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What is the relationship between beet cultivation practices and climate change ?

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Abstract: Sugar beet is the second-largest crop in the world, after sugarcane, for the production of white sugar intended for human consumption. Sugar beet cultivation in Morocco covers an area of approximately 65,000 hectares per year, producing nearly 3 million tons of roots (2019). Sugar beet is a significant crop that plays a crucial economic role in Morocco. Despite its importance, it has environmental impacts due to the intensive use of fertilizers and pesticides, which can lead to soil and water quality degradation and negatively affect local biodiversity. Moreover, the machinery used for beet harvesting and processing contributes to greenhouse gas emissions, exacerbating the issue of climate change and eutrophication . Therefore, the life cycle assessment methodology has been adopted to evaluate the environmental impact associated with agricultural production.
This impact can be measured from the beginning to the end, starting from the extraction of raw materials required for product manufacturing, through distribution, usage, transportation, collection, and disposal, until the end of the product's life cycle. In this regard, the life cycle assessment method is used to determine environmental impacts. The results indicate various environmental effects, such as climate change. Ultimately, this tool holds great significance for the improvement and selection programs for sugar beet.

Keywords: Environment, Global warming, Life cycle assessment, sugar beet.

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Résults:

Indicator	SO	MO	BO	Unit
environmental impact - acidification	2.95089e+2	2.76732e+2	3.11270e+2	moles of H+-Eq
environmental impact - ecotoxicity	7.40083e+0	6.94045e+0	7.80665e+0	kg 2,4-D-Eq
environmental impact - eutrophication	3.16759e-1	2.97054e-1	3.34128e-1	kg N
environmental impact - global warming	5.40754e+2	5.07115e+2	5.70406e+2	kg CO2-Eq
environmental impact - ozone depletion	0	0	0	kg CFC-11-Eq
environmental impact - photochemical oxidation	7.15545e+0	6.71033e+0	7.54781e+0	kg NOx-Eq
human health - carcinogenics	6.59222e-3	6.18214e-3	6.95370e-3	kg benzene-Eq
human health - non-carcinogenics	7.63404e+0	7.15915e+0	8.05265e+0	kg toluene-Eq
human health - respiratory effects, average	1.10730e+0	1.03842e+0	1.16802e+0	kg PM2.5-Eq

Figure 1: This table shows the LCIA results for the project variants. Each selected LCIA category is shown in the rows, and the project variants in the columns. The unit is the unit of the LCIA category as defined in the LCIA method. This table shows the LCIA results for the project variants. Each selected LCIA category is displayed in the rows, and the project variants in the columns. The unit is the unit of the LCIA category as defined in the LCIA method.

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Résults:

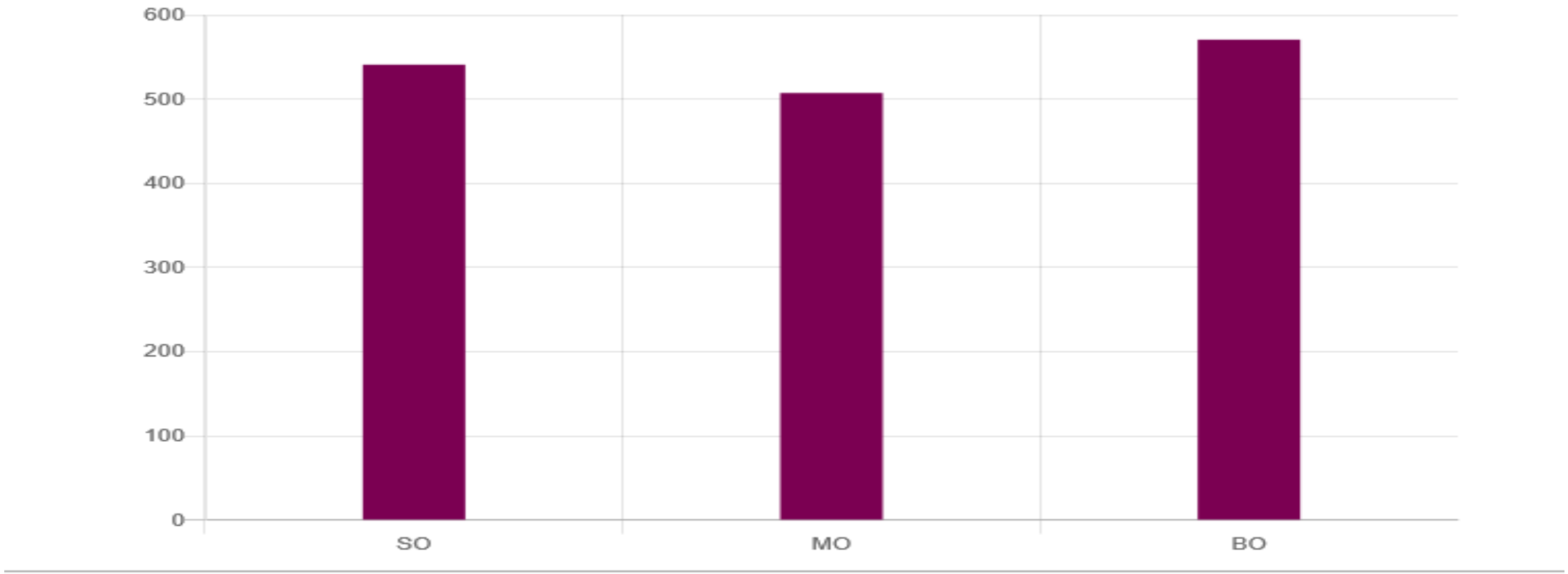

Figure 2: The following graph shows global warming results

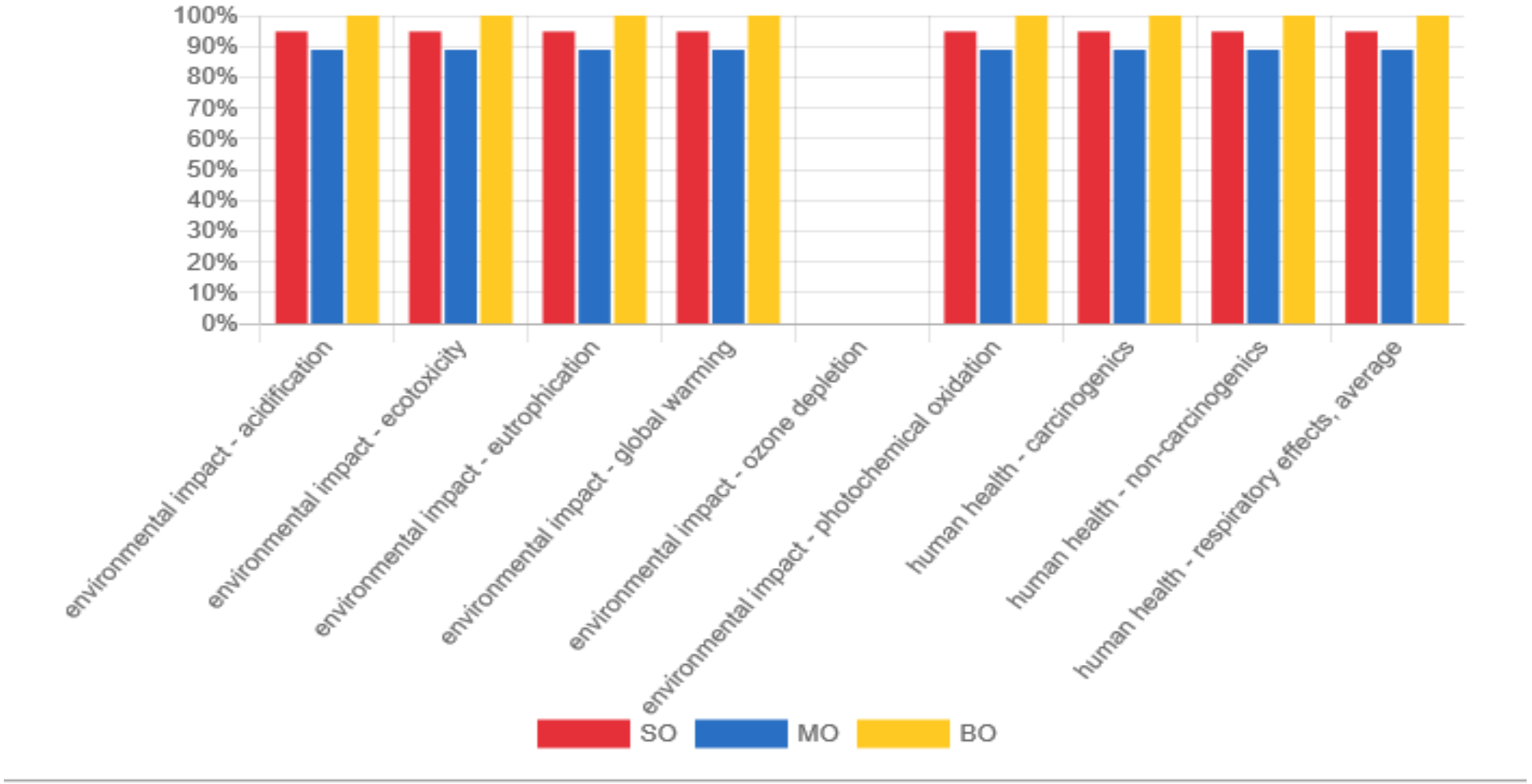

Figure 3 :The following chart shows the relative indicator results of the respective project variants. For each indicator, the maximum result is set to 100% and the results of the other variants are displayed in relation to this result.

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Conclusion

This study addresses the interface between energy consumption and related emissions, and provides comprehensive data for a cradle-to-gate assessment linked to different levels of operation in the TTH region. MO, are considered the best form of farm size for sugar beet production. It is clear that the reduction or substitution of machinery, pesticides and nitrogen in the production process should be considered in future studies. Consequently, improving environmental performance


Thank You