Data information

The production units are considered similar or homogeneous units in order to be comparable for the respective eco-efficiency analysis.

Endogenous variables. The study consists of two types of variables: two inputs (x), three outputs (y), of which two are desirable and one is undesirable (b).

Inputs

x1 - persons employed in the primary sector

x2 - area of agricultural use in hectares

Outputs

Undesirable (b)

x₃ - GHG emissions in tonnes of CO₂ equivalent (b)

Outputs

Desirable

y1- total value of production in thousands of pesos (MXN)

y2- preserved area in hectares that includes forest and jungle.

The endogenous variables x1, x2 and y2 were obtained from different official databases, from the National Institute of Statistics and Geography (INEGI). From INEGI, 2017, Anuario estadístico estatal de Puebla, which contains data at the municipal level.

Since the last database of the Population and Housing Census dates from 2010, the variables mentioned were estimated for the years 2016 and 2017 under the calculation of population growth rate,deforestation rate and land use change for the region.

Regarding the variable y1, we used the open database belonging to the agricultural production statistics of the Servicio de Información Agroalimentaria y Pesquera (SIAP), where the basic annual agricultural statistics are registered at national, state, rural development district and municipal levels. Information available in the Sistema de Información Agroalimentaria de Consulta (SIACON) was also used.

The values of the variable x₃ correspond to the National Inventory of Greenhouse Gas and Compound Emissions (INEGYCEI) for the period 1990-2015 (INEGYCEI, 2018), They were estimated with the Emissions Calculator of the National Emissions Registry (RENE) version 8.0, the tool is congruent with that published in the Fifth Assessment Report of the IPCC (SEMARNAT, 2016) and yields results of total carbon equivalent emissions at the municipal level.

Exogenous variables

In the constructed model, climate enters as an exogenous variable and has been accounted for in relation to the average value of the variables temperature T and precipitation P for a broad region, and not with specific values. The information of these variables is contained in the database of climatological normals by state of the National Meteorological Service (SMN), due to the proximity between them and the availability of updated information by the Basin Organisms and Local Directorates of the National Water Commission (CONAGUA).

References

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