



<b>From</b>	Agri Knowledge Centre
<b>To</b>	EMT Members, Agri Commercial Officers (ACO's)
<b>Location</b>	Kigali
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<b>Subject</b>	Sector Policy for Irish Potato 2012 – Final

## 1. Summary – Quick Guide – Irish Potato

### **Value chain:**

- Production cost RWF 0.7 – 1.7 million/ha depending on use of fertilisers, purchased seeds and other input costs. High dependence on pesticides.
- Yield of 12-30MT/ha. Production potential is as high as 38 MT/ha.
- Market prices are relatively volatile, with no option of storage in case of lower prices.
- The price obtained by farmers for their potatoes, varies in 2012 between RWF 120-200/kg and can vary significantly (RWF 65 to 300/kg for “washed” potatoes.) For current prices please refer to commodity data spreadsheet.
- Rwanda is reported to be a competitive (low cost) producer in the region.
- A significant portion of the Irish potatoes produced are consumed in the areas of production
- There is no potato storage or processing in Rwanda

### **Main risks:**

- Crop very sensitive to diseases
- No storage means crop has to be sold soon after harvest
- Volatile market prices
- Land with best productivity often not suitable for mechanisation (stones and rocks)
- Medium term risk due to poor rotation and lack of (improved / disease resistant) seed multiplication / availability.

Most of the above risks can be mitigated through adequate farmer selection, storage access, off-take arrangements and market price monitoring.

### **Financing opportunities:**

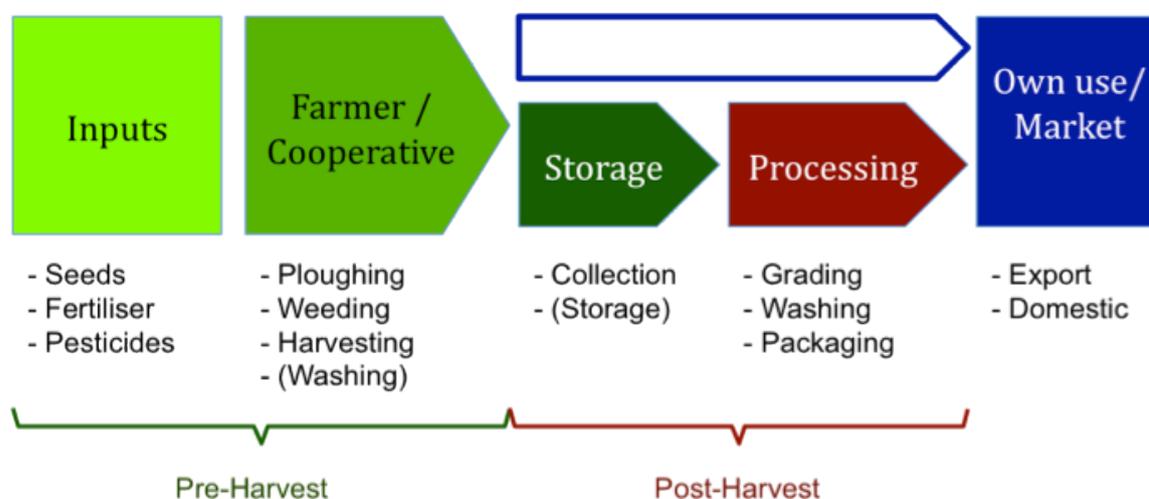
- Input finance offers highest needs in potato farming. Financing needed by large individual farmers or cooperatives, however relative high risk because only small percentage of potatoes are sold through cooperatives, increasing repayment risk of financing:
  - o Clear identification of input needs and costs,
  - o Production track record

- Financing strictly limited to maximum of 20% (farmers) and 35% (cooperatives) of market value of expected production

Opportunity for “Sarura” or Save for Loan financing product.

- Asset finance may be used for transport equipment for cooperative at present (2012) and may be storage and processing facilities in future.

### 3. Irish Potato Value chain



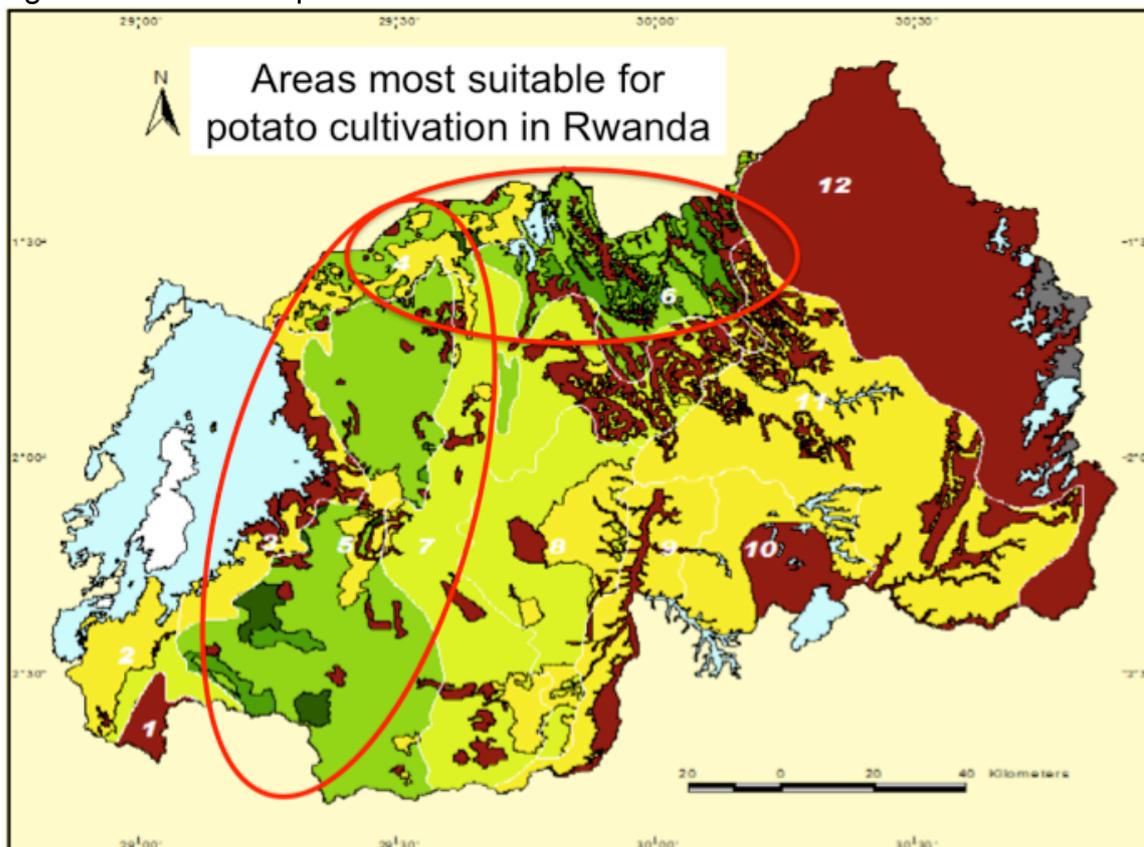
It is important to have a good understanding of the potato value chain and the specific risks related to each stage of the business.

Irish potato (hereafter referred to as “potato”) is a plant grown for its tubers (roots) rich in hydrocarbons and starch. German missionaries introduced the crop in Rwanda in the 19th Century, but it was only in the 1930’s that potato production was officially started in the country.

Potato has become an important food crop in Rwanda with about 133,000 hectares under cultivation and more than 1 million MT of potatoes produced. (in 2012 according to RAB).

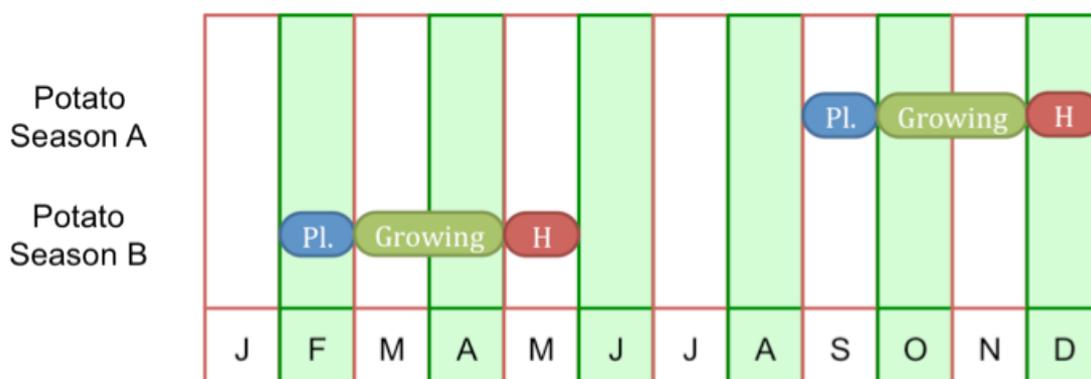
Irish potato requires a relatively cool and moist climate to achieve the best results. Musanze, Burera, Gicumbi and Nyabihu account for 90% of the national potato production.

Fig. 1 Best areas for potato cultivation in Rwanda



In the key potato growing regions the average yield for consumption potatoes is about 12MT/ha, but better farmers achieve as much as 30MT/ha.

### Potato Growing Seasons in Rwanda



The potato production cycle is quite short with 3-4 months and follows two main growing seasons, however in some regions it is possible to extend the growing cycle beyond those seasons if sufficient moisture is available in the soil.

Potatoes have become a very popular food source in Rwanda, more important than some other food products such as maize in the urban areas. In the production regions the consumption is reported to reach as much as

250kg per person per year and is on average significantly higher than other regions or urban areas. The average consumption in urban areas is 80kg per person per year. The limiting factors for production are (i) the availability of suitable land, (ii) the high production costs, and (iii) the availability of potato seeds.

Potato production is one of the most profitable, however because of a tendency to grow potatoes without adequate rotation and limited use of organic matter, there is a real concern for soil degradation and loss of fertility over time.

The potato production cycle is short, only about 4 months compared to 6 months for beans or 8 months for maize, making it in theory possible to have up to three production cycles per year, provided water (rain / irrigation) is available.

Potato production is heavily reliant on pesticides, with as many as 8 applications of 3 different chemicals during each season. The combined cost of potato seeds, pesticides and land preparation makes the potato production one of the most expensive food crops, however largely compensated by the high yields and good returns that can be achieved. On average it will cost a farmer as much as RWF 1 million per hectare (in 2012) to produce potatoes, however the average return is close to RWF 2 million (in 2012).

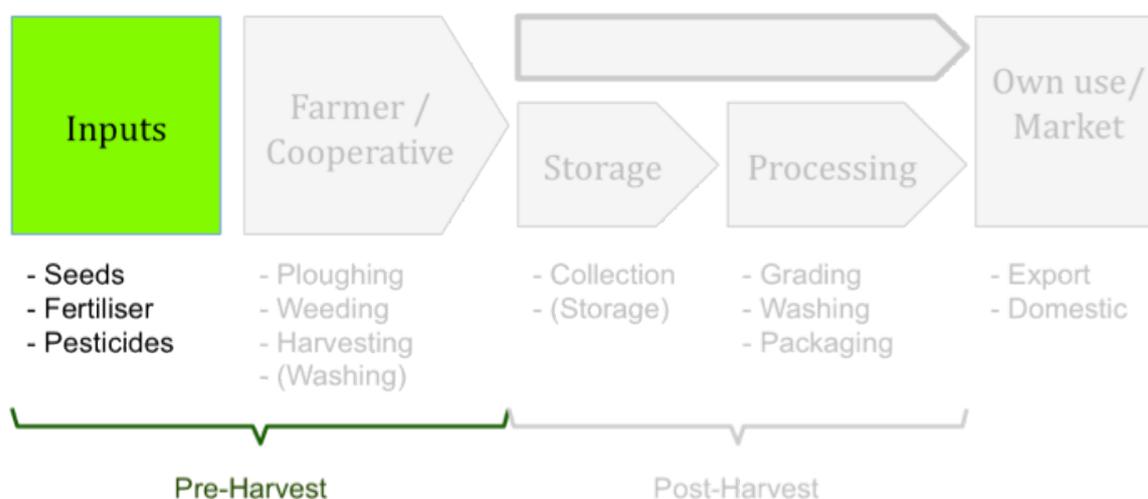
One of the main current weaknesses of the Rwanda potato sector is the shortage of seed material and lack of adequate storage facilities.

Farmers can re-use their planting material approx 3 times. After which they need to buy new seeds. If they use their own planting material more often, they increase the risk of lower yields. The lack of storage or processing facilities makes it necessary for farmers to sell their production almost as soon as it is harvested.

The potato business is very simple as currently in Rwanda there is virtually no storage or processing and therefore the value chain could be simplified to inputs > production > harvest > sale.

The main areas of attention are related to (i) inputs (heavy reliance on pesticides), (ii) production (short production cycle) and (iii) distribution to markets (essentially transport availability at harvest).

## a) Inputs



### Seeds

While farmers can retain part of their (smaller) tubers as seed material for the following season, this can only be done during about 4 cycles, after which the purchase of new seed material is necessary. In Rwanda there is generally a lack of adequate seed material because of insufficient multiplication and as a result farmers may use their seeds for a larger number of cycles or purchase seeds from uncertified sources.

Shortage of potato seeds is due to the fact that farmers generally do not like potato seed multiplication, for the following reasons:

- Potato seed yields are significantly lower because the growth has to be stopped as soon as the tubers have reached a certain size.
- On average there is a 2 month time gap between the harvest of the potato seeds and their sale, during which time the farmer has no access to financing and is tempted to sell part of the seed material as consumption potatoes
- The profitability of seed potato production is not (significantly) better than that of consumption potatoes.

Certified seeds cost about RWF 250-300/kg and 2-2.5 MT of seeds are required for each hectare of field, which corresponds to a total cost of about RWF 500-750,000 per hectare (2012).

### Fertilisers

Generally potato farmers use little fertiliser despite the recommendations and the good results it generates. This may be due to the high natural fertility of the soils used, therefore considering fertilisation superfluous. Farmers are also encouraged to apply organic matter to their soils, to slow down the soil degradation and maintain their fertility. Besides being expensive, organic matter used is however

often poor in nitrogen due to leaching during storage and therefore its apparent benefit for the crop is limited, which may not encourage a high usage of organic matter.

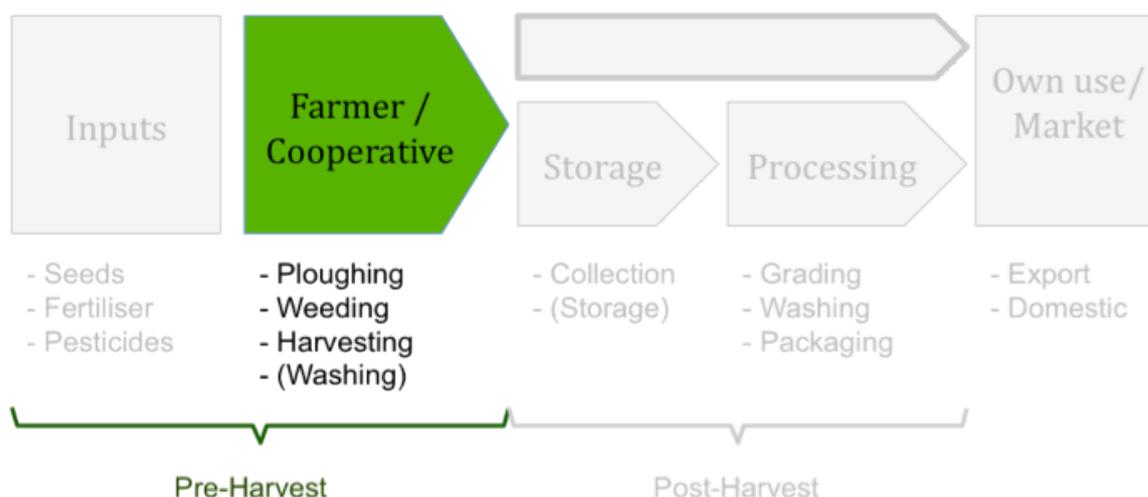
### *Pesticides*

Potato production in Rwanda is currently heavily reliant on pesticide applications, representing between RWF 100 and 200,000 per hectare (2012), the most used pesticide is Dithane, a fungicide to control potato blight (*Phytophthora*). Each crop requires between 6 and 8 applications of 3 different pesticides, making it one of the crops with the heaviest pesticide usage in Rwanda.

### *Key issues for inputs:*

- Long term land fertility
- Use of fertilisers
- Use and cost of pesticides
- Production cost

### **b) Farmer / Cooperative**



Potato crops have one of the shortest production cycles with 4 months between planting and harvesting. The crop grows best in light soils and will accommodate itself to a range of climates, however it is in the lava soils of the northern province and the soils of the Congo Nile crest that the production is most successful.

Production costs vary significantly depending on the availability of seeds and range between RWF 0.7 and 1.7 million per hectare (based on 2012 price data).

Table 1: Potato production costs based on yield of only 9.4MT/ha

	Unit	Value
Average yield	Kg/ha	9,400
<b>Average production cost</b>	<b>Rwf/kg</b>	<b>89</b>
Land renting	Rwf/kg	10
Labour 1 <sup>st</sup> and 2 <sup>nd</sup> plowing	Rwf/kg	23
Organic fertilizer	Rwf/kg	11
Seeds	Rwf/kg	11
Small tools (buckets, bowl, basket, bag...)	Rwf/kg	1
Labour Seedling	Rwf/kg	4
Fertilizers (NPK, DAP, Urea)	Rwf/kg	2
Labour 1st and 2 <sup>nd</sup> weeding	Rwf/kg	8
Labour spreading of fertilizers	Rwf/kg	4
Pesticides	Rwf/kg	3
Labour application of pesticides	Rwf/kg	1
Labour harvest and transportation	Rwf/kg	5
Labour post harvest treatment	Rwf/kg	1
Depreciation of tools (hoe, pump, watering can...)	Rwf/kg	3
<b>Total cost</b>	<b>Rwf/kg</b>	<b>89</b>

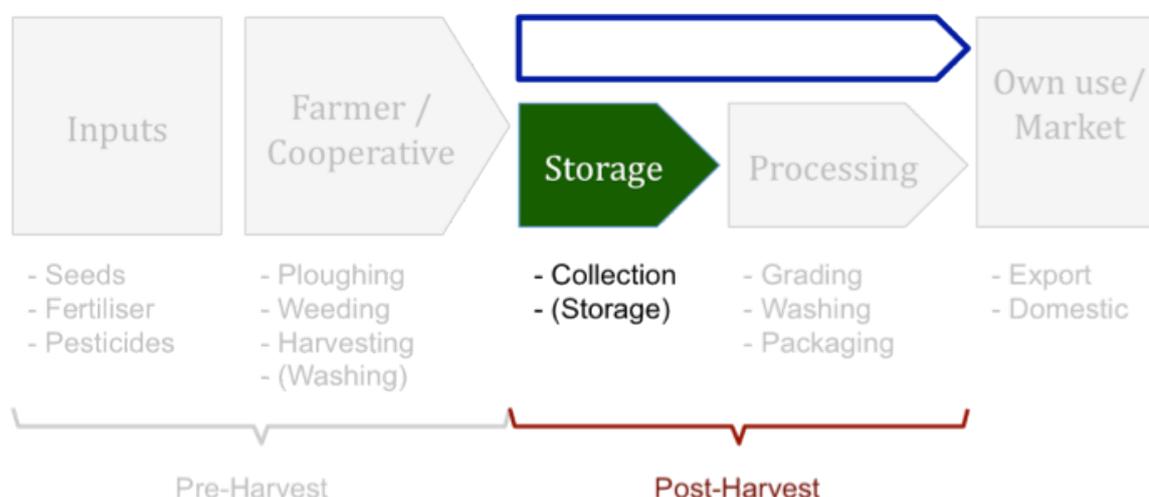
Source: FIDA - Minagri

Because of the short production cycle, high yields and good profitability of the potato production, farmers tend to neglect the crop rotations to maximise their short-term profits. This is a significant potential risk as it could enhance problems linked to disease and soil degradation.

*Key issues for farmer / cooperative:*

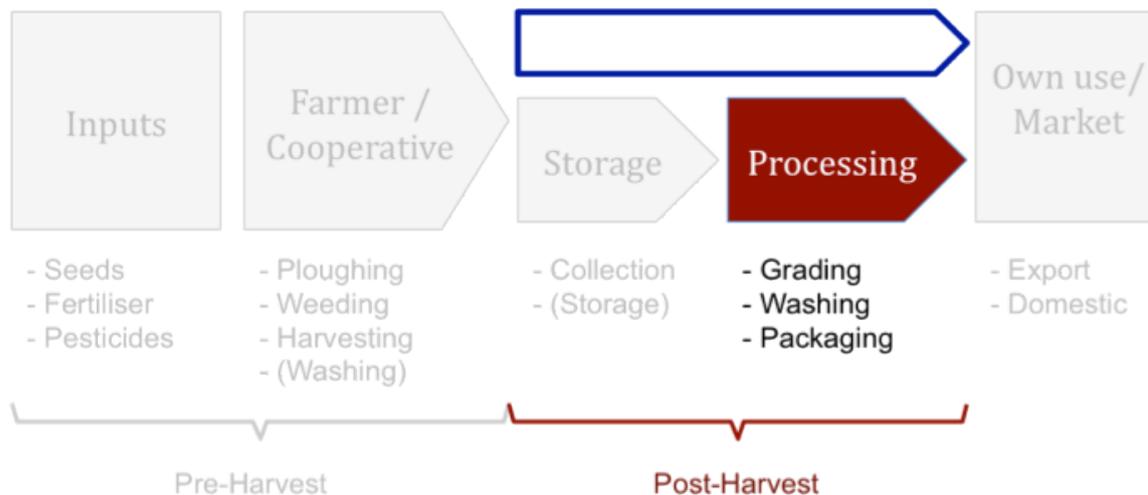
- Disease resistance
- Pesticide applications
- Yield per hectare
- Type of crop (seed or consumption)

### c) Storage



There is no storage facility available for potatoes in Rwanda, which means that farmers have to sell their production soon after harvest. Because of the short production cycle and climate in Rwanda, the production of potatoes is possible during extended periods of the year and storage needs would therefore generally be limited to a maximum period of a few months.

#### d) Processing



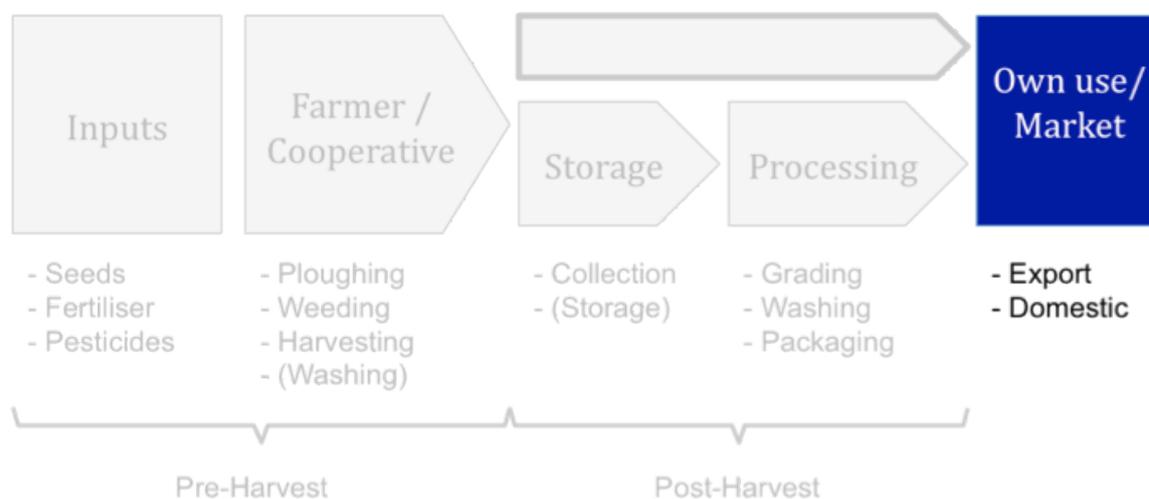
The only “processing” of potatoes that is taking place in Rwanda is a recent development whereby some cooperatives and associations are washing the potatoes and conditioning these in nets or baskets. These washed potatoes have the advantage of being more efficient to transport, last better in storage and in particular fetch a significantly higher price with the HORECA (Hotels, Restaurants and Coffee Shops) outlets and supermarkets.

There is no potato transformation in Rwanda. Organisations such as Imbaraga are conducting trials to produce potato chips and or starch to add value to the produce or ensure that potatoes that are damaged during harvest are being used. Chips, for example, could substitute current products in the markets, which are all imported. These products are still limited to trials that may take some time before they reach commercial activity levels.

#### Key issues in processing:

- Currently no processing capacity in Rwanda

### e) Use / Market



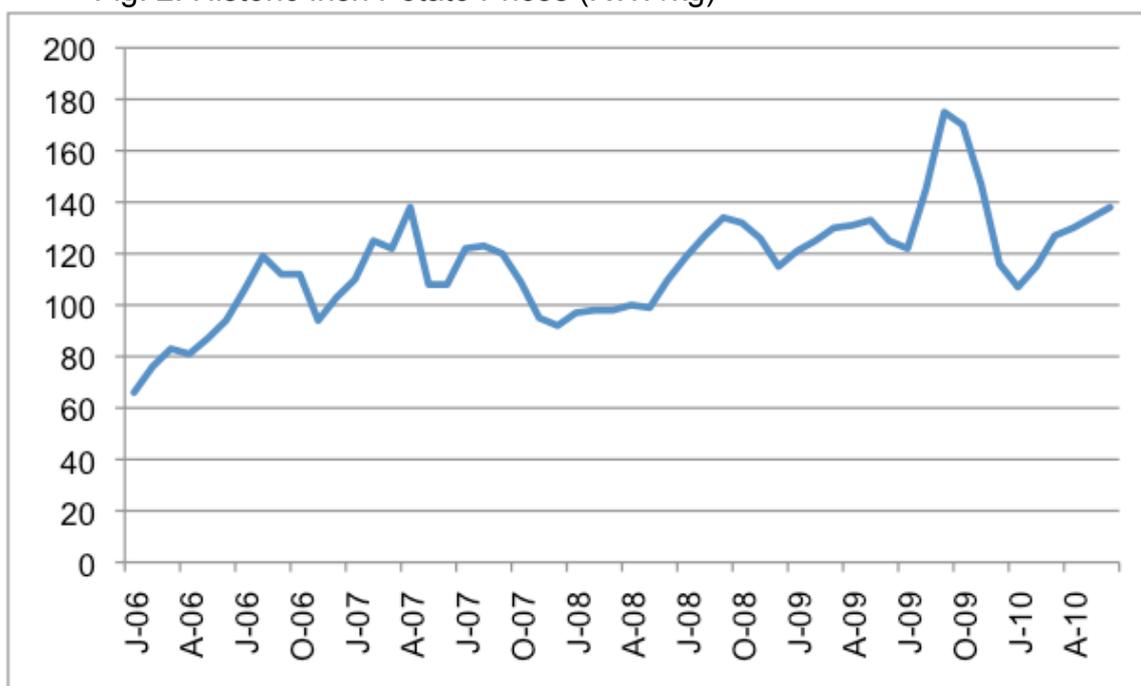
The potatoes are mainly consumed in their areas of production (up to 250kg per person/year) and in the urban areas (about 80kg per person/year). The availability of potatoes during extended periods of the year due to the favourable climate of Rwanda and because demand (including export to neighbouring countries) tends to exceed production, investments into potato storage have not happened.

Most potatoes are transported to the markets almost immediately after harvest, generally unwashed in large bags. The price obtained by farmers for their potatoes, currently (2012) varies between RWF 120-200/kg and can vary significantly (RWF 65 to 300/kg\*). In most cases the farmer does not know the price he will receive for his potatoes before reaching the city market. We also refer to the (BPR) commodity data spreadsheet.

(\*High price obtained for “washed” potatoes)

Rwanda is reported to be a competitive (low cost) producer in the region, with export potential to neighbouring countries, although the domestic market demand is more than enough to absorb the countries full production.

Fig. 2: Historic Irish Potato Prices (RWF/kg)



Source: MNAGRI

Because of the relatively high production achieved by farmers individually, farmers may organise their own transport to the market and therefore do not rely or depend on a cooperative for this activity. Members will generally sell just enough of their production through the cooperative to cover for the pesticides or other inputs that may have been supplied by it.

Some cooperatives and Imbaraga have started selling baskets (nets) of washed potatoes to the HORECA (Hotels, Restaurants & Coffee Shops) sector as well as supermarkets. The prices obtained for these “processed” potatoes are almost twice as high as the unwashed potatoes and therefore of significant interest. Washed potatoes also appear to have a longer shelf-life.

*Key issues in Market:*

- Unpredictability and volatility of price
- No organised collection and sale
- High level of side-selling
- Dependence on high local consumption and urban markets

#### 4. **Financing needs**

Any financing opportunity in the Irish potato business should be considered on the basis of the cash flow that will be generated and how secure this cash flow is. Because the potato business in Rwanda requires no storage and there is no processing industry (at present), this sector is

not very organised and the involvement of cooperatives is relatively limited.

	Input finance	Raw material collection finance	Inventory finance	Asset Finance
Farmers	X			X
Cooperatives	X			X

#### **a) Input finance**

The needs for farming inputs in potato production are relatively high despite the frequent use of own seeds and little or no fertiliser. The costs are high mainly due to the fact that most farmers rent the land, the high usage of pesticides and labour costs, which are very significant in potato production.

Potatoes are very sensitive to diseases and pests, despite their short production cycle. This is exacerbated by the fact that farmers have the tendency to skip or shorten the rotation, thereby increasing the potential risk of crop failure.

The introduction of new varieties, although very significant to ensure a continued high productivity and quality of potatoes, is hampered by the lack of seed multiplication. However, when seeds are available and purchased by the farmers, they represent a very significant part of the input costs.

The cooperative will generally be responsible for the procurement of pesticides, fertilisers if applicable and small equipment (such as sprayers and protective gear).

#### **b) Asset finance**

The absence of storage or processing makes the need for asset finance limited (2012). This may change in future if investments in both storage facilities and processing are considered. Equipment for land preparation is being considered by Imbaraga, however the large number of stones and rocks present in the volcanic soils of the northern region make the use of mechanisation difficult.

Another possible investment would be in trucks to ensure the transport of the potatoes to the markets after harvest.

### **c) Raw material collection finance**

There is a strong market for potato in Rwanda as commercial production fails to meet demand. Cooperatives play a limited role in organising transport for their member's production to the market, however farmers, especially the larger and more productive ones, tend to organise their own transport to markets as they can generally fill a truck by themselves and gain little benefit for having this organised by the cooperative. As a result there are no opportunities for crop collection finance at this point in time (2012). This may change if cooperatives or private parties move into the processing of potatoes (for example transformation into potato chips or production of starch).

### **d) Inventory finance**

Not applicable for potatoes as no storage facilities exist at present (2012). This may change when storage facilities are built for instance for storage of certified seeds.

## **5. SWOT Analysis**

The SWOT (strengths, weaknesses, opportunities and threats) analysis of the potato value chain is summarised below

<b><u>Strengths</u></b> <ul style="list-style-type: none"><li>- Suitable soil &amp; climate for potato</li><li>- Short production cycle (4 months)</li><li>- High yields</li><li>- Strong market demand</li><li>- Cost competitive with neighbouring countries</li></ul>	<b><u>Weaknesses</u></b> <ul style="list-style-type: none"><li>- High usage of pesticides</li><li>- Volatility and unpredictability of prices</li><li>- Limited availability of seeds</li><li>- Absence of storage or processing</li></ul>
<b><u>Opportunities</u></b> <ul style="list-style-type: none"><li>- Export markets</li><li>- Potential for processed products such as chips, starch, etc.</li></ul>	<b><u>Threats</u></b> <ul style="list-style-type: none"><li>- Soil degradation and disease build-up due to lack of adequate rotation</li><li>- Risk of crop loss due to unfavourable weather (excess rain)</li></ul>

## 6. Risks

The table below summarises the main risks and mitigants with regard to different financing opportunities in the potato sector:

Key risks	Mitigants
Perishable crop	Transport and sell quickly
Price risk	Use low prices to calculate repayment capacity, off take contracts
Losses (drying in sun, sand or soil, damage at harvest during transport, loss during transport, etc)	Take into account losses when calculating repayment capacity
Climate risk	Take into account lower yields, repayment of loan next season
Diseases	Crop rotations, pesticides
Soil degradation	Crop rotations, organic and chemical fertilisers

### a) *Input Finance*

Input finance is probably the only area of the potato business sector that would be of interest to finance because of the significant amounts involved. Seeds, pesticides, labour will quickly add to as much as RWF 1.7 million per hectare.

The Save for Loan or “Sarura” financing product would be well suited for this sector, due to its high level of input costs.

Input finance for the potato sector would be of relatively high risk, because most larger farmers will sell their crop directly to middle-men or markets and it may be difficult for the bank to “control” the cash flow resulting from the sale. Members of cooperatives rely mostly on the cooperative for the procurement of seeds and pesticides, but not for the sale of most of their produce, so the cooperative would not be a very good counterparty for input finance to obtain for financial security either.

Risk	Description	Mitigant
Usage	Risk that financing is used for other purposes than purchase of inputs	Disbursement of finance facility subject to actual invoices for inputs
Performance	Risk that the crop fails and that the sale proceed of the harvest is not sufficient to reimburse the input financing	(i) Farmer or cooperative must have adequate track record of yields and profitability; and (ii) Members of the cooperative must demonstrate that they adhere to sound cropping practices (rotation) However potatoes remain a

		high risk crop with yields very sensitive to disease and agricultural practices.
Market	Risk that the farmer / cooperative is unable to sell the crop at a sufficient price	(i) Preference should be given to farmers or cooperative with off-take arrangement or usual client base (ii) Advance rate should be no more than (20)% of expected farmer income or (35%) of expected cooperative income based on last 3 years performance.
Price	Risk that the potato price drops significantly after financing is disbursed	(i) Demand outstrips production and Rwanda has significant export potential; and (ii) Financing is only granted for part of (max 20% for farmers and max 35% for cooperatives) of the expected market value of the expected potato production
Payment	Risk that farmer or cooperative fails to pay or payment is not used to repay financing	Payment must be made through cooperative account with BPR. This may be difficult to enforce due to cash sales on the market (farmers) the high level of side-selling (cooperatives).

**a) Raw Material Collection Finance**

No potential in potatoes at present (2012).

**b) Inventory finance (Warrantage or WHR)**

Not applicable for potatoes at present (2012).

**c) Asset finance**

Financing of assets (transport vehicles) to collect the tubers from the field and/or delivering the products to the urban markets may also be considered. (Please refer to Asset Finance product description for details).