

# **Chapter Seven:**

## **Conclusion and Recommendations**

### **7. Conclusion:**

Since farming is always classified as a major business in the area of the study (south Kordofan and Gedaref (MRS) in Sudan), it is important to account for the good use of agricultural inputs.

It is confirmed that the mechanized rainfed agricultural sub-sector has a considerable contribution for building national economy and generating foreign exchange through exports, which could contribute to agricultural development, hence, the development of economy as whole.

Research of productivity and efficiency measurement is very important, because productivity growth cannot be sustainable without improvement in the total factor productivity. Therefore, this study applied the non parametric data envelopment analysis (DEA) approach to estimate the total factor productivity Growth, efficiency and frontier shift change in South Kordofan and Gedaref (MRS) during the study period (2001-2010).

The steps of estimation help in identifying the improvement in efficiency and contribution of (TFP) components to productivity growth in Sudanese Mechanized rainfed schemes, specifically in south Kordofan and Gedaref area in Sudan. However, the study presents the estimated TFP Growth, efficiency change and frontier shift for areas (Gedaref & S. Kordofan) MRs in Sudan, which include the production of Sesame and Sorghum at each scheme

level during(2001-2010) which show that these estimates vary widely at schemes level during the data period.

The empirical estimates on the performance of Mechanized Rain fed schemes in the two areas have several striking results. The Malmquist (TFP) results reflect unexpected picture for the mechanized rain fed sub-sector in the area of the study as follows:

- The overall area of MRF of the study , south Kordofan and Gedaref rain fed regions sesame had made progress in efficiency change by (7.5%) , while for sorghum ,the efficiency change was( 29.4).

The mechanized Rain fed schemes production in both south Kordofan and Gedaref area in Sudan, is generally characterized by high degree of instability , as argued in the previous chapter , this sub - sector faces many problems , for instance , short of agricultural labor , problems of technology and increasing costs of production .

Under this argument of problems in this sector, the ( DEA) results give different means in terms of efficiency and productivity change Specifically, in mechanized rain fed farming in south Kordofan and Gedaref area in Sudan, these means include efficiency change , Malmquist( TFP) index and frontier shift.

The results from the individual schemes ; south Kordofan and Gedaref mechanized Rain fed schemes for both Sesame and Sorghum crops, show progress in TFP for Sesame in south Kordofan , where increase is more than one( over optimum level) during the period of the study . While Gedaref (MFC) schemes

were weak in terms of (TFP) for Sesame .This weakness of TFP in Gedaref schemes is mainly attributed to frontier shift, which is also so weak during period (2001-2010), where no progress is noted. This could be explained by lack of labor force, machines and production means.

On the other hand the TFP of sorghum, the results show that South Kordofan (MFC) also, is better than Gedaref (MFC), and their TFP growth were more than one during period of study , similarly their frontier shift were also positive , which means successful use of resources during period of study .

Although TFP were positive during period of study, but on the other hand south Kordofan (MFC) faced some reduction in their efficiency change (managerial efficiency) in different years during period of study as Gedaref schemes, and their effects on TFP growth were not clear.

The pattern TFP growth tends to be driven more by frontier shift rather than efficiency (managerial) improvement among South Kordofan schemes.

South Kordofan schemes were at top ranking in term of TFP growth due to high performance in using existing agricultural inputs, which include labor, finance and machines.

Gedaref schemes were strong in term of efficiency change (managerial efficiency) for sesame crop, but this result did not made any progress in TFP growth during the period of study.

## **7.1 THE RECOMMENDATIONS:**

From the discussion and the results derived from the discussion, the study reaches recommendations as follows:

- Gedaref Mechanized rain sub-sector schemes are facing serious production growth problems in term of two crops production, Sesame and Sorghum, where no increase or progress in TFP growth in their agricultural schemes. This important area of rain fed sub- sector must increase total factor productivity growth in their schemes.

- In Mechanized rain fed in general, there is need to improve the managerial efficiency (efficiency change).

- In Gedaref mechanized Rain fed schemes, needs to increase production frontier shift for their schemes, improvement is require in quality of inputs like, machines, labor and finance .The management aspects is important in term of finance use, these guidance will improve the frontier shift as well TFP which also relies on managerial efficiency and help in adoption of new technology.

- Authorities in the mechanized rain fed schemes in general, and specifically in south Kodofan and Gedaref states , must conduct more field research and development activity , because it increase the technical progress in the schemes.

- Authorities in the mechanized rain fed schemes, must develop the agricultural information system , because it can help policy maker to design and prepare feasible agricultural schemes .

- Authorities shall recognize the important of skill labor and semi skill through good training and human resources

development, because it can help in filling gap and shortage in order to adopt technology.

- More focus should be put on the application of the data envelopment analysis (DEA) techniques, because it helps in assessing efficiency and productivity change for different decision making units.

- South Kordofan Mechanized rain sub-sector schemes are suggested to be reference set for Gedaref Mechanized rain sub-sector schemes in terms of improving the efficiency and TFP Growth in the areas of the study.

- The measures derived will provide valuable information relevant to the future performance of agricultural schemes in the mechanized rained areas in Sudan.

- The managerial structure and agricultural policies of (MFC) should be part of the federal ministry of agriculture, instead of state ministries.

- The results obtained , are based on the assumption that the two areas of Mechanized Rain fed schemes in Sudan are Homogeneous institutions. If this assumptions rejected, DEA efficiency scores have to be recalculated separately for each schemes , this procedure, however, we can only compare group-specific efficiency scores, i.e. the efficiency scores within each homogenous

## **7.2 The limitation of the study:**

The study was met with some difficulties as follows:

-1 some area in south Kordofan (Nubba mountains region) is still under the control of (SPLM), free movement is not allowed. Accordingly collecting data in these areas without permission is a risky task.

-2 information systems are weak and unorganized in the two regions of the agricultural sector; in fact authorities are still far away to give necessary value to the importance of keeping accurate reliable data.

Therefore, some authorities refuse to cooperate with the researcher for what they consider top secrets, so they don't give the information they have or to cooperate, this of course made the study more difficult and costive

-3 similar studies (efficiency measurement in agricultural sector) do not exist in the country and this also made the study difficult to make use of previous similar studies.

-4 transportation and facilities costs in the areas of the study are high, and this makes the study costive.

### **7.3 Suggestions for the further future Studies:**

This research represents an early attempt to measure technical efficiency and productivity change in Sudan. However instituted on the limitation of the research mentioned previously, this research provides some Suggestions for the future research as follows:

- First it will be of interest to extend the (DEA) analysis to other economic sectors such as industry and other financial institutions.
- Second In future studies ,there is need to extent thestudy to attempt the effect ofother factors on efficiency and productivity change, these factors are main variables in agricultural production such as, geographical Features (soil type, climate , rain fall) because these variables is not included in thecurrent study.

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