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Using the promthee methodology for adaptation evaluation and alternatives ranking

MASOUD YAZDANPANAH¹, TAHEREH ZOBEIDI², LAURA WARNER³, KATHARINA LÖHR⁴, ALEXA LAMM⁵, STEFAN SIEBER⁴

¹*Agricultural Sciences and Natural Resources University of Khuzestan, Iran*

²*International Institute for Applied Systems Analysis, Cooperation and Transformative Group, Austria*

³*University of Florida, Agriculture education and communication, United States*

⁴*Leibniz Centre for Agric. Landscape Res. (ZALF), Sustainable Land Use in Developing Countries (SUSLAND), Germany*

⁵*University of Georgia, ALEC, United States*

Abstract

Adaptation evaluation, developed and conducted with the aim to identify and assess adaptation options, can serve as inputs for national adaptation plans, or focus on specific sectors, such as the agricultural and water sectors. The current study aimed to evaluate the status of water management adaptation strategies suggested by agricultural extension systems in the hot and dry region in Khuzestan, Iran. Ten criteria and sub-criteria including effectiveness, affordability, social acceptance and compatibility with local cultures were used to evaluate water management strategies (WMSS). The weight of the criteria was calculated using the Analytical Hierarchy Process (AHP) method. Finally, PROMETHEE and GAIA methods were utilised to rank the WMSS. Ten agricultural experts were purposively selected to evaluate the WMSS. The rankings obtained were used for the PROMETHEE based on the net flow. The WMS: Use pipes to transfer water within the farm was ranked higher than all other alternatives. Following that, the WMSS were prioritised as follows: cementing canals or using nylon cover for canal soil floor, increasing the time intervals between irrigations, using a combination of salt and fresh water, changing irrigation time, using modern irrigation and using unconventional water sources. The results indicated different strategies in reducing the effects of climate change can be prioritised. Therefore, agricultural extension educators should tailor messages based on the priorities and effectiveness of adaptation strategies. Therefore, investments should focus on high priority options, like using pipes, should be increased over low priority water managements alternatives, with deficiencies eliminated based on evaluated criteria (Low criteria scores).

Keywords: Agricultural adaptation, climate change, evaluation, ranking options, water management