

Spatially Integrated Development of Economy and Resources

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Defining the overall, net profitability of investments is an intricate task since several factors need to be taken into account both on the cost side as well as on the gross profitability side. In developing countries -where the need for investments is imperative- the economy depends heavily on the primary and secondary sector and the existence or future development of infrastructure. More specifically, investments in the agro-industry and the mining sector (which still consist the cornerstones of the economy in Sub-Saharan Africa and they are both energy and resource intensive industries) can provide great returns but that depends on the availability and the cost of resource input (mainly energy, water and soil productivity) and the potential selling prices of produced goods which depend on proximity to buyers, current global conditions etc.

This study will attempt to take all the aforementioned factors into account and calculate the net profitability of each investment decision (considering agro-industry and mining sector) for each region in Sub-Saharan Africa. More specifically, it will first calculate the overall cost to produce a commodity, subsequently the calculation of the gross profitability for each good will follow and finally, the maximisation of the difference between the cost and the gross profitability will be computed in order to define what is the investment with the highest net returns. To accomplish that, both linear programming tools as well as GIS models will be deployed in order to visualize the results.

Having accomplished the aforementioned steps, a sensitivity analysis will be carried out in order to examine how the results could be affected in different possible scenarios. Typical examples could be an increase in the efficiency/drop in the cost of renewables, improved infrastructure which could lead to easier transportation of goods as well as higher commodity prices. This would give useful insights into long-term investment optimization.

The outcome of the study could be useful to the sustainable development of Africa in three ways. Private investors would get hold of an insightful tool that could provide guidance with regards to which sectors would provide the highest returns in one particular location or -looking at it from another point of view- which are the optimal locations for companies that focus on a particular type of investment. However, the most profitable investment for a private actor is not necessarily the ideal one from a national point of view. A computable general equilibrium (CGE) model using the same geospatial pattern could calculate the multipliers for each sector and consequently define the optimal investment from top down point of view, measuring the impacts on GDP and job creation. Based on this, governments could then define the level of subsidies for particular investments which are the most beneficial for the society. More specifically, the model could compare the most profitable investment to the most desirable one in terms of social inclusion, calculate the difference in profit and then this

figure could be the appropriate level of subsidy for the targeted investment. Finally, global (or national) organizations that provide funding to developing countries could define what are the ideal sectors to finance depending on the country and the particular objectives.