

## Assessment of Water Quality Trading Market Performance through Regulating Agricultural Nonpoint Sources (Findings from an Analytical Case Study of Gharesoo Watershed in Iran)

**Authors:**

**Emad Mahjoobi<sup>1</sup>,  
Mojtaba Ardestani<sup>1</sup>  
and Amin Sarang<sup>1</sup>**

**Institution:**

Department of  
Environmental Engineering,  
Graduate Faculty of  
Environment, University of  
Tehran,

**Corresponding author:**

**Emad Mahjoobi**

**ABSTRACT:**

Agricultural Nonpoint Sources (NPS) are widely believed to decrease pollution for a much lower unit cost than Point Sources (PS) and they could be the main way of potential cost savings in a Water Quality Trading (WQT) program. However, their sporadic nature and inherent uncertainties make the trading challenging. This study focused on an assessment of involving regulated agricultural NPS into WQT market through the context of Agricultural Cooperatives (AC) for defining Total Maximum Daily Load (TMDL) limits in Gharesoo watershed in the west of Iran. Accordingly, a methodology was proposed to pinpoint location-based trading ratios as well as an environmental penalty cost to achieve a more well-designed market structure. Additionally, a trading algorithm was developed to create a detailed pattern benchmark based on which all potential trades among PS/NPS could be determined. Results showed that regulating NPS in the Gharesoo watershed Total Phosphorus (TP) trading market led to higher trading volume, participation rate, and total exchange value. Moreover, it could save the total cost of implementing the TP-TMDL in this watershed compared to the Command and Control approach and the time when merely PS are regulated. Finally, it was revealed that expanding the scale of farmers and farmlands through AC context can decrease the inherent uncertainties of NPS and make them easier to be regulated. Besides, larger credit packages could be created and the performance of trading market is enhanced.

**Keywords:**

Agricultural nonpoint sources; Gharesoo watershed; Water quality trading