

# “Rural redress through investment in water resource management for subsistence farming”

## AUTHORS

Olayemi Bakre  
Nirmala Dorasamy

## ARTICLE INFO

Olayemi Bakre and Nirmala Dorasamy (2015). Rural redress through investment in water resource management for subsistence farming. *Environmental Economics*, 6(4-1), 151-166

## RELEASED ON

Monday, 14 December 2015

## JOURNAL

"Environmental Economics"

## FOUNDER

LLC “Consulting Publishing Company “Business Perspectives”



NUMBER OF REFERENCES

0



NUMBER OF FIGURES

0



NUMBER OF TABLES

0

© The author(s) 2026. This publication is an open access article.

Olayemi Bakre (South Africa), Nirmala Dorasamy (South Africa)

## Rural redress through investment in water resource management for subsistence farming

### Abstract

Rural development is a topical issue in South Africa. Several studies, policies and strategies as regards rural development are discussed at various levels and platforms. However, despite the efforts made by government and non-governmental bodies, rural communities such as the Mtubatuba community situated in the north-east region of KwaZulu-Natal and many other rural communities still wallow in poverty. In consonance to the high prevalence of poverty and stagnation of subsistence farming, the paper aims to suggest other approaches to addressing the cyclical poverty and defunct subsistence farming in this community.

To accomplish this aim, a mixed research approach was used; as elements of qualitative (interviews) and quantitative (questionnaire) research approaches were used to obtain relevant information. The study reveals that water shortage has adversely undermined the development and growth of subsistence farming in this poor community. Furthermore, the difficulties experienced by the marginalized people of Mtubatuba are typical of many rural areas which have not fully benefitted from transformation in a post-apartheid South Africa.

To address this concern, the study suggested the reallocation of the municipalities surplus budget to the investment of water resource management with the intent of transforming the subsistence farming into commercial farming; thus improving the standard of living and reducing poverty to a reasonable extent.

**Keywords:** rural redress, inequality, investment, budget, water resource management, subsistence farming.

**JEL Classification:** O1, O2, Q1, P32.

### Introduction

#### Rural communities of South Africa

South African rural areas are among the poorest in the world as there is still a wide gap in terms of development with their urban neighbors (Westaway, 2010, p. 11; Seekings, 2010, p. 5). The majority of rural dwellers in South Africa rely on subsistence farming, whilst others depend on government grants or family members living and working in urban areas to sustain a living. The income received from family members in urban areas is often insufficient to cater for their daily needs. This paper will however focus primarily on the subsistence farming communities of Mtubatuba Municipality which is situated in the north-east region of the KwaZulu-Natal province. These farming communities are often characterized by high incidences of poverty (Allen and Brennan, 2004, p. 47). With an estimated 6.4 million South Africans falling below the national poverty line in 2010, KwaZulu-Natal (KZN) remains the province with the largest number of poor people (Schwabe, 2010, p. 58).

An estimated 50% of the rural communities of Mtubatuba Municipality are engaged in subsistence farming. Hence, it can be argued that this mode of

farming plays an integral in the lifestyle of these farming communities. Many amongst these farmers live below the poverty line. It is arguable that the development of subsistence farming will translate into rural development, and hence a better standard of living amongst the subsistence farmers (Taigbenu, Ncube and Boroto, 2010, p. 4). Baiphethi and Jacobs (2009, p. 7) justify this preposition when they assert that a significant percentage of the rural communities in South Africa are engaged in subsistence farming. Therefore, underpinning subsistence farming will have an inverse effect on households engaged in subsistence farming and will also result in a decline in poverty.

Development is imperative in the post-apartheid era as there still exists inequality amongst the South African populace (Finn, Leibbrandt and Wegner 2011, p. 72). This inequality is more pronounced in rural communities such as that experienced amongst the subsistence farmers of Mtubatuba Municipality (Triegaardt, 2009, p. 2).

Statistics South Africa (2013, p. 3) reveals that 71.1% of the 717 006 households in KwaZulu-Natal were engaged in subsistence farming. Considering the high percentage of households involved in subsistence farming, more attention should be given to subsistence farming in KwaZulu-Natal. As iterated in this section, the exigency of developing the subsistence form of farming cannot be overemphasized. For this reason, it will be suggested that subsistence farming be revamped in order to accelerate rural development and reduce poverty in rural communi-

© Olayemi Bakre, Nirmala Dorasamy, 2015.

Olayemi Bakre, Ph.D. Candidate, Department of Public Management and Economics, Faculty of Management Sciences, Durban University of Technology, South Africa.

Nirmala Dorasamy, Professor, Senior Lecturer: Department of Governance and Economic Development, Faculty of Management Sciences, Durban University of Technology, South Africa.

ties. This paper will argue on why the local municipalities should invest in water resource management as a means to accelerating development amongst these poor subsistence farming communities.

## 1. Rationale of the study

**1.1. Imperativeness for rural development.** Several researchers and policy makers have argued for the importance of rural development as this set of people is often the most neglected in most countries (Department of Rural Development, 2013, p. 3; Cleaver, 2013, p. 6). One of the main areas of focus in the South African National Development Plan was an agenda to develop rural communities across the country in order to bridge the gap of inequality between poverty stricken citizens and the rich class (South Africa National Development Plan, 2011, pp. 195-196). Firstly, a significant percentage of the rural communities in KZN, as well as other South African rural areas, live below the poverty line. This literally translates into the situation where almost every child born in rural households are born into poor households. An underdeveloped rural community will worsen the poverty scenario in rural South Africa and also lead to more unhealthy citizens and economically disempowered individuals.

Also worth mentioning is the argument put forward by the Rural Development Strategy of the Government of National Unity. It advocates that countries who focus on tackling rural poverty in comparison to urban poverty are able to decrease the poverty rate faster than countries who focus more on urban poverty (<http://www.polity.org.za/polity/govdocs/rdp/rural2.html>). Moreover, the South African manufacturing sector is heavily dependent on the agricultural producers; implying that if the rural setting where many of the farming activities takes place is not developed, it will have a negative consequence on the manufacturing sector of the country as well as its economy. Developing the rural areas through such activities like farming will generate more job opportunities, thereby elevating poverty (<http://www.polity.org.za/polity/govdocs/rdp/rural2.html>).

Furthermore, when rating the overall standard of living, health, poverty and other economic indicators such as inflation and unemployment, the rural communities of South Africa are also taken into consideration. In addition, a substantial amount of minerals, energy, biodiversity, natural and cultural experiences, land and labor come from the rural areas. Some of these resources become scarcer with the passage of time. It is important to maximize their usage (South African National Development Plan, 2011, p. 239). In recognition of this statement, the development and growth of rural communities in KZN needs to be given more attention.

**1.2. Aim and objectives.** The current study has the following aim and objectives.

The paper aims to suggest other approaches to addressing cyclical poverty inherited in Mtubatuba.

The objectives of this research are the following:

- ◆ to evaluate the correlation between water shortage and poverty amongst the populace of Mtubatuba;
- ◆ to examine the extent to which water shortage impacts on livelihood of rural communities of South Africa;
- ◆ to recommend practical resolutions to revamp the defunct subsistence farming community of Mtubatuba.

## 2. Literature review

**2.1. The role of subsistence farming in rural areas.** The agricultural sector of South Africa is considered to be dualistic in nature as it comprises the capitalized commercial sector on one hand and the fluctuating subsistence sector on the other hand (Vink and Kirsten, 2003, p. 13; May and Carter, 2009, p. 9). Many leading South African agricultural economists describe this sector as comprising a developed part on one side and a developing one on the other side. Commercial farming is considered to be developed, market-oriented and on a large scale, while subsistence farming is developing and on a small scale. The market-oriented component is dominated by white farmers, while the African farmers dominate the subsistence component. There is a general consensus by researchers that this divide is a legacy of the racially discriminatory policies of the apartheid era which stunted the natural agricultural development processes amongst black farmers (Lahiff, 2000; Ortmann and Machete, 2003, cited in Averbeke, 2008, p. 9).

In Commercial agricultural census, 2007, a total of 39 982 commercial farm units were identified in South Africa, producing about 95% of agricultural output (Statistics South Africa, 2009). The commercial sector accounts for 87% of the total agricultural land, while the black subsistence and smallholder producers use remaining 13% of agricultural land (Feynes and Meyer, 2003).

The subsistence mode of agriculture is of high importance in South Africa and requires more government support; the development of subsistence farming has a parallel correlation with rural development in South Africa, as many rural dwellers are engaged in subsistence farming. In America, farming is highly mechanized, organized and garners much government support. American farmers have received support from the (American) government through policies and subsidies which have resulted in signifi-

cant growth of agriculture in America. Many subsistence farmers in South Africa are often uneducated people and live below the poverty line, as compared to most of the American farmers who are usually educated and have a good standard of living. A recent survey in the United States of America reveals that above 30% of farmers have attended colleges and some have obtained their degree, whilst a few others are pursuing their post-graduate studies (<http://www.cals.ncsu.edu/CollegeRelations/AGRICU.htm>).

Census of conducted in the United States of America reveals that only 4% of American population is involved in farming and are able to provide sufficient food for American population, with a significant quantity for daily exportation to every continent across the globe ([www.agcensus.usda.gov](http://www.agcensus.usda.gov)).

The small percentage of American farmers involved in agriculture are able to production a significant quantity of agricultural produce for local consumption, as well exporting to several countries mainly due to high mechanization of farming, high levels of literacy among farmers and governmental support (Fuglie, MacDonald and Ball, 2007, pp. 2-5). On the contrary, the 12% of farmers involved in agriculture in South Africa are unable to produce what their American counterparts produce (Statistics South Africa, 2011, p. 3). The reason for the significant difference in the output of agricultural production between both countries include, low levels of mechanisation amongst some South African farmers and low levels of literacy (Agri-South Africa, 2013, pp. 2-3; Goldblatt, 2010, p. 12). Therefore it is suggested that the South African government should provide more incentives and support for subsistence farmers in order to transform a significant proportion of subsistence farmers into commercial farmers as a means of increazing national output of agricultural production and thereby accelerating the pace of rural development (Bhatti, Koike and Nasu, 2012, p. 7). While farming is important in countries such as South Africa, it is of less significance in America which shows a different perspective to farming.

**2.2. Constraints to subsistence farming in rural South Africa.** A number of factors have slowed down the pace of development and growth of subsistence farming in rural South Africa. These impediments to the development of subsistence farming in rural communities across South Africa range from water scarcity in dry farming communities to lack of farming implements (Aliber and Hart, 2010, p. 436).

Some of the impediments are discussed hereunder:

*2.2.1. Water.* According to Morrison, Morikawa, Murphy and Schulte (2009, p. 6), water is highly important in almost every sector. Sectors such as the

agricultural sector have heavy reliance on this resource. Nevertheless, water is becoming scarcer on a global scale and it will become even scarcer with the passage of time. The significance of this valuable resource cannot be overemphasized in rural South Africa as it is the life blood for subsistence farming. Morrison and Corona (2013, p. 1) affirm that water is an essential resource for life, its economic value is inestimable. This statement is concurred with by Puste, Tanuj, Mandal, Gunri, Banerjee, Dasgupta and Maiti (2013, p. 1) who emphasize the importance of water when they state that water is the most fundamental and vital natural resource whose quantity is fixed and not renewable. They further mention that water plays a significant role in the growth of every sector.

Empirical studies (Brown, 2008, cited by Rasmussen, 2009, p. 24; Blignaut and Heerdeny, 2009, p. 1) reveal that water scarcity is often attributed to the climate change effect. According to Mati (2007, p. 4), the most vulnerable people to climate-related disasters are the poor smallholder farmers (subsistence farmers). This is as a result of their inability to access cutting-edge knowledge, afford inputs or utilize appropriate technologies that can mitigate natural disadvantages such as the negative effect of climate change.

*2.2.2. Climate change.* Thorlakson and Neufeldt (2012, p. 3) also argue that South Africa's climate, as well as the relative scarcity of water experienced in most farm lands, and the low potential of arable land available to subsistence farmers often results in risky crop production. It exacerbates the level of poverty amongst rural subsistence farmers as they are compelled to purchase costly inputs which ties down their capital. Morrison, Morikawa, Murphy and Schulte (2009, p. 9) concur with Thorlakson and Neufeldt's view when they state that the most adversely affected people by climate change are rural farmers. They substantiate their argument with the fact that rural subsistence farmers depend only on irregular rainfall which is worsened by climate change.

*2.2.3. Lack of farming tools/assets.* Another constraint to the development of subsistence farming is the lack of farming tools. In instances where farmers had access to crop land, they could not maximize land usage as they lack the implements and other resources to cultivate. In a study in the Eastern Cape, it was observed that even when resources were pooled amongst five rural households, equipment required were still not met (Fraser et al., 2003, cited by Aliber and Hart, 2010, p. 436). According to Baiphethi and Jacobs (2009, p. 18), household assets are considered major determinants of the ability of

subsistence farmers in agricultural production to secure a livelihood through subsistence farming. They further state that the lack of assets for agricultural usage is predominant in Sub-Saharan Africa, as evidenced by unviable small and falling farm sizes and poor-quality land.

**2.2.4. Farm murders.** Goldblatt (2010, p. 23) ranks farming in South Africa as the world's most dangerous profession. He based his argument upon the high rate of murder of farmers in South Africa. Goldblatt further mentions that the murder rate of farmers has increased by 25% since 2005. Evidence provided by the independent South African Human Rights Commission quantifies the murder rate of farmers at 2,500 deaths per annum. If this challenge of murder of farmers is not curbed, it poses a risk to the future growth of farmers across the nation.

**2.2.5. Alien plants.** Studies by Blignaut and Heerden (2009, p. 1) also point out the adverse effect that the prevalence and spread of invasive alien plant species, such as Lantana camara and Cromolona, have on water scarcity. These alien plants consume high amounts of water and compete with crops for the limited water. Invasive alien plants are common features in the case study. Though the community in the last 5 years has uprooted several alien plants, it still poses a threat to crop yield.

**2.2.6. Rural-urban migration.** Another considerable challenge to the development of subsistence farming is rural-urban migration. Many rural dwellers migrate to cities in search of better opportunities. This invariably reduces the labor force available for farming in rural places. Goldsmith, Gunjal and Ndarishikanye (2003, p. 5) assert that "*economic theory and empirical research have shown that the foundation of rural-urban migration is the excess of the urban wage over the rural wage*". As there are higher chances of receiving a better paying job in urban centres, many of the dwellers of rural communities have relocated to urban centres in search of better job opportunities to sustain their living.

From a broader perspective, the following factors were also identified as constraints to the development of subsistence farming in KZN.

#### *Inadequate access to funding for infrastructure*

Subsistence farmers in rural communities lack infrastructure such as storage facilities to preserve their farm products.

#### *Ineffective linking of graduates to farms*

Students who studied agricultural-related disciplines are often not linked to subsistence farmers. Such linkage will have an inverse effect on subsistence farming (Commission of Inquiry into Provincial Growth and Development, 2013, p. 17).

#### *Land reform process*

The bureaucracy involved in land reform has been an impediment to the development of subsistence farming. Much of the land which was allocated to white South Africans during the apartheid era are yet to be returned to the rightful land owners (Commission of Inquiry into Provincial Growth and Development, 2013, p. 18).

### **3. Methodology**

**3.1. Research approach.** The research methodology used was the mixed research approach. Questionnaires and semi-structured interviews were used to gather the required information. Questionnaires were given to subsistence farmers of Ward 19 at the Mtubatuba Municipality. Interviews were conducted with 3 senior officials from the regional office of the Department of Water Affairs in Durban; 3 staff members from the Mtubatuba Municipality; 2 individuals from Ward 19; 2 senior staff members from the Department of Agriculture, Environmental Affairs and Rural Development in Mtubatuba; as well as 2 senior staff members from Umkanyakude, the water supplier for the Mtubatuba Municipality.

**3.2. Target population and sample size.** As defined by Sekaran (2006, p. 265), a target population refers to the population of interest or topic of interest that the researcher intends to base a study upon. According to Bless et al. (2008, p. 99), an effective sample should have three attributes; a well-defined population; an adequately chosen sample; and an estimate of how representative of the whole population the sample is. Burns and Groove (1997, p. 236) also define a sample population as "*the entire aggregation of respondents that meet the designated set of criteria*". Criteria in this context imply the specific requirements required by a researcher to conduct an investigation. The population in this study constituted 85 subsistence farmers in the Ward 19 area and the sample is 50 farmers.

The sampling method used in this study was the non-probability sampling method using the convenience sampling method. In convenience sampling, the researcher selects the most accessible members of the population from which to obtain information. Non-probability sampling techniques rely on the subjective judgment of the researcher when selecting units from the population to be included in the sample (<http://dissertation.laerd.com/articles/sampling-the-basics.php>). A convenience sample can also be explained as a sampling method where the units that are selected for inclusion in the sample are the easiest to access (<http://dissertation.laerd.com/articles/sampling-the-basics.php>).

#### 4. Data collection and analysis

The data collection method in this study was through interviews combined with questionnaires. This served as the primary data collection method. The questionnaires were hand delivered by the researcher to 50 farmers (participants) in Ward 19 of Mtubatuba Municipality. All interviews conducted in this study were face to face interviews. In the current study, among 50 questionnaires distributed 40 were filled by participants and returned. This reflects 80% of return rate of questionnaires. This is an ideal response rate as Fincham (2008, p. 2) concludes in his study on "Response Rates and Responsiveness for Surveys, Standards, and the Journal; *that above 60% response rate is a reliable estimate for research purposes.*

The information gathered through the structured interviews was used for triangulation processes. The purpose of triangulation in qualitative research is to increase the credibility and validity of the results. According to Denzin ((1970), cited by Kimchi, Polivka and Stevenson 1991, p. 1), triangulation in research is defined as "*the combination of two or more theories, data sources, methods or investigators in the study of a single phenomenon*". The triangulation process was handled in this study by making a comparison between responses the subsistence farmers gave (in the questionnaires) with answers obtained through structured interviews conducted among the staff members of the Department of Agriculture, Mtubatuba Municipality and Umkanyankude water service provider.

For analytical purposes, models, tables, figures and charts were used. Inferential statistics used Pearson's or Spearman's correlations at a significance level of 0.05. Testing of hypotheses using chi-square tests for nominal data and ordinal data at a level of significance of 0.05. In addition, internal data was analyzed using t-tests or ANOVA. Primary data gathered from the interviews and questionnaires, as well as secondary data gathered from the DWA, the Mtubatuba Municipality and Department of Agriculture, Environmental Affairs and Rural Development was analyzed and used for the recommendations and conclusions. The Statistical Package for the Social Sciences (SPSS) version 21.0 was used in analyzing data in this research. Bryman and Crammer (2009, p. 21) argue that, when a researcher uses the SPSS analysis program, researcher is able to analyze quantitative data quickly and in many different ways, eliminating long hours spent on scores, carrying out calculations and making inevitable mistakes that occur while such calculations are carried out. First, the quantitative data were analyzed using descriptive statistics. Obtained results are

shown by creating tables and diagrams in order to show the frequency of occurrence as well as identifying statistical relationships between the variables. Afterwards a qualitative data analysis was followed; which adds to the understanding why there is a need to invest in water resource management in Mtubatuba Municipality. The questionnaire and interview were organized into manageable themes, analyzed and stored. However, to enhance the credibility and reliability of this research, a professional statistician was also employed for data analysis. The information obtained through the questionnaires and interviews was collated and grouped into related themes. This was further analyzed in order to determine informative findings. Then recommendations as well as conclusions were made.

**4.1. Governmental approach in addressing inequality in rural areas.** The South African government, both at provincial and municipality levels has enacted several policies and strategies to accelerate development in rural communities. This section however will focus only on strategies which revolve around agriculture, while other strategies used in underpinning rural development such as commerce and tourism will not be discussed. However, these policies and strategies have not yield the desired results. This section will provide a summary on measures the South African government has utilized in addressing this issue.

**4.2. Reconstruction and Development Program.** The Reconstruction and Development Program (RDP) is an encompassing, coherent socio-economic policy framework aimed at mobilizing the citizenry and country's resources, with the intent of eradicating the apartheid system and establishing a firm democratic, non-racial and non-sexist future. The six basic principles of the RDP include:

- ◆ an integrated and sustainable program;
- ◆ a people-driven process;
- ◆ peace and security for all;
- ◆ nation-building;
- ◆ link reconstruction and development;
- ◆ democratization of South Africa (<http://www.polity.org.za/polity/govdocs/rdp/rdp2.html>).

**4.3. Integrated sustainable Rural Development Program (ISRDP).** The Integrated Sustainable Rural Development Program (ISRDP) was rolled out by former President Mbeki in January 2001 (Department of Provincial and Local Government 2003 p. 1).

The main objective of the ISRDP was to achieve integrated sustainable development amongst the most rural communities in South Africa. The ISRDP

was the first governmental initiative which impelled multi-sectoral governmental departments, parastatals and other organizations cooperating in an effort to address the rural development backlogs in the node (Department of Provincial and Local Government, 2003, p. 1). Everatt, Dube and Ntsime (2004, p. 2) acknowledged that the ISRDP was a grassroots driven initiative to underpin development in some of the most rural and poverty stricken South African rural communities in 2001. These districts include (Everatt et al., 2004, p. 2): Sekhukhune, Umkhanyakude, Ugu, Zululand, Umzinyathi, O.R. Tambo, Chris Hani, Central Karoo, Kgalagadi, Maluti A. Phofung, Alfred Nzo, Ukhahlamba, Bohlabela.

Everatt et al. (2004, p. 2) also mention that the ISDRP was a local demand driven developmental strategy propelled to empower local government authorities in providing the fulcrum around which sectoral departmental delivery would be coordinated; targeted at enabling an integrated and responsive rural development and growth. Worth mentioning is that Mtubatuba Municipality was listed among the prioritized poverty stricken districts in 2001. However, 13 years later, it still ranks amongst the poorest districts in South Africa (The KwaZulu-Natal Provincial Growth and Development Plan, 2012, p. 52).

**4.4. The rural development strategy of the government of national unity.** This was released as a discussion document in 1995. However, renewed efforts to design a rural strategy were launched under the auspices of the Rural Task Team of the RDP office. This process led to the publication of The Rural Development Framework by the Department of Land Affairs in May 1997. The document, however, draws attention to the need for coordination of rural development.

The range of initiatives that emerged from the different government departments were not based on a specific set of targets or common indicators. Nevertheless they did address important elements of rural development (<http://www.info.gov.za/otherdocs/2000/isrds.pdf>).

Despite the efforts made by the government to re-vamp the agricultural sector, the impact has not been felt by the subsistence farmers of Mtubatuba. Some subsistence farmers of Mtubatuba allege that they do farm in harsh conditions, resulting in poor yields of farm produce. Empirical studies (Maduna et al., 2013, p. 6) reveal that government policies have not had a significance positive influence on subsistence farmers at the grassroots level. Maduna et al. (2013, p. 6) and Agri-South Africa (2013, p. 2) substantiate this argument when they state that policies such as the Extension of Security of Tenure Act No. 62 of 1997, Conservation of Agricultural Re-

sources Act, 1983 (Act No. 43 of 1983) and Restitution of Land Rights Act, No. 22 of 1994 has not had a resonant impact on subsistence farming as no significant growth and development have been recorded at grassroots level in the past few years. Rather, this sector has recorded a decline of 2.9 % (Statistics South Africa, 2013, p. 2).

**4.5. Developmental support strategies by KwaZulu-Natal provincial government.** This section provides an overview of strategies that the present administration has used in addressing the rural underdevelopment in KwaZulu-Natal. The Department of Rural Development and Land Reform (DRDLR) of the KZN Province has initiated 8 development support strategies in its rural development framework (Department of Rural Development and Land Reform 2013, pp. 15-21). The strategies are discussed briefly below.

*4.5.1. Integrated Development Planning (IDP).* Local municipalities in South Africa use this approach to plan future development in their areas. Due to the poor administration of rural communities during the apartheid era, which resulted in underdevelopment and poor service delivery, the IDP was designed to accelerate development in these communities. The new approach to local government is envisaged to overcome the poor planning of the apartheid regime. The IDP involves the entire municipality, as well as citizens in finding the most suitable means to achieving a long term and sustainable rural development.

*4.5.2. The Animal and Veld Management Program.* This program was initiated to sustain the land use practices in rural KZN. The poor management of veld and overstocking has resulted in low production and deterioration of grazing fields, soil and water. The policy document reveals that the present institutional structure is unfavorable for rural farmers. Hence, the Animal and Veld Management Program is designed to address the following (Department of Rural Development and Land Reform, 2013, p. 21): soil rehabilitation, regreening the village space and decongesting the village space.

**Soil and land management.** This program is intended to curtail the fast declining soil fertility, as well as making maximum usage of land for cultivation and rearing of live stock.

**Water management.** The water management scheme is designed to curtail the water shortages in the agricultural and other productive sectors which require water for their sustainability in rural KZN.

**Crop management.** This program is designed to manage crop production and enhance crop yield so as to improve food security, as well as generating addi-

tional income through crop production amongst rural farmers in KZN.

**Afforestation.** A successful scheme of this program will enhance forestation and reduce the depletion of soil. This will improve soil fertility and create a healthier environment.

**Livestock management.** Significant evidence reveals that most livestock production is found in rural towns or villages across KZN. The successful implementation of this scheme will transform into better livestock production and better standard of living amongst livestock farmers. It is a value-add for farm and non-farm activities along the river banks (Department of Rural Development and Land Reform 2013, p. 21).

However, despite the aforementioned efforts made by government both at provincial and local level, only little successes have been recorded amongst the subsistence farming communities of KZN. Hence, it is imperative to look for other approaches which can sustain subsistence farming with the intent of growing it over a period of time.

**4.6. Budget of local municipalities.** The budgets of local municipalities are financial proposals which provide an overview of financial figures as well as administrative (financial) activities for the coming year; and where the sources of the funding emanate from. Capital financial budgets are often sourced from external loans, internal loans, contributions from revenue, government grants, donations and public contributions, public/private partnerships; while operational budget financing are often sourced through, property rates – service charges/tariffs, fines and equitable shares (<http://www.etu.org.za/toolbox/docs/localgov/webmunfin.html>).

The duties of the local government officials as regards the provision of infrastructure and providing basic services to their constituent are enacted in the South African Constitution as well as the Municipal Structures Act. Some local municipalities have complained of insufficiency of funds as a major constraint to rendering satisfactory services to their constituent. On the contrary, White Paper (South Africa, 2014 p. 2) reports that some local municipalities have surplus budgets, but these funds have not been judiciously utilized and allocated in certain circumstances due some of the following constraints:

- ◆ lack of effective coordination of services implementation;
- ◆ monitoring and evaluation system;
- ◆ political will and negative influence on activities of council;
- ◆ allegations of corruption and fraud;

- ◆ lack of capacity and transfer of skills;
- ◆ continuous negative outcomes of the auditors general report;
- ◆ poor public relations;
- ◆ financial management.

Hence, a prudent and judicious utilization of these funds can underpin development in local municipalities which have access to sufficient funds. In the case of Mtubatuba Municipality, the reallocation of (excessive) funds can possibly fast track development amongst this community. This municipality over the past five years has been privileged to have excess funding to facilitate its activities. This is depicted in Tables 1 and 2 below.

Table 1. Forecast of revenue and expenditure of Mtubatuba Municipality between 2011 and 2018

S/N	Year	Revenue	Expenditure	Surplus
1	2011/12	79.696	21.757	57.939
2	2012/13	92.526	20.804	71.722
3	2013/14	103.121	29.361	76.190
4	2014/15	127.347	22.954	104.393
5	2015/16	162.407	25.215	137.192
6	2016/17	171.668	26.499	145.169
7	2017/18	174.123	27.837	146.286

Source: Adapted from Mtubatuba Municipality Draft Budget and MTREF (2014, pp. 7-14).

Figures in the above Table are rounded off to the nearest R100.

**4.7. MTREF – Medium Term Revenue and Expenditure Framework.** As revealed in Table 1, the surplus fund could possibly be reallocated to agriculture. This fund can be reinvested in highly advanced water resource management techniques adopted by Israeli farmers. Israel is ranked as one of the most water scarce countries in the globe.

Estimated 60% of Israeli total land surface comprises arid and desert land which can barely sustain crop production (Tal and Blaustein, 2008, p. 2). However, despite this unsuitable agricultural terrain, Israelis are known to be world leaders in agricultural production and research (Tal and Blaustein, 2008, pp. 6-8). The Israelis reputation of being world leaders in this field was achieved through several years of research and policy implementation in water resource management (Tal and Blaustein, 2008, p. 8). South Africa and other water-scarce agricultural nations can also take learns from Israel to accelerate agricultural development and reduce poverty. The achievements and results of this research and innovation have enticed many agriculturally developed nations such as the United States of America, Brazil, Germany, China and Indonesia to learn and adopt the highly sophisticated water conservation

techniques invented and developed by the Israelis (Chesla, 2013, p. 2; Novak, 2014, p. 2; WATEC, 2013, p. 3). These sophisticated water conservation techniques have generated employment opportunities, resulted to a tremendous increased output in agricultural production; significantly improved standards of living amongst other various inverse

impact it has made on the Israeli agricultural net exportation (Water Technology and Environment Control Exhibition and Conference (WATEC) 2013, pp. 3-8). Hence, a well-tailored investment in agriculture in Mtubatuba Municipality will underpin subsistence farming in this community with the motive of reducing poverty.

Table 2. Consolidated overview of the 2014/2015 budget and MTREF

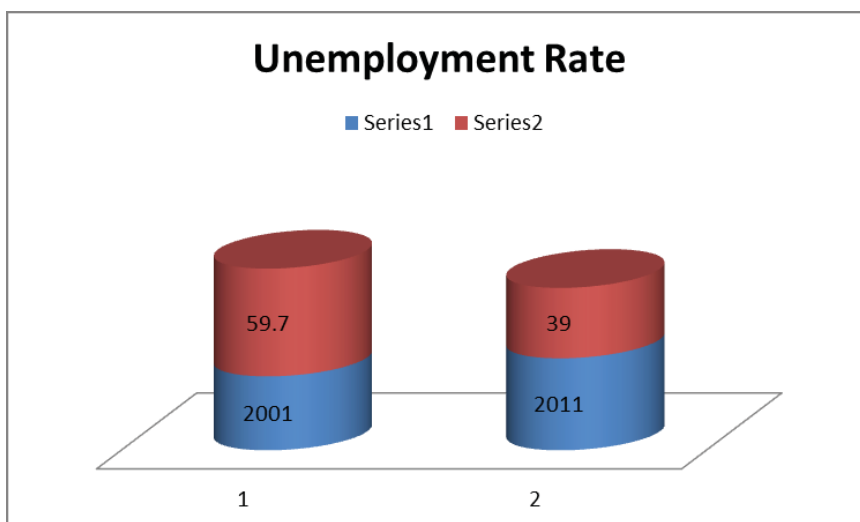
Details	Adjusted budget 2013/2014 (R)	Budget year 2014/2015 (R)	Budget year 2015/2016	Budget year 2016/2017 (R)
Total operating revenue	105.239.343	135.955.607	170.751.494	178.809.405
Total operating expenditure	96.563.635	120.227.455	122.429.153	130.034.449
Surplus/deficit for the year	8.675.708	15.728.152	48.322.341	48.774.956
Total capital revenue	39.653.659	45.807.200	74.793.351	75.987.441
Surplus/deficit for the year on capital	(6.860.559)	(15.659.400)	(45.302.501)	(45.303.391)
Total surplus/deficit for the year	1.815.149	68.752	3.019.840	3.471.565

Source: Adapted from Mtubatuba Municipality Draft Budget and MTREF (2014, p. 4).

As depicted in Table 2, there was a significant growth of 22.59% (R30 716 264) in the total operating revenue in 2014/2015 financial year in comparison to that of 2013/2014 adjustments budget. More also, the total operating expenditure for 2014/2015 financial year is appropriated at the sum of R120 227 455. This sum signifies a budgeted surplus of R15 728 152 before capital expenditure (Mtubatuba Municipality Draft Budget and MTREF, 2014, pp. 3-4).

As emphasized in Table 2, the surmountable portion of the R15 728 152 budget surplus could be invested on water resource management. This preposition is based upon the following premises:

- ♦ high rate of unemployment in Mtubatuba;
- ♦ high incidence of poverty;
- ♦ availability of cultivable land;
- ♦ availability of labor.

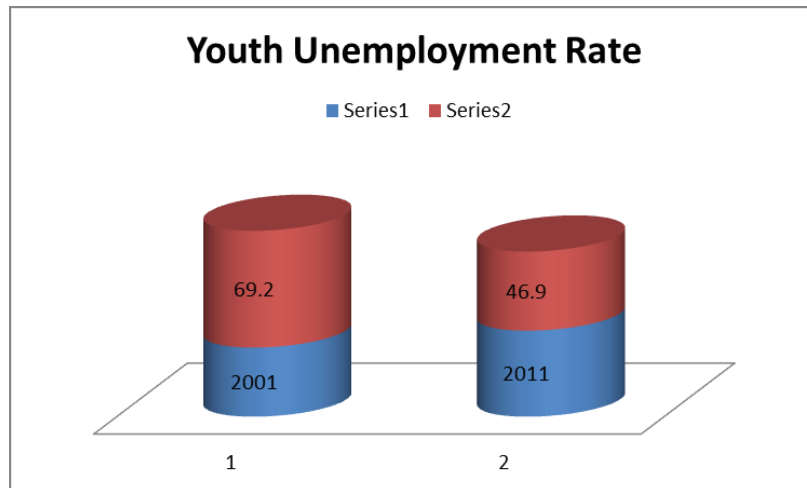


Source: Adapted from Mtubatuba Integrated Development Plan (2013, p. 64).

Fig. 1. Unemployment amongst the populace of Mtubatuba

The Figure above puts the unemployment rate of Mtubatuba in 2001 at 60%. However, by 2011 there had been a significant reduction of unemployment at 39%. This improvement can be largely attributed to Somkhele coal mining industry situated in the Mpu-

kunyoni Traditional Council area which is in a close proximity to the residence of Mtubatuba (Mtubatuba Integrated Development Plan, 2013, p. 64). Hence, investment in agriculture in this community can further improve the unemployment situation.

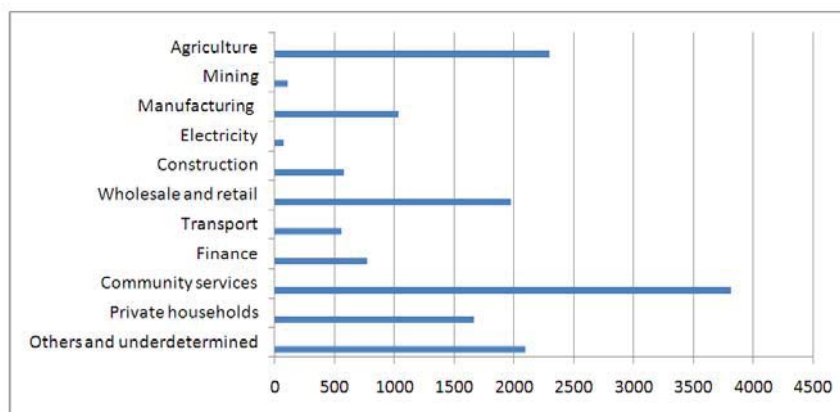


Source: Adapted from Mtubatuba Integrated Development Plan (2013, p. 64).

**Fig. 2. Unemployment amongst the youth of Mtubatuba**

Also, Figure 2 places unemployment amongst youths of Mtubatuba at 69.2% in 2001. However, by 2011 unemployment amongst the youth had dropped to

46.2%. This is a notable improvement of 22.2% of youth employment in this community (Mtubatuba Integrated Development Plan, 2013, p. 64).



Source: Adapted from Mtubatuba Local Municipality IDP (2012, p. 40).

**Fig. 3. Economic activities in Mtubatuba**

Figure 3 supports the aforementioned argument which mentions that a sizeable populace of citizenry of Mtubatuba Municipality is involved in agriculture. A significant percentage of the residents of the Mtubatuba Municipality are involved in community services (26%) followed by the agricultural sector (15%). Considering the percentage of individuals involved in farming the development of this sector can have a significant impact on the standard of living in this municipality.

In addition, this community is encircled with high incidences of poverty. As evidenced by Mr. C.V. Mkhwanazi (Councillor to Ward 19, Mtubatuba Municipality) Mtubatuba is ranked amongst the most poverty stricken communities in the country. The difficulties experienced by marginalized people of Mtubatuba are typical of many rural areas which have not fully benefitted from transformation in a post-apartheid South Africa. As inferred from this

section, it can be argued that the reallocation of surplus funds can be invested in advanced water resource management techniques adopted in Israel and other advanced agricultural countries with the intent of transforming the defunct subsistence farming in this community to a viable commercial farming community.

### 5. The importance of water resource management in rural South Africa

Many studies have explained the importance of water accessibility to the development of rural communities in South Africa (Moeletsi and Walker 2011, p. 428; Taigbenu et al., 2010, p. 9). Water plays a variety of roles in these marginalized communities. The role played by this resource range from domestic to agricultural, employment generation to impact on health. It also has an impact on the lifestyle of females amongst many other uses.

According to Kaliba, Norman and Chang (2003, p. 3), successful agricultural development projects rely on a stable supply of water. Some projects have been unsuccessful due to an insufficient supply of water. Studies on poverty assessment have shown the correlation between sufficient water and agricultural development in rural communities. Kaliba et al. (2003, p. 3) substantiate their argument by justifying how the improvement of the water supply plays an integral role in designing and implementing an effective and efficient strategy for poverty alleviation. Besides the usefulness of water for agriculture in rural communities, Moriarty and Butterworth (2003, p. 11) also explain its importance for domestic use. In most rural communities across South Africa women are responsible for water collection from sources which are often several kilometres from their places of residence. This time spent in water collection could have been used for other productive activities or leisure.

A report by UNESCO (2004, p. 1) reveals that women and young female children spend more than 10 million people-years carrying water from far sources of water supply to their homes annually. While on such trips many women have been abused, and in some instances they face the risk of being raped (Crow and Sultana, 2002, p. 3). A report by UNESCO (2004, p. 1) draws the attention of health organizations to the adverse effect caused by the non-availability of water on women and young girls involved in fetching water. Diseases such as anaemia and other similar diseases are common amongst this group (Swedish International Development Cooperation Agency (SIDA) (1997), cited in UNESCO, 2004, p. 1). Research has shown a strong correlation between improved health and sufficient water, which in turn has a direct relationship with development (Fox and Liebenhal, 2006, p. 271). A study by Wenhold and Faber (2008, p. 38) also highlights the corresponding relationship between water availability and better nutrition. As observed, several studies have indicated access to water as having an inverse effect on communities' health standard. In this context, access to water could be one of the driving forces in improving the health of the rural populace of South Africa often being seen in a poor state of health as compared to their urban neighbors. In addition, the sufficiency of water in rural communities will result in more job opportunities, thereby increasing the level of income, improved standard of living and decline in poverty rates. This view is buttressed by Bresciani and Valdés (2007, p. 7) when they state that water availability for agricultural purposes often generates employment for unskilled labor in rural communities.

Bearing in mind the aforementioned significance of water to rural communities, the available quantity has to be maximized, whereby each drop is used in the most productive manner. Though the focal point in the present paper is on investment on water resource management which is aimed at underpinning subsistence farming; however water needs to be accessible for other activities, thereby leading to simultaneous and gradual development and growth in each sector of the affected community. If water is available for a certain activity while being unavailable for other activities, it creates an imbalance in the social and economic lifestyles of the community (Muller, 2009, p. 6; Morrison et al., 2009, p. 3; Jayne et al., 2010, p. 9). The communities of KZN do not have sufficient water for domestic purpose which makes it a much bigger challenge to obtain water to sustain their crops during dry seasons.

As asserted by Mr Myeza, some municipalities in South Africa do not have sufficient funds to finance irrigation projects for rural farmers. This has undoubtedly made the farmers apply traditional water conservation techniques such as mulching to sustain their crops during drought periods. Mr Myeza further explains that this water conservation technique is passed down from one generation to the next. However in recent times due to poor rainfall in the most parts of KZN along with the declining soil fertility, subsistence farmers are unable to sustain their crop yields through the traditional conservation techniques used 5 years ago. The reason is that investments are required to be made in water resource management, which can result to the creation of more technologically advanced water resource management practices. Taigbenu et al. (2010, p. 9) suggested new water conservation technologies such as rainwater harvesting which is capable of optimizing the use of water for agriculture, thereby reducing the threat of a food crisis. They further recommend appropriate policies and water pricing, which are of importance in providing a framework that will support the new era of sustainable water resources management in the agriculture sector.

**5.1. Need for investment in water resource management.** This paper bases the imperativeness of investing in water resources management based upon the following premises.

*5.1.1. Budget of municipality.* The municipality is privilege to have a surplus budget in the current financial year and also forecasted to have surplus budgets in the next two to three years (Mtubatuba Municipality Draft Budget and MTREF, 2014, pp. 3-4). These surplus funds could be reinvested in water resource management in a bid to sustain the decaying agricultural sector of Mtubatuba. Before

such investment is made, stakeholders in agricultural sector, researchers, policy makers and financial advisers should be consulted as a means to having a formidable plan of investment. Such investment should include a short, medium and long-term plan.

**6.1. Integration between rural development, water resources and agriculture.** Efforts have been made by the South African government to advance the integration between land reform, agriculture, agrarian reform and water resources management (WRM) (Van Koppen, Sally, Aliber, Cousins and Tapela, 2009, p. 4). Van Koppen et al. (2009, p. 4) assert that developmental services such as land reform, agriculture, irrigation, domestic water supplies, WRM, financing, health and social grants are usually planned at the national level and implemented at the local government. These levels are often operated parallel with each other. The local government has the mandate to implement integrated development planning. However, in this circumstance it can only reproduce such fragmentation and poor execution (Van Koppen, Sally, Aliber, Cousins and Tapela, 2009, p. 4).

The agricultural sector has witnessed insurmountable changes in the past decades which have been shaped by substantial macroeconomic and social reforms implemented from the mid-1990s but reforms of agricultural policies were also initiated. Some of the policies enacted during this period were the deregulation of the marketing of agriculture products, abolishing certain tax concessions favoring the sector, reduction in budgetary expenditure on the sector, land reform, and trade policy reform (Organization for Economic Cooperation and Development, 2006, p. 2). Conversely, none of these reforms have impacted directly on the Mtubatuba farming community. On the contrary, the Communal Land Rights Act (2002) which was structured to provide for legally secure tenure in communal areas and accord comparable redress where necessary has benefitted the farming community of Ward 19. This reform resulted in the redistribution of expanses of land which were previously owned by white commercial farmers to the black farmers in Mtubatuba. Thus, this reformatory action is advantageous to agriculture in the area of study (Kariuki, 2009, p. 8).

There exists a direct linkage between rural development, water resources and agriculture (Averbeke, 2008, pp. 22-23). Agriculture aptly thrives in regions with sufficient amounts of water and thus in rural communities characterized by agriculture. Agriculture plays an expedient role in underpinning rural development in such communities as the subsistence farming community of Mtubatuba municipality (Muller, Schreiner, Smit, Koppen, Sally, Aliber, Cousins, Tapela, Merwe-Botha, Karar and Pieter-

sen, 2009, pp. 19-21). Hence as inferred from above, it can be deduced that a well-tailored investment in water resource management will underpin subsistence farming and rural development in Mtubatuba.

**6.2. Failed policies and legislations.** As cited earlier in previous sections of this study, several approaches have been made to accelerate development in rural communities, as well as sustaining subsistence farming (Discussion Paper on Agricultural Policy, 1998; White Paper on Agriculture, 1995). However, these approaches have not yielded the desired result. In addition, the municipalities of rural communities often have limited budgets and for this reason they (municipalities) are unable to finance irrigation on agricultural projects (Mtubatuba Local Municipality, IDP, 2012, pp. 31-32). Irrigation can possibly result in development and growth of subsistence farming in rural communities as these farm areas are often characterized by low rainfall (Averbeke, 2008, pp. 17-19). Hence, as suggested by several studies, in water scarce farming communities, it is necessary to make judicious use of every drop of water in sustaining crops (Taigbenu, Ncube and Boroto, 2010, p. 7; Pennisi, 2008, pp. 171-173). For this reason, it is arguable that the formulation of appropriate policies on water resource management can underpin the acceleration of growth in rural communities and also result in the development of subsistence farming (Wilk and Jonsson, 2013, p. 696; Bhatti, Koike and Nasu, 2012, pp. 5-6).

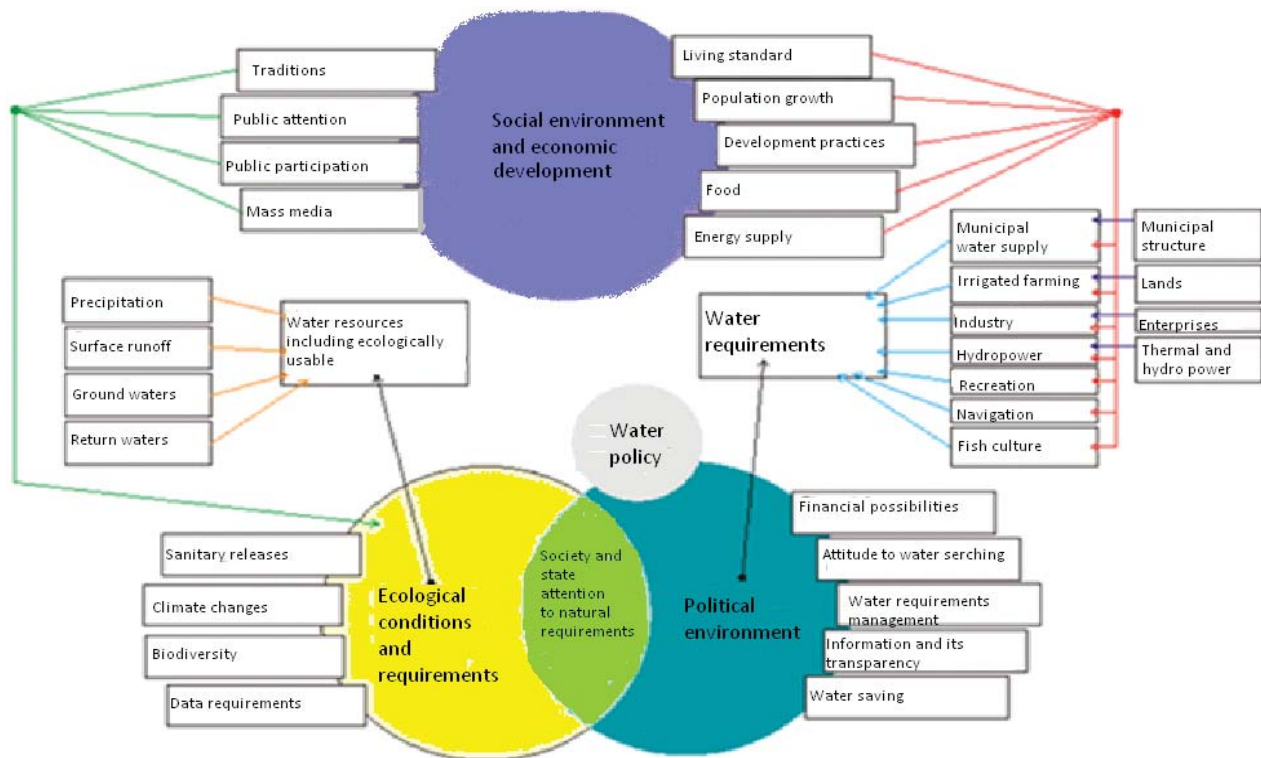
## 7. Recommendations

**7.1. Requirements for successful water resource management.** Achieving successful water resource management will involve different sectors, departments and stakeholders working in the same direction. The involvement of these sectors, departments and stakeholders, as depicted in Figure 1 is imperative for successful water resource management. It will require experts in water management, engineers, policy makers and end users. The expertise and experiences of these personnel are required as their working together tends to have a high potentiality of resulting in a successful water resource management. Additional capital is also required for infrastructural development in order to curb the leaking of pipes (Averbeke, 2008; Bhatti et al., 2012; DWA, 2012). Experts with an indepth knowledge of water management are also required to enact sustainable policies which will be beneficial in the short and long run (Bacus, 2013, pp. 13-14). Due to the shortage of experts in water management, more people need to be trained to fill up the gap (DWA, 2012, p. 18). Lastly, continuous awareness is required to sensitize the populace on water resource management as this will lead to effective usage.

Figure 4 provides an all-encompassing approach to an integrated water resource management system whereby every aspect of water is engaged. It involves the government, consumers, as well as nature. Fulfilling an integrated water resource management approach will imply a water development strategy which will suffice the requirements of the consumers and provide sufficient water for productive uses while meeting the requirements of the ecosystem.

The illustration identifies 3 different role players: the social and economic development at one end and political environment at the other end, while ecology

is termed as the third. The social and economic development highlights public participation and water uses for domestic and production purposes. It further incorporates the municipal structure. The political dimension in this illustration is equally important as it deals with awareness and management of the limited resource. Lastly, it identifies the ecological part, which is divided into water resources and ecological usability. Sound knowledge and efficient management of each of the role players will result in effective water resource management, which translates into growth and development, thereby reducing poverty.



Source: <http://google.co.za/search?q=models+on+integrated+water+resource+management> (2011).

**Fig. 4. Model on integrated water resource management**

Figure 4 incorporates the dependent and independent variables in a manner that will enable policy makers to stimulate and forecast the outcome of alternative policies on water management. At a glance, the model provides a cross-sectoral policy approach aimed at modifying the traditional approach which has resulted in unsustainable water usage. However, in the current study, the researchers examine investment in water resource management as a mechanism for sustaining and developing subsistence farming in rural communities. The dependent variables in the model are the social, economic and political environments, while the independent variable is the ecological condition. The ecological condition refers to the structure and operation of aquatic ecosystems and is mainly evaluated on the basis of the environmental elements, resources and organisms cohabiting in water. The ecological condi-

tion of water resources can either underpin or undermine agriculture and fishery (National Research Institute of Science and Technology for Environment and Agriculture, 2012, p. 1). In addition, the water requirement directly concerns the policy makers. All the elements identified in Figure 4 will have to be involved in achieving an integrated water resource management response in the subsistence farming communities of South Africa. However, the municipality has to take the leading role in achieving integrated water resource management by creating awareness and educating their community members.

Furthermore, the illustration in Figure 4 is relevant to the subsistence farming community of KwaZulu-Natal as this community requires a tailored approach to re-vamping the subsistence farming. More particularly, the available water resource needs to be judiciously

utilized with the aim of making every drop of water adequately used in the most productive manner. A good understanding of this model and implementation by policy makers amongst these affected communities can fast track development in subsistence farming, thereby improving livelihood. However, the policy makers (Councillors, Mayor, Department of Agriculture and Department of Rural Development), while implementing these decisions, will also need to involve the farmers in this community to ensure sustainability and a good understanding of such decisions.

### **7.2. Affirmative and comprehensive policies.**

The ecological condition of water resources can either underpin or undermine agriculture and fishery (National Research Institute of Science and Technology for Environment and Agriculture, 2012, p. 1). In recognition of this, it is imperative for policy makers to take affirmative policies that could underpin the development of water resource management in rural communities as well as South Africa as a whole. The establishment and development of policies on water resource management is considered to be one of the key factors which led to the development of agricultural and economic development in a water scarce country like Israel. The Israeli government alongside researchers developed affirmative policies to accelerate the development of agriculture, and at present, many developed countries are learning from Israel (Tal and Blaustein, 2008, pp. 5-8).

Furthermore, at the grassroots, local municipalities have to set a leading role in achieving an integrated water resource management by creating awareness and educating their community members, more particularly farmers. Contextualizing policy usage to rural communities of KZN will imply that while the policy makers (Councillors, Mayor, Department of Agriculture and Department of Rural Development) are implementing these decisions it will be needful to carry the subsistence farmers in this community along to ensure sustainability of such decisions and also to obtain feedbacks occasional. Achieving a successful and affirmative policy on water resource management will involve different sectors, departments and stakeholders working in the same direction. It will require experts in water management, engineers, policy makers and end users. Experts with an indepth knowledge of water management are also required to enact sustainable policies which will be beneficial in the short and long run (Bacus, 2013, pp. 13-14). Due to the shortage of experts in water management, more people need to be trained as to fill up the gap (DWA, 2012, p. 18). Also, continuous awareness is required to sensitize the populace on water resource management, as this will

result to effective policy implementation and sustainability. In conclusion, policies on water resource management should be included in the subsequent Integrated Development Plan (IDP).

### **7.3. Water resource management as an imperative for rural development and subsistence farming.**

The South African government both at provincial and municipality levels have enacted several policies as well as strategies to accelerate development in rural communities as well as sustaining subsistence farming. However, these policies and strategies have not yield the desired result.

There is a direct linkage between water resource management, subsistence farming and rural development (Kanu, Salami and Numasawa, 2014, pp. 33-43). An efficient and effective use of every drop of water in the sustainability of crop production has a positive effect on subsistence farming which thus enhances rural development (Taigbenu, Ncube and Boroto, 2010, p. 7; Pennisi, 2008, pp. 171-173).

For this reason, it is arguable that water resource management can underpin the acceleration of growth in rural communities and also result to the development of subsistence farming (Wilk and Jonsson, 2013, p. 696; Bhatti, Koike and Nasu, 2012, pp. 5-6).

According to Molden et al. (2007, p. 21), world's available land and water resources can satisfy future demands if the following steps are taken:

- ◆ upgrading rain fed agriculture by investing more in rain fed agriculture to enhance agricultural productivity (rain fed scenario);
- ◆ discarding the artificial divide between rain fed and irrigated agriculture and adopting the integrated water resource management approaches for enhancing resource efficiency and agricultural productivity;
- ◆ investing in irrigation for expanding irrigation where scope exists and improving efficiency of the existing irrigation systems (irrigation scenario);
- ◆ recycling wastewater (grey water) for fodder and food production after suitable treatment;
- ◆ conducting agricultural trade within and between countries (trade scenario);
- ◆ reducing gross food demand by influencing diets and reducing postharvest losses, including industrial and household waste.

In conclusion, several studies have justified the importance of water resource management in sustaining subsistence farming in water scarce communities across South Africa and Africa as a whole. Such management is essential in the rural communities across KwaZulu-Natal in order to enhance subsistence farming thereby developing rural agriculture through water, hence reducing poverty.

## Conclusion

For long time the subsistence farming community of Mtubatuba has been enslaved in a circle of poverty. This community remains stagnant in terms of service delivery, provision of basic services, employment opportunities, education, social amenities, housing, as well as infrastructural development. Though this community is privileged to have vast farm lands populated with individuals who are willing to engage in farming, however, water shortage has posed a hindrance to the development and growth of subsistence farming in this community. The underdevelopment found in Mtubatuba community could be averted by addressing the concern from a different dimension. The paper discussed the pathways for sustainable subsistence farming and poverty eradication through the investment in water resource management. It also evaluated the role the KZN administration has played in revamping farming as well as steps taking to tackle these pertinent concerns. Empirical studies assert that some of the approaches used by the KZN government have not met with the desired result; hence a proto-

type of the Israeli water management techniques could be adopted. Some of these techniques are however capital intensive. However, if such sacrifices are made at present it will generate a cyclical revenue for the KZN government, transform the defunct subsistence farming into commercial farming which will increase crop production, create job opportunities and enhance the livelihood of the affected community in the near future.

More so, revamping the subsistence farming as well as improving the standard of living amongst rural subsistence farmers of Mtubatuba requires a purposeful coordination and exchange of ideas between researchers in the field of study, policy makers as well as stakeholders. Such purposeful co-ordination should have an agenda of transforming the subsistence farming to a sustainable form of farming, whereby many of the rural populace will be encouraged to partake as a means of livelihood. The resultant effect of this will be an increase in household income as well as food security thereby reducing poverty.

## References

1. Aliber, M. and Hart, T. (2010). *Should subsistence agriculture be supported as a strategy to address rural food insecurity?* (online). Available: <http://ageconsearch.umn.edu/bitstream/158215/2/5.%20Aliber%20&%20Hart.pdf> (Accessed 7 July 2013).
2. Averbek, V. (2008). *Best management practices for small-scale subsistence farming on selected irrigation schemes and surrounding areas through participatory adaptive research in Limpopo province* (online). Available: [http://www.google.co.za/?gws\\_rd=cr#bav=on.2,or\\_r\\_qf.&fp=54d4d87d96ae6264&q=Best+management+practices+for+smallscale+subsistence+farming+on+selected+irrigation+schemes+and+surrounding+areas+through+participatory+adaptive+research+in+Limpopo+province](http://www.google.co.za/?gws_rd=cr#bav=on.2,or_r_qf.&fp=54d4d87d96ae6264&q=Best+management+practices+for+smallscale+subsistence+farming+on+selected+irrigation+schemes+and+surrounding+areas+through+participatory+adaptive+research+in+Limpopo+province) (Accessed 27 June 2013).
3. Bacus, Y. (2013). Office of the premier, *Macro policy branch-KwaZulu-Natal*, KwaZulu-Natal Rural Development Framework.
4. Baiphethi, M. and Jacobs, P. (2009). *The contribution of subsistence farming to food security in South Africa* (online). Available: <http://ageconsearch.umn.edu/bitstream/58216/2/6.%20Baiphethi%20&%20Jacobs.pdf> (Accessed 27 July 2013).
5. Bhatti, A. Koike, T. and Nasu, S. (2012). *Water resources management: pathways for sustainable economic growth and poverty eradication* (online). Available: [http://management.koch-itech.ac.jp/ssms\\_papers/sms12-5687\\_fd05c295e09d9310bc02c5ae26225212.pdf](http://management.koch-itech.ac.jp/ssms_papers/sms12-5687_fd05c295e09d9310bc02c5ae26225212.pdf) (Accessed 21 April 2013).
6. Blignaut, J.N. (2007a). *Is-water-shedding-next* (online). Available: [http://www.econrsa.orgpapers/w\\_papers/wp141.pdf](http://www.econrsa.orgpapers/w_papers/wp141.pdf) (Accessed 6 August 2012).
7. Blignaut, J.N. (2007b). *Determining a charge for the clearing of invasive alien plant species (IAPs) to augment water supply in South Africa* (online). Available: <http://www.absa-wildlifeconference.co.za/attachments/article/69/Determining> (Accessed 6 August 2012).
8. Bryman, A. and Bell, E. (2007). *Business research methods*, 2nd ed. Oxford: Oxford University Press.
9. Crow, B., Sultana, F. (2002). Gender, Class and Access to Water: Three Cases in a Poor and Crowded Delta, in *Society and Natural Resources: An International Journal*, 15(8), pp. 709-724.
10. Everatt, D., Dube, N. and Ntsime, M. (2004). *Integrated Sustainable Rural Development Program Phase I evaluation: Nodal Review Researched and written for the Independent Development Trust* (online). Available: [http://www.sarpn.org/documents/d0000920/P1016-ISRDP\\_Phase1\\_June2004\\_t.pdf](http://www.sarpn.org/documents/d0000920/P1016-ISRDP_Phase1_June2004_t.pdf) (Accessed 14 August 2014).
11. Finn, A. Leibbrandt, M. and Wegner, E. (2011). *Policies for reducing income inequality and poverty in South Africa* (online). Available: <http://transformationaudit.org/blog/wp-content/uploads/2012/02/Review-Policies-for-reducing-income-inequality-and-poverty-in-SA.pdf> (Accessed 17 July 2014).
12. Fox, L., Liebenthal, R. (2006). *Attacking Africa's Poverty: Experience from the Ground*, Washington, DC: The World Bank.
13. Goldblatt, A. (2010). *Agriculture: facts and trends in South Africa* (online). Available: [http://awsassets.wwf.org.za/downloads/facts\\_brochure\\_mockup\\_04\\_b.pdf](http://awsassets.wwf.org.za/downloads/facts_brochure_mockup_04_b.pdf). (Accessed 26 February 2014).

14. Hellum, A. (2014). *The right to water for livelihoods: between the right to water, the right to food and the right to* (online). Available: <http://www.abstract--the-right-to-water-for-livelihoods--prof-hellum.pdf> (Accessed 27 July 2014).
15. *Integrated water resources management: the theory-praxis-nexus* (online). Available: [http://bscw.ihe.nl/pub/nj\\_bscw.cgi/d2607467/Jonker.pdf](http://bscw.ihe.nl/pub/nj_bscw.cgi/d2607467/Jonker.pdf) (Accessed 3 January 2013).
16. Jayne, T.S., Mather, D., Mghenyi, E. (2010). *Principal challenges confronting smallholder agriculture in sub Saharan Africa* (online). Available: <http://www.sciencedirect.com/science/article/B6VC6-50J9W0F-4/2/e8fd56c5f7b526a8ecd6732f1c5e45> (Accessed 4 July 2013).
17. Kaliba, A.R.M., Norman D.W., Chang Y.M. (2003). *Willingness to pay to improve domestic water supply in rural areas of central Tanzania: implications for policy* (online). Available: [www.uaex.edu/akaliba/Documents/p03~3.pdf](http://www.uaex.edu/akaliba/Documents/p03~3.pdf) (Accessed 6 August 2012).
18. Kariuki, S. and Tshandu, Z. (2011). Service delivery frameworks as instruments of citizen empowerment: *A tale of two experiences, India and South Africa* (online), 11/2014; 31(6). Available: [http://www.researchgate.net/publication/266379379\\_Service\\_delivery\\_frameworks\\_as\\_instruments\\_of\\_citizen\\_empowerment\\_A\\_tale\\_of\\_two\\_experiences\\_India\\_and\\_South\\_Africa](http://www.researchgate.net/publication/266379379_Service_delivery_frameworks_as_instruments_of_citizen_empowerment_A_tale_of_two_experiences_India_and_South_Africa) (Accessed 7 September 2014).
19. Maduna, M.B., Dlamini, S. Msimang, T. Mbizeni, S. and Chetty, D. (2013). *Land access; tenure; restitution and support programs for small holder farmers*, Workgroup three input into provincial rural development summit. KwaZulu-Natal.
20. Mati, B. (2007). *100 ways to manage water for smallholder agriculture in eastern and southern Africa* (online). Available: <http://www.asareca.org/swmnet/downloads/1179993482SWMnet/t%20Working%20Paper%2013%20100%20Ways%20of%20AWM%20in%20ESA.pdf> (Accessed 2 July 2013).
21. Morrison, J., Morikawa, M., Murphy, M. and Schulte, P. (2009). *Water scarcity and climate change*.
22. Morrison, B. and Corona, J. (2013). *The importance of water to the United States economy* (online). Available: <http://water.epa.gov/action/importanceofwater/upload/Importance-of-Water-Synthesis-Report.pdf> (Accessed 27 February 2014).
23. *Mtubatuba Local Municipality, Integrated Development Plan (IDP) Review for 2011/12*. Available: <http://dissertation.laerd.com/articles/sampling-the-basics.php> (online). 2010. (Accessed 17 August 2012).
24. Mulat, Y. (2013). Indigenous Knowledge Practices in Soil Conservation at Konso People, South western Ethiopia: *Journal of Agriculture and Environmental Sciences*, 2 (2) (online). Available: [http://aripd.org/journals/jaes/Vol\\_2\\_No\\_2\\_December\\_2013/1.pdf](http://aripd.org/journals/jaes/Vol_2_No_2_December_2013/1.pdf) (Accessed 27 September 2014).
25. Muller, M., Schreiner, B., Smith, L., Koppen, B., Sally, H., Aliber, M., Cousins, B., Tapela, B., Merwe-Botha, M., Karar, E. and Pietersen, K. (2009). *Water security in South Africa*. Development bank of Southern Africa, Midrand, Available: <http://www.dbsa.org/Research/DPD%20Working%20papers%20documents/DPD%20No12.pdf> (Accessed 27 September 2013).
26. Myeza, V. (2013). Extension Officer. Department of Agriculture, Environmental Affairs and Rural Development, Mtubatuba. Interviewed by Olayemi Bakre. Masters dissertation.
27. Organization for Economic Cooperation and Development (OECD). (2006). Highlights and policy recommendations: *OECD review of agricultural policies*. 92-64-03679-2 (online), Available: <http://www.nda.agric.za/docs/GenPub/OECDHighlights.pdf> (Accessed 28 October 2014).
28. Pennisi, E. (2008). *Plant genetics: The blue revolution, drop by drop, gene by gene* (online), 320, pp. 171-173. Available: [www.sciencemag.org](http://www.sciencemag.org) (Accessed 16 June 2014).
29. Republic of South Africa. Department of Rural Development. (2013). Discussion and framework (action plan) on the rural economy and transformation models. KwaZulu-Natal.
30. Republic of South Africa. Department of Rural Development. (2013). KwaZulu-Natal rural development summit, Discussion paper on rural infrastructure. KwaZulu-Natal.
31. Republic of South Africa. Department of Rural Development. (2013). *Socio economic development in the comprehensive rural development plan*. KwaZulu-Natal.
32. Republic of South Africa. Department of Water Affairs. (2012). *National Water Resource Strategy 2*.
33. Republic of South Africa. Office of the Presidency. (2011). *National development plan: vision for 2030*. Pretoria.
34. Republic of South Africa. Office of the Presidency. (2013). *Towards the medium term strategic framework (2014-2019). Rural development and land Reform*. KwaZulu-Natal.
35. Republic of South Africa. Provincial Planning commission (2012). *2030 provincial growth and development plan*, KwaZulu-Natal Office of the Premier.
36. Republic of South Africa. Rural Development. (2013). *Rural development summit position paper*, KwaZulu-Natal.
37. Republic of South Africa. (2003). National water act (No. 36, 1998). Government Gazette number 19182: 26 August (online): Available: <http://www.pmg.org.za/files/gazettes/080919water-regulations.pdf> (Accessed 13 August 2014).
38. Schreiner, B. and Van Koppen, B. (2002). Catchment management agencies for poverty eradication in South Africa, *Physics and Chemistry of the Earth*, 27, pp. 969-976.
39. Schreiner, B., Tapela B. and Van Koppen, B. (2010). Water for agrarian reform and rural poverty eradication: where is the leakage? (online). Available: <http://www.plaas.org.za/sites/default/files/publications-pdf/Schreiner%20et%20al.pdf> (Accessed 29 July 2014).
40. Schwabe, C. (2010). *Monitoring the changing face of South Africa's poverty* (online). Available: [http://www.eepublishers.co.za/images/upload/positionit\\_2012/changing-face\\_visu\\_june12.pdf](http://www.eepublishers.co.za/images/upload/positionit_2012/changing-face_visu_june12.pdf) (Accessed 23 May 2013).

41. Sekaran, U. (2006). *Research Methods for business: A Skill-Building Approach*. 4<sup>th</sup>ed. New York: John Wiley and Sons, Inc.
42. South Africa. Mtubatuba Municipality. (2013). Integrated Development Plan 2013/14 review. Draft report 2012/13-2016/17. March 2013 (online). Available: [http://devplan.kzntl.gov.za/idp\\_reviewed\\_2013\\_14/IDPS/KZ275/Draft/Mtubatuba%20Draft%20IDP%202013-14%2027Mar13.pdf](http://devplan.kzntl.gov.za/idp_reviewed_2013_14/IDPS/KZ275/Draft/Mtubatuba%20Draft%20IDP%202013-14%2027Mar13.pdf) (Accessed 3 March 2015).
43. South Africa. Mtubatuba Municipality. (2014). *Draft budget and medium term revenue And expenditure framework (MTREF) 2014/2015*. (online). Available: <http://mfma.treasury.gov.za/Documents/03.%20Budget%20Documentation/2014-15/01.%20Draft%20budgets/02.%20Local%20municipalities/KZN275%20Mtubatuba/KZN275%20Mtubatuba%20Draft%20budget%202014-15.pdf> (Accessed 13 February 2015).
44. Mtubatuba Municipality. (2011). Annual report draft – Year ending 2010-2011. Second draft (online). Available: <http://mfma.treasury.gov.za/Documents/06.%20Annual%20Reports/2010-11/02.%20Local%20Municipalities/KZN275%20Mtubatuba/KZN275%20Mtubatuba%20Annual%20Report%202010-11.pdf> (Accessed 18 April 2015).
45. South Africa. Western Cape Government. Environmental Affairs and Development Planning. (2013). *Funding sources for municipalities*. April 2013. (online). Available: [http://eadp.westerncape.gov.za/sites/default/files/basic-page/uploads/DEA%26DP\\_Municipal\\_Funding\\_Directory\\_Final\\_Branded\\_Oct2013\\_0.pdf](http://eadp.westerncape.gov.za/sites/default/files/basic-page/uploads/DEA%26DP_Municipal_Funding_Directory_Final_Branded_Oct2013_0.pdf) (Accessed 11 March 2015).
46. Taigbenu, A.E., Ncube, M. and Boroto, R.J. (2010). *Water resources management in agriculture: convergence of needs and opportunities* (online). Available: <http://www.waternetonline.ihe.nl/challengeprogram/NP02%20Taigbenu%20res%20man%20agric.pdf> (Accessed 6 February 2013).
47. Triegaardt, J. (2009). *Poverty and inequality in South Africa: Policy considerations in an emerging democracy* (online). Available: <http://www.dbsa.org/EN/About-Us/Publications/Documents/Poverty%20and%20inequality%20in%20South%20Africa%20Policy%20considerations%20in%20an%20emerging%20democracy.pdf> (Accessed 20 July 2014).
48. UNESCO. (2004). Water Portal Weekly Update. No. 69. Brussels.
49. UNN-WWAP. (2003). *The World Water Development Report 1: Water for people, Water for Life*. Paris, France: UNESCO.
50. Van Koppen, B., Sally, H., Aliber, M., Cousins, B. and Tapela, B. (2009). *Water resources management, rural redress and agrarian reform*. Development Planning Division. Working Paper Series No.7, DBSA: Midrand.
51. Wenhold, F., Faber, M. (2008). *Nutritional status of South Africans: links to agriculture and water*. WRC Report no. TT 362/P/08. Water Research Commission. Pretoria, South Africa.
52. Wilk, J. and Jonsson, A. (2013). *From water poverty to water prosperity – A more participatory approach to studying local water resources management* (online), 27(1), pp. 695-713. Available: [www.diva-portal.org/..FULLTEXT01.pdf](http://www.diva-portal.org/..FULLTEXT01.pdf) (Accessed 27 May 2014).
53. Williams, M.J. (2007). The social and economic impacts of South Africa's child support grant (online). Honours, Williams College. Available: [http://web.williams.edu/Economics/Honors/2007/Williams\\_thesis.pdf](http://web.williams.edu/Economics/Honors/2007/Williams_thesis.pdf) (Accessed 29 July 2014).