Analysis of the economic impact of Rural Enterprise Development Hub Project on maize farmers in Mqanduli, South Africa

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ABSTRACT
The research analysed the economic impact of Rural Enterprise Development Hub Project (RED Hub Project) on maize farmers. A sample of 200 maize farmers was drawn from a total of 398 beneficiaries of the project using Cochran sample size formula. Convenience sampling was done at the second stage using structured questionnaires which were administered on the beneficiaries of the project from 9 villages in Mqanduli Community. With the use of a ‘before’ and ‘after’ approach the study determined the provision of market for supply of maize produce by benefitting farmers and change in annual income of maize farmers. The data were analysed using descriptive and inferential statistics. P-value less than 0.05 were considered to be statistically significant. The results revealed that there has been a significant positive impact of RED Hub Project on the income of benefitting maize farmers per hectare and per farm. This is represented by 100% provision of market by the project for maize produce, a significant (t-statistics 179.4 and p-value <0.05) mean change of 212.47% in income per hectare in the area, a significant (t-statistics 38.4 and p-value <0.05) improvement of the mean income of benefitting maize farmers per farm by 264.32% in the area. Therefore, the study recommends sustained purchase of maize produce by the project from its beneficiaries and an extension of purchase from all maize farmers in Mqanduli.

Key words: Beneficiaries, Economic, Impact, Maize, Mqanduli, RED Hub Project.

INTRODUCTION
Over the years, the South African government has launched and implemented programs to boost agricultural productivity, these programs were stepped down by provincial governments to suit the specific needs of the rural populace at the grass root level. One of these programs, the Comprehensive Rural Development Programme (CRDP) was launched in 2009 at Muyexe Village, in Limpopo Province by the President of South Africa, Jacob Zuma. The vision of CRDP was to build up dynamic, fair and rural communities that would be sustainable (Department of Rural Development and Land Reform-DRDLR, 2015).

In 2012, two years after the launch of CRDP the Eastern Cape Provincial government in South Africa launched the Rural Enterprise Development Hub Project (RED Hub Project). The RED Hub Project concept is aligned to the CRDP’s priorities with the rural areas as centre of operation. The concept links three elements of production, processing and marketing all within the community (RED Project Mission Brochure, 2013). Based on the ECRDA report, the cost of the primary production is jointly funded with 75% and 25% from ECRDA and farmer contributions respectively. The Development Bank of Southern Africa (DBSA) through its Jobs Fund agro-processing initiative in partnership with the RED Hub Project supported the financing and implementation of maize production, processing and marketing all within the community in order to generate income for beneficiaries and improve their livelihood (ECRDA, 2014/15 Annual Report). The focus on maize farming especially in Mqanduli is because of the potential the community have for high maize yield.

The RED Hub project is anchored on a Community Driven Development (CDD) strategy which gives control to beneficiaries to own and decide their development. CDD alludes more to the way a strategy or an undertaking is planned and executed than to the substance of an approach or to the parts of a venture task or program (International Fund for Agricultural Development-IFAD, 2009).

As ascertained by Kwadwo and Peter (2012), Community Driven Development (CDD) programs in the most recent decade have been held onto as a powerful strategy for Program Based Approach (PBA) for International Development Aid delivery. Community Driven Development gives community groups a charge over their development (Dongier, et al., 2003; Baird, et al., 2009; Binswanger, et al., 2010, World Bank, 2013). The RED Hub project model creates a platform for economic activity, ultimately resulting in increased rural incomes through the
Maize is important in South Africa’s strategy for food security and its importance can never be over emphasized (Essa and Nieuwoudt, 2001). It is an important cereal crop grown across nations and the world’s most wildly cultivated crop, Sub-Saharan Africa and South Africa in particular (Mokhele, et al., 2016 and Matji, 2015) as the crop is a staple food to many populations. Maize is dominantly produced by small scale subsistence farmers in South Africa by upcoming middle and big private enterprise farmers through a range of farming systems, the most common being rain-fed agriculture with only 20% grown under irrigation (ARC-LNR, 2016). For the past five seasons in South Africa, maize has been the major provider toward the gross field value of crops with a gross value of 40% which amounted to R27, 556 million in 2015/2016 (DAFF, 2016; Grain Review, 2016; Matji, 2015; BFAP, 2015).

It is the view of Tagne, et al., (2008); Mokhele, et al., (2016); Melusi, et al., (2016) that maize is the foremost income earner to farmers to most developing countries with poor resources. Similarly, Wossen, et al., (2017) observed that agricultural projects targeted to reduce rural poverty and to increase food security could improve productivity and welfare outcomes of beneficiary smallholder farmers. Eastern Cape Provincial government in their effort to encourage commercial production of maize, processing and marketing targeted at increasing maize farmers’ income and food security in the study area introduced the Rural Enterprise Development Hub Project model in partnership with the Development Bank of Southern Africa (Inkqubela, 2015, 2016 and ECRDA, 2013/14; 2014/15; and 2015/16 Annual Reports).

MATERIALS AND METHODS

This research was carried out at Mqanduli Community, Eastern Cape Province, South Africa. The community is named after a nearby hill and is located 30km South of Mthatha and 22km North of Elliotdale (STATSA, 2017). Mqanduli is a Community within King Sabata Dalindyebo Local Municipality in OR Tambo District Municipality, Eastern Cape Province. Mqanduli was the first community to benefit from the project with the initial cultivation of 936 hectares of land planted with white maize (Inkqubela, 2015, 2016 and ECRDA, 2013/14; 2014/15; and 2015/16 Annual Reports).

Mqanduli was created in 1876 and is located between latitudes 31°49’ 9’’ South and longitude 28°46’ 42’’ East (Figure 1.) It is 752m, 2467.19ft, 29606.32 inches above sea level. The population density is 268.05/km² with a percentage increase of +1.15% per year. Mqanduli economy is driven by agricultural enterprise comprising mainly maize farming (DRDLR, 2015 and Statistic South Africa, 2017).

The data used to compare economic status of beneficiaries before and after the intervention of RED Hub Project included; increase in income and profit of maize farmers. Two hundred (200) respondents out the population of 398 benefitting maize farmers from nine (9) villages were statistically selected at 95% confidence level with 5% degree of error based on the Cochran sample size formula (Cochran, 1977).
The Cochran sample size formula is as shown below:

$$\text{sample size} = \frac{z^2 \times p(1-p)}{e^2} \times \frac{1}{1 + \frac{z^2 \times p(1-p)}{e^2} \times \frac{1}{N}}$$

Where Population = N

Q = the complement of p (proportion)

Margin of error = e

Z-Score (Standard Score) = Z

Convenience sampling was done at a second stage to determine the number of maize farmers in various villages who benefitted from RED Hub Project. Convenience sampling is a type of non-probability or non-random sampling where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of a study (Etikan, et al., 2016).

Data collected were analysed using descriptive (Mean (x), Frequency Counts and Simple Percentages) and inferential (Paired wise t-tests statistics, Cross tabulation, and Percentage change) statistics to show the variance in farmers’ income before and after the project intervention. P-value less than 0.05 were considered to be statistically significant.

RESULTS AND DISCUSSION

Table 1 depicts the socio-demographic and economic characteristics of the beneficiaries. Out of the 200 respondents, 134 representing 67% were females and 66 representing 33% were males. The mean age and household size were 46.6 years and 5.3 respectively. Dependency ratio for household was 4.4. Household mean income before RED hub intervention is R1, 411.9C ($116.30C) per month. The marital status of the sampled respondents indicate that 134 (67%) are married and living together as family, this validates the view that the marriage institution is still appreciated and it is a sign of financial responsibility of the respondents in caring for dependent relatives (Oladoja and Adeokun, 2009).

Forty Eight (24%) are widowed/separated while 18 (9%) are single. Majority of the beneficiaries of the RED Hub project representing 52% (104) have formal education while 96 beneficiaries representing 48% had no formal education. This has great implications on the implementation of the RED Hub project in the area as most of the illiterates perceived the project as being more of an embodiment of paper work. On the average, the experience of beneficiaries of the project in the study area was 30.75 years.

**Sources of maize market before and after RED Hub Project Intervention:** According to Shabu, (2013), steady markets for farm produce can drastically influence farmer’s productivity.

Table 2 shows that, 74% (148) of the benefitting maize farmers were selling their maize produce to Local Consumers while 26% sold to intermediaries (retailers and wholesalers) before the RED Hub project intervention. The study further reveal a 100% provision of market by the project through its Mills for maize produce at a higher price than that of the open market to encourage maize farming in the study area.

**Impact of RED Hub Project on maize farmers income:** The income of maize farmers increased after the RED Hub project based on the findings of the study. The mean increase in annual income of maize farmers for all the 9 villages is from R2, 407.65C ($198.32C) to R7, 523.24C ($619.71C) per hectare with a significant (t-statistics 179.4; p-value <0.05) with a percentage change of 212.47% after the RED Hub project intervention as in Table 3.

Gengqe has a highest mean income/ha of R2, 678.55C ($220.64C) and R7, 665.92C ($631.46C) before and after the project intervention with an increase of 186.20% followed by Qhingqolo with a gross mean income of R2, 443.81C ($201.30C) and R7, 619.05C ($627.60C) before and after the project intervention with 211.77% increase of farmers income/ha. Khwenxura has a gross mean income of R2, 456.62C ($202.36C) and R7, 607.69C ($629.66C) per hectare before and after the project intervention with 209.79% increase. Nzwakazi village R2, 588.57C ($213.23C) and R7, 600.00C ($262.03C) mean income per/ha with 193.60% increase. Cezu village R2, 318.97C ($191.02C) and R7, 540.95C ($262.17) with 225.22% increase, Ntsimbini village R2, 283.75C ($108.12C) and R7, 529.52C ($262.22C) with 229.70% increase, Maqomeni village R2, 180.69C ($79.62C) and R7, 519.64C ($619.41C) with 244.83% increase. Ngcanasini village R2, 341.74C ($192.90C) and R7, 438.69C ($612.74C) with 217.66% increase. Phendu had the least gross income/ha after the project intervention with R2, 325.00C ($191.516C) and R7, 125.65C ($586.96C) with an increase of 206.48%.

The study reveal a significant average increase in annual income per farm from R4, 741.95C ($390.61C) to 17,276.00C ($1,423.06C) with a percentage increase 264.32% and statistical t-value and p-value of 38.4 and <0.05 respectively after the intervention of the project as shown in Table 4. Khwenxura has a highest mean annual income/farm of R23, 692.31C ($1,951.60C) with 345.09% increase. Cezu village R2, 318.97C ($191.02C) and R7, 540.95C ($262.17) with 225.22% increase, Ntsimbini village R2, 283.75C ($108.12C) and R7, 529.52C ($262.22C) with 229.70% increase, Maqomeni village R2, 180.69C ($79.62C) and R7, 519.64C ($619.41C) with 244.83% increase. Ngcanasini village R2, 341.74C ($192.90C) and R7, 438.69C ($612.74C) with 217.66% increase. Phendu had the least mean annual income/ha after the project intervention with R2, 325.00C ($191.516C) and R7, 125.65C ($586.96C) with an increase of 206.48%.
### Table 1: Socio-Demographic Characteristics of Respondents

| Variables                  | All Beneficiaries (n=200) | Male (n=66) | Female (n=134) |
|----------------------------|---------------------------|-------------|----------------|
| Age                        |                           |             |                |
| 35 and below               | 14 (7.0)                  | 12 (85.7)   | 2 (14.3)       |
| 36-60                      | 166 (83.0)                | 43 (25.9)   | 123 (74.1)     |
| Above 60                   | 20 (10.0)                 | 11 (55.0)   | 9 (45.0)       |
| Education                  |                           |             |                |
| No Formal Education        | 96 (48.0)                 | 26 (39.4)   | 70 (52.2)      |
| Primary                    | 101 (50.5)                | 37 (56.1)   | 64 (47.8)      |
| Matric                     | 2 (1.0)                   | 2 (3.0)     | 0 (0.0)        |
| Higher Education           | 1 (0.5)                   | 1 (1.5)     | 0 (0.0)        |
| Village                    |                           |             |                |
| Ntsimbini                  | 21 (10.5)                 | 6 (9.1)     | 15 (11.2)      |
| Khwenxura                  | 26 (13.0)                 | 8 (12.1)    | 18 (13.4)      |
| Qhingqolo                  | 21 (10.5)                 | 7 (10.6)    | 14 (10.4)      |
| Phendu                     | 16 (8.0)                  | 6 (9.1)     | 10 (7.5)       |
| Cezu                       | 21 (10.5)                 | 7 (10.6)    | 14 (10.4)      |
| Ngcanasini                 | 36 (18.0)                 | 14 (21.2)   | 22 (16.4)      |
| Maqomeni                   | 16 (8.0)                  | 6 (9.1)     | 10 (7.5)       |
| Gengge                     | 22 (11.0)                 | 6 (9.1)     | 16 (11.9)      |
| Nzwakazi                   | 21 (10.5)                 | 6 (9.1)     | 15 (11.2)      |
| Marital Status             |                           |             |                |
| Single                     | 18 (9.0)                  | 12 (18.2)   | 6 (4.5)        |
| Married                    | 134 (67.0)                | 53 (80.3)   | 81 (60.4)      |
| Widowed/Separated          | 48 (24.0)                 | 1 (1.5)     | 47 (35.1)      |
| Household Head             | 200 (100)                 | 66 (33.0)   | 134 (67.0)     |
| Number of Dependents       |                           |             |                |
| 0-2                        | 12 (6.0)                  | 4 (6.0)     | 8 (6.0)        |
| 3-5                        | 159 (79.5)                | 55 (83.4)   | 104 (77.7)     |
| 6-10                       | 29 (14.5)                 | 7 (10.6)    | 22 (16.3)      |
| Family Size                |                           |             |                |
| 0-3                        | 11 (5.5)                  | 4 (6.0)     | 7 (5.2)        |
| 4-6                        | 159 (79.5)                | 55 (83.4)   | 104 (77.7)     |
| 7-10                       | 30 (15)                   | 7 (10.6)    | 23 (17.1)      |
| Household Income (R)       |                           |             |                |
| 1000 and below             | 24 (12.0)                 | 11 (45.8)   | 13 (54.2)      |
| 1001-2000                  | 173 (86.5)                | 54 (31.2)   | 119 (68.8)     |
| 2001-3000                  | 3 (1.5)                   | 1 (33.3)    | 2 (66.7)       |
| Housing Type               |                           |             |                |
| Owned                      | 200                       | 66 (33.0)   | 134 (67.0)     |
| Years of Farming           |                           |             |                |
| 15 Years and below         | 24 (12.0)                 | 17 (70.8)   | 7 (29.2)       |
| 16-35                      | 135 (72.5)                | 33 (24.4)   | 102 (75.6)     |
| 36-55                      | 41 (20.5)                 | 16 (39.0)   | 25 (61.0)      |

Source: Field Survey, 2017

### Table 2: Source of maize market

| Variable                  | Before Frequency | Before Percentage | After Respondents Frequency | After Percentage |
|---------------------------|------------------|-------------------|----------------------------|-----------------|
| Local Consumer            | 148              | 74%               | -                          | -               |
| Intermediaries            | 52               | 26%               | -                          | -               |
| Export Market Agents      | -                | -                 | -                          | -               |
| RED Hub Mill              | -                | -                 | 200                        | 100%            |

Source: Field Survey, 2017
### Table 3: Change in Annual income of Maize Farmers/ha (R)

| Village | Annual Income of Maize Farmers/ha in | Annual Income of Maize Farmers/ha in | Mean difference (CI) | T statistics (p-value) | Percentage Change in income/ha |
|---------|-------------------------------------|-------------------------------------|----------------------|------------------------|-------------------------------|
| Ntsimbini | 2,283.75 (290.11) | 7,529.52 (162.49) | 5,245.8 (5,100.8-5,390.7) | 75.5 (0.000) | 229.70 |
| Khwenxura | 2,456.62 (233.69) | 7,607.69 (39.22) | 5,151.1 (5,052.0-5,250.1) | 107.1 (0.000) | 209.76 |
| Qhingqolo | 2,443.81 (381.97) | 7,619.05 (60.16) | 5,175.2 (4,996.8-5,353.7) | 60.5 (0.000) | 211.77 |
| Phendu | 2,325.00 (156.00) | 7,125.65 (740.15) | 4,800.6 (4,400.1-5,201.2) | 25.5 (0.000) | 206.48 |
| Cezu | 2,318.97 (200.72) | 7,540.95 (148.75) | 5,222.0 (5,117.6-5,326.3) | 104.4 (0.000) | 225.22 |
| Ngcanasini | 2,341.74 (186.80) | 7,438.69 (67.05) | 5,097.0 (5,031.7-5,162.2) | 158.5 (0.000) | 217.66 |
| Maqomeni | 2,180.69 (52.03) | 7,519.64 (520.07) | 5,339.0 (5,043.3-5,635.0) | 38.5 (0.000) | 244.83 |
| Gengqe | 2,678.55 (412.21) | 7,665.92 (123.29) | 4,987.4 (4,788.7-5,186.0) | 52.2 (0.000) | 186.20 |
| Nzwakazi | 2,588.57 (346.90) | 7,600.00 (0.00) | 5,011.4 (4,853.5-5,169.3) | 66.2 (0.000) | 193.60 |
| All Villages | 2,407.65 (303.61) | 7,523.24 (298.59) | 5,115.6 (5,059.4-5,171.8) | 179.4 (0.000) | 212.47 |

Note: t-test statistics. P-value <0.05; 0.000 = significant (Source: Field Survey, 2017)

### Table 4: Change in annual income of maize farmers (r)/farm

| Village | Annual income of maize farmers (r) before x (SD) | Annual income of maize farmers (r) after x (SD) | Mean difference (CI) | T statistics (p-value) | Percentage change in Income |
|---------|----------------|----------------|-------------------|-----------------------|-------------------------|
| Ntsimbini | 5,407.14 (1211.94) | 21,333.33 (4722.00) | 15,926.2 (14,031.7-17,821.0) | 17.5 (0.000) | 294.54 |
| Khwenxura | 5,312.31 (681.83) | 23,692.31 (2422.05) | 18,380.0 (17,339.3-19,420.7) | 36.4 (0.000) | 345.99 |
| Qhingqolo | 3,057.14 (1178.58) | 9,438.09 (2330.34) | 6,381.1 (5,751.3-7,010.7) | 21.1 (0.000) | 208.72 |
| Phendu | 5,340.00 (240.00) | 17,875.00 (1588.08) | 12,535.0 (11,701.2-13,368.7) | 32.0 (0.000) | 234.74 |
| Cezu | 5,868.57 (955.47) | 21,895.24 (3300.07) | 16,026.7 (14,665.8-17,387.5) | 25.6 (0.000) | 273.09 |
| Ngcanasini | 5,273.33 (311.53) | 18,800.00 (561.63) | 13,526.7 (13,000.9-14,013.5) | 121.6 (0.000) | 256.51 |
| Maqomeni | 4,935.00 (628.71) | 18,337.50 (1839.88) | 13,402.5 (12,345.4-14,459.6) | 27.0 (0.000) | 271.58 |
| Gengqe | 3,790.91 (1177.30) | 12,190.91 (1858.29) | 8,400.0 (7,594.1-9,206.0) | 21.7 (0.000) | 221.58 |
| Nzwakazi | 3,411.43 (1075.71) | 10,133.33 (1835.57) | 6,722.0 (6,025.1-7,238.7) | 27.0 (0.000) | 197.04 |
| All Villages | 4,741.95 (1281.98) | 17,276.00 (5518.53) | 12,534.1 (11,910.0-13,198.5) | 38.4 (0.000) | 264.32 |

Note: t-test statistics. P-value <0.05; 0.000 = significant (Source: Field Survey, 2017)

### Table 5: Other benefits of RED Hub Project Intervention

| Variable | Frequency | Percentage |
|----------|-----------|------------|
| Increased production | 153 | 76.5 |
| Increased income | 157 | 78.5 |
| Improvement in other means of livelihood | 123 | 61.5 |
| Job creation | 144 | 72.0 |
| Acquisition of household item | 59 | 29.5 |
| Improved capacity on maize farming | 70 | 35.0 |

Source: Field Survey, 2017

and after the project intervention with 208.72% increase of farmers’ income/farm. Phendu has a gross annual mean income of R5, 340.00C ($439.87C) and R17, 875.00C ($1,472.41C) per farm before and after the project intervention with an increase of 234.74%. Ngcanasini village R5, 273.33C ($434.38C) and R18, 800.00C ($1,548.60C) mean annual income per farm with an increase of 256.51%. Maqomeni village R4, 935.00C ($406.51C) and R18, 337.50C ($1,510.50C) with 211.58% increase, Gengqe village R3, 790.91C ($312.27C) and R12, 190.91C ($1,004.19C) with 221.58% increase, Nzwakazi village R3, 411.43C ($281.01C) and R10, 133.33C ($834.71C) with 197.04% increase.

Findings in Table 3 and 4 above is in agreement with Tagne, et al., (2006), Mokhele, et al., (2016), Melusi, et al., (2016) that maize is a major source of income to farmers in several developing countries.

Table 5 above indicate that, other than increase in income of maize farmers who benefitted from the RED Hub Project, 153 (72.5%) respondents affirmed that there is increase in maize produce as a result of the intervention of the project. One hundred and twenty three (61.5%) confirmed...
the fact that there is an improvement in other means of livelihoods of the benefitting maize farmers in the study area. Up to 144 farmers representing 72.0% of the beneficiaries indicated that jobs were created within host villages. Those jobs include field ranchers, farm supervisors, and machinery operators among others. Farmers were able to acquire more household items as result of the project intervention as represented by 59 (29.5%) respondents. Farmers also developed more capacity on maize farming with a percentage of 35.5% (70) of total respondents. This supports the view of Wossen, et al., (2017) that agricultural projects targeted to reduce rural poverty and to increase food security could improve productivity and welfare outcomes of beneficiary smallholder farmers.

CONCLUSION

Substantive evidence from the study reveal that incomes of beneficiaries of RED Hub project increased significantly in the study area within the intervention period. The study has been able to reveal that there is market provision by the project to encourage farmers’ productivity and increase in their income hence improved economic status of maize farmers. Such improved economic status implies that the RED Hub project has positively impacted on the income of maize farmers in the Mqanduli community. Based on the findings, the study recommends sustained purchase of maize produce by the project from its beneficiaries and an extension of purchase from all maize farmers in Mqanduli.

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