

Full Length Research Paper

Impact of government financial incentives on peri-urban vegetable production in Botswana

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In its effort to increase agricultural productivity, the Government of Botswana has established a financial scheme to improve vegetable production. Citizen Entrepreneurial Development Agency (CEDA) and CEDA young farmers fund are encouraging farmers to get involved in vegetable production through financial and technical assistants. However, data on the impacts of these funds on vegetable production in the country are scarce and often unreliable. Very little is in fact known about the change in the quantity of vegetable produced, vegetable produce imported to the country and consumed after these funds are introduced. This paper discusses the impact of these government incentives on farm land allocated to vegetables, total vegetable production and import of vegetable in Botswana. The increasing interest in vegetable production, the change in demography and the trend in import of production inputs are also discussed.

Key words: Botswana, Citizen Entrepreneurial Development Agency (CEDA), financial incentives, government, urban, vegetable.

INTRODUCTION

The contribution of agricultural sector in Botswana has been declining since independence in 1966. This decline is largely attributed to the rapid development of the mining sector (Seleka, 1999; Anon, 2009). In its effort to reverse this trend and diversify the economy from mineral sector, the government of Botswana has introduced a number of interventions to promote agricultural development. The major strides in this regard are the financial schemes and import restriction systems developed starting from the late 1970s (MoA, 1977). Botswana's agricultural sector started getting stronger after the national development plan 9 (NDP 9) policy on critical sectoral issues and future strategy for development (MoA, 1991), which stated that agriculture should be strengthened and diversified. In line with this policy, the government of Botswana reviewed financial assistance policy (FAP) which was started in 1982 and lasted up to 1998. This project was then succeeded with a new financial scheme, citizen entrepreneurial development agency (CEDA) that is still running. In 2004, an additional financial scheme named CEDA young farmers fund (CEDA YFF) was initiated with a purpose of addressing the

younger and educated farmers (CEDA 2006). In CEDA YFF, the government put an age restriction on beneficiaries and the project focused first on young farmers with age less than 35 years, which was later raised to 41 years to include some older farmers. These financial schemes provided financial assistance to several subsistence farmers in urban and peri-urban areas of the country. Several vegetable farmers using modern technologies and improved seeds have emerged and are actively involved in medium scale vegetable production. However, very little is in fact known about the change in the quantity of vegetable produced, vegetable produce imported to the country and consumed after these funds are introduced. This paper discusses the impact of these government incentives on farm land allocated to vegetables, total vegetable production and import of vegetable in Botswana. The increasing interest in vegetable production, the change in demography and the trend in import of production inputs are also discussed.

MATERIALS AND METHODS

Data collection and analyses

The data on area cultivated, vegetable produced, and number of vegetable projects, were obtained from Department of Crop Production, Horticulture Division Annual Reports. The authors

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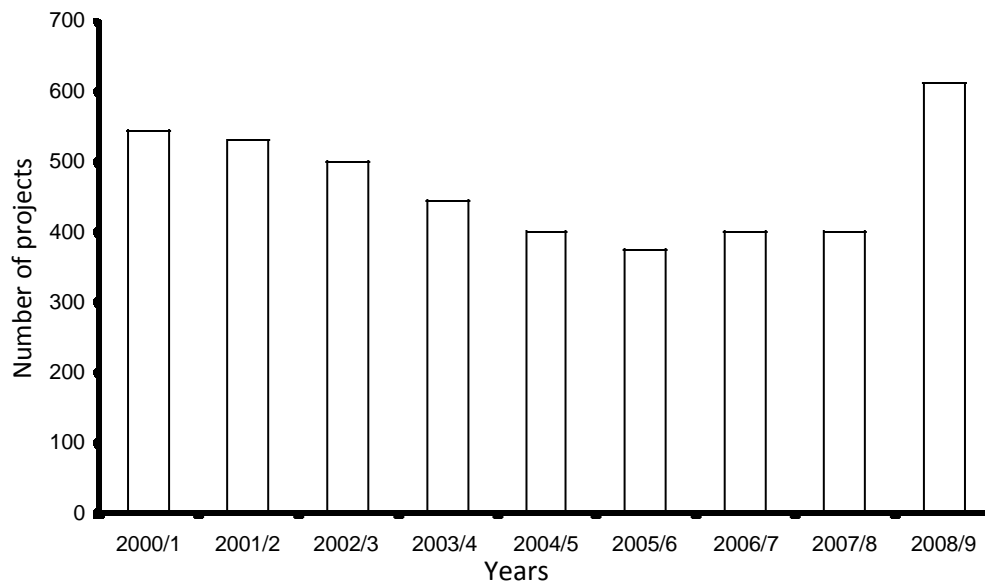


Figure 1. Variation in the number of vegetable projects funded by different financial schemes between 2000 and 2009 in Botswana. Source: Horticulture division annual reports.

participated in the collection and compiling of the annual reports of the department for the duration of the study. Data on vegetable import and consumers' demand were obtained from central statistics office (CSO). Proportion of vegetable farmers receiving fund from different schemes were calculated and graphs were produced using excel spread sheet.

Government financial assistance schemes and import restrictions

1. Financial assistance policy (FAP) was started in 1982 and ended in 1998. The objective of FAP was to promote employment creation, economic diversification (to reduce the economy's dependence on mining, the cattle industry and the public sector), rural development and active citizen, and women participation and

ownership of productive ventures (Molokonmme, 1992; Rebaagetse, 1999). The majority of horticultural enterprises in Botswana were developed through grant money received from FAP. According to Rebaagetse (1999), FAP had funded 357 horti-cultural projects by 1998, about 167 of which were operational in 1999. The maximum repayment period for such loans was 5 years. In FAP, medium-scale vegetable projects were receiving loans ranging from P 150, 001 to P 2 million, at an annual interest of 7.5% and maximum repayment period of up to seven years (FAP, 1982).

2. Citizen entrepreneurial development agency fund (CEDA) was introduced in 2002 to promote the development of citizen business and citizen participation in the economy. Its specific objectives are; to support enterprises that which add value to the economy; to promote the development of citizen entrepreneurial culture and skills; to promote diversification; to promote the development of competitive and sustainable citizen-owned enterprises, to promote sustainable employment creation; to promote linkages of citizen-owned enterprises with primary industries; and to improve efficiency in business service delivery (CEDA guidelines, 2002).

3. CEDA young farmers fund (YFF) was established in 2006, under CEDA through which young people (aged between 18 and 35 years) will have improved access to finance and entrepreneurial training and engage in sustainable agricultural activities, better equipped with the requisite skills for running farming business;

established to assist in reversing challenges of facing Botswana, such as unemployment, rural-urban migration and slow rural development and for the youth, they predominantly form Botswana's population, they are the most affected section of the society by varied challenges. The fund financed maximum loan of P 500.000.00 at an interest rate of 5% with payment period ranging from 5 to 10 years. According to CEDA 2009 annual report, 188 projects were approved under CEDA YFF at the value of P 76 million and horticulture accounted for 32 % of the total funding at P 24 million.

4. Import restriction: The government through Southern African Custom Union Agreement (SACUA) provisions have also put in place a mechanism to protect its horticultural producers through permit system. This mechanism was put in action by statutory instrument No.56 of 1977, control of Goods Act (Cap.43.07). Permits are issued for household consumption and commercial purpose (MoA, 1977). It is through this system that amount of fruits and vegetables that can be brought into the country at any one time are regulated.

RESULTS

Number of vegetable projects funded by government financial schemes

Figure 1 shows the number of projects in the country immediately after the termination of FAP. The vegetable project numbers declined from 550 in 2000 to 400 in 2005/2006. Thereafter, the projects grew slightly in 2006/2007 and 2007/2008. However, in 2008/2009, a dramatic increase in number of vegetable projects was recorded (from 400 projects to 742).

The proportion of vegetable projects and the contributions of government financial schemes are presented in Table 1. Out of the total number of projects, 414 (57.74%) were funded by individuals, while a total of

Table 1. Proportion of vegetable projects funded by government financial schemes in 2009.

Funding organization	Number of projects funded	Percentage
Individual	414	57.74
Financial assistance policy	166	23.15
CEDA	84	11.72
Government departments	39	5.44
NGO	14	1.95
Total	717	100

Source: Horticulture division annual reports.

Table 2. Cultivated area, vegetable production and productivity from 1997 to 2008.

Year	Area cultivated (ha)	% increase in area from previous year	Total Production (tonnes)	Productivity (tonnes/ha)
1997/1998	407.85	-	6,900	16.9
1998/1999	496.75	21.8	9,198	18.5
1999/2000	545.45	9.80	9,885	18.1
2000/2001	988.5	81.23	2,995	3.0
2001/2002	671.35	-32.08	8080	12.03
2002/2003	462.34	-32.13	13,406	29.0
2003/2004	546.0	18.09	16,000	29.3
2004/2005	670.96	22.89	18,000	26.8
2005/2006	698.0	4.03	24,076	34.5
2006/2007	1026.0	46.99	24,076	23.5
2007/2008	973.10	-5.16	31,985	32.9
2008/2009	830.0	-14.71	31,150	37.5

Source: Horticulture division annual reports.

287 (40.3%) of the vegetable projects were funded through government financial schemes (Table 1). FAP funded 166 vegetable projects (23.15%), CEDA and CEDA YFF supported 84 projects (11.72%), while other government departments funded 39 of the vegetable projects, accounting for 5.44%. There were relatively few non-governmental organizations in the country and they only supported 14 (1.95%) of the vegetable projects

Area allocated for vegetable production and productivity

Area allocated to vegetable production has fluctuated over the years (Table 2). In 1997/1998 season, the area under cultivation was 407.85 ha and this area increased to 496.75 ha in 1998/1999 season representing 21.8% increase. In 1999/2000 season, the area cultivated increased by only 9.80% to 545.45 ha. While in 2000/2001, there observed a drastic increase in land under cultivation to 988.5 ha (81.23 %). However, this increase was followed by a decline in area under cultivation by 32 % to 671.35 ha in 2001/02 season. This decline continued into 2002/2003 season, when the area under

cultivation went down by 32.13% to 462.34 ha. In 2003/2004, the area increased to 546.0 ha (18.09% increase). In 2004/2005, the area increased by 22.89% to 670.96 ha. However, in the following year in 2005/2006, the area under cultivation increased to 698.0 ha (only by 4.03%). In 2006/7 another drastic increase in area under cultivation was recorded, as the cultivated area increased to 1026.0 ha (a 46.99% increase). After 2006/2007 season, a downward trend in area under cultivation was observed. In 2007/8 the area declined to 973.1 ha (a 5.16% reduction), while in 2008/2009, the area declined to 830.0 ha, that is, a decline of 14.71% from 2007/2008 season. However, it should be noted that the area under vegetable production increased from 407.85 ha in 1997/1998 to 830.0 ha in 2008/2009, representing a significant increase of more than hundred percent in a period of 12 years.

A general increase in productivity was observed over the years, even though there was no consistency (Table 2). In 1997/1998 season, 6,900 tonnes of vegetables were produced in the country at a production rate of 16.9 tonnes per hectare. While in 1998/1999 season, the total production increased to 9,198 tonnes and the average production also increased to 18.5 t/ha. The total

production increased to 9885 tonnes in 1999/2000 with a slight reduction in the yield per hectare (18.1 t/ha). In 2000/2001 season the total production declined to 2,995 tonnes and the yield per hectare recorded for the year was also the lowest, averaging 3.0 t/ha. The following year, (in 2001/2002 season) total production increased to 8,080 tonnes and the productivity was 12.03 t/ha. In 2002/2003 total production was 13,406 with productivity of 29.0 t/ha. While in 2003/2004 season, the total production increased to 16,000 tonnes without a change in productivity per hectare. In 2004/2005 season, total production increased to 18,000 tonnes with relatively lower productivity of 26.8 t/ha. In 2005/2006 and 2006/2007 season, total production increased to 24,076 tonnes with productivity of 34.5 and 23.5 t/ha respectively. In 2007/2008, total production increased to 31,985 tonnes with an average of 32.9 t/ha. In 2008/2009 season, total production stood at 31,150 tonnes with the highest productivity ever recorded of 37.5 t/ha. It is worth noting that total production increased four and half times from 6,900 tonnes in 1997/1998 to 31,150 tonnes in 2008/2009 and the productivity for the same period increased by more than two fold from 16.9 to 37.5 t/ha (Table 2).

Import of vegetables to Botswana and national vegetable demand

In 1997/1998, the national demand stood at 31033 tonnes and 77.77% (24,133 tonnes) of it was covered through vegetable imported from neighbouring countries (Table 3). While in 1998/1999, national demand declined slightly to 38,277 and quantities of imported vegetables increased to 29,079 tonnes, contributing 73.64% of national demand. Contrary to the previous year, national demand increased to 39,490 in 1999/2000 and imports increased slightly to 29,605 tonnes satisfying 74.97% of the demand. In 2000/2001, the national demand increased to 40,481 tonnes and the quantity of imported vegetables increased to 37,488 tonnes, with the contribution of import elevating to 92.61%.

After 2000/2001 season, the percent contribution of imports to national demand continued to decline. For instance, in 2001/2002, the national demand increased to 41,409, while imported vegetables declined to 33329 tonnes, satisfying only 80.49% of the nations demand for vegetables. Similarly in 2002/2003, the national demand rose to 43664 tonnes, while the quantity of imported vegetables decreased to 30258 tonnes, declining by 69.30%. Similarly, the national demand increased to 44667 tonnes in 2003/2004, while the quantity of imported vegetables declined to 28667, contributing only to 64.18% of the national vegetable demand.

By 2004/2005, the national demand stood at 46,000 tonnes, while the percentage contribution of imports to national demand was 28000 tonnes (60.87%). In 2005/2006, the national demand for vegetables was 46667 tonnes, whereas the quantity of imported

vegetables was 22,591 tonnes. For the first time, the contribution of the imported vegetables went below fifty percent of the national demand at 48.41% in 2005/2006. National demand stood at 47333 tonnes in 2006/2007 at the same time as imports decreased to 23257 tonnes representing 49.13% of national demand. The national demand continued to grow, reaching 49,333 tonnes in 2007/2008, as the quantity of imported vegetables declined to 17348 tonnes, contributing 35.17% to the vegetable demand. The objective of Botswana Government desire for import substitution appear to be bearing fruits, as currently, the national demand stands at 50,000 tonnes, and the country imports 18,850 tonnes, with import's contribution falling to 37.70% to the national demand (Table 3).

DISCUSSION

Number of vegetable projects funded by government financial schemes

Despite the continuity in funding through government financial schemes, vegetable projects started declining from 550 in the year 2000/2001 to 400 in 2005/2006. This decline is mainly attributed to the collapse of FAP funded projects (Rebaagetse, 1999). As reported by Hovorka (2004), most FAP funded vegetable projects collapsed as they could not support themselves. Seleka et al. (2002) attributed the decline to low skill level of producers, inadequate labour (particularly skilled labour), the inability to identify and target support to farmers with potential for growth. Research results show that the process of adoption is highly dynamic and variable with farmers testing a farming practice and discontinuing or re-adopting them due to a whole range of factors, of which incentives and profitability could be among the reasons to be mentioned. Farmers getting involved in agriculture for such reasons may be termed 'pseudo-adopters' (Kiptot et al., 2007). The increase in number of vegetable projects observed in 2005/2006 may, therefore, be associated either with the increase in the re-adopting farmers or the newly adopting farmers funded by the newly introduced CEDA and CEDA YFF who got involved in vegetable production (CEDA, 2009). According to CEDA (2009), 188 projects were approved under CEDA YFF at the value of P 76 million and horticulture accounted for 32% of the total funding at P 24 million. This demonstrates the emphasis that government gave to the improvement of vegetable production in the country. The government's effort, however, has not resulted in continuous increase in the number of vegetable projects. The trend observed in the number of vegetable projects has some important implications. For urban and peri-urban vegetable production to be attractive to farmers, they must provide other tangible economic benefits besides financial assistance to commence vegetable farming. Detailed data on productivity, cost of production, harvest volume,

Table 3. Vegetable imported to the country from 1997 to 2008 and its contribution to satisfying the national demand.

Year	Vegetable imported to the country (tonnes)	National demand for vegetable (tonnes)	% contribution of import to satisfy demand
1997/1998	24133	31033	77.77
1998/1999	29079	38277	73.64
1999/2000	29605	39490	74.97
2000/2001	37488	40481	92.61
2001/2002	33329	41409	80.49
2002/2003	30258	43664	69.30
2003/2004	28667	44667	64.18
2004/2005	28000	46000	60.87
2005/2006	22591	46667	48.41
2006/2007	23257	47333	49.13
2007/2008	17348	49333	35.17
2008/2009	18850	50000	37.70

Source: CSO (2004).

wasted vegetable, and farmers' knowledge need to be collected and relevant correction measure taken to insure the sustainability of government funded vegetable projects.

Area allocated for vegetable production

The drive to increase vegetable production in the country has resulted in an increase in the area devoted to vegetable production by the farmers. This could be attributed to financial incentives from government that enabled them to acquire irrigation and other farm inputs, which otherwise they could not afford. Similar result was reported by Piotto et al. (2004), where the area devoted for agriculture responded to government and other incentives, with farmers dedicating portions of their land as they continue to receive government incentives. Remenyi (2000) stated that lack of access by urban poor to micro-finance services, especially credit for working capital, is an important constraint on greater, more varied and more innovative forms of participation in urban agriculture on wage employment or self-employment. Financial incentives such as CEDA and CEDA YFF have played a significant role in devoting more land to vegetable production in the country, leading to an increase in vegetable production. Good policies like this are reported to have a huge potential role in alleviating poverty and should be encouraged (Barbier, 2000).

Vegetable production and productivity

Botswana's effort to increase vegetable production is partially met as there is an observed gradual increase in the amount of vegetables produced in the country. In the 12 years considered in this study, the national vegetable production has doubled. The productivity has also shown

a drastic improvement through time. The 16.9 t/ha reported for the year 1997/1998 has reached 37.5 t/ha in 2008/2009 season. This increase in vegetable production and productivity observed could be associated with an increase in area allocated for vegetable production and/or due to the use of production inputs like fertilizer and pesticides. In recent surveys conducted in vegetable producing urban and peri-urban areas of Botswana, Madisa et al. (2010) reported a significant change in the demography and educational background of vegetable farmers. Their observations on the educational background and age of vegetable farmers were found to be opposite to what is commonly known of small-scale farmers in Africa (Kamara et al., 2001; Lewu and Assefa, 2009) and what was previously reported from vegetable farms of Botswana (CSO, 2004). Most of the interviewed farmers in this study were literate and were at their active age. Existing literature show that improved crop production strategies require high levels of expertise from farmers in order to be implemented effectively (Crosby et al., 2000) and farmers who are better educated are generally more open to innovative ideas and new technologies that promote technical change (Lapar and Ehui, 2003). The educated farmers who get involved in vegetable production through incentives such as CEDA and CEDA YFF might have contributed to the observed increase in productivity as they have a better knowledge of the benefits of adopting improved vegetable production practices and are likely to have adopted the practices. Our view agrees with the rapid increase in the import of production inputs from the neighbouring countries (CSO, 2004).

Import of vegetables in Botswana

Though there is significant increase in production and productivity, Botswana is still heavily dependent on

import to satisfy the nations demand for vegetable. In 1997/1998, Botswana national vegetable demand was 31033 tonnes and 77% was met by imports as the country was only producing 6900 tonnes or 22% of its national demand. The country managed to reduce the imports from 77 to 37.7% in 2008/2009. At one point (2001/2002), the country was importing 92% of its national vegetable demands. These significant results show that government's efforts on increasing vegetable production through financial incentives to farmers are bearing fruits. The increase in vegetable production saves the country a lot of foreign reserves, it also provide a lot of jobs to the nationals. Diversification into horticultural production as reported by Pumpkins et al. (2005) and Chand et al. (2008) is becoming attractive for many poor farmers around the world. The sector is reported to be profitable (Lumpkins et al., 2005) as farmers involved in horticultural production usually earn much higher farm incomes as compared to cereal producers per capita farm income. However, the continued dependence on import of vegetables to satisfy the national demand is negatively affecting the country. However, market oriented production requires the use of high yielding varieties and increase dependence on chemical fertilizer, pesticide and micro-nutrient addition (Brown and Shrestha, 2000) which ultimately increase production cost. The high level of operational costs incurred in small-volume-based vegetable production due to high input cost, unavailability of the inputs in nearby markets and lack of transport further soar the cost of production and hinders farmers from participating in these emerging markets (Machethe, 2004). Sooner or later, non-competitive segments of the market fall (the small-scale peri-urban farmers and traders) by the way side in due course. These issues are fundamental and need focusing. More efforts are needed to cushion the vulnerable groups, who have previously dominated the vegetable market, against the emerging big and medium commercial players who are currently in complete control of the wholesale, institution and retailer market. Hence, government incentive and import restriction need to be assisted with strategies that are required for tackling issues such as sustainability and viability and operational efficiency of the urban and peri-urban vegetable projects.

Responsible governmental institutes need to give a due consideration to and closely follow-up the vegetable production practices in urban and peri-urban areas and assist farmers with production, management and marketing of vegetables.

REFERENCES

- Barbier EB (2000). The economic linkages between rural poverty and land degradation: some evidence from Africa. *Agric. Ecosyst. Environ.*, 82(1-3): 355-370
- Brown S, Shrestha B (2000). Market-driven land-use dynamics in the middle mountains of Nepal. *J. Environ. Manage.*, 59 (3): 217-225.
- CEDA (2002). Citizen Entrepreneurial Development Agency: Guidelines, Government Printer, Gaborone.
- CEDA (2006). Citizen Entrepreneurial Development Agency; Young Farmers Fund Guidelines
- Chand R, Raju SS, Pandey LM (2008). Progress and potential of horticulture in India. *Indian J. Agric. Econ.*, 63(3): 299-309
- Crosby CT, De Lange MM, Stimie CM, Van Der Stoep I (2000). A review of planning and design procedures applicable to small-scale farmer irrigation projects. WRC Report No. 578/2/00. Water Research Commission, Pretoria, South Africa.
- CSO (2004). Population and Housing Census: Summary Statistics on Urban Areas Gaborone Government Printer, Vol. 1-3
- Hovorka AJ (2004). Commercial Urban Agriculture in Greater Gaborone: Form and Function, Challenges and Prospects. *Bot. J. Afr Stud.*
- Kamara A, Van Koppen B, Magingxa L (2001). Economic viability of small-scale irrigation systems in the context of state withdrawal: the Arabie Scheme in the Northern Province of South Africa. In Proceedings of the 2nd WARSFA / Waternet Symposium: Integrated water resources management: theory, practices, cases. Cape Town, 30-31 October.
- Kiptot E, Hebinck P, Franzel, Richards S (2007). Adopters, testers or pseudo-adopters? Dynamics of the use of improved tree fallows by farmers in western Kenya. *Agric. Syst.*, 94 (2): 509-519
- Lapar MLA, Ehui S (2003). Adoption of dual-purpose forages: some policy implications. *Trop. Grasslands*, 37: 284-291
- Lewu FB, Assefa Y (2009). Farmers' knowledge in the cropping systems of Northern KwaZulu-Natal, South Africa: Current challenges and solutions for sustainable future food production. *Afr. J. Agric Res.* 4(11): 1148-1153
- Lumpkin TA, Weinberger K, Moore S (2005). Increasing income through Fruit and vegetable Production Opportunities and Challenges. Consultative Group on international Agricultural Research Science Forum, CGIAR Priorities: Science for the poor. Marrakech, Morocco.
- Machethe CL, Mollle NM, Ayisi K, Mashatola MB, Anim FDK, Vanasche F (2004). Smallholder irrigation and agricultural development in the Olifants River Basin of Limpopo province: management, transfer, productivity, profitability and food security Issues. WRC Report No. 1050/1/04. Water Research Commission, Pretoria, South Africa.
- Madisa. ME, Assefa Y, Obopile M (2010). Assessment of Production Constraints, Crop and Pest management Practices in Peri-urban Vegetable Farms of Botswana. *Egypt. Acad. J. Biol., Sci.* 1(1): 1-11.
- Ministry of Agriculture (MoA) (1977). statutory instrument No.56 of 1977, control of Goods Act (Cap.43.07). Permits are issued for household consumption and commercial purpose. Division of Agricultural Trade Department of Agribusiness Promotion. Gaborone, Botswana
- Ministry of Agriculture (MoA) (1991). Botswana's Agricultural Policy; Critical Sectoral Issues and Future Strategy for Development. Information section MoA, Gaborone, Botswana.
- Molokomme IM, (1992). Report on FAP Service Sector Study. Prepared for Botswana Government. Ministry of Finance and Development Planning, Gaborone, Botswana.
- Piotto D, Montagnini F, Kanninen M, Ugalde L, Viquez E (2004). Forest plantations in Costa Rica and Nicaragua: Performance of species and preferences of farmers. *J. Sustainb. For.*, 18(4): 59-77
- Rebaagetse S (1999). Overview of the performance of Agricultural Projects Funded through the financial Assistance Policy (FAP) for the period 1982-1998. Ministry of Agriculture, Gaborone, Botswana.
- Remenyi J (2000). Poverty Reduction and Urban Renewal through Urban Agriculture and Microfinance: A Case Study of Dhaka, Bangladesh. *jvr. uaBerlin.*
- Seleka TB, Malope P, Madisa ME (2002). Situational analysis on tomato production, marketing and post harvest activities in Botswana, Gaborone.