THE IMPACT OF VALUE CHAIN
CONSTRAINTS ON POTATO FARMERS
A survey of Nyanga District smallholder
Irish potato farmers (2008-2013)

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The impact of value chain constraints on potato farmers: A survey of Nyanga District smallholder Irish potato farmers (2008-2013)

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The impact of value chain constraints for low resourced smallholder farmers in developing countries is not readily known, making it difficult to prescribe how the same farmers could penetrate high value formal markets. This study investigates the impact of value chain constraints on smallholder Irish Potato farmers in Nyanga district in the eastern province of Manicaland in Zimbabwe. The results assist the smallholder Irish potato farmers in ascertaining value chain bottlenecks to resolve and in accessing high value potato markets. A survey of the smallholder Irish potato farmers in Nyanga was done in which the Rapid Participatory Market Appraisal (RPMA) and a semi-structured interview questionnaire were the dominant data collection instruments. The study found out that the core actors in the Nyanga smallholder Irish potato value chain included input suppliers, business services developers (market linkage and production support), the Irish potato farmers themselves and the fresh potato commodity buyers. Results also show that the value chain presents several constraints for the smallholder Irish potato farmers with the main bottleneck being their inability to afford transportation of both inputs and produce. The road network is poor and the few truckers who come to the area charge high fees which the farmers cannot afford. As the smallholder potato farmers lie in the middle of the value chain, there are middlemen on either side (between the farmers and the input suppliers and between the farmers and the market) who take advantage of the farmers’ inability to raise the exorbitant transportation charges. These middlemen dictate the prices at which to sell seed and other fertilizer and chemical inputs to farmers and at the same time dictate the prices at which to buy produce from the same farmers. Irish potato supply chain constraints are thus hindering farmers from accessing high value markets in the absence of farmer consortiums through which collective bargaining especially in relation to transportation could be negotiated. Meanwhile, Irish potato farmers should carefully screen out the middlemen they deal with as a good number of them are motivated by profiteering at the expense of the farmers.

Key words: Value chain constraints, smallholder Irish potato farmers, Value Chain Analysis (VCA), contract farming arrangements, middlemen.

INTRODUCTION

A value chain is considered to be a whole set of value-adding activities through which a product passes from its initial production to the eventual delivery of the final product to the consumer (Kanji et al., 2005). Kaplinsky and Morris (2000) put emphasis on the aspect that a value chain incorporates business-related functions or activities such as production, transportation, transformation, processing, marketing, trading, retailing and consumption of a given product or service. Undertaking a potato sub-sector analysis is viewed as a plausible way of gaining insight into the operations of potato market channels while focusing on growth potential, activities and efficiency of the actors along the chain, business support services involved and policy and
regulatory frameworks.

Potatoes are increasing in importance worldwide owing to their potential to boost the household food economy and income earning capabilities of producers (CIP, 2010). Vorley and Fox (2004) however, content that there is insufficient research on how smallholder low-resource-based potato farmers can penetrate high value formal markets. There also exists a dearth and paucity of information on the potential production and value addition opportunities for smallholder farmers in developing countries. In Zimbabwe, limited documented studies have been carried out on the Irish potato value chain. As such, the nature, impact and magnitude of constraints endured by smallholder Irish potato farmers in Zimbabwe are not known. In fact, the Irish potato sub-sector has not received much attention by policy implementers at national level. This is despite the worldwide realisation that the potato crop continues to gain prominence as a possible alternative crop to meet the dietary needs of an increasing global population.

Major progress has been made in breeding and multiplying high-yielding Irish potato varieties by the Ministry of Agriculture, Irrigation and Mechanisation in Zimbabwe’s Horticultural Research Council (HRC), through on-farm and off-farm research co-ordinated from Nyanga Experimental Station. Despite the efforts directed at improving potato production over the past four decades through government initiated research and development into high-yielding varieties, low resource productivity and inefficiency still remains a major challenge in the sub-sector. The average smallholder production level is at 7mt/ha compared to a potential farm yield level of 14mt/ha and those from research stations of 25 to 35 metric tonnes per hectare (Horticultural Research Institute, Nyanga Experimental Station, 2005). This suggests that technological and research advances made in this sector have not translated into increased agricultural productivity among smallholder potato producers.

Carrying out an Irish Potato Agribusiness Value Chain Analysis (VCA) for the Nyanga farming communities is credited for significant academic and practical benefits. This provides insights into the level of involvement of Nyanga smallholder Irish potato farmers in the Irish potato agribusiness value chain. By so doing, the main drivers of the potato value chain and constraints hindering its development are unearthed. The research is also of paramount importance because smallholder potato farmers have over the past decade been unable to benefit from growing a high value agricultural crop in the form of potatoes. It is therefore considered necessary that research studies of this nature be conducted if any hopes have to be entertained for assisting potato farmers to benefit from producing and marketing this commodity.

Exploration of value chain bottlenecks in the Irish Potato Agribusiness Value Chain (IPABVC) becomes imperative in this instance. According to the Food and Agriculture Organisation (FAO)'s Crop prospects and Food Situation Report (2012), Zimbabwe was forecasted to record a 32% decline in cereal production for the 2012/2013 season (FAO, 2012). This projection gives the potato crop the potential to play a complementary role to cereals in boosting household food security and to act as a potential income source for many smallholder farmers. Irish potatoes have the potential to complement maize as a staple crop in Zimbabwe (Zivenge and Karavina, 2012).

**Background of the study**

**The state of global potato production**

Globally, more than 200 million tonnes of potatoes are being cultivated annually on 20 million hectares of land (Cromme,Prakash and Ezeta, 2010). This ranks the potato at number four among the world’s important staple crops following wheat, rice and maize. More than half of global potato production originates from developing and least developed countries up from just a share of 11% in 1960. There has been a steady decline in the production of the crop in traditional growing regions of Europe. The pace of expansion in global potato cultivation far exceeds that of higher ranked crops such as maize and wheat. Global potato production has doubled in the past 20 years. Gereffi, Humphrey and Sturgeon, (2005) point out a striking phenomenon that despite these impressive increases in total production, potato yields in non-traditional potato producing countries are still far below their agro-ecological potential. Crop husbandry is still poor, because farmers are not fully aware of good agricultural practices for this newly introduced crop.

**Potato production in Zimbabwe**

Zimbabwe has a two-fold agriculture sector comprising of large scale and smallholder agriculture. The smallholder sector comprises of three land holding categories, namely: Small- scale Commercial Area (SCA), Communal Area (CA) and Resettlement Area (RA) farmers (Mudzonga and Chigwada, 2009). The resettlement farmers under the fast track land resettlement program are classified as A1 or A2 farmers depending on the acquired land size. The A1 farmers have an average maximum of seven hectares in size. Table 1 gives a ten year interval overview of Zimbabwe’s potato production in relation to global production of the crop.

Production volumes of Zimbabwe’s potatoes are slowly increasing although overall contribution to the global output is still insignificant. This increase can hopefully be accelerated if constraints militating against smallholder potato farmers are identified and uprooted. Meanwhile
the country continues to import potatoes in an attempt to meet demand.

**The global urban population boom and demand sophistication**

The rapid growth in urban populations presents special challenges for small-scale farmers in developing countries (Blair, 2005). Small-scale farmers are under increasing pressure to fulfil the new market requirements of powerful supermarket chains and agro-industry which demand product quality, volume and continuity of delivery. Many research and development institutions have now found out that small-scale farmers’ key concern is not only agricultural productivity, but also better access to markets.

The volume of potatoes being imported by Zimbabwean processors, wholesalers and retailers from South Africa stands at an average of 120 tonnes per month (ZimStats, 2012). This phenomenon gives weight to the findings from local studies that local production and supply of fresh potatoes on the local market is being outstripped by the demand for the commodity on the local Zimbabwean market (Masarirambi, Mandisodza, Mashingaidze and Bhebhe, 2012, ZimStats, 2012). No studies have actually shown why this is the case. There is scope therefore for a study to ascertain the bottlenecks in the potato agribusiness value chain. Identification of value chain bottlenecks will pave way for recommendations that will contribute to increased efficiency and competitiveness of the Irish potato agribusiness value chain. Smallholder farmers appear generally to have difficulties in making the transition to more commercially viable engagements as symptized by their inability to meet the quality and safety standards set by food processors. Large retailers, wholesale buyers and exporters have high quality expectations also leaving the farmer at a quandary. It is thus important to understand how the market players engage with farmers in order to advice on smallholder farmer pitfalls.

Although potatoes are increasing in their importance worldwide for household food security and as a source of income, there seems to be a general lack of information on the constraints inhibiting smallholder Irish potato farmers from fully exploiting opportunities that abound in the Irish potato agribusiness value chain. The contribution of smallholder farmers to economic development can only be realised if these farmers are linked to high-value agricultural produce markets (IFT, 2005). Besides ascertaining the constraints that smallholder farmers face, it is imperative to gain a clear understanding on the structure, coordination mechanisms, the actors and the activities that they undertake in the Irish potato agribusiness value chain. In terms of extension and back-up service provision such as technical agricultural extension support and inputs support, Irish potatoes are said not to be given equal priority in comparison to other crops such as tobacco, wheat, soybeans, cotton and stable food crops. In view of the foregoing discussion, this research seeks to make an investigation into the impact of value chain constraints faced by smallholder farmers in the Irish potato Agribusiness Value Chain (IPABVC).

The overall objective of the study is to do a survey of the Irish potato agribusiness value chain with an intention to unearth the nature, the impact and magnitude of constraints faced by smallholder Irish potato farmers in Nyanga district of Manicaland province. Specifically, the research seeks to identify the Irish potato agribusiness value chain actors that interact with smallholder potato producers in Nyanga district, identify the constraints facing smallholder potato producers in the Irish potato agribusiness value chain and determine the factors that influence access to input and output markets by smallholder potato producers in Nyanga district.

The rest of the article will be structured as follows: First a theoretical literature overview is given on value chains and possible actors in those value chains. This section is then followed by a discussion of the methodology used to gather and analyse data. There after the findings are presented and discussed before appropriate conclusions and recommendations are proffered while areas for further studies are also proposed.

**Theoretical literature overview**

**Value chain identification**

There are many definitions and varying perspectives regarding value chains. Kaplinsky and Morris (2001) view a value chain as both a heuristic and analytical tool. On one hand, they view the value chain as a descriptive construct which plots the flow of goods and services up and down the chain, and between different chains. As such, value chains provide a heuristic framework for the

<table>
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<th>Year</th>
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<th>Zimbabwe</th>
<th>Contribution</th>
</tr>
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<td>1980</td>
<td>240,464,520</td>
<td>20,441</td>
<td>0.0085%</td>
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<tr>
<td>1990</td>
<td>266,624,520</td>
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<td>0.012%</td>
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<td>2000</td>
<td>327,349,600</td>
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<td>2010</td>
<td>324,181,889</td>
<td>58,000</td>
<td>0.018</td>
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</tbody>
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Source: FAOSTAT, 2012
generation of data. However, recent developments in value chain theorisation have begun to provide an analytical structure that provides insights into global income distribution and the identification of effective policy levers to ameliorate trends towards equalisation. The 'value chain' definition can be interpreted in the narrow or the broad sense (Kaplinsky and Morris, 2001). In the narrow sense, "value chain" is a term that describes the full range of activities which are required to bring a product or service from conception, through the different phases of production, delivery to final consumers, and final disposal after use. However, taking a broad approach, the concept of value chain encompasses the issues of organization and coordination, the strategies and the power relationship of the different actors in the chain (Webber and Labaste, 2007).

In essence, agricultural value chains are made up of three distinct categories of players, namely: value chain primary actors who directly produce the agricultural commodities, value chain service providers who indirectly deal with agricultural commodities, and finally, product development governors and regulators who put in place the rules, procedures and policies at the local, regional and international level (Porter and Kraemer, 2011).

**Actors in the potato agribusiness value chain**

According to Gurung et al. (2009), players in the potato production chain would be; seed and associated input suppliers, growers, packaging and sorting labourers, potato commodity bulk movers, bulk agricultural commodity buyers, middlemen, retail supermarket chains and potato processors. Zivenge and Karavina (2012) elaborate that the benefits that accrue to those who partake in such chains would be better negotiation standing, low-cost business operations, reduction in product logistical movement, better chances of taking advantage of developments in modern communication gateways, the creation of mutual faith in fellow chain participants, and the better management of an organisation’s resources.

This value chain map showing actors can be directly derived through a value chain mapping exercise using a generic market map (Figure 1) (PSDA, 2008). The
business and extension services section, enabling business environment are all platforms that interface with agricultural producers and will be the focus of the research on the Irish potato agribusiness value chain.

The generic agribusiness market map shown in figure 1 above demonstrates the intricate roles played by the numerous actors in the value chain. An enabling environment is required to allow for business viability. The primary producers and the small scale processors have their operations enabled through access to financial services, acquisition of market information, adequate input supplies and good producer coordination among other things. A diagrammatic illustration of actors in potato agribusiness ventures allows for the identification of constraints in the potato sub-sector. Gurung et al (2009) state that constraints in potato agribusiness ventures can be identified with ease through this mapping exercise, including the role and extent to which each player in the business transforms the product from inception to final delivery of product to consumers.

Value Chain Analysis (VCA) allows for the identification of key areas in an organisation, which when proactively pursued towards the end, lead to superior organisational performance (Gurung et al., 2009). Where the organisation has no superior abilities to perform, it can seek help from other organisations with services that match the area of need (Kapilnsky and Morris, 2009). Value chain analysis is therefore a vital tool in economic policy development and implementation as it provides an analytical framework for understanding margins of value addition, income distribution, and the levers of market power. Value chain analysis is an action-oriented method that acknowledges the linkages in the chain along with flexible implementation (Obare., Nyagaka., Nguyo , and Mwabuko, 2010).

In global horticultural commodity trade, agribusiness relationships exploration is the only practical way of ascertaining collaborative relationships that exist, the utilisation of resources by the different chain participants, as well as points at which knowledge sharing and resource sharing can be leveraged on (Geriffi et al, 2005). However, it is also important to note that agribusiness associations and interrelationships transform now and again, and as such there is need for a broad and holistic approach to exploring business interrelationships, and this is only possible through using other industry analysis frameworks to augment VCA.

Value chains analysis and agriculture development
Despite successful examples of integrating small scale farmers into global value chains (a prominent one being Kenyan export horticulture producers), the share of developing countries small-scale producers in global supply chains is still small (Hulme, 2007). The exclusion of small-scale producers puts them at a disadvantage. This tendency of exclusion is partly the reason why many development agencies are re-shaping their approaches in order to promote agricultural growth and productivity in Africa. Value chain building and upgrading is thus viewed as an important vehicle for fostering the growth of agricultural sectors in developing countries (royal tropical Institute, 2009). This can only be realised if smallholder farmers’ problems are identified and known.

RESEARCH METHODOLOGY
Population and sampling techniques
The population of the research is made up of smallholder Irish potato farmers from Nyanga district situated in the eastern province of Manicaland in Zimbabwe. In the context of this research, smallholder farmers are those that cultivate potatoes on less than two hectares of land. Smallholder potato farmers who made up the population were spatially distributed across four operational wards in Nyanga district, namely wards 15, 25, 26, and 28. The population considered for sampling was from the three land holding categories, namely small scale commercial, communal area, and A1 farming area farmers. For smallholder farmers to be considered as part of the sample and be eligible for selection, they had to be on the list of smallholder potato producers that is maintained by Agricultural Extension Workers under the Ministry of Agriculture, coming from the four potato producing wards, and falling into any of the land holding categories stated above. Male and female smallholder farmers in charge of the potato enterprises were considered for selection as part of the representative sample.

A sample of 97 smallholder Irish potato farmers was selected. This was achieved through multistage selection criteria where firstly the four potato growing wards were considered as the primary units. In each ward, prospective research subjects were categorised by the type of land holding they belonged to. Subsequently, a random selection was applied to those candidates in the respective land holding categories before the selected sub samples were put together to form the eventual integrated sample. The sample size translates to ten percent of the total population of smallholder Irish potato farmers in Nyanga district. This was considered to be large enough to sufficiently reflect the agribusiness value chain constraints of the Nyanga Irish potato farmers (Saunders et al., 2009). The unit of analysis was the individual farmer himself.

Data collection techniques
A Rapid Participatory Market Appraisal (RPMA) technique was used in the form of value chain mapping, where the sampled smallholder Irish potato producers took part in a participatory potato market chain mapping...
exercise. This enabled the researchers to get knowledge of the Irish potato value chain actors associated with the small-scale growers. In essence, the value chain mapping exercise enabled the identification of the roles played by various value chain actors and the relationships that exist among them. The RPMA technique relies on a combination of secondary data, review of trends, and primary data collected by interviewing market chain actors (Bernet, Devaux, Thiele, Lopez, Velasco, Manrique and Ordinola, 2008).

Focus group discussions (FGDs) comprising of twelve to fifteen participants per session from the four main potato producing areas were also conducted. The value chain mapping exercise alluded to above was conducted during the focus group discussions. The main primary data gathering instrument used was a semi-structured interview questionnaire that was administered to the sampled smallholder potato farmers. Secondary sources of information included a survey of publications from the Food and Agricultural Organisation (FAO), the Ministry of Agriculture as well as the Central Statistical Organisation (CSO). These adequately complemented the primary data collection exercise as this allowed for data source triangulation.

No monetary or other material incentives were used to encourage participation. The need for the study was clearly explained to the respondents with the help of local agricultural extension officers. No ethical requirements were violated, with all participants willingly offering informed consent.

PRESENTATION AND DISCUSSION OF RESULTS
A hundred percent (100%) response rate was achieved with all questionnaires considered usable. This excellent response rate was mainly attributed to the fact that personal household visits were made and in the event that the respondents were away from their homesteads, the enumerators booked appointments with the smallholder farmers and managed to interview all the sampled smallholder potato farmers. According to Simmons et al. (2005), a response rate of 50% for phenomenological research is sufficient enough to allow the researcher to gather valid and reliable data that is representative of the population. This research’s philosophical perspective leaned towards the phenomenology paradigm which was centred on considering the respondents’ feelings, attitudes, perceptions, and strong beliefs towards the impacts of the constraints they suffer in the Irish potato agribusiness value chain.

Demographic profiling of respondents
Geographical dispersion of respondents
Of the 97 smallholder Irish potato farmers surveyed, ward 15 (40%) had the greatest number of respondents. The specific areas that were surveyed are Tombo, Claremont, Matema, Bende, Nyakupinga and Britannia. Most of the respondents were from Tombo (in ward 15) while the least number came from Bende (ward 26).

Gender, age and landholding profiling
A total of 66% of sampled households were male headed while female headed constituted a total of 34% of the respondents. This distribution also mirrors the numerical dominance of the males in the potato agribusiness value chain. Distribution of the respondents by age showed the majority (78.4%) in the 20-49 age range, followed by 20% of the respondents in the 50-65 age range with the remainder being above 65years of age. Consideration of the respondents by type of land holding revealed that Communal areas and A1 resettlement model farmers constitute the majority of the respondents with each category contributing nearly equal numbers of respondents (Figure 2). The small scale commercial landholding category had the least number of respondents.

The demographic profile of the respondents captures a satisfactory cross-section of the smallholder Irish potato farmers whose views and outcomes are believed to be representative of all such farmers.

Having derived a background understanding of the smallholder farmers being surveyed, subsequent sections of this article highlight the results around the objectives the study sought to address. The first objective sought to identify the Irish potato agribusiness value chain actors that interact with smallholder potato producers in Nyanga district.

Value chain actors that interact with smallholder potato farmers
A combination of the value chain mapping exercise, a semi-structured interview questionnaire and focus group discussions enabled the identification of value chain actors that interact with smallholder potato producers. These included middlemen, processors, supermarkets and wholesalers. The majority of the respondents (82.5%) sold the bulk of their produce to middlemen who are sometimes called commodity brokers. This constitutes the most popular and most accessed market channel of choice for most smallholder Irish potato producers in Nyanga district. These findings are in line with the assertion made by Krap,( 2010) who contends that smallholder farmers are faced with a myriad of constraints and end up selling the bulk of their produce to middlemen who come to their area. Only 7.2% of the respondents sold their produce to firms, with some of the sellers in this category selling their produce to Manica produce, a wholesaler commodity brokering firm.

Sources of potato seed, fertilizer and agro-chemicals
A total of 38.1% of the respondents indicated that they
exclusively used certified seed procured from registered seed growers in Nyanga district. The remainder did not use certified seed for planting purposes. Instead, much of the seed they used is retained seed. This practise is blamed on the high cost of acquiring certified seed. The majority of the respondents, representing 70.1% of surveyed smallholder potato growers source their fertiliser requirements from middlemen who partner local agro-dealers while the rest source their requirements from external agro-dealers and individual traders. Those smallholder potato farmers who source fertiliser from individual traders have developed closer relationships and trust with the traders as they have been doing business with them over the course of many years under trade terms such as bartering of fertiliser in exchange for the potato commodity. The majority (83.5%) source their agricultural chemicals for potato production from local agro-dealers while 10% of the respondents source agro-chemicals from external agro-dealers. The remaining 4.1% of the respondents indicated that they source agro-chemicals from individual traders who deliver the input requirement to their doorsteps. These differences appear to suggest that there are no singular one stop suppliers of the farmers’ needs. Other than the conventional input suppliers and buyers, other value chain actors the respondents interact with include large scale commercial farmers in their vicinity. The interaction is occasioned by the need to purchase seed potato and for gaining knowledge on good agricultural practices (GAP) in potato production. They also interact with FINTRAC and International Rescue Committee (IRC), other NGOs that are playing a pivotal role in supporting potato crop production and trying to facilitate access to high value markets for horticultural commodities in Nyanga district.

AGRIBANK also features prominently in the value chain in terms of the provision of cash for purchasing irrigation pipes and for purchasing seed potato for planting purposes. AGRITEX is ranked as the most prominent provider of crop production and marketing extension services.

Figure 3 gives a diagrammatic presentation of the value chain actors that interact with smallholder potato farmers in Nyanga district, including the roles that the different players undertake in the value chain, as identified and mapped by smallholder potato farmers in Nyanga district.

The second objective sought to identify the constraints facing smallholder potato producers in the Irish potato agribusiness value chain.

**Constraints faced by the smallholder Irish potato farmers**

*Production and Marketing constraints*

About 96.9% of the respondents concurred that limited access to inputs stood out as the major constraint for production and marketing. Inputs such as fertilisers and agricultural chemicals are usually in their barest minimum quantities. Potato farmers have limited access to these standard inputs owing to their limited availability. Besides, the fertiliser and agrochemicals are considered to be priced exorbitantly and in most cases at unviable prices which the smallholder farmer cannot sustain. These findings concur with Zivenge and Karavina (2012) who observed limited access to inputs to be a major bottleneck confronting smallholder farmers in developing countries.

Another constraint limiting production and marketing success is the scarcity of marketing information. About 36.1% of the respondents strongly agreed while 63.9%
just agreed that limited access to marketing information is a prominent potato production and marketing constraint that they face in their potato production enterprises. In this regard, most smallholder potato farmers are simply considered to be price-takers and are supplied with information regarding the price of the commodity by middlemen or commodity brokers who come to their areas. The farmers have limited information on fresh produce markets such as the Mbare and Mutare fresh produce markets. As such, they rely on middlemen for the supply of inputs and it is the middlemen who dictate the price of inputs that they bring and the price at which they buy the commodity. As such limited access to information puts smallholder potato farmers at a disadvantage as they would not know the quality and quantity of requirements of different markets. These findings concur with the assertion made by Jayne, Mather and Mghenyi, (2010) that one of the reasons why smallholder potato farmers follow very few and limited market channels for selling their potato produce is because they have limited access to marketing information. Limited marketing information has led to the situation where very minimal value addition activities such as product grading, sorting and packaging are undertaken by smallholder potato farmers. All these inherent factors and attributes result in smallholder potato farmers being simply

Figure 3: The Irish potato value chain map
farmers failing to get maximum returns on their potato commodities.

**Inputs and produce transportation bottlenecks**
Inputs and produce transport bottlenecks pose as a major constraint in the potato farms. Only 5.2% of the respondents were indifferent regarding the impact of transport challenges on their potato enterprises. Owing to the bulky nature of the commodity, bigger trucks are required but the cost associated with such transportation has a negative bearing on the profitability of Irish potato farmers. The farmers are not able to access other lucrative markets as they do not have the means to transport their produce to such markets, which are usually located in other regions of the country where demand for the commodity outstrips its supply. The farmers too cannot afford to hire trucks to transport the potato commodity to more lucrative and high value markets. The poor road network in the area does not help matters either. This situation confirms the farmers’ heavy reliance on middlemen and commodity brokers who come and procure the commodity from the farmer, albeit at a lower price than what the market is offering.

**Production inconsistency as a constraint**
Production inconsistency on the part of the growers is also regarded as one of the major hindrances to successful production and marketing of the Irish potato crop. Most formal markets, such as wholesalers and retail supermarkets, demand a consistent and an uninterrupted supply of the potatoes in order to meet the ever increasing demand for the commodity by consumers. On the other hand, due to the limited access to irrigation facilities and irrigation water, it means that most smallholder farmers cannot consistently supply such highly lucrative markets. This scenario reduces the farmers’ prospects of accessing high value markets.

Most smallholder farmers have a limited market choice and are used to supplying middlemen who come on their own and buy the commodity when it is available. They see this as a normal situation and would rather continue doing so and maintain the status quo. However, the middlemen bring their own terms often leaving the farmers with very narrow margins.

**Limited value addition as a constraint**
About 54.6% of the respondents acknowledge that limited value addition is a marketing constraint in smallholder Irish potato production. They agree that value addition through grading, sorting and packaging of potatoes before selling them on the market is still not common among smallholder Irish potato farmers. However, in spite of the fact that the potato growers are aware that their potatoes would fetch higher value when well graded and packaged, they appear not to be putting any effort in changing their approach. Instead, they regard the acceptance of ungraded and unpackaged potatoes by the middlemen as a removal of hassles albeit the low prices they often get.

**Inaccessibility of agricultural credit as a constraint**
The liquidity crunch running high across nearly all sectors of the national economy make it difficult for farmers to access loans on credit. The inaccessibility of agricultural credit poses as a major production and marketing constraint for the Irish potato farmers. There is a general lack of and limited access to lines of credit in Zimbabwe, and especially among smallholder farmers. On the other hand, potato seed represents the most expensive input component in potato production, contributing 52% to the overall production costs. Lending institutions perceive smallholder farmers as high risk groups with little or no collateral security to cater for cases where the borrower defaults. There are also perceived high transaction costs on the part of banks associated with the regularisation of loan agreements, monitoring for compliance and recovery when a lending institution is dealing with smallholder farmers who are less resource endowed.

**Compliance to legal and industry standards as a constraint**
A number of the surveyed farmers failed to meet some of the legal food requirements. Industry standards such as the Hazard Analysis Critical Control Point (HACCP) act as major hindrances to compliance by smallholder potato producers. HACCP is a management system in which food safety is addressed through the analysis and control of biological, chemical, and physical hazards from raw material production, procurement and handling, to manufacturing, distribution and consumption of the finished product (US Food and Drug Administration, 2013). Supermarket and wholesale chains have revolutionised the way the potato commodity has been marketed as there are now stringent quality control checks that are undertaken before the commodity is registered as fit for human consumption. Some of the farmers surveyed are indifferent as to the implications of compliance to legal and industry standards as they are unaware of such standards given that they do not access such markets hence their ignorance of such expectations.

**Technological barriers as a constraint**
Technological advances such as the increased use of cellphones and the uptake of electronic transfers provide an avenue for efficient transactions by smallholder farmers as they interact with commodity buyers, value chain finance providers and input suppliers. Production technology in the form of tractors and ridgers improve
crop yield performance. The uptake of modern information technology platforms such as cellphones significantly determines market choice for agricultural commodities (Zivenge and Karavina, 2012). Farmers can benefit from using technology to get real time market prices for their potato produce compared to formal markets. In essence, formal markets usually offer stagnant prices while the informal markets can offer real time market-based prices which may be higher than those offered on the formal market. While this avenue would be very important to explore, there is minimum use of communication to do business. To some extent, cell phones are however, seen as a growing feature that the farmers are beginning to hold onto.

**Human capital skills gap as a constraint**
A number of the farmers appear to have gained confidence in potato production. Only 18.6% of the respondents strongly agreed and 25.8% agreed they still face skills problems and thus view the human capital skills gap as a major constraint to potato production and marketing among smallholder Irish potato farmers in Nyanga district. Most farmers have gone mastering requisite skills through experience although a number of them still lack formal training. In this regard, a total of 44.4% (18.6%+25.8%) of the respondents lament the absence of formal training as a major hindrance to potato production. Extension services being offered are considered to be inadequate. Providers of extension services from non-governmental organisations and AGRITEX are considered to be few and overstretched.

**Other production and marketing constraints**

**Limited land available for rotation purposes as a constraint**
It was found that 70.1% of smallholder Irish potato farmers grow potatoes on land ranging from less than 0.5 hectares to less than one hectare. Respondents decried the inadequate land space for rotational purposes among communal area farmers as a real cause for concern. As a result, most smallholder potato producers resort to mono cropping practices where they grow potatoes on the same piece of land on a continuous basis. This poses problems in pest and disease control. Fungal diseases infestation was consequently highlighted as being prevalent in areas where farmers do not practice crop rotation.

**Infrastructure constraints**

**Electricity supply inadequacy as an infrastructural constraint**
Most smallholder farmers use gravity fed irrigation systems that do not require water pumps. Hence electricity availability is not a major concern to them. Since most smallholders sell their produce to middlemen while the crop is still in the field and only harvest when the middlemen is about to collect the commodity, there is currently no cold room storage facilities that are being used under smallholder potato production in Nyanga district. Need for electricity was however voiced as a measure to improve their irrigation infrastructure. Despite the use of gravity fed irrigation systems by smallholder farmers with access to irrigation water, some farmers have water sources that require pumps to deliver water to their fields. It becomes imperative that these farmers get access to electricity to convey water to their irrigation facilities. There is also scope for the development of cold storage facilities for the storage of the crop soon after harvest and this will require electricity availability.

**Shortage of production equipment as an infrastructural constraint**
Although modern production equipment such as tractors and ridgers has the potential to increase crop productivity and yield performance of the potato crop, there is limited uptake as most poor resourced farmers cannot afford to buy them. Similarly, equipment such as cold room facilities for storage can help to prolong the shelf life of the commodity and at the same time improve the marketing of the crop during peak demand periods, but the farmers cannot afford it. The farmers have to make do with what they have. Over the years, smallholder farmers have been able to realise fairly good harvests even when using traditional farming equipment such as ox-drawn implements.

**Shortage of irrigation equipment as an infrastructural constraint**
The majority of the respondents (92.8%) agree that shortage of irrigation equipment is a major production and marketing constraint in smallholder potato production in Nyanga. Despite the availability of irrigation water which is gravity-fed, most smallholder potato farmers cannot afford to buy the poly vinyl chloride (PVC) pipes that are required to convey water from the mountains to their potato fields. Some of the water sources are as far away as fifteen kilometres from their fields and as such would require huge investments in the form of irrigation pipes.

**Factors influencing access to input and output markets**
The third objective of the research was centred on identifying the factors that influence access to input and output markets by smallholder Irish potato producers in Nyanga district. Numerous factors were seen as having influence on access to input and output markets. The top ranking among them included access to communication

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technology, the state of the road transport network, transport availability, the ability to procure inputs and market the potato produce in groups, the quality of their potato produce, and the quantity of potatoes that they produce as individual farmers, consistency in production as well as engagement in contract farming.

Access to communication technology
Communication technology uptake is still very low among the smallholder Irish potato farmers. The use of electronic bank transfers and other non-banking system methods of transferring money while considered to be very useful are hardly used to help smallholder farmers access payments and also make payments for procuring their production requirements. Use of the internet is also almost non-existent. Adaptation to the rapidly changing globalised agri-food market is taking a bit of time for the farmers. It is acknowledged however, that setting up the necessary facilities requires a lot of public and private sector partnership in order to capacitate the smallholder farmer so that they are up-to-date on how they can use and exploit the advantages that information technology brings.

The state of the road transport network and transport availability
Most of the respondents (84.6%) concurred that the poor road transport network in Nyanga district is a major determining factor when it comes to accessing input and output markets. Some smallholder farmers indicated that they are unable to transport their produce to lucrative markets because they are growing the crop in mountainous areas where it is difficult to bring the product to the main transport route. At the same time, the cost of hiring trucks is prohibitive owing to the bulky nature of the potato commodity and also the long distance to lucrative markets across the country.

The ability to procure inputs and market the potato produce in groups
Study results show that the majority of smallholder potato producers in Nyanga are not affiliated to any farmer organisation groups. This might be a possible explanation why they are unable to organise group inputs purchase and transportation of produce to markets. Such alliances when they exist will allow smaller farming units to gain economies of scale, share resources, minimize risk, enter new markets and reduce their transaction costs (Vorley and Fox, 2004). The smallholder potato farmers end up using retained seed to avoid incurring transport cost to far away seed sources. In Bende potato production area, farmers have been making an attempt to organise themselves into groups but with little successes. At least in the 2012/2013 planting season they managed to secure planting input support from Fintrac, an NGO that was helping potato farmers to produce and market the crop, as well as managing funds that had been underwritten by Microking (a loan credit institution). Indeed, the farmers testified that the relative relief they enjoyed through the intervention by Fintrac was quite a welcome development. This acknowledgement points to the importance of value chain finance availability and accessibility to smallholder potato farmers.

The qualities of their potato produce
A possible reason why smallholder farmers are only able to sell their produce through limited market channels is because they undertake limited value addition activities such as grading, sorting and packaging. The smallholder Irish potato farmers seldom take heed of the quality concerns of their produce. As such, they are unable to meet the quality specifications of other formal and informal market channels which hold product quality in high regard. The low quality of the potato produce is also attributed to the use of retained seed which is prone to attack by diseases in the field and during storage. All these factors contribute to quality being an important attribute towards the access of output markets by smallholder potato farmers. Middlemen who come and procure the crop from smallholder farmers usually require that a smallholder farmer sells large quantities of the crop. On the other hand, ferrying the commodity to fresh produce markets in Harare, Mutare and other towns requires that smallholder farmers produce and sell quantities in large amounts, enough to fill the capacity of delivery trucks. Smallholder potato farmers have an opportunity to organise themselves into groups and be able to sell their produce in bulk.

Restricted engagement in contract farming
The 18.6% of the respondents who strongly agree and 54.6% who just agree that contract farming engagement influences the extent to which smallholder potato farmers get access to input and output markets give an impression of lack of unanimity on the role of contract farming arrangements. Contract farming arrangements can be in the form of resource providing arrangements where farmers are able to access high quality inputs for crop production. Contract farming arrangement may also involve product and production management by the value chain financier (abiding, 2004, ICRISAT, 2009). In this case, the financier may also procure the product from the producer. As such, contract farming arrangements enable crop producers to access input and output markets. The remaining respondents (26.8%) did not have a lot of faith in contract arrangements as they related to previous cases where they witnessed forced asset seizure by contracting party in the past years to defaulting farmers.
These occurrences have reduced some of the smallholder farmers’ willingness to enter into contract farming arrangements again.

CONCLUSIONS
The study concludes that the absence of Irish potato farmers’ associations through which members could pool resources together to procure inputs and bargain for favourable transportation arrangements as a group leaves the farmers vulnerable to exploitation by middlemen. The study further concludes that the smallholder Irish potato farmers fail to access high value potato markets as a result of poor product quality, production inconsistency, limited value addition, limited engagement in contract farming arrangements, and their failure to meet legal and industry standards. Limited access to appropriate communication technology, the state of the road transport network and transport availability also influences the farmers’ choice of market channels. It is thus acknowledged that that the smallholder Irish potato farmers are weighed down negatively by the numerous constraints littering the potato agribusiness value chain.

Recommendations
Smallholder farmers need to embrace value chain activities such as grading, sorting and product packaging prior to marketing if they are to entertain hopes of accessing the lucrative high value agrifood markets which promise better returns for producers. Smallholder farmers should also collaborate more amongst themselves and organise themselves into farmer organisation groups in order to attain economies of scale when it comes to marketing the crop, procuring inputs and sharing knowledge amongst themselves. There is greater scope for improves access to markets other than the one major market channel that is being accessed by the majority of smallholder potato farmers. There is also a need to explore the issue of inputs credit schemes specifically targeting smallholder potato farmers, as is the case in the cotton and tobacco sub-sectors.

Research limitations
Value chain analysis requires the full participation of all value chain actors and calls for the conduction of learning workshops where all value chain actors get the opportunity to interact and share problems and possible solutions. This process dispels any misconceptions and misunderstanding of the roles and participation of each value chain actor in the potato agribusiness value chain. However, this did not happen principally due to resource limitations. Nevertheless, the researchers are convinced that the respondents sampled made up a representative cross section that allowed for an in-depth analysis of smallholder Irish potato agribusiness value chain. The research objectives proposed were certainly met.

Areas for further research
The study recommends that further research be carried out on how best the few extension officers in the Irish potato growing areas can best offer their services.

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