- » Punish misuse/ overuse of agrochemicals
- » Promote further research for mitigating water pollution from agriculture

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