ISSN: 2687-8097
Scientific Journal of Research and Reviews
DOI: 10.33552/SJRR.2026.05.000602
Iris Publishers

Review Article

Potato Production in Zimbabwe - Opportunities and Limitations

Dube BN[1], Alistratova FI[1], Zoteyeva NM[2], Kiru SD[1*]

[1]*Saint-Petersburg State Agrarian University, Saint-Petersburg, Russian Federation*

[2]*N. Vavilov Institute of Plant Genetic Resources, Saint-Petersburg, Russian Federation*

***Corresponding author:** Kiru S.D, Saint-Petersburg State Agrarian University, Saint-Petersburg, Russian Federation.

Received Date: February 06, 2026

Published Date: April 15, 2026

Abstract

Potato (*Solanum tuberosum* L), also known as the underground apple and a staple food crop for more than 60% of the world [1] is one of the widely produced crops, ranking fourth in global production. As a result of its versility in use and preparation, it is gaining popularity even in areas with other staple crops and is a great carbohydrate substitute even for maize. Potato production and consumption has seen an increase over the past few years in Zimbabwe, with forecasts proving that productivity is bound to increase due increased consumption and demand. Several constraints are being faced however by potato producers in Zimbabwe, which increase production costs and in turn result in very high prices which even sharply increase in winter as most of the produced varieties are susceptible to very low temperatures. Studies have been and are being conducted on potato production for better yield and tolerance to adverse weather conditions and pests but more work still needs to be done on this regard so as to improve the total output especially in Africa where the consumption per capita is very low.

Keywords: potato; phytophtora infestans; resistance; Zimbabwe; constraints; opportunities

Introduction

Zimbabwe is a Southern African country with a total of 16,2 million hectares of arable land that can be used for agricultural activities such as crop production, livestock production and ranching. Of the total arable land, only 60%-70% is underutilization, with the remaining portions left idle as a result of some constraints that hinder production and productivity [2]. Several parts of the country have a sub-Saharan type of climate with frequent droughts and extremely high temperatures. All these factors have contributed to the ever-decreasing agricultural production in the country. The main staple crop of Zimbabwe is maize (Zea mays) and hence it is widely produced by both communal and commercial farmers. On the 18th of May 2018, the government of Zimbabwe declared potato as a strategic food crop and hence the need to improve and solve the constraints faced in potato production. Currently 3500 hectares are used for the cultivation of potatoes [3]. Potato is a highly nutritious crop rich in vitamin C, potassium and antioxidants [4]. It ranks fourth in global production [5] and third in Zimbabwe after wheat and maize. Studies conducted over the years have proven that the rate of potato production is greatly increasing in Africa and developing countries and declining in most developed countries.

Global potato production and consumption per capita: The top ten leading countries in potato production and export (metric tons) include China: (93,5 mln.t), India: (60,1) Ukraine: 21,3, 4. United

States (20,1), Russia (19,3), Germany (10,5), Bangladesh (9,9), France (8,8) Poland (8,2), Netherlands (7,8). Eastern European countries such as Russia, Poland and Belarus have the highest per capita ranging from 90kg per year up to more than 150 kg per year in Belarus and the entire Europe has a per capita of 83.4kg per year. Zimbabwe on the other hand has a per capita of 1.60kg per year which is lower by 2.94kg from the highest ever obtained of 4,54kg in 1963 (FAOSTAT, 2024).

In terms of production, Zimbabwe ranks 151 out of 165 countries from the FAOSTAT list of potato producers. Data from FAOSTAT 2021 shows that from 2016-2020, Africa spent US$386 million in potato imports (854000 tons) whilst receiving US$ 301million from exports (FAOSTAT, 2024). The average price of medium to high grade potatoes in Zimbabwe ranges from $5 to $10 in summer and from $10 to $15 in winter.

Potato production in Zimbabwe: The most commonly produced varieties in Zimbabwe include BP1, Amethyst, Mont Claire, Valor, Mondial, Mnandi, Diamond, Kondor, Sifra and Cara as they are more well adapted to the climatic conditions of the country, with an average yield of 20t/ha. Farmers however harvest way less than the yield potential of these varieties due to several economic, social, political and ecological factors. The average yield obtained in Africa is 15tons/hectare, whilst the average potato yield in the world according to FAOSTAT 2021 (FAOSTAT 2024) is 21tons/hectare with highest hectarage of 42 tons/hectare in Oceania.

Zimbabwe is divided into 5-agro ecological regions primarily according to their climatic conditions and soil types. This has therefore over the years influenced the quantity of potatoes produced per region (Table 1). As much as potatoes are cool season crops, performing better at a range of 15°C-20°C, they are frost sensitive and in Zimbabwe the most cultivated varieties cannot withstand constant exposure to temperatures below 5°C.

From the table below (Table 1), Region II contributes 60%-70% to the total output of potatoes in Zimbabwe as a result of favorable climatic conditions and soil type (Sandy-Loams). The sandy loam soils in this region are well aerated, exhibit high Cation Exchange Capacity (CEC), resulting in fertile soils with good nutrient and water holding capacity therefore favorable growth conditions for potatoes [4]. Farmers in this region should be encouraged to produce so as to increase gross potato production in Zimbabwe.

Table 1: Zimbabwe Agro-ecological Regions and their characteristics [40].

Region	Characteristics	Amount rainfall (mm/year)	Contribution in overall potato production (%)
I	Intensive farming	Above 1000	Oct-15
II	Semi-intensive farming	750-1000	60-70
III	Semi-intensive farming	650-800	Oct-15
IV	Semi-marginal: livestock production	450-650	05-Oct
V	Marginal	Below 450	0-1

Potatoes are usually produced in two splits in Zimbabwe; the first split is from late July to early August and the second split from November [6]. This is done so as to avoid the winter months thereby, leaving a winter gap period as most of the existing varieties are susceptible to low temperatures. Using more suitable varieties will significantly increase potato yields in the country, as most farmers avoid growing potatoes and mainly resort to growing cabbage and other frost-resistant crops such as onions during the winter.

Potato production constraints in Zimbabwe: There is a need to produce varieties that are tolerant to late blight, caused by Phyophthora infestans. Blights present a major challenge in agricultural production as it is nearly impossible to combat them without the use of integrated management which entails cultural, chemical and several other methods. However, the greater portion of the integration however is chemical management [7]. Late blight is spread through spores that can be spread by splashes from rain or irrigation water and hence can easily spread to uninfected healthy plants [7]. Several studies have been conducted on the best control strategies for Late blight and many fungicides have been produced. Proper chemical application measures should be followed along with other control strategies.

Late blight has always presented severe challenges in production for example the Irish famine in the 19th century [7]. It is necessary therefore, to develop breeding work to solve the problem of late blight, since this is the most reliable way to combat the disease. In some African countries, breeding work is already being successfully carried out to select or create potato varieties that can resist this disease [8-10]. At the moment, the most widely grown potato cultivars possess a narrow gene base for P. infestans resistance, and this coupled with an increase in the genetic variation of P. infestans populations creates an increased risk of disease spread in the potato fields. The use of new resistance sources would enrich the genetic background of cultivated potato.

Since the discovery of the R-genes from S. demissum Lindl., a wide range of wild Solanum species have been identified as the potential sources for more Rpi-genes [11, 12]. The use of molecular markers is of great importance in plant breeding. To make potato late blight resistance durable against P. infestans the technique requires the use of the molecular markers. Marker-assisted selection (MAS) has already been established in potato breeding and focused on resistance to pathogens and pests. Molecular markers linked with target genes of interest facilitate their introgression

into developing varieties and this reduces the time required for new varieties to be produced. Mapping of chromosome locus is an important goal in plant breeding for gene cloning and marker-aided breeding. Several studies have used the MAS pathway to select the resistant individuals obtained in crosses with resistance sources. Based on the use of developed and validated molecular markers it is necessary to combine several resistance genes in one genotype, Pyramiding (major) R-genes can be the solution to improve on both durability and high level of resistance [13].

One of the most important issues in breeding is the successful selection of source material for crossbreeding. As parental forms, it is necessary to use a source that has genes for resistance to the most aggressive races such as wild potato species. Thus, the evaluation of hybrids with wild species conducted in Uganda [10] and Congo [14] allowed to isolate resistant clones, which were identified as promising parents for the program of selection resistance to late blight. They demonstrated high and medium resistance to late blight and high yield. The evaluated progeny from crosses with wild species showed high prospects for obtaining new potato varieties in the climatic conditions of Central and East Africa. Studies conducted in Uganda showed that the relatively high heritability coefficient and the prevailing additive genetic effects imply that genetic achievements in increasing resistance to P. infestans and tuber yield can be realized by selecting the best clones. (Namugga et al., 2020). Scientists in Rwanda have developed methods of crossing among additional parental forms and analysis of the ability to recombine traits of economic importance to select new genotypes. The additive gene effect was dominant over the non-additive gene effect for both traits. All families selected for further evaluation showed improved levels of high productivity resistance. The study identified the best families with high tuber yield and increased resistance to late blight [15]. Before introducing a new variety or an existing variety to a new location, it is necessary to evaluate its resistance to local races of late blight [16, 17].

Heavy chemical application does not only degrade the environment but also sharply increases the cost of production of farmers who need to buy huge amounts of pesticides yet tolerant and resistant varieties can be an answer to this challenge. It is of utmost importance therefore for the government create strengthen existing or create new institutions, policies [18]. and funds directed to potato research and production of new, tolerant, high yielding, short season varieties.

Farmers should increase the level of their knowledge not only in the field of agricultural technology, but also in the biology of potatoes, potato pests and diseases. The technology of cultivating potatoes includes stages such as - germination of seed tubers, their planting, caring for plants, including soil processing and protection against pests, diseases and weeds, harvesting, post -harvesting and storage [19]. The yield and safety of the resulting harvest [20] depend on the correct choice of seed material, and individual operations in agricultural technology. The decisive role is played by the choice of variety, the quality of seed material and plant protection from diseases [21]. Of particular importance is the correct use of fertilizers for potatoes during the growing season and soil preparation [22].

The chemical protection of potatoes from late blight is one of the most significant restrictions for the production of potatoes. Successful experience in the use of fungicides against late blight is shown in different countries of Africa and Asia [23-27]. The influence of the methods and terms of priority and the number of spraying potatoes against this harmful disease has been proved. In addition, in each particular country it is necessary to develop economically effective and feasible options for comprehensive management of late blight, taking into account the local climatic conditions [25, 28-30]. At the same time, it was established that the most effective, environmentally friendly (both for people and animals) and inexpensive method for the control of late blight is the approach of integrated diseases management, taking into account the physiology of their development [7].

Biological methods of protection against diseases are also essential and very relevant. Biological methods of potato protection should be used as they are of great importance in solving environmental problems caused by the use of chemicals. In many countries, bacterial drugs have long been widely used, based on various strains of Bacillus Subtilis, strains that overwhelm the processing pathogen are quite effective in monitoring this disease [31, 32]. At the same time, it is not necessary to take into account the tolerance of the cultivated varieties to the drugs used and how to use it to offer farmers an attractive economic advantage, given the low and oscillating prices for potatoes [33]. To develop an approach to protecting the potato field from late blight, it is of great importance to have good knowledge of the biology of the development of this pathogen, including the dynamics of the spread of its races, the creation of a proper prediction model [29, 34]

Opportunities for potato production in Zimbabwe: It is evident that there is room to improve potato production in Zimbabwe and one of the best strategies that can be used is the production of better, improved, high yielding varieties with tolerance to frost and blights [7], which are a nightmare to potato producers as they increase the total cost of production through the purchase of pesticides. Moreover, mechanization should be embraced in an effort to reduce labor and time taken to harvest potatoes. At the moment, human labor is the most used for the harvesting of potatoes, this is more expensive and generally contributes to the high pricing of potatoes. It is necessary therefore to introduce and embrace the use of farm machinery that will be more time saving, efficient and cost effective in the harvesting process.

Recent studies have shown that there will be a terrific expansion of the potato market in developing countries, Zimbabwe included [35]. This is mainly because of value addition and processed potato products whose fame is increasing throughout the country. This leaves a huge gap and opportunities in this sector but the most limiting factor will be prices. If the local prices continue to increase, processors and consumers will continue to get their potatoes from neighboring countries thus dwindling the potato market in Zimbabwe.

Policies [18] that will encourage production should also be put in place for example the amount of tax charged for locally produced goods, moreover the transport network is still underdeveloped in Zimbabwe therefore farmers incur very high transport costs for their produce and also for inputs. This coupled with very high fuel prices and at times unavailability makes transportation more expensive thus further increasing the market price of table potatoes. The government of Zimbabwe recently introduced a zero tax for potato producers and a restriction on the import of potatoes with the aim to increase local production and this could be a great opportunity for new markert players who are willing to engage in potato production.

Storage facilities should also be improved to reduce postharvest losses. If these issues are addressed, the general production of potatoes will improve and once such limiting factors have been addressed, the cost of production will sharply decrease, therefore the general market price will also decrease, making potatoes available at affordable prices to all Zimbabweans. This will in turn contribute to the nation's goal of achieving a food secure state, also allowing for exports leading to an improved GDP and foreign currency generation.

Conclusion

In Zimbabwe there is a great potential to improve potato production by improving state policy regarding potato manufacturers. More breeding work also needs to be done and implemented on the ground so as to bring about the most suitable varieties based on the agro-ecological zones of the country. It is necessary therefore to capacitate and develop extension and research and also the necessary resources so as to enhance productivity.

At the moment, Zimbabwe does not appear on the top five list of potato producers in Africa. Egypt, Algeria, South Africa, Morocco and Kenya are the top five potato producing countries in Africa [36], it is therefore advisable for Zimbabwe to have exchange programs with these countries and adopt some of the strategies that are being used especially by its neighbors who are in Southern Africa such as South Africa. Such exchange programs might see an increase in the quantity and quality of potatoes produced for example, the average yield for potatoes in South Africa is 49 t/ha [36] and this suggests that South Africa has high technology and information systems in potato production. Zimbabwe and South Africa are neighbours, suggesting that they have similar environmental and natural factors which affect potato production in some areas.

Adopting some of the technologies used in South Africa will therefore be more feasible and easier. Plant breeding is one of the key tools that can be used to fight hunger, poverty and malnutrition which are serious challenges in some parts of the country. Over the past few years, most parts of Zimbabwe have been drought stricken, leaving most small-scale farmers vulnerable and without enough food to meet their daily needs. The use of plant breeding technologies will therefore result in the production of more suitable and tolerant varieties to the climatic shocks being experienced. It is evident that irregular weather patterns and extreme weather phenomenon caused by climate change are playing key roles in food inadequacy and vulnerability of most Zimbabweans who depend solely on rain fed agriculture and it is time that policies were put in place so as to build resilience and strengthen the agricultural sector. Plant breeding could also present a solution to late blight and bacterial diseases such as soft rot, accounting for 20%-60% yield losses [4].

Global potato production saw a 16.1% increase from the year 2000 to 2022 and Africa saw a huge 106% increase within the same period [37]. This shows that given the improvement in techniques and methods of production, potato production will continue to increase significantly in Africa. Average potato yield is also expected to increase to 24t/ha by the year 2030 [38] Efforts are being made by the ministry of lands, agriculture, fisheries, water and rural development in Zimbabwe and plans have been put in place so as to enhance agricultural production [18].

Given such changes and advancements towards research and production, Africa as a whole will see an increase in potato production and with such changes in policies, adoption of better technologies, use of machinery and embracing plant breeding for improved seed systems, Zimbabwe will have a significant increase in potato production by the year 2030[39-47].

Acknowledgements

None

Conflict of Interest

No Conflicts of Interest.

References

1. FAOSTAT (2022) Crops and liverstock products, Statistical Databases. Food and Agriculture organization.
2. FAO (2016) AQUASTAT Country profile- Zimbabwe. Food and Agriculture Organization of United Nations (FAO). Rome, Italy.
3. FAOSTAT (2013) Food and Agriculture Organization of the United Nations Statistics Division.
4. Sakadzo N, Mavugara J, Musara A (2020) A Critical Review of Value Chain for Irish Potato in Zimbabwe with Specific Regards to the Economic Policy: A Review 2(2).
5. Witte JC (2013) Growing potatoes: Production and consumption in East Africa. Agricultural Economics and Policy Wageningen University, The Neatherlands.
6. Svubure O, Struik PC, Haverkort AJ, Steynd JM (2015) Yield gap analysis and resource footprints of Irish potato production systems in Zimbabwe 178: 77-90.
7. Tiwari I, Shah KK, Tripathi S, Modi B, Subedi S, et al. (2021) Late blight of potato and its management through the application of different fungicides and organic amendments: a review. Journal of Agriculture and Natural Resources 4(1): 301–320.
8. Muhinyuza JB, Nshimiyimana JC, Kirk WW (2007) Susceptibility of commonly grown potato cultivars to potato late blight in Rwanda and control with fungicides. African Crop Science Conference Proceedings 8: 835–840.

9. Akino S, Takemoto D, Hosaka K (2014) Phytophthora infestans: A review of past and current studies on potato late blight Journal of General Plant Pathology 80(1): 24-37.
10. Namugga P, Sibiya J, Melis R, Barekye A (2018) Yield response of potato (Solanum tuberosum L.) genotypes to late blight caused by Phytophthora infestans in Uganda. Am J Potato Res 95: 423–34.
11. Bradshaw JE, Bryan G J, Ramsay G (2006) Genetic resources (including wild and cultivated Solanum species) and Progress in their utilisation in potato breeding. Potato Research, 49: 49–65.
12. Simko I (2002) Comparative analysis of quantitative trait loci for foli-age resistance to Phytophthora infestans in tuber-bearing Solanum species. Am J Potato Res 79:125–132.
13. Tan MYA, Hutten RCB, Visser RGF et al. (2010) The effect of pyramiding Phytophthora infestans resistance genes R Pi-mcd1 and R Pi-ber in potato. Theor Appl Genet 121: 117–125.
14. Katembo VA, Kasereka KP, Onautshu OD, Nouhoun ZW (2024) Potato Breeding for Late Blight Resistance in Central and East Africa European Journal of Agriculture and Food Sciences 6 (4).
15. Muhinyuza JB, Shimelis H, Melis R, Sibiya J, Nzaramba MN (2016) Combining ability analysis of yield and late blight [Phytophthora infestans (Mont.) de Bary] resistance of potato germplasm in Rwanda. Aust J Crop Sci 10(6): 799
16. Gopal J, Singh BP (2003) Screening potatoes for resistance to late blight (Phytophthora infestans) under field conditions. Potato Res 46: 47–56.
17. Ferjaoui S, Boughalleb N, Khamassi M, M Hamdi, Romdhani ME (2010) -Evaluation de la résistance de certaines variétés de pomme de terre biologique au mildiou (Phytophthora infestans (Mont) de Bary) Tropicultura 28(1): 44-49.
18. https://www.agric.gov.zw/
19. Harahagazwe D. (2020) Potato Value Chain Development in Cameroon. Second Semester Technical Report - Lima, Peru: International Potato Center (CIP).
20. Mangani R, Mazarura U, Tuarira A (2016) Effect of Planting Method on Growth, Yield and Quality of Three Irish Potato (Solanum tuberosum) Varieties Grown in ZimbabweAnnual Research & Review in Biology 9(5): 1-7.
21. Makoni E, Urombo J (2014) The impact of value chain constraints on potato farmers: A survey of Nyanga District smallholder Irish potato farmers (2008-2013).
22. Kakava BK, Mapfumo P (2020) Effect of Different Rates of Compound C-Extra on Potato (Solanum Tuberosum L.) Productivity. J Agric Res 5(4): 000254.
23. Fontem DA, Aighewi B (1993) Effect of fungicides on late blight control and yield loss of potato in the western highlands of Cameroon. Int J Pest Manag 39(2): 152–155.
24. Fontem DA (1995) Yield of potato as influenced by crop sanitation and reduced fungicidal treatments. Tropicultura 13: 99-102.
25. Fontem DA. (2001) Influence of rate and frequency of Ridomil Plus applications on late blight severity and potato yields in Cameroon. J Afr Crop Sci 9(1): 235–243.
26. Arora RK, Sharma S, Singh BP (2014) Late blight disease of potato and its management. Potato J 41(1): 16–40.
27. Randriantsalama AR, Randrianaivoarivony JM, Ramalanjaona VI (2014) The use of chemical control and varietal resistance against potato late blight in Madagascar. Afr. Crop Sci. J. 22:959–68.
28. Ojiambo P, Namanda S (2001) Impact of Fungicide Application and Late Blight Development on Potato Growth Parameters and Yield in the Tropical Highlands of Kenya and Uganda January African Crop Science Journal 9: 225-233.
29. Olanya OM, Adipala E, Hakiza JJ, Kedera JC, Ojiambo P, et al. (2001) Epidemiology and population dynamics of Phytophthora infestans in Sub-Saharan Africa: progress and constraints. Afr. Crop Sci J 9(1):901–17.
30. Sharma P, Saikia MK (2013) Management of late blight of potato through chemicals. IOSR J Agric Vet Sci 2(2): 23–26.
31. Keerthana U Nagendran K, Raguchander T, Prabakar K, Rajendran L, Karthikeyan G (2018) Deciphering the role of Bacillus subtilis var. amyloliquefaciens in the management of late blight pathogen of potato, Phytophthora infestans. Proc Natl Acad Sci India Sect B. Biol. Sci 88: 1071–80.
32. Kumbar B, Mahmood R, Nagesha SN, Nagaraja MS, Prashant D (2019) Field application of Bacillus subtilis isolates for controlling late blight disease of potato caused by Phytophthora infestans. Biocatal. Agric. Biotechnol. 22: 101366.
33. Nyankanga R, Wien H, Olanya O, Ojiambo P. (2004) Farmers' cultural practices and management of potato late blight in Kenya Highlands: implications for development of integrated disease management. Int J Pest Manag 50 (2): 135–44.
34. Muhinyuza JB, Nyiransengiyumva S, Nshimiyimana JC, Kirk WW (2008) The effect of the application frequency and dose of Mancozeb on the management of potato late blight in Rwanda. J Appl Biosci 3: 76–81.
35. Anisimov BV (2021) World potato production: market trends, forecasts and prospects (analytical review). Potato and vegetables 10; 3-8.
36. https://www.potatoes.co.za/
37. https://www.elsenburg.com/wp-content/uploads/2024/09/2024-05_20-Cele_MIR-of-the-South-African-Potato-Industry-v3.pdf
38. https://potatoes.news/global-potato-consumption-in-2030-growth-challenges-and-opportunities-for-farmers/
39. FAOSTAT (2021) Food and Agriculture Organization of the United Nations Statistics Division.
40. (2006) Food and Agriculture Organization of the United Nations. Chapter 2: Zimbabwe's natural regions and farming systems.
41. Lutaladio N, Ortiz O, Haverkort A (2009) Sustainable potato production guidelines for developing countries.
42. Namugga P, Melis R, Sibiya J, Barekye A (2017) Participatory assessment of potato farming systems, production constraints and cultivar preferences in Uganda. Aust. J. Crop Sci 11(8): 932–940.
43. Nyankanga R, Njogu M, Muthomi J, Olanya M (2012) Efficacy of fungicide combinations, phosphoric acid and plant extract from stinging nettle on potato late blight management and tuber yield. Archives of Phytopathology and Plant Protection 45(12): 1449-1463.
44. Okonya JS, Kroschel J (2015) A cross-sectional study of pesticide use and knowledge of smallholder potato farmers in Uganda. BioMed Res Int :1–9.
45. https://www.potatopro.com/news/2022/local-seed-potato-research-promising-zimbabwe
46. https://repository.up.ac.za/server/api/core/bitstreams/baabdb3e-5c44-4da4-a511-0baa5c16be37/content
47. Role and potential of potato in global food security. Dr. Qu Dongyu, Director-general, FAO.