Ajara agriculture sector competitiveness and export promotion policy study

Prepared by Dr Steve Goss for UNDP

Co-financed by the EU through its
European Neighbourhood Programme for Agriculture & Rural Development
(ENPARD)

BATUMI 2014

All right reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without prior permission.

This is an independent publication commissioned by the United Nations Developmen Programme (UNDP). The views expressed in this publication are those of the authors and do not necessarily represent those of UNDP.

Copyright UNDP, 2014
by the United Nations Development Programme

cover and layout: CALLIGRAPHY Ltd.
Printed in Georgia by

Table of Contents

1 Introduction

The EU-funded European Neighbourhood Programme for Agriculture and Rural Development (ENPARD) began operating in Georgia in 2013 with the objective of boosting the production of food and reducing rural poverty, through strengthening of co-operation amongst small farmers and improved performance of the institutions engaged in agriculture. Its main partners are the Ministry of Agriculture of Georgia and the Ministry of Agriculture of the Autonomous Republic of Ajara, together with their agencies and other agricultural service providers.

Project activities are implemented through FAO, local NGOs and in the case of Ajara UNDP, which also provides co-financing.

The objective of this assignment was to prepare a study of agricultural competitiveness and export promotion, to contribute to policy development and programme implementation. The field work was carried out in a 3-week mission in January-February 2014, and the report submitted in March.

1.1 Overview of Ajara

The Autonomous Republic of Ajara lies in the south-west corner of Georgia, with the Black Sea as its western border and Turkey to its south. It gained its current name in 1991 after the dissolution of the Soviet Union, where it was known as the Ajar Autonomous Soviet Socialist Republic.[1] Certain responsibilities, such as foreign trade and defence, remain at the state level but Ajara has its own government with four ministries: finance and economy; labour, health and social care; education, culture and sport; and agriculture with the Ajara Ministry of Agriculture being the main counterpart for ENPARD Ajara.

The Republic of Georgia has two large neighbours, Russia to the north and Turkey to the south-east, that have played major roles in its history, and also borders Armenia to the south and Azerbaijan to the south-west, as well as having 310 km of Black Sea coast. Every lorry-load of goods exported from Georgia must pass through one of these countries or leave by ship.

Relations with Russia have been frequently difficult since the end of the Soviet Union, including a Russian import ban on Georgian products that began with wine in 2006, then added mineral water, and was soon extended to include citrus fruit. Conflict with Russia broke out in 2008 over the region of Abkhazia in the north-west corner of the country and the coastal region of South Ossetia, which borders Russia and includes the important Roki tunnel through the Greater Caucasus Mountains. By the end of August 2008 Georgia had effectively lost control of both these regions. Both countries cut off diplomatic relations with the other and closed their embassies. This all had considerable trade implications, including the continuing Russian embargo, complete closure of the road route along the Black Sea coast to the Russian city of Sochi, and major difficulties in trading through the Roki tunnel due to South Ossetian control and toll charges at one end and Russian control at the other.

1. For a summary of Ajara's long history and a discussion of some of the factors that led to its autonomous status, see http://en.wikipedia.org/wiki/Adjara.

The trade embargo had a dramatic impact on Ajara's citrus exports, for which Russia had been the main market, and an estimated 50 % of the 2006 crop was simply wasted for lack of markets.[2] Traders worked hard to shift their exports to the Ukraine, which is now the largest export destination, though it is understood many of the imports are shipped on to Russia, Moldova and Belarus. Exports to Azerbaijan have also grown markedly, and it is believed that the majority of this fruit ultimately reaches the Russian market. The economic costs of this for Ajara have included higher transport and transaction costs, the share of the marketing margin being taken by the intermediary Ukranian and Azeri traders, and the various costs and lost opportunities resulting from the lack of stable trading relationships.

Tensions with Russia have recently started to ease, with citrus exports being permitted from December 2013 and exports of wine and mineral water planned to restart in February 2014. On 19th December 2013, Vladimir Putin indicated in a press conference that diplomatic relations with Georgia might soon be resumed, though no official decision has yet been taken. These developments are viewed by farmers and traders with a mixture of excitement at the new export opportunities they offer, and nervousness that access could be cut off again at any moment.[3]

1.2 Regions of Ajara

Ajara is divided into six administrative regions: Keda, Kobuleti, Khelvachauri, Shuakhevi, Khulo and the City of Batumi with its surrounding villages. It has considerable diversity within its 2,900 square kilometres, but can be roughly divided into three main agro-ecological zones:

- Coastal strip
- High mountains
- Mountain valleys

1.2.1 Coastal strip

The coastal strip includes the western part of the regions of Khelvachauri in the south and Kobuleti in the north. It also contains the regional capital and port of Batumi, and the second city of Kobuleti.

Along most of the coast, the land begins to rise almost immediately as you move inland, so this is a region of low hills. In this zone the southerly location, strong maritime influence and relatively low altitude give average winter temperatures of 4-6° C and summer temperatures of 22-24° C. Frosts do occur, but are rarely severe so a range of sub-tropical crops can be grown, including mandarins, amongst the most hardy of the citrus family.

---

2. Source: Ajara Regional Development Strategy.

3. Since the mission, Ukraine has experienced a serious crisis including Russian intervention in Crimea. The full implications of this for Georgia's trade with Ukraine and with Russia remain to be seen.

Most of the soil is heavy clay which, combined with the high annual rainfall of more than 2,200 mm, leads to serious problems of water-logging and constrains the choice of plants that may be grown. The principal crops are citrus, persimmon, hazelnut and tea, though most of the tea plantations have now fallen into disuse. This same selection of crops is found on the limited areas of flat land, on the gentle slopes and on the steep slopes, which are usually terraced. One particular feature on the former tea plantations is that root exudates and leaf fall from the tea plants have further lowered the pH on these inherently acidic soils, placing an additional limitation on the range of crops that can be grown.

Farms throughout Georgia are small, those in Ajara are smaller than average, and the farms in this coastal strip are the smallest of all, with the average citrus farmer having just 0.25 of orchards. Most farms keep one or two cows to provide the household with milk, which makes an important contribution to total food production even though little of it is formally marketed.

For the large majority of farmers in this zone the practical enterprise choice is between different perennial trees and bushes, including the established favourites of mandarins, persimmon and hazelnut, the declining product of tea, and a few new arrivals, including blueberries, which are well-suited to the acidic former tea gardens. Hazelnuts tend to be concentrated on the lower slopes, citrus somewhat higher up, and most farmers simply continue to grow whatever type of plant was there when they inherited or otherwise acquired the land.

For those farmers fortunate enough to have an area of relatively flat and well-drained, there is the possibility of vegetables, either grown in the open or under plastic. Some farmers might also choose to extend their production of milk and beef, though with the serious shortage of forage and grazing land they would be quite dependent on bought-in feed, and so their profitability would be very sensitive to the relative prices of milk and concentrates.

Up till now, mandarins have accounted for the large majority of agricultural output from this zone, and so this report looks in considerable detail at mandarin production and marketing, and also considers this zone's second most important product: hazelnuts.

Non-agricultural opportunities are greatest in this zone, with easy access to the coastal cities of Batumi and Kobuleti, with their manufacturing, trading and service industries and a huge influx of tourists in the summer months. When talking of competitiveness here, the biggest question is whether farming can compete with non-agricultural activities for the family's time, effort and capital.

1.2.2 High mountains

Ajara is split by two high mountain ranges: the Meskheti range that starts some 10-15 km inland from Batumi and runs up to the north-east, and the Shavsheti range that forms the central part of the border with Turkey. These mountains rise to more than 3,000 metres and are largely impassable by road, so Batumi is connected to Eastern Georgia and Tbilisi by the main road that runs along the valley between these two mountain ranges.

Temperatures on the high mountains fall to an average of -7 or -8° C in winter, when they are frequently covered in snow. There is little settled agriculture in this zone, and much of the land is wooded, including temperate rain forest on the western slopes of the Meskheti range, where annual rainfall is more than 4,500 mm. The main agricultural product of current importance is honey, produced by beekeepers who move their hives across all three zones during the course of the season, and so honey production is examined in this report.

The high mountains are also important to farmers who are based in the final zone mountain valleys and move up into the mountains with their cattle during the summer, in a long-established pattern of transhumance.

1.2.3 Mountain valleys

The valleys and hills between the Meskheti and Shavsheti ranges include parts of the regions of Keda, Shuakhevi and Khulo, with altitude increasing progressively inland before dropping down towards eastern Georgia. The main towns lie at altitudes of 256 m (Keda), 420 m (Shuakhevi), and 923 m (Khulo). Smaller roads lead off into the side valleys and climb up to higher settlements, including 16,000 ha of alpine pastures in Khulo region.

The lower parts of the valley, passing through Keda region, are suited to a wide range of temperate crops, including grapes, tobacco and a variety of annual vegetables and frost-hardy fruits, though the region is too cold for citrus.

Shuakhevi region, being further inland, has lower overall rainfall and hotter, drier summers. Parts of the Acharistskali river valley have a sub-tropical climate and can grow many of the same fruit and vegetable crops as the coastal strip, together with field crops, such as maize and beans.

Climate in the higher mountain valleys, particularly in Kholo region, is markedly different from the coastal strip: wetter, colder in both summer and winter, and subject to frost and snow, which can leave many villages cut off in winter. Here sub-tropical crops are out of the question and most of the agricultural land is used for extensive grazing of cattle, with areas of flatter valley land used to grow potatoes and make hay for the winter. Tobacco used to be produced during the Soviet era but has now practically disappeared.

There are many rivers throughout this zone and some areas, such as Keda and Shuakhevi, began rearing trout for sale to markets in Batumi and Tbilisi, from around the end of the 20th century..

In trout production, competitiveness is a real issue, since farmers must buy-in expensive feed and fry, and then compete on the market with trout imported from Turkey. However, this is an option for a limited number of producers in specific areas, and in practice, most farmers at higher altitudes have very little alternative other than grazing livestock; for them the question is not what to produce, but how to produce it and how to market it most effectively.

Non-agricultural opportunities are more limited in this zone, particularly as you move further inland and away from Batumi, but include mining, mineral water bottling, a hydro-electric power station, the wide range of small-scale manufacturing and service industries found in every small town, and employment in public services such as education, health care and public administration. The total number of jobs in all these sectors is quite limited, and so the relative importance of agriculture is higher than in most parts of Europe, probably providing the main source of income for more than a third of all households.

This report looks at two farming systems important in this zone: the integrated production of cattle, potatoes and maize, and trout production.

1.3 Agricultural production and exports

This section presents a brief overview of agriculture in Ajara, based on data provided by its Ministry of Agriculture.

1.3.1 Farm structures

Ministry data for 2011 identify:

- 81,000 agricultural households
- 52 agricultural enterprises
- 231 non-commercial legal entities involved in agriculture (churches, schools, etc.)

The private farms or "agricultural households" are generally small, with almost half (46 %) having 0.2-0.5 ha of land. The number of medium-sized and large farms is very low, with:

- 7,900 having at least 1 ha
- 410 having at least 3 ha
- 23 having at least 10 ha
- 13 having at least 100 ha

This size structure will have important implications for farmers' motivation and ability to participate in training, work together, make investments, and implement change. It poses a particular challenge to ensuring a regular supply of product of sufficient quality and quantity to export.

Land fragmentation is also an issue, with farms typically having 1-3 plots of land.

Livestock holding reflects the overall small size of farms together with their emphasis on producing food for household consumption, with almost 60 % (59 %) of cattle-keepers having just

1.3.2 Main products

The Ajara Ministry of Agriculture's draft Strategic Plan identifies the following sub-sectors of agriculture:

- Main branches:
  - Citrus production, strongly export focussed
  - Fruit and nut growing, for:
    - household consumption
    - supplying the domestic[4] and tourist market
    - export, particularly sub-tropical crops such as persimmon, feijoa, kiwi and bay
  - Market gardening & potatoes, for the domestic and tourist market
  - Animal breeding, for:
    - household consumption

4. The draft Strategy describes this as "import substitution", but in fact any food produced and consumed in Ajara will tend to substitute for imports, even if consumed on the farm.

- the domestic and tourist market

- Traditional branches:
  - Vine growing, for household consumption
  - Fish farming, for the domestic and tourist market
  - Crops production
  - Bee keeping, mainly for export
- Supporting branches:
  - Tea growing, for the domestic and tourist market
  - Cereals, mainly maize for livestock (also some legumes)
  - Tobacco growing, mainly for export

Medicinal plants growing

The principal locations of each of these products are discussed in section 1.2 above, together with

The following table shows the breakdown of agricultural land use in Ajara for 2012:

Agricultural land use in Ajara 2012	Total	Share	*Of which:* Productive	Abandoned	Share abandoned
Arable	10,309 ha	14.1%			
Combinable crops	**6,582 ha**	**9.0%**			
Beans	285 ha	0.4%			
Maize	6,297 ha	8.6%			
Potatoes	**2,415 ha**	**3.3%**			
Vegetables	**948 ha**	**1.3%**			
Cucumbers	295 ha	0.4%			
Other vegetables	288 ha	0.4%			
Tomatoes	365 ha	0.5%			
Tobacco	**120 ha**	**0.2%**			
Other edible crops	**13 ha**	**0.0%**			
Forage crops*	**231 ha**	**0.3%**			
Fallow	1,736 ha	2.4%			
Perennial crops	15,899 ha	21.8%	10,861 ha	8,826 ha	56%
Tea	**5,616 ha**	**7.7%**	**520 ha**	**5,096 ha**	**91%**
Citrus	**7,775 ha**	**10.7%**	**6,691 ha**	**1,084 ha**	**14%**
Mandarins	7,375 ha	10.1%	6,345 ha	1,030 ha	14%
Oranges	245 ha	0.3%	210 ha	35 ha	14%
Lemons	155 ha	0.2%	136 ha	19 ha	12%
Pome fruits	**1,386 ha**	**1.9%**	**462 ha**	**924 ha**	**67%**
Stone fruits	**918 ha**	**1.3%**	**492 ha**	**426 ha**	**46%**
Nuts	**1,675 ha**	**2.3%**	**912 ha**	**763 ha**	**46%**
Hazelnuts	368 ha	0.5%	350 ha	18 ha	5%
Other nuts	1,307 ha	1.8%	562 ha	745 ha	57%
Subtropical fruits	**439 ha**	**0.6%**	**415 ha**	**24 ha**	**5%**
Persimmon	420 ha	0.6%	396 ha	24 ha	6%
Kiwifruit	13 ha	0.0%	13 ha	0 ha	0%
Faijoa	6 ha	0.0%	6 ha	0 ha	0%
Vineyards	**180 ha**	**0.2%**	**179 ha**	**1 ha**	**1%**
Bay laurel	**85 ha**	**0.1%**	**85 ha**	**0 ha**	**0%**
Other perennial crops	**1,613 ha**	**2.2%**	**1,105 ha**	**508 ha**	**31%**
Individual planting correction**	**-3,788 ha**	**-5.2%**			
Grassland	44,918 ha	61.6%			
Meadows	**7,159 ha**	**9.8%**			
Pastures	**37,759 ha**	**51.8%**			
Total Agricultural Area	72,862 ha	100.0%	10,861 ha	8,826 ha	

Source: Ajara Ministry of Agriculture

* "Forage crops" calculated by difference from "Total arable area" and all listed arable crops.

** The areas for perennial crops include "individual plantings" on land already recorded for another use, as well as single-species plantations; this correction brings the sum back to the "Perennial crops total" quoted in the statistics.

The overall breakdown is into:

- Grassland: 62 %, of which the large majority is pastures
- Perennial crops: 22 %, of which half is citrus
- Arable and fallow: 16 %, of which half is maize

Statistics for the perennial crops record how much of the area under each crop is "productive": more than half of the total area, some 8,800 ha, is currently not productive. The biggest share of this comes from tea plantations, over 90 % of which are abandoned, but also two-thirds of the pome fruit orchards (apples, pears, etc.) are out of production, together with more than half of all nut groves except hazelnuts.

The following table gives total livestock numbers in Ajara, for 2012:

Livestock in Ajara	2012
Livestock type	Number
Cattle	**95,188**
Cows & she-buffaloes	51,600
Bulls	2,124
Steers	1,936
Other cattle	39,528
Sheep and goats	**5,585**
Horses	**595**
Pigs	**965**
Poultry	**138,900**
Beehives	**18,550**
Trout farms	**92**
Not operating	38
Operating	54

Source: Ajara Ministry of Agriculture

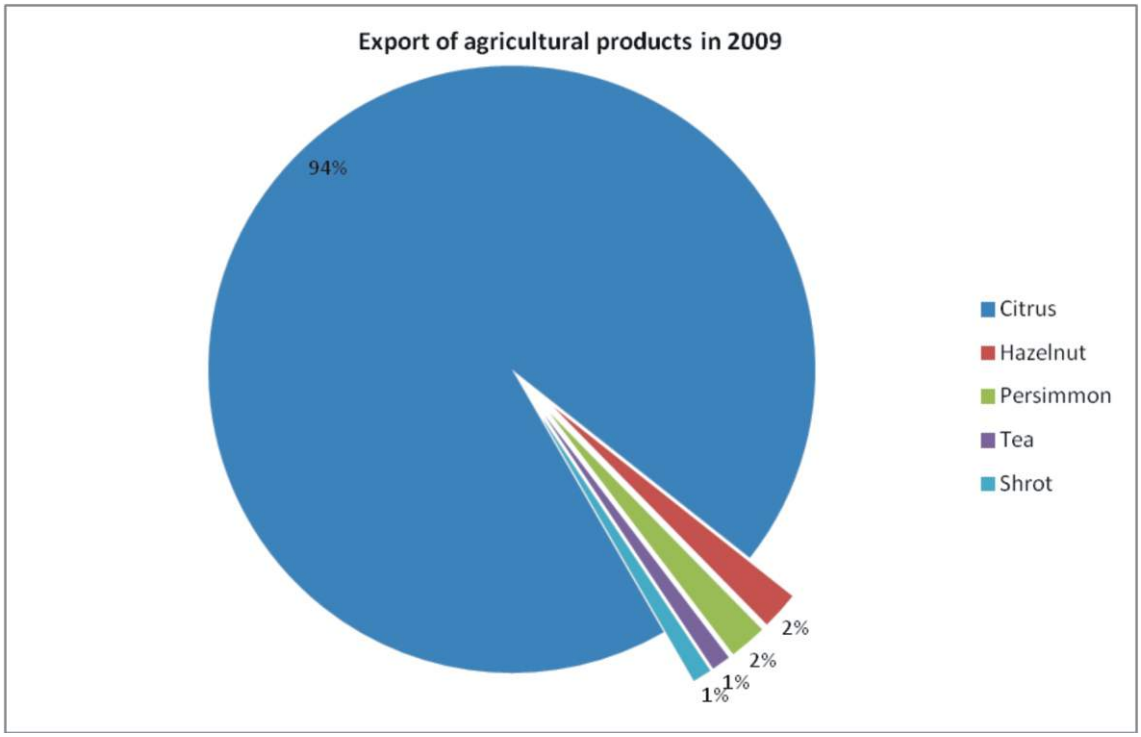
Cattle are by far the most important livestock species.

The number of poultry is extremely small, indicating that there are few, if any, large commercial poultry farms.[5]

5. As an indication of scale, the average size of a "legal entity" poultry farm in Bosnia and Herzegovina is 45,000 layers or 210,000 broilers, depending on its specialisation.

1.3.3 Main exports

Trade statistics are collected at the state level, with no firm data for Ajara, though the draft Strategic Plan of the Ajara Ministry of Agriculture includes the estimates of agricultural exports from the autonomous republic:



Source: Ajara Ministry of Agriculture
"Shrot" is described in the text as "crushed seeds"

The two key features of this chart are:

- The over-riding importance of citrus within agricultural exports;
- The almost complete lack of any other major export, with only hazelnuts and persimmons reaching even to 2 %. (There is also a regular informal export of honey to Turkey, which is not shown in the official statistics.)

The issue of international trade is examined in detail in each of the individual product chapters.

1.4 Focus of this study

The title of this study raises two issues competitiveness and export promotion with competitiveness generally being understood to mean the ability to compete against imports. This section discusses briefly the meaning and importance of competitiveness, import substitution and exports, and finally establishes the list of products to be studied and the main issues faced by each.

1.4.1 The question of competitiveness

"*Can Ajara farmers be competitive?*" Variations of this question are asked repeatedly and strong opinions expressed on what is or is not, could be or will never be, competitive but what does it really mean to be "competitive"?

A business can be considered as competitive if it can, without subsidy, sell its products and generate sufficient profit to stay in business. As a minimum, the cash profit after all business-related payments for inputs, rent, paid labour etc. must be positive, or the business will get into increasing debt and ultimately collapse. The question is what level of return on his own land, labour and capital the businessman or woman requires in order to keep going in the long run.

If a livestock farmer in the mountains of Ajara has no other way of earning money no other enterprise, no jobs to be had then they will keep raising their livestock as long as the income in cash and in kind is greater than their costs, and so they may be competitive on the market against producers with far higher productivity. But as the non-agricultural economy improves and more options become available, many such farmers will value their time more highly, find that they can no longer compete on the market at the kind of prices they need to meet their increasing income expectations, and so "reallocate their resources" to another sector.

Similarly, a mandarin producer may be prepared to keep farming for an income of less than $ 1,000 per year as long as they see no alternative to mandarins. If they find another crop that offers a higher return per hectare, or another job that offers a higher return on their labour, then they will move out of the now-uncompetitive mandarin business.

Currently Ajaran agriculture *is* competitive, it consistently ranks amongst the top three sellers of mandarins to Ukraine against competition from countries such as Spain, Italy, Turkey and Pakistan. It exports honey to Turkey, which has a much bigger honey production of its own. But Ajara manages to compete only by valuing its land and its labour at close to zero. This situation that can continue as long as there are few alternatives, but as the country gradually rebuilds and new economic opportunities arise, the kind of low-productivity, low-quality, low-income production that currently dominates so much of Ajaran agriculture will no longer seem so attractive.

Whichever dimension of competition is considered external competition in the form of imported agricultural products or internal competition from alternative non-agricultural uses for a farmer's time and resources farmers and Ajara as a whole can benefit by becoming more competitive. Therefore the key question is not so much "*Is Ajaran agriculture competitive?*" but "*How can Ajaran agriculture become more competitive?*" This study looks at what government, donors, civil society and the agricultural sector itself should do to help farmers farm better, processors process better and traders trade better, to make agriculture more competitive.

Competitiveness and scale

Improvements in production, processing and marketing can bring big benefits to the agricultural sector, but there is a limit to how much they can raise farm incomes. Section 2 of this report illustrates what is possible for one sector of Ajaran agriculture, citrus, where farmers are currently making less than $ 1,000 a year from their crop. With new techniques, better materials and improved marketing, it is possible to increase yields by a factor of four and raise the selling price by perhaps 50 %, taking gross farm income up to nearly $ 6,000. Whilst this would be considered as a good income in the Ajara of today, it is around half the average family income now found in the western Balkans and a quarter of that in the EU's new Member States. If Ajara manages to develop its overall economy to approach the income levels of Central and Eastern Europe, then even the best of small farmers will experience a growing gap between their standard of living and that of the rest of society.

Two possible responses to this are to subsidise agriculture so as to narrow the income gap, or to increase the average size of farms and thus the income per family. The difficulty is that the total area of land is fixed, so a larger average farm size means a smaller total number of farms and thus a movement of people out of agriculture and into other sectors where their labour is more in demand. Whilst to many this outcome may seem undesirable, it is what tends to happen in the long run, irrespective of preference or policies. As an example, throughout western Europe the number of farms halves and the average farm size doubles roughly once every generation, with the same pattern applying from countries like Portugal with the smallest farms to the UK with the largest, along with rising standard of living in both agriculture and other sectors.

From the policy perspective, this consultant would caution against trying to use subsidies to resist this trend. Apart from being almost bound to fail, it has three major drawbacks. Firstly, it will make it easier for farmers to continue with the very low levels of productivity that characterise most of the value chains studied in this report, thus holding back the changes that are necessary in order to make Ajaran agriculture more competitive. Secondly, it will tend to keep families in poverty, by discouraging people from taking the risks and making the changes that will ultimately bring them a better life. And thirdly, unlike mandarins, money does not grow on trees: in order to subsidise agriculture, government has to tax the rest of the economy and so reduce non-agricultural growth and slow down the creation of the very jobs that the rural population so desperately needs. A more productive use of limited public funds would be to support actions to increase competitiveness, such as those recommended in section 7.3 of this report.

1.4.2 Exports and import substitution

Until a few years ago, discussions about a country's balance of payments used to be focussed on exports, exports, exports. Now the discussion is as much about import substitution, as since it is generally recognised that a dollar less spent on imports is as good as a dollar earned from exports. However, there is still a widespread perception that only marketed produce contributes to import substitution, and that food produced and consumed on the farm somehow does not count.

The reality was recognised by the British government during the Second World War, when they launched a massive promotional and advisory campaign under the slogan "*Dig for victory*", encouraging citizens to use every available bit of land to grow food for themselves. With more food produced in people's gardens, less had to be bought from the market and so less had to be imported. This not only preserved precious foreign exchange and slowed the growth of Britain's burgeoning war debt, but meant that the merchant-ship convoys battling their way across the north Atlantic could carry more fuel and military supplies in place of food.

Fortunately, Georgia no longer has a war to fight, but it does have a growing trade deficit and in 2012 had to spend 6.5 % of export earnings on servicing foreign debt.[6] Every increase in food production will help to reduce this debt, no matter whether or where it is marketed.

---

6. Balance of payments of Georgia, 2012. National Bank of Georgia, 2013.
http://www.nbg.gov.ge/uploads/publications/balanceofpayments/sagadasaxdelo_eng_24_12_13.pdf

1.4.3 Products and issues

At the start-up meeting for this mission, the Ajara Ministry of Agriculture identified the following products as being of greatest interest:

- ***Citrus***, as the most important agricultural export;
- ***Trout***, an important source of income for several villages in Keda and Shuakhevi regions, sold in Batumi and Tbilisi, but now getting strong competition from Turkey;
- ***Tea***, to see whether there is potential to expand production and exports;
- ***Potatoes***, as producers in the potato areas are coming under a lot of pressure from Turkish imports;
- ***Honey***, as the only significant agricultural export to Turkey, to see if the trade can be legalised and so made secure, and also to improve domestic marketing;
- ***Hazelnuts;***
- Other fruit, such as ***persimmon***;
- ***Bay*** leaves.

They also asked what might be done for ***cattle*** producers in upland areas, and at a later meeting the Deputy Minister from the Georgian Ministry of Agriculture, Davit Natroshvili, stressed the opportunities for ***blueberry*** production.

It is not a question of whether Ajara is more competitive in citrus or potatoes or livestock, since these are each produced in different areas. The analysis of Ajara's regions and agro-climatic zones in section 1.2 above showed that there are three main groups of farmers, each with a different set of questions to answer:

- In the ***coastal strip***, the question is which perennial crop to grow (mandarins, hazelnuts, persimmon, tea or some new crop, such as blueberries), how to grow it, and how to market it most effectively.
- In the ***high mountain valleys***, the basic question is how to make more money out of extensive livestock production and the associated cropping.
- In ***the lower hills and valleys*** there is a greater range of options, from field crops such as maize through to a variety of perennial crops, but an individual farmer may have far less choice in the specific circumstances of his small plot.

In addition to this, two specific groups beekeepers and trout producers want to know how to increase their returns through better production and marketing, taking advantage of export opportunities and responding to the challenge of competition. Finally, every farmer must answer the question of whether to engage in agriculture at all.

Given that mandarins account for 94 % of Ajara's agricultural exports, no study on export promotion would be complete without looking at this product in depth. Therefore this study examines citrus in most detail and examines the other selected value chains.

In summary, the products covered by this study are:

- ***Mandarins***: Coastal strip Export promotion
- ***Hazelnuts***: Coastal strip Export promotion
- ***Cattle*** + ***Potatoes*** + ***Maize***: Mountain valleys Import substitution
- ***Honey***: Throughout Ajara Export promotion
- ***Trout***: Mountain valleys Import substitution

2 Citrus

Citrus production, along with tea growing, was established in Ajara during the Soviet Union. Tea production declined rapidly once Georgia gained its independence, but the production of citrus fruit continued and mandarins remain Ajara's largest agricultural export by far. The sector is also the main recipient of government attention and subsidies, and the essential starting point for any study of export promotion.

2.1 Background

- Within Georgia, around 80 % of citrus production takes mainly in Ajara[7], where it is concentrated in the two lower-lying coastal regions of Batumi and Kobuleti. Export by sea takes place through the port of Batumi, so the citrus chain is predominantly an Ajara issue[8].
- Over 90 % of production is mandarins, with some oranges and lemons.[9]

> *Citrus reticulata*
>
> Mandarins and tangerines are closely related forms of the species *citrus reticulata*, and are small, easy-peeling relatives of the orange. Satsumas and Clementines are two seedless forms of mandarin, reproduced by vegetative propagation. Production in Ajara is predominantly of Satsumas, which are more frost-tolerant than other kinds of mandarin and tangerine.

- Citrus production was established in Ajara during the soviet era because this was the warmest part of the Soviet Union and hence the best place to produce a domestic supply of citrus not because of its potential competitiveness on international markets.

- Production was geared to supplying the soviet market, with much of the output sent to Russia. When the Russian market closed, exports shifted to other markets, though remaining almost entirely within the former Soviet Union.

7. Ajara Regional Development Strategy. The remaining 20 % is grown in the next two regions moving up the Black Sea coast: Samegrelo and Guria.

8. Export statistics are available only for Georgia as a whole, but are believed to be highly representative of Ajara, since is carries out the large majority of the exports.

9. According to the draft Strategic Plan of the Ajara Ministry of Agriculture, the orchard area is 91.1 % mandarins, 4.6% oranges, 4.2 % lemons and 0.1% grapefruit and other citruses.

2.2 Citrus production

There are almost 23,000 citrus producers in Ajara. Most have plantations of 0.1-0.5 ha, with an average of 0.26 ha. Given an average yield of around 13 t/ha, individual producers will typically have just over 3 t to sell each year. At the current selling price of around 0.50 GEL/kg, this represents a total annual income of about 1,600 GEL or $900, with significant year-to-year variation.

Key production statistics are shown in the following table:

Key figures on citrus production in Ajara

	Ajara	Per hectare	Per farm	Per tree
Farms with citrus	22,880	3.85	1	-
Citrus area[1]	5,945 ha	1 ha	0.26 ha	18 sq.m
Number of citrus plants	3,391,000	570	148	1
Average harvest[2]	122,000 t	20.5 t	5.3 t	36 kg
Average harvest[3]	75,000 t	12.6 t	3.3 t	22 kg
Potential harvest[4]	271,000 t	46 t	12 t	80 kg

Source: *Ajara Ministry of Agriculture, draft Strategic Plan, p.25*, except as noted below.

[1]The average spacing of 18 m^2 per plant equates to an average distance of 4.2 m between plants.

[2]Average harvest over 5 years, probably including 3 good years and 2 bad years.

[3]Average harvest over 4 years given in the Ajara Regional Development Strategy, using data from the Ajara Ministry of Agriculture.

[4]Potential harvest if the average yield could be raised to 80 kg per tree, a level that some farmers in Ajara are starting to achieve with new cultivation practices.

- The average spacing of 4.2 m between trees is close to optimal, but this average hides a lot of variation, including many closely planted orchards where the dense canopy brings serious pest and disease problems.
- A large proportion of the trees are around 30 years old, when they should be at their peak of production, but the average yields of 22-36 kg/tree are far below their potential yield of up to 180 kg. There are also many trees that are 50-60 years old and well past their prime.
- The area under citrus at the start of 2011 was estimated at 5,900 ha with 3.4 million trees. The 5-year average yield is quoted as 20.5 t/ha, indicating average production of 122,000 t; production figures for 2006-7-2009-10 show an average of 75,000 t, suggesting that the average yield is closer to 12.7 t/ha.

Alternate bearing

One feature of many citrus species is "alternate bearing", the tendency to fruit well in one year and badly in the next. This phenomenon, which is particularly pronounced in mandarins, is typically initiated by an external stress such as frost or drought, but then continues to cycle for several years as a large crop of fruit acts as such a large nutrient sink that it tends to exhaust the tree and leave it in need of a year to recover, as well as direct hormonal inhibition of fruit and flower bud development by the growing fruit. Because the initial trigger is usually a specific weather event, alternate bearing tends to be synchronised in relatively small areas or even individual blocks, so that a small producing region like Ajara will tend to show greater year-to-year variation than a large producer like Spain or Morocco. The alternation in Ajara mandarin yields is reflected strongly in the ARDS data and rather less markedly in the AMoASP numbers.

One implication of this is that total production and export volumes can more than double or halve from year to year, affecting logistical requirements from storage to packing to transport. The cycle

of alternate bearing differs around the world so global production is a lot more stable, and thus Ajara's share on its target markets will fluctuate from year to year. This can make it difficult to maintain a stable logistics and marketing chain, when it will be seriously under-utilised every other year, and suggests that the current *ad hoc* but flexible approach to export marketing may have its benefits.

Alternate bearing also contributes to the small size of fruit in "on" years, which is one of the sector's biggest quality problems, contributing significantly to the rather lower prices paid for Ajaran mandarins than for other supplies to the Ukranian market.

Given that the yield cycle is more strongly synchronised in small areas, the income fluctuation for an individual producer will be even more extreme, with some growers reporting that they have no crop worth harvesting in the "off" years. For a farm family that depends on mandarins as its main source of income, the fact of receiving most of their income in one short period every two years must make for a very difficult cash-flow.

Citrus variety trials and sapling production

The AgroService Centre in Ajara (ASC) is currently trialling new varieties and planning to multiply saplings to supply to growers. Trials of 75 different citrus varieties began in 2012 at the Chiakivi centre, and include lemons and oranges as well as mandarins. Conclusions on their suitability for the Ajaran climate should be reached by 2015, allowing the supply of commercial saplings to begin with around 30,000 in early autumn 2015 and spring 2016, building up to 75,000 per year by 2018/19.

To put this in context, there are approximately 3.4 million citrus trees in Ajara, and it has been estimated that around one third are in need of replacement.[10] If this were carried out entirely with saplings produced by ASC, it would take 15 years. However, there are other commercial sources of saplings available, and most farmers prefer to replant a small proportion of their orchards every few years to reduce the drop in income whilst they wait for new trees to come into full production. Thus the scale of the ASC sapling operation is probably appropriate to Ajara's needs.

2.2.1 Choice of crop

- ***Mandarins vs other citrus***: Is the current focus on mandarins appropriate, or might other citrus be more competitive? The trialling of other citrus crops by ASC should help to answer this question, though it will be important to generate economic as well as technical results. ASC should produce gross margin budgets for each species and variety that makes it through to their short-list, where the trade-off between factors such as yield, quality and crop-protection costs can be clearly seen. They should also produce estimates of fixed costs for the main types of production and produce, for the Ministry and ENPARD management, full economic margins that take account of the inherent subsidies in the scheme.

- ***Citrus vs other crops***: Is citrus the best use of this land or might, for example, greenhouse vegetable production be more profitable? ASC should also become in a position to answer this question from its trials of other kinds of fruit and grapes, and its potential support to greenhouse vegetable production. Once again, economic data will be important, and it might be appropriate to adjust the balance of its sapling production as conclusions start to emerge on the relative profitability of different crops.

---

10. Both the ASC agronomist and the USAID EPI citrus export gave figures of 30-35 % of trees as old and in need of replacement.

2.2.2 Production issues

• **Tree age**: Some of the citrus trees data back to the first decades of the Soviet Union and are long overdue for replacement. However, many are around 30 years old and should be at the peak of production; for these orchards the primary emphasis should be on changing management techniques, rather than on tree replacement.

• **Virus infection**: Another common problem is virus infection; these trees need to be grubbed up and replaced with new trees on virus-free and resistant rootstocks.

• **Varieties**: New varieties could help to improve yields, disease resistance, fruit quality and timing: some new varieties flower later (reducing the risk of frost damage to the buds) and mature earlier (allowing harvest when prices are higher and before the worst of the hail.

• **Tree spacing**: Many orchards are tightly spaced, with completely closed canopies. In the humid conditions of Ajara this greatly increases pest and disease problems such as scab and scale pests. In very dense orchards, simply removing every second row can help to let in light and air, with no reduction in overall yield per hectare. When orchards are replanted they can move to a more appropriate spacing of around 4 metres between trees.

• **Pruning**: Traditional pruning has involved removing all side branches up to around 1.5 m, and then allowing a tall and dense canopy to develop. This, combined with the overall density of the orchard, makes it difficult to reach the fruit for harvest, and encourages the trees to bear on their upper branches, where fruit are most exposed to hail and frost. Allowing some lower branches to develop and opening up the centre of the tree leads to more fruit being produced lower down, and reduces the risk of both mechanical damage and pest and disease problems.

• **Root cutting**: The combination of heavy soils and high rainfall means that soils are often waterlogged and starved of oxygen, encouraging the trees to develop roots near the surface. Traditionally, these superficial roots have been cut away in an attempt to stimulate deeper rooting, but the main effect has been to deprive the tree of its principal source of nutrients. Applying a mulch of manure, leaves or other organic material helps to protect these surface roots and allow them to continue extracting nutrients from the soil.

• **Plant nutrition**: Mandarins require nitrogen at the beginning of the season to support leaf development, but if the farmer applies too much or too late it will reduce fruit quality. Mulching with around 50 kg of cow manure per tree is usually sufficient to supply the plants' macro- and micro-nutrient requirements, but where manure is not available in adequate quantities, regular fertilising is necessary to support good yields. Many farmers currently apply neither manure nor artificial fertilisers, and so should see immediate yield benefits from better plant nutrition.

• **Plant protection**: At present a large number of orchards are not sprayed at all; according to census data quoted by the Ajara Ministry of Agriculture, in 2010 only 10 % of citrus growers applied any kind of chemical protection, and just one third of these used a full regime of spraying three times throughout the season. When pesticides are used, growers often follow a prescriptive regime rather than responding to the specific issues of their crop, so unnecessary pesticides are used and many problems go untreated. Over time, this practice has led to various forms of pesticide resistance, so new pesticides and integrated control methods are now required.

• **Alternate bearing**: The magnitude of year-to-year variation in yields can be reduced, and quality improved, by manual thinning during high-yield years. Although quite time-consuming, this will help to increase fruit size and quality in the “on” year as well as to increase yields in the subsequent “off” year, when prices will be higher. When planting new trees, it can also be useful to strip off all the fruit in the first year of production if it happens to coincide with an “on” year, thus deliberately putting these trees “out of synch” with the rest of the area.

2.2.3 Variety testing and sapling production by the AgriService Centre

The work of the AgroService Centre (ASC) to test different fruit varieties and then provide improved saplings to commercial growers is one of the biggest initiatives in the citrus sector. The following notes set out a few issues that will be important to its overall success; many of them may already be in hand, so this should be treated as a short checklist rather than any criticism of the ASC programme:

- ***Sapling allocation and on-farm trials***: The approach taken to the pricing and distribution of saplings will have a major effect on the uptake by farmers and the overall economic impact of the project. Supply is likely to be far less than demand, at least in the early years of the scheme, and it is planned to keep prices low, so an allocation mechanism will be required.[11] The first few years' sapling supply might best be viewed as on-farm trials and demonstrations, and allocation designed with this in mind. Technical and financial performance on commercial farms is almost always poorer than in the highly-controlled environment of a research and testing facility, so this next stage should seek to update the yield and financial projections, and check that the initial choices of species and variety are confirmed in practice. Given the lead time between planting and yielding, the on-farm trials should start as soon as possible.

- ***Sapling pricing and subsidy***: The pricing projections in the draft ASC Strategic Plan envisage around 50 % cost recovery, with the balance covered by the Ajara Ministry of Agriculture as an annual subsidy of 57,000 GEL ($ 32,000). They will want to monitor whether it is the most cost-effective way of supporting these particular farmers: if in most cases the replanting is something that a rational, well-informed farmer with access to affordable credit would carry out anyway, then there is little distortion and the subsidy represents a transfer payment that helps to offset market failures. However, if the subsidised saplings lead to farmers replacing relatively young trees that could have been rehabilitated more cost-effectively, then the full cost of replacement (farmer cost + subsidy) may be higher than the benefits, and so the subsidised provision of saplings would actually make Ajara poorer. Every input subsidy carries a risk of such distortions, and so scheme monitoring should pay attention to this point.

- ***Supporting package***: In order to get the maximum benefit from the citrus testing and supply programme, a full supporting package of advice will be required, covering issues such as plant spacing, pruning, fertilising, crop protection, harvesting, post-harvest management and marketing. The planned mechanisms of mass information, group work and individual advice should be well able to deliver this advice, but it will be important to ensure that a high-quality extension package has been prepared and piloted by the time the first saplings are distributed. Ideally the materials would be developed in 2014 and trialled during 2015, through the various stages of planting, pruning, harvesting etc. As a minimum, the materials should be prepared by 2015 so that the first year's sapling supply can be used for piloting.

- ***Existing experience***: Quite a lot of work has been done on citrus over recent years by various NGOs and donors. Examples include the advisory work done by *Elkana* on sustainable mandarin production, and the USAID-funded *EPI* project ("Economic Prosperity Initiative") which has develop 8 specialist citrus advisors in Ajara and so far

11. The initial target production of 30,000 saplings in 2015 will be sufficient for 50-60 typical farms (based on the average of 570 plants per holding quoted in the draft Strategic Plan of the Ajara Ministry of Agriculture).

trained 3,000 farmers in improved production techniques. The lessons learned, expertise built up and materials produced should be seen as valuable resources to help support the ASC sapling-supply initiative and increase its overall economic impact.

• ***Input supply***: Citrus producers will require particular fertilisers and pesticides, and some actions may be needed to control quality and to help farmers make the most economic buying decisions.

• ***Cash flow during replanting***: Growers will experience a gap in their cash flow between cutting the old trees and getting a significant harvest from the new ones. Options include:

• Staggered planting (e.g. replacing 1/3 of a grower's orchard each year, over 3 or 6 years);

• Support payments during the transition period.

Given the expected shortage of supply, the option of staggered planting might be best, with due caution to avoid disease transfer from old to new trees.

2.3 Citrus marketing chains

This section looks at four aspects of the citrus marketing chain:

• Sales for the **domestic** fresh market, which typically account for around 15 % of production.

• Sales for **export** of whole fruits, which account for around 65 % of production, with the first part of the chain being similar to that for domestic sales.

• **Processing and wastage**, which together account for 20-25 % of total production.

The role of the new "**Consolidation Centres**" in marketing of the 2013 crop to each of these three routes.

2.3.1 Domestic marketing

The most common situation is where a wholesaler buys direct from the farmer and then sells the mandarins on to a retail shop-keeper or market-stall holder, i.e.

Farmer Wholesaler Retailer Domestic consumer

Two variants on this chain are discussed at the end.

• ***Harvesting***: The farmers' family pick the mandarins, generally in November, and place them in slatted wooden boxes of various sizes, from 14-25 kg or more. If the quantity is large or the family labour limited, local workers may be hired to help with the picking at a cost of 20-25 GEL/day; if each person picks 300-400 kg daily, this works out at about 0.06-0.08 GEL/kg. Hired pickers will usually be unemployed and landless families from nearby towns.

• ***Storage***: The farmer will always need to store the crop for at least a few days, until he can sell it to a trader, though sometimes this is extended up to three months to keep selling through till February. Since this is a winter crop, cooling is not generally needed, and the usual arrangement is to have a semi-underground store as a lower floor of the farmer's house or garage, where temperature fluctuations are minimised and there is little risk of frost damage.

• ***Sorting***: The farmer's family, together with hired labour if needed, manually sort the mandarins by size and quality. The main distinction is into "marketable" and "non-marketable", though some other categories may also be used:

○ "**Marketable**" or "standard" mandarins essentially consists of everything else, with around 60 % of total production falling into EU size classes 3-7. Farmers will sometimes pick out the largest and smallest of their "marketable" mandarins to form two additional classes:

○ "**Super**" mandarins, of perhaps 60 mm diameter and above, corresponding roughly to EU size classes 2, 1 and Extra. These are usually stored the longest and sold in February when prices are highest, with a retail price of at least 2.00 GEL/kg. No more than 10 % falls into this category;

○ "**Small marketable**" mandarins, around 35-45 mm diameter but undamaged, equivalent to about EU size class 8. If the farmer has a lot of these then he may try to sell them for fresh consumption, albeit at a reduced price (in January 2014 these were selling retail for 0.80 GEL/kg at Batumi market compared to 1.20 GEL for "standard" mandarins); otherwise they will be treated as non-marketable. Up to 10 % might fall into this intermediate category, where applied.

○ "**Non-marketable**" or "**non-standard**", including very small mandarins and damaged fruit. Selection is made visually and diameters are not absolutely fixed or precisely applied, but the cut-off point is typically around 40-45 mm, so "non-standard" mandarins would correspond to EU size classes 10, 9 and possibly 8 (see Annex 2 for the EU citrus marketing regulation, which includes full details of size classes). These fruits may be sold for processing or simply be dumped as waste, as discussed in section 2.3.3 below. Some 20-40 % of the total crop typically ends up in this category, depending on the year, the way the orchard has been managed, and how the farmer sorts them.

Where the farmer simply sorts into "marketable" and "non-marketable", the split between these two categories would typically lie be around 70:30.

Sometimes the wholesaler will bring his own labour to sort the fruit on-farm, and thus ensure that he gets only the quality he requires. On occasions the wholesaler will also provide the labour for harvesting, and agree an appropriate price with the farmer.

• ***Packing***: After sorting, mandarins are put back into the wooden boxes into which they were picked. These have to be bought by the farmer for each crop, and cost 1.50-2.00 GEL for 14 kg boxes, or 3.60 GEL for the larger 25 kg boxes.

• ***Farmgate sale***: The wholesaler ("trader", "middleman") drives round the villages calling at mandarin growers, looking at the crop and negotiating the price. In December 2013 wholesalers were paying 0.40-0.50 GEL/kg ($ 0.22-0.28) for "standard" mandarins, paying in cash when they collect the fruit. "Small standard" mandarins would receive considerably less than this, whilst traders do not buy "non-marketable" fruit; this has to be disposed of separately by the farmer, as discussed in section 2.3.3 below.

• ***Transport***: A full-time trader will typically have his own small truck or van to take the mandarins from the farm to a city market.

• ***Wholesale sale***: The trader will rent a place at the wholesale market, and sell whole boxes of mandarins to shop-keepers and retail market-still holder. Structured wholesale markets exist in only Tbilisi and Batumi, and in smaller towns the wholesale trade may take place direct from truck.

• ***Retail sale***: Where the retailer does not have his own shop, he will rent a space in the retail market, found in all sizeable towns and cities, and run by the municipality. In January 2014, standard mandarins were retailing at Batumi market for around 1.20 GEL/kg and non-standard mandarins at around 0.80 GEL/kg.

• ***Subsidy***: For the 2013 season the Ajara Ministry of Agriculture introduced an export subsidy and a processing subsidy (discussed below), but mandarins marketed fresh to consumers did not benefit from either of these subsidies.

Main variations

• ***Trader-retailer***: Sometimes the trader will rent space in the retail market and sell direct to consumers. This will generate higher margins but take more time, and the turnover may be lower.

• ***Farmer-wholesaler***: Occasionally a farmer will take the mandarins to market himself, using either his own transport or a rented truck, and rent a pitch in the wholesale market. A farmer who decides to do this may well also but mandarins from his neighbours and thus perform a double function as a grower and a trader gaining a share of the marketing margin in exchange for a greater input of time, effort and risk.

2.3.2 Export marketing

Currently the main export destination is Ukraine, with the export organised by either a trader or a larger farmer. The situation where a trader does the exporting is described first, and then a number of variants discussed.

Farmer Trader Ukraine wholesale market Onward sale

• ***Harvesting & storage***: Carried out by the farmers' families, as above.

• ***Sorting***: Normally the farmers' families will carry out the sorting, but the exporter may arrange to supply labour in the same way that some domestic traders do.

• ***Packaging***: For the Ukrainian market, mandarins are packed into the same 20-25 kg wooden boxes as used for domestic trade. Russia does not allow import in wooden boxes, so if Russia is to be the immediate or final destination, the produce must be packed in plastic boxes of 15 kg capacity (or into cardboard boxes, though this has so far only be done at Consolidation Centres see below).

• ***Farmgate sale***: The exporter will drive around visiting mandarin growers and negotiating on price until he has sufficient to fill a lorry normally 20 tonnes but sometimes up to 25 tonnes. With average production per farm of 2-5 tonnes, depending on year, he may need up to 10 suppliers to make up a load. Unless the exporter is a relative or friend of the farmers, who are prepared to wait for him to return from Ukraine, he will pay them in cash when he takes the mandarins, and from that point on takes both the trading risk and the market margin.

For the 2013 harvest, exporters were generally paying 0.35 GEL/kg, together with a commitment to pass the 0.15 GEL/kg export subsidy (see below) back to the farmers when they receive it from the Ajara Ministry of Agriculture.

• ***Transport***: The exporter will hire a Ukranian lorry and driver, to wait in the

nearest town or large village. He will then use a small truck or van (owned or hired) to collect the boxes from the various farmers and then load them onto the lorry.

• ***Documentation***: The exporter must obtain two certificates before departure:

o **Phytosanitary Certificate** from the Ministry of Agriculture.

o **Certificate of Origin**, available from either the nearest Chamber of Commerce, from the Ministry of Economy (which has an office in Batumi), or from the Revenue Section of the Ministry of Finance (which runs the customs service at Batumi port and issues Certificates of Origin there). This certificate is issued free by the Ministry of Economy but charged for by the other two organisations. They are obliged to issue the certificate within 3 days but usually respond in 1-2 days.

There are companies that will obtain both of these certificates on behalf of the exporter.

• ***Shipping***: Most commonly, the exporter buys a ticket to take the lorry on the regular Batumi-Odessa farmer, and travels together with the lorry driver and the goods. There is also some trade to other Ukranian ports, such as Kherson and Skadovs, but without such a regular shipping line.

• ***Clearance into Ukraine***: At the Ukranian port of entry, the exporter will use a freight forwarder ("spedition") to manage the customs paperwork.[12] Under the Georgia-Ukraine Free Trade Agreement there are no import tariffs to be paid, but all imported goods are subject to Ukranian VAT at 20 %, and the exporter will also have to pay the customs administration and inspection charges and the freight forwarders' fee. Informal payments can add significant further cost.

• ***Wholesale sale***: The exporter will rent a unit at the wholesale market, into which he can unload the boxes, release the lorry, store the mandarins without them freezing, and sell to retailers or to other traders. The unit can also be used as a space to re-sort the fruit if any was damaged in transit, and to re-pack into different containers if this is required.

• ***Onward sale***: From the wholesale market, Ukranian traders may distribute the mandarins throughout the country or even ship them on to Moldova or Belarus. During the Russian embargo on Georgian goods, which lasted from 2006 until (in the case of citrus) December 2013, it is understood that significant quantities of Georgian mandarins were taken from Ukraine into Russia.

• ***Subsidy***: For the 2013 harvest, the Ajara Ministry of Agriculture announced a mandarin export subsidy of 0.15 GEL/kg. This was included within the price paid to farmers, but the exporters are still waiting for the Ministry to set up the mechanism for them to claim subsidy for the exports they have made. It was expected that payments would begin in February 2014, following which the exporters would pay the subsidy to the supplying farmers.

12. Ukranian law only allows legal entities to import goods, so an exporting farmer must find an arrangement whereby the mandarins are formally "owned" by a legal entity when they are cleared into Ukraine.

Main variations

• ***Farmer-exporter***: Quite often a larger farmer will undertake the exporting. Since few farmers produce enough to fill a 20-tonne lorry, usually a larger farmer (with perhaps 10 tonnes) will also buy mandarins from 3-6 neighbours to make up a load, thus acting as a consolidator and trader as well as an exporter.

• ***Export to Russia***: During the last month, direct sales to Russia have once again become possible after a 7-year embargo, and traders are trying to develop the best transport routes. One option is to travel to Samara by road, another is to take the mandarins by ship from Batumi to Novorosisk. There is no regular ferry for this line, so it is necessary to charter individual ships. Previously there were a few companies that did this as a business, charging exporters for their service and also taking nominal ownership of the fruit so they could clear it into Russia, before returning the goods to the exporters for onward transport and sale.

These ships carry only freight, not vehicles, so the fruit has to be loaded at Batumi port and then unloaded and put onto Russian lorries at Novorosisk. Often the mandarins are exposed to rain during loading and unloading, so cardboard boxes cannot be used (the boxes themselves will be damaged and the stored humidity may cause spoilage of the fruit); however, as Russia now requires that plastic boxes are used, this is unlikely to be an issue.

The choice of plastic or cardboard boxes rather than wood is just one indication of the gradual rise in quality standards that is now taking place in Russia, and this year the minimum size acceptable in Russia was 50 mm diameter compared to 45 mm for Ukraine. It seems that Russia will be a slightly more demanding market than Ukraine, but one where investment in better sorting and packing may pay dividends.

Data for export to Samara by road in mid-November 2013 indicate a selling price of 2.70 GEL/kg (55 rubles) and transport, customs and documentation costs of 1.10 GEL/kg, leaving a total of 1.60 GEL/kg to purchase the mandarins in Ajara, cover incidental costs and generate a profit for the exporter. Compared to the usual buying price of 0.35-0.40 GEL/kg paid by individual export traders and Consolidation Centres, there seems to be potential for considerably more margin in trading to Russia, though doubtless both prices and margins will come down somewhat as more Georgian product starts to reach that market.

• ***Export within the southern Caucasus***: The statistics above indicate that in some years almost half of total exports have been to the neighbouring countries of Armenia and Azerbaijan. Exports to Armenia, averaging 17 % of the total over this period, have been almost entirely for consumption within that country. Most of the exports to Azerbaijan, 26 % of the total, are likely to have been shipped on to Russia. Much of this trade is carried out by Armenian and Azeri importers coming to Georgia and using their contacts to buy direct from farmers. The steps are exactly as described above for a Georgian exporter, though in this case both the trading risk and marketing margin accrue to the foreign trader.

• ***Ukranian importer***: On occasions a Ukranian trader will do the same as his Armenian or Azeri counterparts, coming to Georgia to buy fruit from farmers and import it into Ukraine. So this has not been a very common practice, but the recent establishment of "Consolidation Centres" (see section 2.3.4 below) will make it easier for foreign companies to source product in Georgia, and so they may come to play a larger role in exporting.

• ***Export to the European Union***: The trade data for 2006/7 to 2009/10 show that just 37 tonnes two lorries were exported to the EU, both going to the Czech Republic in the most recent of these seasons. In 2013 the USAID-funded "EPI" project tried to test-market one load of mandarins into the EU, going be road to Austria; unfortunately the driver was not familiar with the route, nor the paperwork, nor the people involved, and by the time the fruit reached its destination the large majority so damaged as to be unsalable. The question of whether Georgia can profitably export mandarins to the EU was left unanswered, but it was made clear that exporters have to invest time and effort to make inroads into any new market, particularly one as demanding as the EU. Details of EU marketing requirements for citrus fruit are given in Annex 2.

2.3.3 Usage of sub-standard fruit

With current production practices, at least 30 % of the mandarins are small or damaged, and unsuitable for sale to domestic consumers or for export. The two options for these "non-standard" or "non-marketable" mandarins are to sell them for processing or simply to dump them. There have been three mandarin processing plants in Ajara:

• ***"Cintro" Ltd*** has operated sporadically and at a low level, with no more than 100 tonnes processed in any year covered by the statistics, but it no longer exists.

• ***"Khilis Kompania Narinji" Ltd*** has processed up to 500 tonnes in years of high production, but is currently inactive.

• ***"Kartuli Produkti" Ltd*** processed some 11,000 tonnes from the 2007 harvest but then ceased operation. It re-opened in 2012 under new ownership, believed to include Ukranian capital, and is currently the only option for farmers wanting to sell their non-standard mandarins for processing. For the 2013 harvest it is paying a price of 0.10 GEL/kg, plus a government subsidy of 0.10 GEL/kg so that farmers receive 0.20 GEL/kg. Farmers have to deliver the mandarins to the factory, and so will usually have to hire transport, which might cost as much as the price being paid for their fruit.

Given the sporadic operations of the processing factories, the low price paid and the necessity to arrange transport, many small farmers find it more cost-effective to simply dump their mandarins in a field.

In a high-yielding year, Ajara may have up to 30,000 tonnes of non-marketable mandarins, of which the majority has normally gone to waste. Even at the low price of 0.10 GEL/kg, this represents a potential value of 3 million GEL ($ 1.7 million), though the costs of transport are real and include a significant element of imported fuel. With only one mandarin-processing factory in the country, it is likely that the large majority of the subsidy is captured by the processor rather than being passed back to the farmers. The subsidy might be of some developmental value if it helps to kick-start a genuinely profitable business, but if the processing factory is unable to operate without subsidy in future years, it would suggest that this is an artificial operation that ultimately makes Ajara poorer, whilst transferring money from the Ajaran taxpayer to the (believed foreign) private owners of the plant.

2.3.4 Consolidation centres

In autumn 2013 the government of Ajara attempted to improve the export marketing of mandarins by providing land or buildings for 30 "consolidation centres" in the main citrus districts of Ajara. The sites were sold to commercial companies for the token sum of 1 GEL, on condition that the buyers prepared the premises and equipment for sorting and packing mandarins. The objective was to add value in two ways:

- Through consolidation, by bringing a lot of produce together in one place so that exporters could easily source full lorry-loads;
- Through grading and packing the produce to meet the buyers' requirements.

Despite the government's push to get the centres ready for the 2013 mandarin harvest, only around 15 were up and running in time, including 6-10 larger operations. Of these larger Consolidation Centres, it is understood that 1 or 2 of these are Ukranian-owned, 1 or 2 Turkish-owned and 1 or 2 joint Turkish-Ukranian, and that in these cases the Turkish or Ukranian traders carry out the export and take the risk and the marketing margin.

Some people have pointed out that these Consolidation Centres could also function as distribution centres for imported produce, or even that their well-placed sites might be converted to another use; it remains to be seen whether there is any basis for these fears.

The key features of the process in its first year were:

- ***Transport to the consolidation centre***: Farmers had to bring the produce to the Consolidation Centre, often requiring them to hire trucks. This could typically cost 0.03 GEL/kg.
- ***Sorting***: The sophistication of sorting varied from centre to centre, ranging from hand sorting on tables similar to the approach normally used by farmers, through to automated sorting machinery brought in from Turkey. Farmers had to pay a charge of around 0.12 GEL/kg for sorting and unloading/loading by the Consolidation Centre, equivalent to 30 % of the price paid for their mandarins.
- ***Packaging***: Sorted mandarins were placed in 15 kg plastic boxes at a cost to the farmer of 1.20-1.50 GEL per box, around 0.09 GEL/kg; significantly cheaper than 0.14 GEL/kg for the traditional wooden boxes, though some problems in transport were reported with the flimsier plastic boxes and it seems that they work best when firmly packed onto pallets.

  For the 2013 harvest, cardboard boxes were also used for the first time in some Consolidation Centres. These sell for around the same price as wooden boxes, but are pre-printed with the exporter's logo and contact details, giving a more professional appearance and a more attractive presentation when finally offered to the consumer. However, it seems that the Georgian flag and labelling on some boxes actually had the opposite effect by provoking anti-Georgian sentiment on the Russian market and lowering the price. Cardboard boxes can be easily packed onto pallets and perform well when the entire journey is made in one lorry, but are not very suitable if the goods have are exposed to rain at any point in during transport and marketing, as used to occur with ship transport to Novorosisk.

- ***Marketing of standard mandarins***: Ownership of the mandarins remained with the farmers, who could either take them back and market them as described above, or sell the standard mandarins to the Consolidation Centre company for export, typically receiving around 0.40 GEL/kg immediately, with the promise of a further 0.15 GEL/kg of export subsidy to be paid to them once the exporters receive it from the Ajara government.

- ***Marketing of non-standard mandarins***: As exporters, the Consolidation Centre companies were not interested in buying the non-standard mandarins, so the farmers needed to cart these away and sell them for processing or dump them.

Farmers were generally dissatisfied with the initial results because:

- The process of sorting was already being carried out, and now they had to pay for the sorting service and the associated handling, rather than doing the sorting on-farm with their own labour.
- They had to arrange and pay for transport to the Consolidation Centre, whereas a trader would collect from their farm.
- They still had to pay the transport cost to take their non-standard mandarins from the Consolidation Centre to the processing plant, having already paid to transport them from the farm to the Consolidation Centre.
- The more stringent grading applied in the Consolidation Centres resulted in around 40-50 % of produce being classified as non-standard, slightly higher than the usual ratio.
- The price they received for their standard mandarins was the same as they would have received from a trader.

Thus the overall perception is that the system has just added cost and not value.

From an economic perspective, there seem to be two main issues:

1) The Consolidation Centres have substituted (semi-)automated sorting for labour-intensive hand sorting. The sorting charge is quite high, whilst the opportunity cost of farm family labour is very low. As new income opportunities gradually develop, farm households may start to value their time more highly and so become more interested in passing the work of sorting onto someone else. Until then, the cost of centralised sorting will have to be brought down markedly in order to become attractive to farmers.

2) Bringing produce to the Consolidation Centres has added up to three new logistical steps: transport to the centre, unloading, and potentially re-loading onto the farmer's vehicle. When the Consolidation Centre buys the fruit from the farmers and exports it, then these are all steps which have saved it cost, but it seems that neither these cost savings, nor the marketing advantage of having a large quantity of consistent product in one place, have been passed on to the farmers. If there genuinely were economies of scale, then their benefits appear to have been captured by the Consolidation Centre companies.

2.3.5 Price formation from farm to trader, exporter or processor

The following two tables show the formation of price along the value chain from the farm to the trader, exporter or processing factory. The first table shows the two options for farmgate sale, either to a domestic trader or to an exporter:

Sold at farm gate						
Price point	**Sold to domestic trader**			**Sold to exporter**		
additions/deductions			Share of ex-farm			Share of ex-farm
Paid by trader	**0.45 GEL/kg**	**$ 0.25/kg**	**100%**	**0.35 GEL/kg**	**$ 0.19/kg**	**100%**
less						
Boxes on-farm	0.08 GEL/kg	$ 0.04/kg	18%	0.08 GEL/kg	$ 0.04/kg	23%
Net ex-farm price	**0.45 GEL/kg**	**$ 0.25/kg**	**100%**	**0.35 GEL/kg**	**$ 0.19/kg**	**100%**
less						
Picking	0.07 GEL/kg	$ 0.04/kg	16%	0.07 GEL/kg	$ 0.04/kg	20%
Sorting on-farm	0.03 GEL/kg	$ 0.02/kg	7%	0.03 GEL/kg	$ 0.02/kg	9%
Income from growing	**0.35 GEL/kg**	**$ 0.19/kg**	**78%**	**0.25 GEL/kg**	**$ 0.14/kg**	**71%**
Subsidy (if paid)	-	-		0.15 GEL/kg	$ 0.08/kg	43%
Income with subsidy	**0.35 GEL/kg**	**$ 0.19/kg**	**78%**	**0.40 GEL/kg**	**$ 0.22/kg**	**114%**

Source: Project estimates from multiple sources

The second table shows the two options where the farmer delivers the mandarins, either to a Consolidation Centre or to the processing factory:

Delivered to Consolidation Centre (CC) or processing factory						
Price point	**Delivered to Consolidation Centre**			**Delivered to processing factory**		
additions/deductions			Share of ex-farm			Share of ex-farm
Paid by CC/factory	**0.40 GEL/kg**	**$ 0.22/kg**	**250%**	**0.10 GEL/kg**	**$ 0.06/kg**	**143%**
less						
Transport to CC/factory	0.03 GEL/kg	$ 0.02/kg	19%	0.03 GEL/kg	$ 0.02/kg	43%
Sorting & handling by CC	0.12 GEL/kg	$ 0.07/kg	75%	-	-	
Boxes at CC	0.09 GEL/kg	$ 0.05/kg	56%	-	-	
Net ex-farm price	**0.16 GEL/kg**	**$ 0.09/kg**	**100%**	**0.07 GEL/kg**	**$ 0.04/kg**	**100%**
less						
Picking	0.07 GEL/kg	$ 0.04/kg	44%	0.07 GEL/kg	$ 0.04/kg	100%
Income from growing	**0.09 GEL/kg**	**$ 0.05/kg**	**56%**	**0.00 GEL/kg**	**$ 0.00/kg**	**0%**
Subsidy (if paid)	0.15 GEL/kg	$ 0.08/kg	94%	0.10 GEL/kg	$ 0.06/kg	143%
Income with subsidy	**0.24 GEL/kg**	**$ 0.13/kg**	**150%**	**0.10 GEL/kg**	**$ 0.06/kg**	**143%**

Source: Project estimates from multiple sources

There are several points to note here:

- The final income to the farmer is made up in several stages:
  - The starting point is the "*Price paid by trader/CC/factory*", which is the price most often talked about;
  - The "*Net ex-farm price*" is the value of a kilogram of mandarins ready to leave the farm gate, after paying for the boxes, for transport when the farmer is responsible for this, and for sorting at the Consolidation Centre when applicable. Where family labour is used for picking and for any on-farm sorting, this entire "Net ex-farm price" accrues to the farming family;
  - The "*Income from growing*" reflects the value of a kilogram of ready-to-harvest mandarins on the tree. This is the amount received by a farmer who has to use paid labour for picking and any on-farm sorting;
  - The final figure, "*Income with subsidy*", applies if a farmer receives government export or processing subsidy. Who actually receives this subsidy is discussed below.
- Each of the price-formation chains relates to a slightly different quality of fruit:
  - "*Sold to a domestic trader*" applies to that approximately one-fifth of marketable mandarins that are consumed within Georgia. Farmers aiming for this market must grade to a rather higher standard in order to attract this highest price, with around half the total crop meeting this quality;
  - "*Sold to exporter*" applies traditional sorting standards, with around 60-70 % being "standard" and 30-40 % being small or damaged "non-standard" fruit;
  - The price chain for "*Delivered to Consolidation Centre*" applies a rather higher grading standard than normal on-farm sorting, so only 50-60 % grade as "standard";
  - "*Delivered to processing factory*" applies to 30-50 % of the total harvest, depending how the rest were sold and so what grading standard was applied.
- There is considerable variation in all of the prices and costs quoted here. As an example, the ex-farm price paid by domestic traders can vary from 0.40-0.50 GEL/kg. Transport costs obviously depend on the location of the farm, and the value used here is based on a 10 km drive to the Consolidation Centre or processing factory;
- A critical factor in the calculations is the government subsidy that was announced shortly before the 2013-14 harvest, to give 0.15 GEL/kg exported and 0.10 GEL/kg delivered for processing. At the time of the mission, farmers had sold almost all of the harvest but no subsidies had yet been paid out by the Ajara Ministry of Agriculture. The understanding of most farmers seems to have been that, once the export or processing had been carried out and the subsidy paid, it would be passed back to the supplying farmer, whether the mandarins were sold direct from the farm, delivered to a Consolidation Centre or taken to the processing factory.

At the end of March 2014, when this report was being finalised, the Ministry had started paying out subsidy to the processing factory and to the actual farmers or traders who had exported mandarins and had all the export documentation to prove it. The question of how much, if any, of the subsidy would be passed back to the original growers was still an issue of considerable dispute, so the table makes clear what the farmer's income would be with and without subsidy.

- Of the three options for selling standard mandarins, the best appears to be farm-gate sale to a trader for export provided that the farmer is eventually given the subsidy. As it now seems possible that many of these farmers will not receive subsidy, then the best option changes to being sale to a trader for the domestic market, where subsidy was never in question.
- With this year's data, delivery to a Consolidation Centre appears to be the worst option for sale of "standard" mandarins, mainly because of the high sorting and handling costs. This

conclusion holds whatever is the final outcome of the subsidy debate.

• The estimated income from non-standard mandarins is very low, at just 0.10 GEL/kg including subsidy. This assumes that the farmer only has to transport the crop 10 km to the factory; for farms located 40 km or more from this single facility in Kobuleti, the transport cost could be prohibitive and the common action of simply dumping the non-standard mandarins would be a rational choice. Without the government subsidy, sale to the processing factory would not be attractive even for nearby farmers, so if this factory is to continue operating in future years, it will either need to keep receiving subsidy, or will have to increase the price it pays to farmers.

• As every farmer produces a combination of "standard" and "non-standard" mandarins, the net return is a weighted average of the price received for each. The following table estimates the overall average return to farmers from the two main alternative marketing routes for export of standard mandarins. The assumptions made are that:

- Consolidation Centres apply stricter grading than on-farm sorting, so only 60 % of the crop grades as "standard";
- the full export subsidy does eventually reach the farmer, irrespective of to whom he sold his crop;
- paid labour is used for picking and any on-farm sorting;
- "non-standard" mandarins are sold for processing:

gives the following average returns to the full crop when sold for a combination of export and processing:

Destination	Sold at farm gate			Delivered to Consolidation Centre		
Exported	70%	0.32 GEL/kg	$ 0.18/kg	60%	0.24 GEL/kg	$ 0.13/kg
Processed	30%	0.10 GEL/kg	$ 0.06/kg	40%	0.10 GEL/kg	$ 0.06/kg
Overall average		**0.25 GEL/kg**	**$ 0.14/kg**		**0.18 GEL/kg**	**$ 0.10/kg**

Source: Project estimates from multiple sources

From these calculations, admittedly based on incomplete experience of the first year's operation, the Consolidation Centres do not seem a very attractive marketing route from the farmer's point of view.

2.3.6 Economics of the marketing chain

Within the domestic and export marketing chains described above there are a number of different economic processes taking place, each of which adds value but also adds cost, and each of which could potentially be improved. These processes are:

- Harvesting
- Storage
- Sorting, packing & grading
- Consolidation
- Transport
- Wholesaling & retailing
- Price-formation
- Information transfer
- Risk-taking
- Financing

Harvesting

Citrus harvesting is labour-intensive and relatively costly: if hired labour is used it absorbs around 20 % of the market value of the crop. Adopting the orchard-management practices proposed in section 2.2.2 above (wider tree spacing; lower initial branches; more open canopy) will make harvesting a little quicker and more efficient, but it will still demand a lot of manual labour. However, the harvesting cost is part of the overall value-added and the money remains within the mandarin-growing areas, either as wages paid to hired pickers[13] or, where the farmer's family does the picking, there is no cash payment at all and the imputed harvest cost constitutes part of the farmer's profit.

Storage

Storing produce adds value by transferring it from a period of high supply/low demand to a period of low supply/high demand, but has three cost elements:

- The cost of the storage itself;
- The capital tied up until the product is sold;
- The losses that occur during storage.

Most citrus farmers have citrus storage built into or near their houses, and since neither artificial heating nor cooling is used, the costs of storage are small. It has not yet been possible to quantify losses in storage, but farmers are well aware that it is a perishable product compared to, say, hazelnuts which can be stored for months and sold when the price is good or money is needed. Even within these basic stores, losses can be reduced significantly by a few simple practices such as:

---

13. The ENPARD programme in Georgia has a specific objective of reducing rural poverty, and here it is worth noting that hired mandarin pickers are likely to come from some of the poorest families, for whom this seasonal work may make a small but valuable contribution to poverty reduction: if 3 family members obtain 10 days' harvesting work at 20 GEL/day, they will generate 600 GEL, equivalent to two months' salary for the average manual worker.

• Improving the starting quality of the fruit through the orchard-management practices recommended above;

• Sorting the mandarins well before storage, to ensure than no damaged or rotting fruit are included;

• Storing in smaller-capacity, shallower wooden boxes, so that there is a better air flow around the fruit;

• Leaving the stack of boxes uncovered or covering with a permeable cloth rather than polythene, to allow moisture to escape;

• Opening the door of the storeroom during dry days to allow the release of moisture and of the heat built up by respiration of the fruit.

A good extension service could experiment to find the best practices applicable to the storage facilities that most small farmers have, including any simple and affordable modifications such as making additional openings for ventilation.

With funds now becoming available for cooperative actions, one question is whether it is worthwhile providing purpose-built stores for groups of farmers. At first sight it seems that the storage life and level of losses may not be much better than in a well-managed private storage, but could be a considerable improvement on bad storage. If advice on storage is made available to small farmers, then the additional benefits of group storage are unlikely to exceed the costs of building and running these stores and the associated "costs of cooperation". Centralised storage is only likely to become attractive if it is combined with other value-adding activities such as consolidation or support to cash-flow.

For many small farmers, cash-flow is likely to be one of their biggest problems, and they may often be forced to sell before the peak of the market or to accept a low offer from a trader because they simply need the cash. Given the costs and difficulties of supplying small amounts of credit to large numbers of farmers, there might be scope for group borrowing by a cooperative storage and marketing organisation, so that farmers receive some money when their product is accepted into store, and the remainder when it is sold into a higher-priced market. However, it would be important to check whether there is really an economic benefit from such an activity, or whether it is just a convoluted method of giving farmers a subsidy.

• ***Recommendation****: Include storage advice within the extension package for citrus growers.*

Sorting, packing & grading

With the development of citrus consolidation centres in 2013, the Ajara government placed a new emphasis on sorting and packing, but it is important to note that both these operations were already being carried out in most cases, either by farmers or by traders.

Hand sorting on-farm costs around 0.03 GEL/kg using hired labour, nothing is using family labour. Sorting charges in the new consolidation centres was charged at around 0.09 GEL/kg, three times the price of paying people to sort on the farm. Sorting machinery was developed to save labour and cut costs, so why was it so expensive in Ajara? Possible reasons include:

• The very low cost of manual labour may be cheaper, and hence economically more efficient, than the amortisation and operating costs of machinery and premises;

• Sorting in consolidation centres rather than on-farm brings the mandarins out of the informal economy into the formal economy, where everything is subject to tax and accountancy and regulations. This may have given significant additional costs to the consolidation centres;

The consolidation centres might have informally agreed to pay similar prices and make similar charges, using this power to boost their own profits and give farmers a relatively poor deal.

Farmers tend to favour the third explanation, but it would be necessary to go into the cost structure of a couple of consolidation centres in some detail to get a definitive answer.

Despite the presence, at least in the larger centres, of sophisticated machinery, the process was still a simple two-way sort into "marketable" and "non-marketable", and did not involve any further grading, for example into any of the 12 grades recognised by the EU. For the current markets in Ukraine and Russia, simple sorting is sufficient and further grading would not have added any value. However, if their requirements develop over time, or Georgian traders succeed in penetrating the EU market, then better grading may become necessary and the consolidation centres will be able to add a layer of value that is hard to achieve on-farm.

One thing the consolidation centres did add even in their first year was a greater range of packaging options, including both plastic and pre-printed cardboard boxes, properly packed and strapped onto standard-sized pallets. The cardboard boxes in particular give an exporter the opportunity to develop a distinct brand, which could be important in breaking the reputation of Georgian mandarins as being small, somewhat bitter, and generally of low quality. However, to achieve this consolidation centres will need to obtain better-quality raw material and to start measuring additional quality parameters, such as juice content and sugar-acid ratio. This would represent a step change from the basic "buying-up" operation that they were originally designed to perform.

Packing and pollicisation by consolidation centres was charged at around 0.09 GEL/kg in 2013: similar to the purchase price of plastic boxes and cheaper than wooden boxes at about 0.14 GEL/kg. This is the only area so far where consolidation centres have actually reduced costs for the farmer.

Consolidation

With a typical farm producing around 3 tonnes of mandarins a year (of which 2-2.5 tonnes may be marketable) and a standard lorry carrying 20 tonnes, there is always a need for consolidation of produce. Until now this has been carried out by a combination of professional traders and larger farmers, as described above. The key economy of scale was to fill one lorry, and only a few large traders worked above this level.

From the 2013 harvest until the end of January 2014, the largest consolidation centre is understood to have exported around 1,000 tonnes, or 50 lorries, creating the possibility of establishing a stable trading relationship with a small supermarket chain. One exporter reported being offered a contract to supply 5,000 tonnes of mandarins to Ukraine, but would have had to fix the price and delivery schedule in the summer. With no ability to enter into binding contracts with farmers, he could neither guarantee the supply nor take the price risk, and so had to decline the offer.

Initial indications are that the consolidation centres carried out 10-20 % of total exports from the 2013 harvest, around 10,000 tonnes, though accurate figures should become available when the Ministry pays the export subsidy. Spread across 15 consolidation centres this does not give the concentrated volumes needed to fill large contracts such as the one just described. The likely future of consolidation centres is that they will become concentrated into the hands of a few large exporting companies, perhaps each running a number of smaller centres spread throughout the citrus-growing areas. This would solve the issue of volume, though possibly at the cost of reduced competition, but not that of price volatility, which is discussed under "Price formation" below.

Moving goods via a consolidation centre requires unloading and then reloading them, as compared to transferring boxes directly from a trader's small truck into a waiting lorry (which is paid for by the trader, not the farmer). With the use of a fork-lift truck it should be possible to load a 20-tonne lorry in under an hour, compared to a full day when loading by hand, so passing through a consolidation centre should have added very little cost. However, the centres were charging around 0.03 GEL/kg for loading and unloading, compared to around 0.01 GEL/kg for hand loading yet another example of the way in which consolidation centres seem to have added rather than reduced costs.

Transport

Whether or not consolidation centres are used, transport within Georgia is still a two-step process, with small trucks being used on the narrow village roads and unmade farm tracks, and 20-tonne lorries doing the long distances. Where a trader collects from the farm, he will provide and usually own the small truck; when the farmer delivers to a consolidation centre, he must rent the transport. The reported price of 3.00-3.30 GEL per tonne-kilometre seems rather high,[14] and is another indication of the general lack of competition within Georgia.

It would probably be more convenient and efficient for each consolidation centre to contract one or two small trucks throughout the buying season and to collect from the farmers though they would have to price this service more competitively than they have so far done for sorting and loading.

Wholesaling & retailing

Wholesaling and retailing are time-consuming activities that have to be carried out, whether by a farmer, a cooperative, a trader or two consecutive traders. Production requires one mindset, trading another, whilst running a successful retail shop requires yet another, customer-oriented mindset. This is why citrus farmers are very rarely involved in retailing even on the domestic market, and why the majority prefer to sell their produce to a wholesaler rather than take it to market and spend most of the day waiting for and negotiating with buyers. A professional wholesaler can consolidate produce from many different farmers, thus giving continuity of supply and leaving just one person standing in the market instead of many. This division of labour has a sound economic rationale and is found all round the world, with farmers only tending to get involved in selling when their plots are so small that every bit of extra margin counts, and their time has very little opportunity cost.[15]

There do not appear to be major inefficiencies in the wholesale and retail marketing of citrus, and with the large number of traders involved pricing should be relatively competitive (though see the sections on “Information transfer” below). If a group of citrus farmers decided to form an association or cooperative for domestic marketing, to give some of their time and effort in exchange for the marketing margin, there is no reason why they should not succeed, though they

---

14. As a simple comparison, transport of bulk goods in similar small trucks is charged in Serbia at € 0.50-€ 1.00 (1.2-2.4 GEL) per tonne-kilometre, despite manual wage rates being 2-3 times those in Georgia.

15. The recent success of “Farmers' Markets” in the West exploits a particular market niche of consumers who enjoy the experience of shopping in a market and are prepared to spend time and pay a premium for produce that they perceive as local and of higher quality. Other shops and market traders complement this by providing supply throughout the week, in multiple locations and with a range of quality and price to suit all pockets.

would be competing directly with established traders doing the same job, rather than exploiting any particular economic advantage.

In terms of exports, a Georgian trader is most unlikely to compete with a Ukranian or Russian retailer working on his home territory, and the main option here seems to be to cut out the wholesaler entirely and sell direct to large supermarket chains, as discussed under "Consolidation" above.

Price formation and information transfer

At present, most initial price-formation in the citrus chains occurs at one of three points:

- In the negotiation between a grower and the trader who comes to his farm;
- In the negotiation between an exporting farmer and the buyers who come to the wholesale market in Ukraine;
- In the prices offered by Consolidation Centres.

In the first situation, the trader spends most of his time either visiting farms or at the market. He has a very good knowledge of the quality and quantity available on farms, and of the level of demand on the local markets. This knowledge, coupled with the cash in his pocket, puts him in a strong bargaining position relative to the farmer, who is typically dependent on conversations with neighbours and phone calls to a few contacts in order to know what is going on in the markets.

If the trader is involved in exporting, then he is in a similar position to the farmer when it comes to understanding his target market: he has the knowledge he brought back from his previous trip (which may already be out of date by the time he is back in Georgia) and the network of contacts that he calls by phone. Yet even with these contacts, he cannot understand the market as well as the Ukranian wholesalers who are at the market all day, every day and know not only what is going on in the market but also hear the rumours of new shipments on their way from countries around the world. The main exception here is the large exporting companies that can maintain a permanent presence in their target markets throughout the citrus season.

When a farmer decides to do the exporting himself, he faces the same challenges as the exporting trader, and is typically even less well-informed since he will normally make just one trip a year.

The way in which prices were set by the Consolidation Centres is not very clear, but seems to have been simply to match the prices being offered by private traders.

There are two usual solutions to the problem of information inequality, designed to improve the bargaining position of farmers and to make trading more fair and efficient:

- Structured price-formation mechanisms, such as auction markets and commodity exchanges;
- Market information systems.

Fruit and vegetable auctions are well develop in the Netherlands, with their famous "clock" auction system, but in most countries auctions are mostly used for livestock, whilst fruit prices are set by direct negotiation between buyers and sellers at the wholesale markets. In former Socialist countries, commodity exchanges tend to play a greater role.

Various organisations, including the EU, USDA, USAID and FAO have helped to set up market information systems throughout the region, many of which are now operating as commercial companies or government-funded services. Systems relevant to Georgian citrus exports include:

- Russia: www.fruit-inform.com providing commentary, prices and graphs on markets

around Russia, Eastern Europe and Central Asia, in English and in Russian. This also appears to be the best source of regular information on the Ukranian market.

- Armenia: www.armis.am providing fruit and vegetable prices on a number of markets in Armenia, in English and Armenia.
- Kazakhstan: www.kam.kz subscription-only service.
- EU & US: www.freshfruitportal.com giving prices from the Rotterdam Fruit Exchange, as well as subscription services.

Georgia is clearly in need of its own agricultural market information system to carry out a number of functions such as:

- Collecting prices and analysing trends on Georgian markets;
- Obtaining prices from key international markets, using a combination of open-source data, subscription services and paid market reporters in, for example, Odessa;
- Keeping abreast of developments in markets and standards, covering everything from the demand for GlobalGAP to proposed changes to EU fruit grading standards or phytosanitary requirements;
- Disseminating all of this information as widely and quickly as possible to farmers and traders throughout Georgia.

Risk-taking and financing

When a trader buys mandarins from an Ajaran farmer, he usually pays in cash when he takes the fruit, and must then spend out on transport, marketing and in the case of exports documentation and customs charges, before getting any money back. Relatively few farmers have the financial resources to do this, and so the traders inject an important degree of liquidity into the system.

Also the trader pays the farmer without knowing exactly what price he will get when he sells, thus accepting the trading risk: if the market drops or the produce is delayed and spoiled, it is the trader's loss, just as any rise in the market adds to his profit. Given that farmers tend to be relatively risk-adverse, this is an additional economic service provided by traders and Consolidation Centres.

If farmers' associations or cooperatives are to start playing a major role in citrus marketing, they will need working capital as well as fixed assets, and must have a clear understanding of how the risk will be shared amongst members.

2.4 Citrus export markets

2.4.1 Georgia in the world

The following table shows FAOSTAT data for production of tangerines, mandarins, clementines and satsumas, averaged across the two years 2010 and 2011. It shows the 15 countries which account for 90 % of world production, headed by China, Spain and Brazil, together with Georgia and Azerbaijan. Georgia produced an average of 51,000 tonnes, 0.21 % of the global total, whilst Azerbaijan produced just under a third of this, 45,000 tonnes and 0.06 % of world output. No production was recorded for Armenia.

Country	Average production 2010 - 2011	Share of world production
China	11,730,000 t	47.54%
Spain	2,157,005 t	8.74%
Brazil	1,063,368 t	4.31%
Turkey	865,475 t	3.51%
Japan	857,100 t	3.47%
Egypt	822,468 t	3.33%
Iran	763,000 t	3.09%
Korea	647,647 t	2.62%
Morocco	612,932 t	2.48%
USA	568,351 t	2.30%
Italy	546,595 t	2.22%
Pakistan	537,186 t	2.18%
Argentina	412,194 t	1.67%
Mexico	407,920 t	1.65%
Thailand	320,103 t	1.30%
Georgia	**50,850 t**	**0.21%**
Azerbaijan	15,781 t	0.06%
All other countries	2,295,016 t	9.30%
Grand Total	**24,672,989 t**	**100.00%**

• Clearly Georgia is a very small player on the global market, and hence a price-taker, though it occupies a much more important role in certain specific markets such as Ukraine (see next section).

• Concerns have been expressed in Ajara about the proposed "Eurasian Union" that Russia is now promoting, which would give strong preference to goods produced by member countries, to the detriment of Georgia if it chose not to join. At the time of the mission it was not clear whether Ukraine, Georgia's largest export market for citrus, would choose to join the Eurasian Union or strengthen its ties with the European Union. However, the events of early 2014, including loss of Ukranian control over Crimea, make the future of Ukraine and its trading relationships even more uncertain.

• However things play out in Ukraine, the formation of a Eurasian Union is unlikely to have a major impact on Georgia's citrus exports, since none of the prospective members produces sufficient citrus fruit to satisfy demand and so regular imports from outside the bloc would still be required. The state of political relations between Georgia, Ukraine and Russia relations are likely to be a much more important factor than any trading union.

16. Armenia has expressed its intention to join the Eurasian Union and it is therefore unlikely that Azerbaijan, the only other country of the former Soviet Union that has any significant production of citrus fruit, would join in the near future. Even if it did, Azerbaijan's citrus output is far too small to satisfy the needs of all the prospective Eurasian Union members, and it is understood that much of the citrus currently sent from Azerbaijan to Russia in fact originates from Georgia.

2.4.2 Citrus markets

The following table shows the total quantity of citrus produced each year and the amount sold on the domestic market, the export market, and not marketed. Data are from the Ajara Regional Development Strategy:

	2006/7		2007/8		2008/9		2009/10	
Row Labels	Quantity	Share	Quantity	Share	Quantity	Share	Quantity	Share
Domestic market	8,008 t	18%	21,917 t	21%	10,444 t	23%	12,770 t	12%
Export market	14,518 t	32%	67,545 t	65%	23,951 t	54%	84,928 t	81%
Not marketed	22,877 t	50%	15,068 t	14%	10,105 t	23%	7,302 t	7%
Total	45,403 t	100%	104,530 t	100%	44,500 t	100%	105,000 t	100%

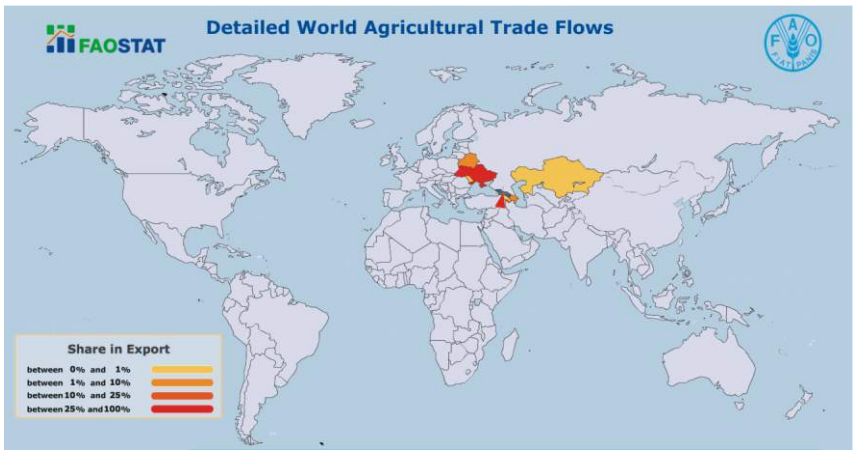
The data show the typical alternation of production, and also show that exports have been growing rapidly: from 14,500 tonnes (32 % of total production) in the low-yielding year of 2006/7 to 85,000 tonnes (81 % of production) in high-yielding 2009/10.

A significant share of production is not sold on either the domestic or export markets. This consists mainly of the "non-marketable mandarins": small and damaged fruit that are suitable only for juice production are often simply dumped, either because transport costs are higher than the price offered by the factory or because, as in several recent years, no juicing plant was actually working (see section 2.3.3 above). Some 50 % of the 2006 harvest went unsold, due to the sudden ban in imports of Georgian citrus into Russia, though this share fell in subsequent years as traders switched their attentions to Ukraine and regional markets.

Comparing the first two years with the second two, total production has remained almost unchanged, and so the growth in exports has come from a big drop in the amount of un-marketed citrus and an apparent 25 % fall in domestic sales.

2.4.3 The destination of Georgian production

The following map shows the destinations of Georgian citrus exports by quantity in 2011, using Faostat data taken from official Georgian statistics:



The principal destinations in this year were Ukraine (82 %), Azerbaijan (9 %), Belarus (6 %) and Kazakhstan (1%).

The following table gives a more detailed breakdown of citrus exports over a 4-year period, once again using data from the Ajara Regional Development Strategy:

Row Labels	Year 2006/7 Quantity	Share	2007/8 Quantity	Share	2008/9 Quantity	Share	2009/10 Quantity	Share
Export market	**14,518 t**	**100%**	**67,545 t**	**100%**	**23,951 t**	**100%**	**84,928 t**	**100%**
FSU	**14,518 t**	**100%**	**67,545 t**	**100%**	**23,951 t**	**100%**	**84,685 t**	**100%**
Armenia	3,594 t	25%	18,094 t	27%	3,579 t	15%	7,029 t	8%
Azerbaijan	2,040 t	14%	7,754 t	11%	8,322 t	35%	31,787 t	37%
Belorussia		0%	80 t	0%	401 t	2%	1,439 t	2%
Kazakhstan		0%	20 t	0%		0%	335 t	0%
Moldova		0%	74 t	0%	72 t	0%	153 t	0%
Russia		0%		0%	34 t	0%		0%
Ukraine	8,884 t	61%	41,348 t	61%	11,543 t	48%	43,924 t	52%
Uzbekistan		0%	175 t	0%		0%	18 t	0%
EU		**0%**		**0%**		**0%**	**37 t**	**0%**
Other		**0%**		**0%**		**0%**	**205 t**	**0%**
Total	14,518 t	100%	67,545 t	100%	23,951 t	100%	84,928 t	100%

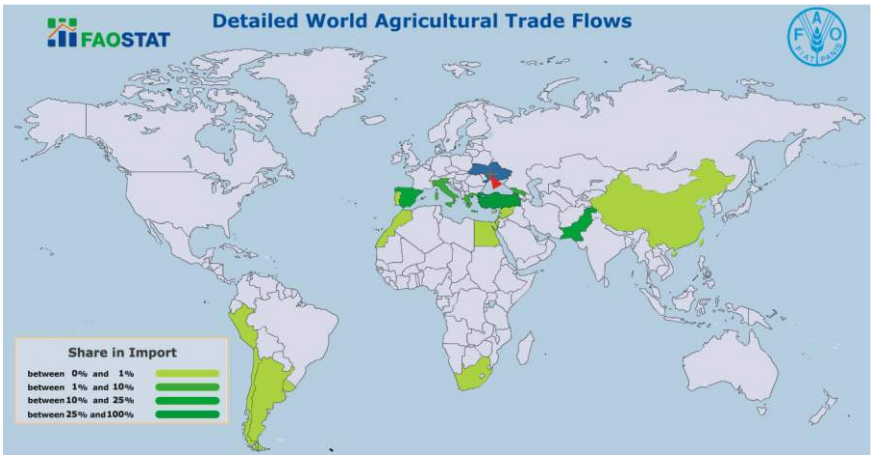
Whilst Ukraine is still clearly the largest market, these data show it accounting on average for 55 % of total exports, whilst the regional markets of Azerbaijan and Armenia account for 43 %. The exports to Armenia were for consumption in that country, whilst much of produce sent to Azerbaijan is believed to have been shipped on to Russia (see below).

The only EU destination during this period was the Czech Republic, with an export of just 37 tonnes in 2009/10, and the only other market outside the former Soviet Union was Kuwait, also in 2009/10.

The rest of this section examines the competition on the key target markets of Ukraine and Russia, together with the trade pattern through Azerbaijan and sales to Armenia. The source for all maps and tables is the FAOSTAT database (http://faostat.fao.org).

Mandarin imports into Ukraine

The following map shows the origin of "tangerines, mandarins, clementines and satsumas" (henceforth: "mandarins") imported into Ukraine in 2011. The colours indicate the supplying countries' shares of the total import of 182,000 tonnes:



The first point emerging from this map is that Ukraine imports mandarins from all around the world, from Chile to China, Spain to South Africa. The second is the leading role that Turkey took in this year with 47 % of total imports, followed by Spain, Pakistan, Italy and then Georgia in fifth place with 6 % of the total.

The following table gives a longer-term view, showing imports of mandarins into Ukraine for a 10-year period. Values are in thousand tonnes, and the table includes all countries that delivered an average of at least 3,000 t/year; the leading supplier in each year is shown in bold:

Supplier	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Av.	Share
Turkey	**25.5**	**26.6**	**26.6**	**41.1**	**66.7**	9.2	**56.5**	**54.9**	**10.6**	**85.5**	**40.3**	42%
Georgia	10.1	12.9	8.8	19.4	12.6	**34.0**	22.1	37.8	7.5	10.8	17.6	18%
Spain	1.0	0.4	2.1	6.9	9.3	0.8	20.4	14.5	7.1	34.1	9.6	10%
Pakistan				0.4	8.5	0.3	15.0	8.4	10.5	20.9	9.1	10%
Italy	0.0	0.0	0.3	1.7	1.9	0.8	3.9	8.5	1.8	17.0	3.6	4%
Israel	1.8	2.7	2.6	4.6	5.9	7.2	4.4	2.4	1.6	0.9	3.4	4%
USA						32.5					32.5	34%
Rest	0.7	1.0	2.5	5.8	10.0	50.8	10.9	9.9	9.7	12.9	11.4	12%
Total	**39.1**	**43.5**	**42.8**	**79.9**	**114.9**	**135.5**	**133.2**	**136.4**	**48.7**	**182.1**	**95.6**	**100%**

This shows that Turkey has long been the biggest supplier, with Georgia usually coming next and actually beating Turkey to first place in 2007. Spain and Pakistan have been significant suppliers in some of the last four years, whilst Italy only played an important role in 2011. It is interesting to note that Morocco is not a significant supplier to Ukraine, with annual imports always less than 300 tonnes.

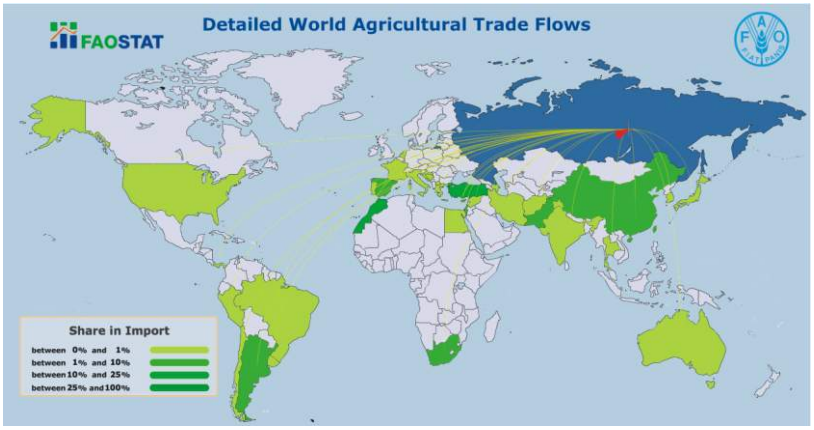
The EU in total has supplied an average of 19,000 tonnes a year, but the data include countries such as Ireland and Finland which do not grow citrus, so obviously include some re-exports. The serious EU suppliers are Spain, Italy and Greece, with an average of 15,000 tonnes per year, though this has grown to almost 30,000 tonnes per year (24 % of total imports), since 2008.

The trade data show no significant mandarin exports by Ukraine. A number of experts and traders have reported that Georgian supplies to Ukraine are often moved on to Russia, Belarus and Moldova, but if this trade is taking place it must be through informal channels.

The data on trade values given in the FAOSTAT database shows that the average value of Georgian mandarins imported into Ukraine during 2008-11 was $ 440/t, more than 30 % below the average price of $ 644 for imports from all sources. This serious price differential, which is currently being analysed by the ENPARD-FAO policy support project might be due to a combination of quality, packing, timing and trader relationships.

Mandarin imports into Russia

The following map shows the comparable picture for Russia:



Russia imported just over 800,000 tonnes of mandarins in this year, of which 25 % came from Morocco, 23 % from Turkey and 16 % from China.

The 10-year trend is shown in the following table, again in thousand tonnes with the leading supplier each year marked in bold:

Supplier	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Av.	Share
Morocco	49.6	**68.3**	81.7	**107.3**	**152.6**	**157.4**	**152.2**	132.5	**167.7**	**198.7**	**126.8**	27%
China	**54.2**	59.9	**82.2**	82.6	82.8	113.9	124.6	**158.0**	133.4	132.0	**102.4**	21%
Turkey	40.8	38.4	45.8	63.7	96.3	95.8	116.0	134.6	162.7	186.9	**98.1**	21%
Pakistan	0.0	0.8	6.0	15.4	32.8	22.9	32.2	43.5	82.9	77.1	**31.4**	6.6%
Argentina	6.0	6.7	13.3	18.1	26.6	33.1	37.8	40.6	46.5	48.1	**27.7**	5.8%
Spain	11.7	13.5	13.2	11.6	14.7	40.4	37.6	19.9	27.5	57.7	**24.8**	5.2%
Israel	2.9	3.4	10.4	12.0	9.1	19.1	18.2	23.7	22.7	21.5	**14.3**	3.0%
Georgia	15.1	12.3	13.1	44.6	8.6	9.3	6.4	0.9			**13.8**	2.9%
S. Africa	2.4	4.3	8.7	5.6	7.6	7.3	12.4	11.1	14.1	13.2	**8.7**	1.8%
Azerbaijan	1.4	2.5	1.7	5.5	6.2	16.2	14.6	11.8	10.3	0.9	**7.1**	1.5%
Cyprus	0.1	0.6	1.2	0.9	2.1	5.6	3.3	6.2	9.4	16.6	**4.6**	1.0%
Uruguay	1.2	2.3	1.5	3.3	4.2	3.8	3.5	3.2	5.8	5.6	**3.4**	0.7%
Italy	0.4	0.8	1.5	1.6	1.4	3.5	2.3	7.8	4.7	7.2	**3.1**	0.7%
Rest	3.8	4.8	4.4	4.5	7.1	8.2	11.4	18.7	39.4	39.7	**14.2**	3.0%
Total	**190**	**218**	**285**	**377**	**452**	**536**	**572**	**612**	**727**	**805**	**477**	100%

Georgian imports actually continued into 2009, despite the trade embargo starting in 2006, and over the period 2002-2008 averaged over 15,000 tonnes per year, with a peak of almost 45,000 tonnes in 2005. This placed Georgia in 7th place, with just over 4 % of the Russian market. Georgia's exports to Ukraine over this period averaged 17,000 tonnes per year, so Russia was almost as important a market as Ukraine.

EU suppliers play a proportionally smaller role on the Russian market than in Ukraine, with an average of 7 % of total imports. However, that still accounts for some 34,000 tonnes per year, and in 2011 rose to almost 90,000 tonnes, with the largest suppliers being Spain and Cyprus, followed by Italy and Greece. Whilst EU quality standards may slowly come to influence the Russian market, the main competition for Georgia will come from the non-EU countries of Morocco, China, Turkey and Pakistan, and it is these suppliers that it must match on quality and price.

The average price of mandarins imported into Russia during 2008-11 was $ 865/t, just over one-third higher than the price for imports to Ukraine. During the last two years for which Georgian sales to Russia were reported (2008-9), the average price for Georgian produce was $ 460/t compared to an overall average of $ 799; this may reflect the same range of quality and market factors as mentioned above for Ukraine, plus a degree of prejudice against Georgian .

Mandarin imports and exports through Azerbaijan

The following table shows the rather complex pattern of mandarins imports and exports by Azerbaijan:

Trade	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Av.	Share
Export, to:	1.5	2.4	1.7	6.0	4.8	16.4	13.6	12.6	11.6	2.2	7.3	100%
Russia	1.4	2.4	1.7	6.0	4.8	16.4	13.6	12.5	11.6	2.1	7.3	100%
Rest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0%
Import, from:	0.3	0.1	0.0	0.2	0.9	0.2	1.0	9.5	10.1	2.6	2.5	100%
Georgia					0.0	0.0	1.0	9.3	9.5	1.3	2.1	85%
Iran	0.3	0.1	0.0	0.2	0.9	0.0		0.0			0.1	6%
Rest	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.2	0.5	1.3	0.2	9%

From 2002-2006 Azerbaijan exported an average of 3,300 tonnes per year, almost all to Russia, and imported an average of 300 tonnes per year from Iran. From 2007-2010 exports suddenly jumped to 13,600 tonnes per year, with declared imports from Georgia averaging 5,200 tonnes.

FAO production statistics for Azerbaijan show that harvested area actually fell by 16 % from 2002-6 to 2007-10, whilst reported production went up by almost 140 %. It this seems highly probable that the majority of Azerbaijan's export to Russia over this period consisted of official and unofficial imports from Georgia.

From 2002-2006 Azerbaijan exported an average of 3,300 tonnes per year, almost all to Russia, and imported an average of 300 tonnes per year from Iran. From 2007-2010 exports suddenly jumped to 13,600 tonnes per year, with declared imports from Georgia averaging 5,200 tonnes.

FAO production statistics for Azerbaijan show that harvested area actually fell by 16 % from 2002-6 to 2007-10, whilst reported production went up by almost 140 %. It this seems highly probable that the majority of Azerbaijan's export to Russia over this period consisted of official and unofficial imports from Georgia.

Mandarin imports into Armenia

The following and final table in this series shows imports into Armenia in the same way:

Supplier	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Av.	Share
Georgia				0.4	0.5	0.3	0.8	1.8	3.2	2.0	0.9	45%
Iran	0.1		0.1	1.2	1.6	0.7	0.2	0.0	0.0	0.0	0.4	20%
Pakistan					0.0	0.1	0.8	0.9	0.6	1.3	0.4	19%
Rest	0.0	0.1	0.1	0.1	0.1	0.3	0.3	0.3	1.2	0.8	0.3	16%
Total	0.1	0.1	0.2	1.7	2.2	1.4	2.2	3.0	5.0	4.1	2.0	100%

Georgia did not begin to supply Armenia until 2005, and by 2008 had risen to take first place on the market from Iran. Georgian sales to Armenia averaged 2,000 tonnes per year from 2008-11, equivalent to one tenth of the volume going to Ukraine.

Armenia has neither mandarin production of its own nor a border with Russia and so, unlike the situation with Azerbaijan, this is a simple situation of Georgia supplying one of its neighbours with mandarins.

2.4.4 Income potential

• Even with new trees and good marketing, output value from a 0.25 ha farm is unlikely to exceed $5,000 and net income $3,000 (assuming they pay a commercial price for new plants etc.).

• Average per capita GNI of the Candidate Countries is around $12,000 and that of the 2004 New Member States around $23,000, suggesting average net household income of around $18-36,000; mandarin farms would need to be 6-12 times larger than they are now in order to match these income levels.

• i.e. if Georgia aspires to ever approach Central European levels of household income, then for every 10 families currently producing mandarins, 8-9 should leave agriculture (and quite possibly leave the rural areas) and find another source of income, selling or renting their land to the remaining growers, who would then each produce 20-40 t annually (x the increase in yield from the new trees). By the time Georgia achieves this, Central European incomes should have risen considerably, so further farm enlargement would be required in order to achieve parity.

2.5 Conclusions: The competitiveness of Ajaran mandarins

Can Ajaran mandarins compete on export markets?

The answer is an unequivocal "Yes", since Georgia is routinely in the top two or three suppliers to Ukraine, providing close to 20 % of its total imports, and has continued to provide significant quantities to Russia via Ukraine and Azerbaijan, despite the embargo. Until 2013 all this was achieved without government subsidies. However, it was based on a very low labour cost and a low opportunity cost for land, and the return to the average producer was no more than $1,500 in a good year and as little as $500 in a bad year. Whilst generating export revenues for the region of up to $ 16 million per year, this is certainly no recipe for rural prosperity.

Can Ajaran mandarin production and export become more competitive than it is now?

Again, the answer is a clear "Yes". Two years' experience of the USAID "EPI" project found that ordinary small farmers could treble their yields with a package of simple, low-cost measures. Replacement of old and diseased trees with the new saplings set to come out of the AgroService Centre nursery should allow further yield improvements, as well as the possibility of higher prices from early-harvest varieties, whilst simple improvements in storage may allow extra returns to be extracted at the other end of the season. Increased efficiency in the marketing chain could help to raise farm gate prices throughout the season, perhaps by up to 50 % in the short term.[17] However, the greatest market benefits will come from raising quality throughout the whole chain, from the initial choice of varieties, through orchard management, to storage and then sorting, packing and grading to meet the requirements of increasingly demanding clients.

17. At the time of the mission, there was some optimism amongst mandarin producers and traders that the end of the Russian embargo would allow the re-development of profitable direct exports to Russia. However, the developing crisis in Ukraine has rather dispelled such optimism.

What is necessary to bring about this increase in competitiveness?

The first priority is undeniably to improve orchard management, the second is probably to replace the estimated 30 % of trees that are too old or diseased to ever produce good yields of quality fruit, and the third is to post-harvest handling and marketing. The key to the first, and a necessary precondition for success with the second, is a good system of extension targeted at small farmers and farmer groups to deliver the four key messages of mulching rather than root cutting, proper pruning and plant spacing, fertilising when needed, and use of safe and appropriate pesticides in response to real risks of economic loss. The latter in particular should be backed up by plant pest monitoring service that tracks weather conditions and pest populations, notifies farmers in good time, and provides specialist advice in pest identification and treatment recommendations.

Both the Georgian and the Ajaran ministries of agriculture are supporting the testing and replication of citrus varieties, and the AgroService Centre will shortly begin distributing saplings to farmers. This process should be monitored carefully to ensure that the pricing is appropriate and that the varieties are suited to the reality of farm and market conditions and avoid, for example, a complete switch to early-harvesting varieties that might just result in a glut at a different time in the market. It will be important to encourage competition amongst suppliers, rather than a government-backed monopoly, with an effective phytosanitary service to ensure the health and quality of all saplings sold.

Better post-harvest handling and marketing is partly a matter knowledge, which again should be delivered through a well-funded and proactive extension service, and partly a matter of organisation. A start has been made with Consolidation Centres, and funds will shortly become available for farmer groups. The keys to success will be to listen and respond to farmer feedback, to find the organisational structures that work best in Georgia without any preconceptions or prejudices, and to robustly promote competition throughout the marketing chain.

Should farmers in Ajara be growing mandarins at all?

If the 70-year experiment of the Soviet Union has taught us anything in agriculture, it is that government is not best-placed to tell farmers what to produce or where to sell it. Neither consultants nor donors nor even the extension service should try to step in where socialism failed, as only the farmer can decide what is the best option for his or her individual circumstances, skills and preferences. However, these institutions have an invaluable role to play in providing farmers with the information they need to make the best decision, including good technical advice and reliable information on markets and margins. Extension should have the clear goal of helping farmers of every size increase their profits, and should be supported by the twin pillars of a market information system and a regular farm business survey, both firmly focussed on getting their results out to farmers so that they can decide what to grow.

Initial analysis for this study suggests that two common competing crops mandarins and hazelnuts currently generate roughly similar levels of revenue and margins, with hazelnuts having some important cashflow advantages. However, with the identified scope for increasing both yields and prices of mandarins, and Georgia's well-established position on international markets, this is definitely not a crop to be ignored.

Can consolidation centres play a useful role?

The answer here is “Probably”. The functions of consolidation, sorting and packing are already carried out by private traders at relatively low cost. Consolidation centres offer the potential for better quality sorting, packing and grading, but will need to offer more competitive rates than in 2013 in order to attract large numbers of farmers. As the consolidation centres themselves “consolidate” into a smaller number of big operators, they may become able to offer the volumes, quantity and continuity needed to supply direct to large supermarket chains in Russia and

Ukraine, thus bringing higher returns to the whole sector. The critical issues will be price and competition, and government must monitor developments to ensure that they do not end up with a series of local monopolies, or even one Ajara-wide cartel. In this the continued operation of numerous small traders and exporters will be an essential spur to competition, and government should make sure that they are not squeezed out.

Is there scope for farmers' groups or cooperatives?

The answer here is "It depends what they are going to do".

Citrus growing in Ajara is a highly manual activity, given the size of the farms, the steepness of the terrain and the nature of the tasks to be performed, so there are few technical economies of scale in production, but there could be significant economies of scale in the transfer of knowledge to farmers. The most obvious and immediate role for cooperation would be the creation of small, informal farmer groups supported by a strong extension service, as a cost-effective method of transferring much-needed knowledge to nearly 30,000 small citrus growers. From this relatively un-threatening beginning, the groups might be able to develop the mutual trust and local leadership that would allow them to undertake more ambitious joint operations. Given that the biggest and quickest increases in farmers' profits will come from improvements in production rather than marketing, this should be the clear priority for donor support.

As far as consolidation, sorting, packing and grading are concerned, an association or cooperative has no obvious technical benefits over a company-run consolidation centre, and would take considerable time to build up to the scale that some of these companies achieved in their very first year. The more important issue here is one of market power: if the consolidation centres continue to charge high prices for their services and to pay no more than private traders, then there would be scope for farmers' associations to take over this role themselves. Just a few successful cooperatives could be sufficient to challenge the position of the consolidation companies and introduce more competitive pricing, but it would probably be wise to wait a year or two to see how the situation develops before committing donor funds in this area.

The "big prize" in coordinated action would be to achieve full vertical integration, so that farmers manage their orchards and harvest their fruit in order to deliver the quality, quantity and, as far as possible, timing that large retailers require, within an agreed price and payment schedule. This represents a highly sophisticated model of business and social organisations that cannot be achieved overnight. It could be done using commercial companies and contracts with individual growers, as is common in the UK; with fully-integrated cooperatives, as occurs in many European countries; or with a hybrid model whereby small- to medium-sized production and packing cooperatives sell their produce on contract to large-scale exporters. At this stage in the development of the sector, it might be best to support a few operations with different models, to see what lessons can be learned and replicated on a bigger scale.

2.6 Recommendations for the mandarin value chain

- Increase orchard productivity and fruit quality by changing farmers' practices through transfer of knowledge and demonstration of benefits.
- Extend the season in both directions, with early-harvest varieties and with improved cold storage of late-harvested fruit, to increase sale prices and allow expensive sorting and processing facilities to spread their costs over a longer period of operation.
- Improve sorting, packing and grading for export to those markets that pay a quality premium.
- Promote the development of a number of large packer-exporters ("Consolidation Centres") to allow direct contracting and supply to foreign supermarket chains, whilst ensuring the continued operation of smaller pack houses and private traders in order to provide competition.
- Increase competition and reduce costs for the provision of services including transport and sorting.
- Establish a market information system to increase farmers' bargaining power and to keep all stakeholders better informed of developments and demand on target markets.
- Introduce phytosanitary and quality control of planting material, and establish a plant pest monitoring, forecasting and advisory service.

3 Hazelnuts

Hazelnuts represent one the main alternatives to mandarins along the "coastal strip". Currently, most farmers in these areas grow either citrus or hazelnuts, depending on altitude (hazelnuts more common on lower land, citrus more dominant higher up) and on what plants were already there when they inherited or otherwise acquired the plot, though some have begun to diversify into other perennial crops such as kiwi and persimmons, whilst a few continue to produce tea.

This study did not examine hazelnuts in the same detail as mandarins, in part because most Georgian hazelnut production occurs outside Ajara and so has been studied by other projects. The data in this section are based on published statistics, a limited number of field visits, and a review of existing reports.

3.1 Key statistics

In the following sections, production data refer to quantities of whole (in-shell) hazelnuts, whilst trade data refer to shelled hazelnuts (kernels). Typically, 1 tonne of Georgian hazelnuts will yield about 370 kg of kernels.

3.1.1 Production

The basic data on area harvested, production and yield of hazelnuts in Georgia are given in the following table:

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Area (ha)	4,915	5,500	4,600	9,000	13,000	12,000	10,000	12,000	15,000	15,500
Production (t)	13,901	14,820	8,327	16,393	23,500	21,200	18,700	21,800	28,800	31,100
Yield (t/ha)	2.8	2.7	1.8	1.8	1.8	1.8	1.9	1.8	1.9	2.0

Source: FAOSTAT

- The Georgian hazelnut area was around 5,000 ha in 2002-2004 but has now tripled to just over 15,000 ha. Yields have fallen somewhat over this period, probably as new plantations take time to build up to full yield, so total production has slightly more than doubled, from around 14,000 t in 2002-3 to around 30,000 t.

- The harvested area jumped up on two occasions: in 2005-6 and again in 2010-11. Given that it takes around four years for a new plantation to start giving significant yield, this suggests that new plantings were made around 2002 and again around 2006; Ferrero began to invest in Georgian hazelnut production around 2007.

- Though hazelnut exhibits the same phenomenon of "alternate bearing" as citrus (so an individual farmer's yield should be averaged over a 2- or 4-year period to gain an accurate picture), this appears to operate at a very local level and the national data to not show alternation of yields or production.

Data specifically for Ajara, from a different source, are shown in the following table:

	2012					2013 (forecast)				
Region	Area		Production		Yield	Area		Production		Yield
Kobuleti	245 ha	70%	825 t	73%	3.37 t/ha	245 ha	65%	870 t	70%	3.55 t/ha
Khelvachauri	60 ha	17%	182 t	16%	3.03 t/ha	62 ha	16%	180 t	14%	2.90 t/ha
Keda	20 ha	6%	65 t	6%	3.25 t/ha	41 ha	11%	120 t	10%	2.93 t/ha
Shuakhevi	5 ha	1%	18 t	2%	3.60 t/ha	7 ha	2%	25 t	2%	3.57 t/ha
Khulo	0 ha	0%	0 t	0%	-	1 ha	0%	3 t	0%	3.00 t/ha
Batumi	20 ha	6%	45 t	4%	2.25 t/ha	20 ha	5%	46 t	4%	2.30 t/ha
Ajara	**350 ha**	100%	**1,135 t**	100%	**3.24 t/ha**	**376 ha**	100%	**1,244 t**	100%	**3.31 t/ha**

Source: Ajara Ministry of Agriculture

- Comparing 2012 data for Ajara with 2011 data for all of Georgia shows that Ajara accounts for 2.3 % of the total hazelnut area and 3.6 % of overall production, so hazelnut production is relatively less important in Ajara than in Georgia as a whole.

- Kobuleti is clearly the dominant hazelnut region in Ajara, accounting for around 70 % of total area and production.

- The reported yields for Ajara average 3.3 t/ha for 2012-13, some 70 % higher than the all-Georgia average yields reported by FAOSTAT. Local experts consider that a yield of 1.4-1.5 would be more realistic for Ajara.

The size distribution of hazelnut plantations in Ajara is not recorded, but given that they are main alternative to mandarins in the same regions, it seems probable that the size distribution of holdings is similar for both crops, implying that the typical hazelnut holding is around 0.25 ha and produces an average of about 0.5 t/year.

The following table puts Georgia in the world context, showing 2012 production, area and yield for the ten biggest hazelnut producers:

Country	Production		Area		Yield
Turkey	660,000 t	72.17%	422,765 ha	70.46%	1.56 t/ha
Italy	85,232 t	9.32%	57,992 ha	9.67%	1.47 t/ha
USA	30,000 t	3.28%	11,890 ha	1.98%	2.52 t/ha
Azerbaijan	29,624 t	3.24%	23,768 ha	3.96%	1.25 t/ha
Georgia	24,700 t	2.70%	12,400 ha	2.07%	1.99 t/ha
China	23,000 t	2.52%	11,500 ha	1.92%	2.00 t/ha
Iran	21,440 t	2.34%	21,022 ha	3.50%	1.02 t/ha
Spain	13,900 t	1.52%	14,000 ha	2.33%	0.99 t/ha
France	8,358 t	0.91%	4,279 ha	0.71%	1.95 t/ha
Poland	4,223 t	0.46%	3,686 ha	0.61%	1.15 t/ha
Rest of world	13,970 t	1.53%	16,699 ha	2.78%	0.84 t/ha
Total	**914,447 t**	**100.00%**	**600,001 ha**	**100.00%**	**1.52 t/ha**

Source: FAOSTAT, data for 2012

- World hazelnut production is highly concentrated, with Turkey alone producing 72 % of total production, and just two countries (Turkey and Italy) accounting for over 80 %.
- Georgia is in fifth place, with 2.7 % of total production and 2.1 % of world area.
- These data show that average hazelnut yields in Georgia are good, almost identical to those in China, and that of the major producers, only the USA has a higher yield.

3.1.2 Production

The following table shows the quantity of Georgian hazelnut kernel exports, in tonnes per year, for each of the top ten destination countries and for the rest of the world:

Destination	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average	Share
Germany	639	1,552	745	1,988	2,508	3,435	945	2,415	2,456	4,527	2,121	22.7%
Italy	1,205	1,270	199	2,488	3,239	1,382	547	1,705	1,016	3,111	1,616	17.3%
Czech			180	800	1,327	900	832	1,383	1,169	1,381	797	8.5%
Russia	1,003	1,475	1,468	2,431	670	10	148	373			758	8.1%
France	65	43		21	684	889	394	611	612	1,113	443	4.7%
Ukraine	101	94	75	101	344	424	536	420	640	1,182	392	4.2%
Belgium		36	44	82	570	1,138	88	296	186	1,386	383	4.1%
Greece	275	344	424	586	330	302	83	626	108	439	352	3.8%
Spain	31	96	70	16		131	282	1,516	287	728	316	3.4%
Azerbaijan					20		240	457	704	1,430	285	3.1%
Other	191	308	488	952	1,842	2,478	1,647	4,577	2,462	3,795	1,874	20.1%
Total	**3,510**	**5,218**	**3,693**	**9,465**	**11,534**	**11,089**	**5,742**	**14,379**	**9,640**	**19,092**	**9,336**	**100.0%**

Source: FAOSTAT

- Germany has been the top destination for each of the last five years. It and Italy together buy on average 40 % of Georgia's hazelnut exports.
- Russia was a significant market until 2006, when trade dropped off sharply due to the political troubles.
- Exports to Azerbaijan began to increase rapidly from 2008; given that Azerbaijan is the world's fourth biggest producer of hazelnuts, it seems highly likely that most of its imports from Georgia are re-exported to Russia.

Competition on Georgia's target markets is shown by the following table, which records the origin of overall hazelnut imports to the top nine destinations for Georgian exports (Azerbaijan is left out of this list because of the re-export trade). To clarify, the numbers in this table are the total import of hazelnuts to the nine countries Germany, Italy, Czech Republic, Russia, France, Ukraine, Belgium, Greece and Spain, by country of origin, averaged across the five years 2007-2011:

Country of origin	Average annual imports	
Turkey	93,011 t	63.84%
Luxembourg	11,806 t	8.10%
Italy	10,055 t	6.90%
Azerbaijan	9,213 t	6.32%
Georgia	8,546 t	5.87%
France	3,498 t	2.40%
Germany	2,394 t	1.64%
Netherlands	2,217 t	1.52%
Spain	1,818 t	1.25%
United Kingdom	1,099 t	0.75%
Rest of world	2,030 t	1.39%
Grand Total	145,688 t	100.00%

Source: FAOSTAT, for 2007-2011

- Clearly, Turkey is Georgia's biggest competitor, accounting for 64 % of total supply to Georgia's main markets.
- Luxembourg's second position is misleading; it is not a producer of hazelnuts, so this must represent re-exports.
- Italy is a significant exporter and competitor with Georgia, as well as being its second-biggest market.
- Azerbaijan is also an important competitor.
- Overall, Georgia occupies fifth place on its main target markets.

Average prices for Georgian hazelnut kernel exports, to all destinations, are shown below:

Year	Average export price	
2000	$ 2,716/t	4.89 GEL/kg
2001	$ 2,538/t	4.57 GEL/kg
2002	$ 1,717/t	3.09 GEL/kg
2003	$ 2,193/t	3.95 GEL/kg
2004	$ 4,553/t	8.20 GEL/kg
2005	$ 7,286/t	13.11 GEL/kg
2006	$ 4,683/t	8.43 GEL/kg
2007	$ 5,748/t	10.35 GEL/kg
2008	$ 4,785/t	8.61 GEL/kg
2009	$ 4,415/t	7.95 GEL/kg
2010	$ 5,227/t	9.41 GEL/kg
2011	$ 6,467/t	11.64 GEL/kg
Average	**$ 4,941/t**	**8.89 GEL/kg** ($ 4.94/kg)

Source: FAOSTAT

Although export prices vary markedly from year to year, the general tendency has been for prices to increase, approaching 12 GEL/kg in 2011 (equivalent to around 4.40 GEL/kg in-shell nuts).

In March 2014, prices for the 2013 Ajara crop, "Megrula" variety, were still close to this 2011 peak:

- Ex-farm, in-shell = 3.85-3.95 GEL/kg (approx. $ 2.10/kg)
- EX-factory, kernels = 11.00 GEL/kg ($ 6.10)

Looking at reported import prices shows that Georgian hazelnuts fetch on average $ 5.40/kg when they reach their destination. This is around 20 % lower than the price achieved by the main EU producers, who receive on average $ 6.50, but better than the figure of $ 4.50 achieved by Azerbaijan.

3.2 Hazelnut production and marketing

Farm structures

In two villages visited in the Kobuleti region, hazelnuts are the dominant cash crop, kept by almost every household. In one village there are around 250 households producing 200 tonnes per year; in the other, 400 families producing around 600 tonnes per year. Few farmers in these villages grow mandarins, and where they do, this is usually be instead of hazelnuts, rather than together. Farmers often grow some maize for home consumption, and some keep one or two cows for household supply. Around half of households also have a non-agricultural income source, sometimes from family members working in a small business or in public employment in a local town, sometimes remittances sent back by relatives working in Turkey or elsewhere in Georgia or abroad.

Plantation siting

Hazelnut plantations are found on both level ground allowing regular spacing and the possibility of using machinery and on pronounced slopes where only hand cultivation and walk-behind machinery are practical. Rainfall is very high in this region and the subsoil is heavy clay, so waterlogging is a serious problem on level sites, often tackled through digging drainage ditches between rows of trees.

Tree variety and origin

Many of the trees are quite old, from 40-100 years, and have been passed down from generation to generation. The main varieties grown are Gushishvela (whose nuts fall to the ground when ripe), Zhabila and Megrula (harvested from the tree). When farmers replant, either to replace dead or diseased trees or to expand the plantation, they usually take their own cuttings from existing trees rather than bringing in new material. It has been suggested that introducing new varieties and disease-free stock could increase yields, but no estimates have been found of how much difference this might make.

Plant spacing

Trees are typically spaced around 4 metres apart in both directions, giving just over 600 tress to the hectare. One visiting USAID specialist[18] suggested that plant density could be increased, thus raising yields per hectare, but growers were concerned this would make drainage more difficult,

---

18. *Hazelnut production assessment and training*; USAID, 2011. Richard Verne Gingerich visiting under the "Economic Prosperity Initiative" project.

and there do not yet appear to have been any field trials to identify optimum spacing for these conditions.

Pruning

Some plantations showed evidence of recent pruning to open up the tree and leave just 4-6 fruit-bearing branches, but this seems to be the exception rather than the rule. More commonly there were multiple shoots giving a dense bush, with pruning typically limited to removing dead and diseased wood. This is probably one of the first areas where demonstration and extension could help to increase yields and quality.

Fertilising

Very few farmers use artificial fertilisers, and unless the household keeps cows, not even animal manure is applied. The USAID specialist observed that leaves were often light in colour, indicating nutrient deficiency. Proper fertilising would almost certainly increase yield and nut size, but there have not yet been any demonstration farm trials to inform farmers how much increase in yield and income they might expect to receive, or how much they would need to spend on fertiliser.

Pest control

Small knapsack sprayers are reasonably available in the villages, but pesticides are rarely used, with one farmer reporting that they only sprayed when the government told them about a specific problem, such as the outbreak of American Butterfly a few years ago. The USAID expert found several orchards where around 20-45 % of buds were damaged by bud mite, suggesting there would have been an economic response to insecticide. Regular spraying against blight would also increase tree health.

Orchard floor management

The space between the trees is usually covered with grass, which helps to reduce soil erosion during heavy rain. It is normally grazed by cows, which provides the cows with feed and returns nutrients to the soil, though at a possible cost of some damage to the trees. Mowing the grass or controlling its growth with herbicide would help to reduce water loss during the summer, provide a clearer surface for nut harvesting and reduce the hiding places for damaging rodents.

Harvesting

With the preferred variety, Gushishvela, nuts are picked up from the ground by hand several times throughout the harvest season. Smaller farms can usually achieve this with just their family labour; larger plantations will pay people 20-25 GEL/day to pick around 25-30 kg, giving a harvest cost of close to 1 GEL/kg.

Yields

Hazelnuts exhibit the same phenomenon of “alternate bearing” as mandarins: the harvest will be good in one year, half or less in the following year, and then the cycle repeats. This means that all yield numbers have to be checked to see whether they were for an “on” year or an “off” year. The farmers interviewed reported yields of up to 2.5-3.0 t/ha in “on” years, with 1.5 t/ha or less in “off” years, and suggested an average of around 2 t/ha, which would be in line with most of the official statistics reported above.

Drying and storage

All of the farmers visited dried their hazelnuts in or around their houses laid on racks, spread out on the floor of a bedroom, or kept on a covered veranda. Assuming a typical area of 0.25 ha and yield of 2 t/ha = 0.5 tonnes total, the quantity to be dried would rarely exceed 2 cubic metres,

which would cover 5 square metres if spread out to the maximum recommended depth of 40 cm. In other words, one ordinary bedroom is more than sufficient to dry a whole year's crop, and with harvesting on a number of successive occasions, there would really be no logistical difficulty.

In warm dry weather, the nuts will be dry enough to store after about two weeks, when they are placed in woven polypropylene bags and kept in the house or in a dry garage or basement. The ease of storage was seen as one of the biggest advantages over mandarins, where ten times more space would be required to store the crop from a similar area, and even then the maximum storage period would be no more than two or three months. To a hazelnut farmer, the sacks of nuts in the house are like money in the bank, which can be kept almost indefinitely until a good offer is made or the family needs some cash, when some of the harvest will be marketed in one of the following ways:

Marketing: Option 1 Farmer takes to middleman

In the Kobuleti region there are around half a dozen "hazelnut collectors" or middlemen, operating out of a small shed or simple metal container beside the main road. They act as agents on behalf of 5 or 6 different factories (cracking plants), of which one is in Ajara and the others elsewhere in Georgia. These middlemen are given funds in advance to buy hazelnuts at an agreed price, and literally carry envelopes of cash from different factories. At the time of visiting (early February 2014) prices had reached their peak and all factories appeared to be offering the same basic price of 4 GEL/kg which corresponded very closely with the prices quoted by farmers.

Farmers bring their nuts by van or car to the collecting centre, where they are weighed, sampled and a number cracked open to assess the proportion of sound kernels. Presumably there is then a negotiation about price and quality, though the details of this were not explained, and at the end the farmer drives off with his cash and the sacks of nuts go into the shed or container. Throughput at one centre was 2-3 tonnes/day, with individual farmers supplying anything from a single sack to a number of tonnes in one go, and it was reported that the 6 centres in Kobuleti would together collect 1,500-2,000 tonnes each season.

Periodically each of the factories sends a van to collect their share of the nuts and repay the agent, who receives a commission of 0.03-0.05 GEL/kg, equivalent to around 1 % the value of the goods collected. How the agent decides which factory gets which nuts was not made clear.

The system is very basic, but it operates at extremely low cost and there was no evidence that the agents or "middlemen" were using market power to extract a high share of the product value. Indeed, it would be hard to conceive of any kind of consolidation centre or group marketing activity that could bring costs below the level of 1 %.

Marketing: Option 2 Middleman collects from farm

Some of the farmers visited reported that they usually sold their hazelnuts to middlemen who came to their farm, inspected the nuts there, paid in cash and transported them away. It was said that there were 5 or 6 middlemen working in this way, and the farmer could simply phone round them all to check the price before making a sale, though one said that the spread between the highest and lowest price quoted would never be more than 0.05 GEL/kg, so he preferred to deal with the same person each year. It was not clear whether these middlemen were the same people as the agents with fixed collection points or additional to them, nor whether they were true middlemen who laid out their own capital and took a trading risk, or agents working with capital advanced to them by the factories.

Prices were reported as ranging from 3.80 GEL/kg for the dominant Gushishvela variety to 4.20 GEL/kg for Megrula. These prices are very similar to those offered by the static agents, with the transport cost being almost sufficient to account for any difference. There were some reports that middlemen buying from the farm would actually pay *higher* prices, since they felt they had a

better assessment of quality when they knew the farm and could see the nuts in storage a counter-intuitive phenomenon that was repeated for honey (see section 5.3.1 below).

Marketing: Option 3 Farmer delivers to factory

The factories generally use agents and middlemen to save them the trouble of carrying out large numbers of transactions with small farmers, but when a farmer has several tonnes to sell, he has the option of hiring transport and delivering direct to the factory. The price is typically around 0.10 GEL/kg higher when the farmer delivers, but he faces greater uncertainty, since the factory might reject the nuts or propose a substantial discount on ground of poor quality, leaving the farmer to choose between accepting the lower price or paying to transport the nuts back to his farm again.

Processing

It was not possible to visit any of the processing factories on this mission, though it is understood that the one facility actually in Ajara simply cracks and shells the nuts, runs them through a drier to bring the moisture level down further, and sells most of its output to a chocolate factory in Tbilisi.

A second USAID report[19] looks at marketing and processing, and notes that most of the world demand is for whole hazelnut kernels, which is what Georgia currently produces. Whilst value could be added through further processing (roasting, making pastes, etc.), the report considers that Georgia is probably already in the right market by simply shelling, drying and shipping the kernels.

Exporting

The following table summarises the approximate build-up of cost and value as hazelnuts pass through the marketing chain and are exported to Europe:

Price point		In-shell		Kernels	Share of
Operation	Price range	GEL/kg	$/kg	$/kg	ex-farm
Ex-farm	**GEL 3.85-3.95**	**GEL 3.90/kg**	**$ 2.17/kg**	*$ 5.86/kg*	100%
Trader's margin	GEL 0.03-0.05	GEL 0.04/kg	$ 0.02/kg	*$ 0.06/kg*	1%
Into factory		**GEL 3.94/kg**	$ 2.19/kg	**$ 5.92/kg**	**101%**
Cracking & sorting	$ 0.50			$ 0.50/kg	9%
Ex-factory				**$ 6.42/kg**	**110%**
Sea transport to Europe	$ 0.13-0.15			$ 0.14/kg	2%
Delivered Europe by sea				**$ 6.56/kg**	**112%**
or					0%
Road transport to Europe	$ 0.20-0.25			$ 0.23/kg	4%
Delivered Europe by road				**$ 6.64/kg**	**113%**

Source: Data collected by ENPARD Ajara from local farmers and traders.

19. *Georgia Hazelnuts Assessment*; USAID, 2011. Thomas J. Payne visiting under the "Economic Prosperity Initiative" project.

3.3 Potential for improvement

There is a dirth of quantitative information on how much hazelnut output could potentially be improved, but the following paragraphs seek to indicate a rough order of magnitude:

Production improvements

The biggest increase in hazelnut farmers' incomes will come from increasing yields through improved varieties and plant spacing, and better pruning, fertilising, pest control and orchard floor management. The potential increase in yield might be 50-100 %, taking average yields up to around 3 tonnes/ha, albeit with some increase in costs.

Better drying and storage

If hazelnuts are stored without proper drying, then there is a risk of serious problems, including aflatoxin production. However, no data have been found to suggest that this is a widespread problem in Ajara, nor to indicate how far from optimal the current basic drying practices are. Probably a few simple practices such as picking up the nuts regularly and always before rain, ventilating and moving around the nuts while they are drying, and storing them in air-permeable woven sacks would be sufficient to prevent most storage problems.

Farmers are already able to store all their produce until either the market reaches a peak, or they need some money and so have to sell.

From this very preliminary assessment, there does not seem to be any strong case that investments in drying and storage would be cost-effective (though potential impacts on quality were not examined).

Alternative marketing

The second USAID report proposes direct contracts between hazelnut growers and processors, partly as a channel for delivery of advice (which could help to introduce the production improvements noted above) and partly to cut out the middlemen. The data here suggest that the middlemen/collectors operate on very low margins, providing a service appropriate to the small-scale, low-tech production base; alternative marketing structures could quite easily add more cost than value.

Quality improvement

Several reports note that Georgian hazelnuts often suffer from quality problems, including a disproportionate share of empty or rotten kernels. Improved production techniques would help to address some of these problems, but if it came to the point where farmers had to choose between quality and quantity, then it might be necessary to develop improved systems of grading and pricing to pass the signal back from consumers to producers; this would ideally be considered as part of an overall package of demonstration, extension and on-farm trials.

Scale

Assuming that yields can be increased to around 3 tonnes/ha but that there is limited scope to raise prices, the maximum income from a 0.25 ha plantation is unlikely to exceed 3,000 GEL ($ 1,700) before costs. If farmers aspire to a higher standard of living than this, then there will need to be considerable consolidation in the industry, with many of the existing hazelnut producers moving to alternative, non-land-based employment, and with a smaller group of professional growers taking over their plantations. With such a structure in place, there might be more scope for processors to work more directly with growers.

This conclusion is very similar to that reached for mandarins, except that the scope for yield and

price increases seems to be more restricted with hazelnuts than with mandarins, so scale is even more of a limiting factor. As with mandarin farmers, the pace of restructuring is likely to be driven more by developments in the non-agricultural economy than by the agricultural sector itself.

3.4 Conclusions and recommendations

3.4.1 Conclusions: Mandarins or hazelnuts?

In some quarters there seems to be interest in looking for alternative crops to mandarins that could be grown in the same "coastal strip" of Ajara. Options include kiwi, persimmons, some revival of the tea industry, blueberries on old tea plantations, or most commonly hazelnuts.

In round numbers, most of the key figures for mandarins versus hazelnuts differ by a factor of ten:

- In a reasonably good year, mandarins yield 20 t/ha, hazelnuts 2 t/ha;
- Mandarins currently sell at round 0.40 GEL/kg, hazelnuts at 4 GEL/kg;
- One worker will pick 300-400 kg of mandarins in a day, or 30-40 kg of hazelnuts.

Thus the gross income from both crops is around 2,000 GEL from a quarter of a hectare, of which up to 20 % might be absorbed by the cost of paid labour (where used), so there is no overwhelming advantage to either crop. Both crops exhibit the same phenomenon of "alternate bearing", which mean that the farm family generates most of its income just once every two years.

In considering which crop to grow, a farmer should take into account:

- What plants already exist on his land (to avoid the cost and cash-flow disruption of replanting to another crop);
- Its altitude (with hazelnuts doing better on lower land, mandarins better higher up);
- The cash-flow advantages of hazelnuts, as an easy crop to store and market whenever desired;
- The apparent scope for improved production and marketing to bring greater increases in the yields and prices of mandarins than are possible for hazelnuts.

In this context it is strongly recommended that projects and advisory services should provide accurate and unbiased information to help new entrants or expanding farmers decide in which crop to invest, should help both mandarin and hazelnut producers to grow and market their chosen crop as well as possible, and beyond this should leave the decision up to the individual entrepreneur.

3.4.2 Recommendations: Improve productivity through knowledge transfer

The top priority is to begin a multi-year programme of on-farm trials, demonstrations and extension, covering the whole process from establishing a new hazelnut orchard to on-farm drying and storage. Within Ajara, AgroService Centre is probably the most potentially sustainable organisation to run such a programme, though it would almost certainly need some external funding and regular support from international hazelnut specialists. The two standard tools of Gross Margin analysis and a Market Information System would be as important here as in other sectors.

As experts began to work with farmers' groups on production and post-harvest issues, questions of marketing would inevitably arise and it is possible that useful areas for further initiatives would arise.

4 Cattle-potatoes-maize

This chapter looks at the dominant farming system practised in the mountain valleys and extended into the high mountains during the summer. The three principal enterprises are cattle, potatoes and maize, interacting in a system where one piece of land may produce different outputs throughout the year and where nutrients from one enterprise feed through into another. With the system as currently practised, it is important to note the three enterprises of cattle, potatoes and maize are complementary, rather than competing.

4.1 Case study of "Did-ajara" village, Khulo region

This section presents a case study of "Did-ajara" village in Khulo region, which was visited on 5th February 2013. Khulo town is 80 km from Batumi along a winding, tarmac road that takes 2-2 ½ hours by car. Did-ajara is a further 15 km into the mountains up an unmade road that is best traversed by jeep or in a van with good ground clearance, taking a further ½ hour. At 930 metres above sea level there was snow on the ground in the shade and on north-facing slopes, but the temperature within barns did not fall below freezing even at night. Access to the higher pastures is not possible until the spring thaw, so these were not visited.

The farming system here developed as a sustainable way of harvesting nutrients from a large area of natural pasture and converting them into storable food. Most farm families in this village use land in three different places:

- 0.25-0.3 ha of owned cultivated land next to the house, which has the living quarters upstairs and the cattle shed and storage barn underneath. The land is typically planted with early potatoes in March, and after these are harvested in June-July a second crop of maize goes in, for harvesting in the autumn.
- 1-3 ha of owned land in the lower mountains, at around 1,000 m. Most of this land is used to produce hay and then graze with cattle, but around 300 m^2 is used for potatoes.
- Use of common grazing in the higher mountains, at around 1,100 m, where there may be another 300 m^2 of potato land.[20]

The farmers practice transhumance, moving with their cattle up to the medium-height pastures in the spring, where people harvest hay with scythes and cows harvest grass with their tongues. Each family has a second small house in this area, where the milk is processed into cheese every day, then stored and brought back down to the village periodically for sale.

In summer the cattle are moved up to the high pastures, where they graze a wide area, producing both milk for cheese, and meat through their own live-weight gain.

As winter approaches, the people and their animals move back down to the village, bringing with them cheese and hay. The cattle are kept in the barn throughout the winter and their manure spread onto the adjacent field, so the mineral nutrients harvested from 3 ha of hay become concentrated onto 0.3 ha of cultivated land.

20. It is understood that not all villages in the region have access to mid-altitude land for grazing and hay-making; it is probably more common to have land in just two places: cultivated lowland around the house, and high mountain grazing pastures.

Early potatoes are sold as soon as they are harvested, so the issue of storage does not arise, whilst main-crop potatoes are stored in hay-insulated earth clamps on the mountain pastures, and inside the barn at the village.

Maize is harvested by hand and the cobs hung up to dry in the barn, to be used as human food during the winter, whilst the stalks are dried and stored to be chopped and fed to the cattle.

Until the last few years, the only tools used where the ox-plough, the hand-hoe and the scythe. A recent government programme to subsidise 50 % of the cost of machinery has now allowed many farmers to purchase walk-behind cultivators with digging blades and a removable ridging-plough attachment.

Potatoes and cheese are shipped to Batumi by van, with around ten people in the village owning vans and transporting their neighbours' produce for a fee per kilogram. The same transport brings back animal feed: wheat bran and ground maize, which are mixed in equal quantities as concentrate feed for the cows. No fertilisers are purchased, so this is the only supply of nutrients from outside the region.

The other main purchased inputs are fuel for the cultivator, artificial insemination for the cows, and sprays against potato blight and Colorado beetle.

Female calves are usually reared as replacement heifers, either for the farm or for sale, whilst male calves are reared for 6-9 months and sold before winter, some for further fattening and some for immediate slaughter. These cattle sales combine with those of cheese and potatoes to constitute the family's entire agricultural income.

The farming system has hardly changed in centuries and could be sustained almost indefinitely without external inputs, but its scale and total output are limited by the area of cultivable land, hay meadows and mountain pastures. The productivity of the common pastures could be increased somewhat by better management, rotating the grazing and adjusting the number of animals in proportion to the actual carrying capacity each year, but without inputs of fertiliser and feed, the scope to increase production is strictly limited.

Of the 8,700 families and 36,500 people in Khulo region, around 3,200 people are in non-agricultural employment. Many of these are in the public sector, including 850 teachers. This suggests that around one-third of families receive income from employment, with the rest depending on agriculture, pensions and any remittances they may receive from family members working elsewhere in Georgia and abroad. Therefore these villages have a much higher dependence on agriculture than in most parts of Europe.

If these families aspire to a higher standard of living than they have now, the two main options are:

- Move out of the village to take non-agricultural employment[21], renting or selling their land to a farming neighbour; this should increase the income of both those who leave and those who stay behind.

21. The most obvious alternatives to out-migration are either to create alternative employment in the village through activities such as agri-tourism, crafts and collection of forest fruits (which realistically is likely to provide an income for only a small minority of the current 6-8,000 farming families), or to commute to non-agricultural jobs in Khulo town. Local employment in the public sector and small-scale service industries is already an important source of income, but a recent attempt by a Turkish investor to boost the economy by establishing a clothing factory in Khulo failed due to lack of profitability. Rural development initiatives should look at the possibilities for development in towns as well as villages, to see how weak points in the manufacturing and service value chains might be addressed.

• Intensify production and marketing, with a greater use of purchased inputs, capital items, knowledge and management skill.

The two processes can be combined, so that farmers become both bigger and better.

The following sections look in more detail at the value chains for cattle and potatoes, to see how they might each be made more profitable, and attempts to estimate what kind of income might be possible with more intensive agricultural production. The maize enterprise plays a supporting role in producing food for farmers and their livestock but does not generate a cash income, and so was not analysed on this occasion; a few brief notes on maize are included at the end of the chapter.

Population trends in Khulo raion

The director of Khulo AgroService Centre expressed concern that people were leaving the area rapidly, which would seem to be an understandable response to the production constraints discussed above. However, official statistics suggest that the long-run rate of out-migration is in fact rather limited, with the following table showing how the population of Khulo raion changed over the 23 years from 1989 to 2002:

Area	1989	2002	2002/1989	Annual change
Khulo town	1,132	1,142	100.9%	0.04%
Villages	38,407	32,288	84.1%	-0.75%
Khulo raion total	39,539	33,430	84.5%	-0.73%

Source: Ajara Statistical Department yearbooks

This shows that the population of the town has remained almost exactly constant whilst the villages have lost 16 % of their population, the equivalent of 0.75 % per year. At this rate the rural population would halve in 92 years, showing that rural depopulation in this region has been much slower than in most European countries. However, 1989-2002 has been a tumultuous period for Georgia, and future trends could well be very different as people respond to new opportunities in towns as well as to the opportunities and challenges in the rural areas themselves.

Former tobacco production

During the Soviet era, much of the rural population of Khulo was employed in growing and harvesting tobacco on the collective farms or “kholkhozi”. along with raising potatoes and cattle for their own use. Tobacco production was abandoned shortly after the collapse of the Soviet Union, partly because it was hard work and partly because the price slumped from around $ 9/kg to today's 2-3 GEL/kg ($ 1-1.5).

Farming systems in lower mountain valleys

Khulo raion is the highest and coldest of the regions of Ajara, which limits the range of crops that can be grown. In the lower valleys of Keda and Shuakhevi raions the same cattle-cropping interaction occurs but with a wider variety of crops, including different vegetables and some fruit. Closer proximity to Batumi also makes it easier to supply fresh vegetables to the market, and so profitable farming requires a continuous sensitivity to market demand as well as good production techniques.

UNDP Ajara is currently discussing the possibility of working with AgroService Centre to support demonstrations and business start-ups of vegetable production under plastic. This could provide a possible new income source for farmers in the lower valleys as well as along the coastal strip.

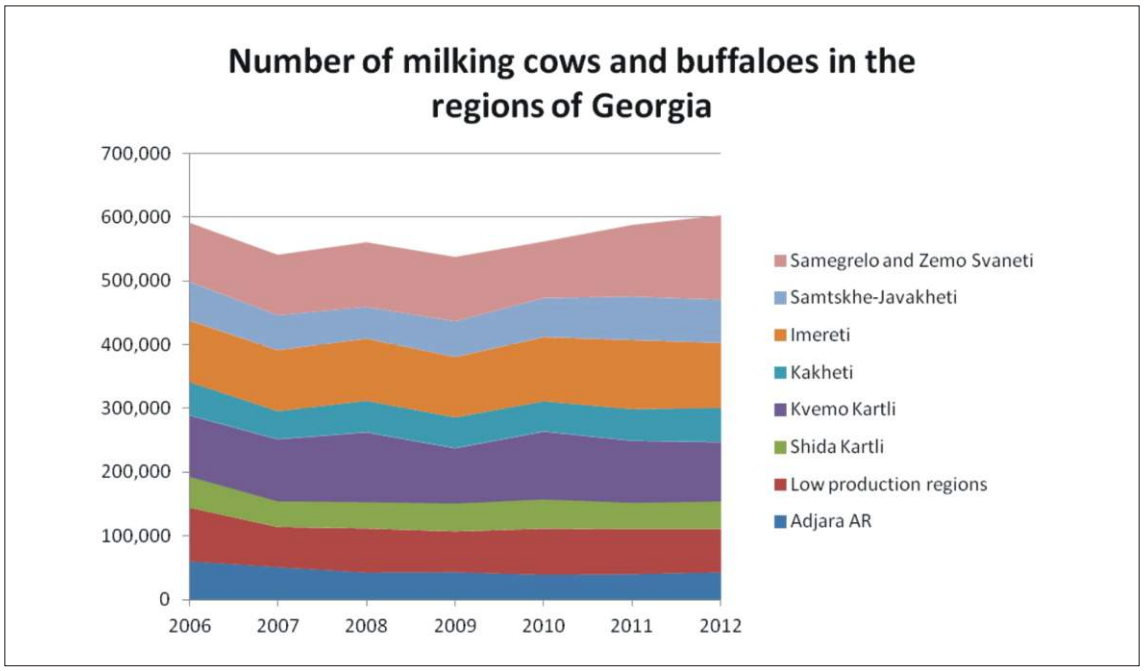
4.2 Cattle

Dairy cattle are the heart of the farming system in these mountain valleys, and account for the large majority of total output. This section looks at production and trade in milk, putting Ajara in the national and international context, and then looks in detail at how the system functions in the case-study village of Did-Ajara.

4.2.1 Key statistics

Production

The following chart shows the number of milking cows and buffaloes in each region of Ajara from 2006 to 2012, stacked so that the overall height of the graph represents the total number for all of Georgia:



Source: Geostat

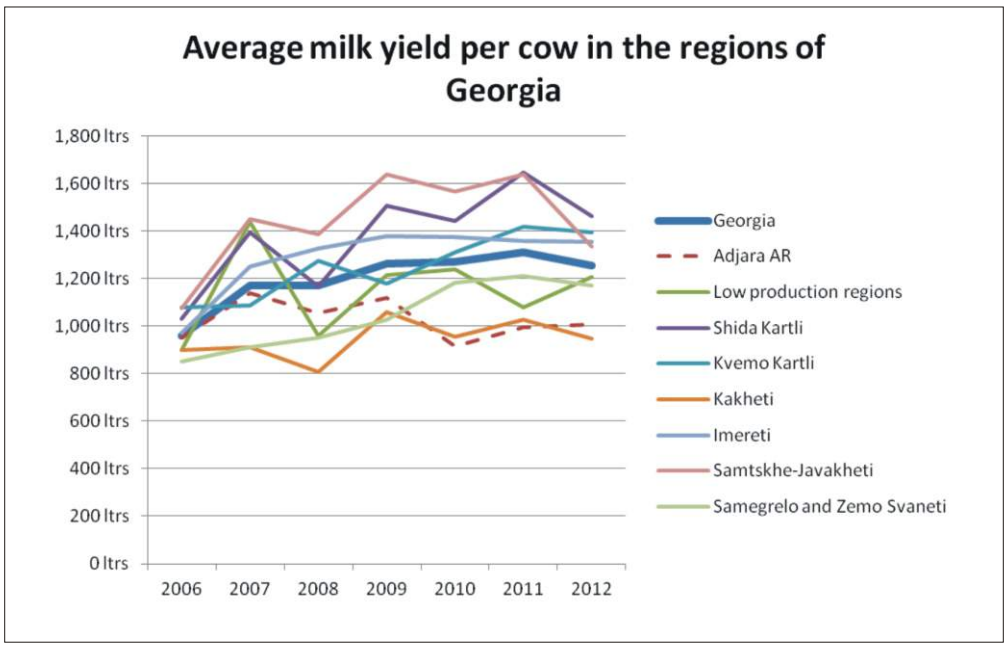
• The total number of cows in the country fell from 591,000 in 2006 to a low of 538,000 in 2009, then recovered to reach a new high of 603,000 in 2012.

• However, the split of cows between the regions has altered markedly over this period, with Ajara showing the greatest decline in its herd: in 2006 there were 112,000 cows in Ajara but by 2012 this had dropped by almost 30 % to 86,000. Shida Kartli raion and the group of "low production rate regions" also saw their number of cows drop by more than 10 % over this period.

• At the other end of the scale, both Samtskhe-Javakheti raion and Samegrelo and Zemo Svaneti saw significant increases, with the latter region finishing the period with 43 % more cows than it had in 2006.

By 2012, Ajara had 7 % of all Georgia's cows and produced 6 % of its milk.

The following chart shows how milk yields have varied over this same period:



Source: Geostat

- Whilst absolute yields per cow are very small in international terms (partly reflecting the small breeds and partly the extensive grazing systems and low level of feeding), there has been general improvement over this period, with the national average yield increasing 31 % from 960 to 1,260 litres per cow.
    - Ajara saw yield growth for the first three years and then a marked drop to below 2006 values; there has been some recovery since then but yields are still only just above 1,000 litres per cow, making this the second-lowest yielding region of Ajara.
    - The two regions with the most rapid herd growth, Samtskhe-Javakheti raion and Samegrelo and Zemo Svaneti, have seen their yields keep track with the national average.

Separate data from the Ajara Ministry of Agriculture show that Kulo raion (the area chosen for this case study) has around 30 % of all the cows in Ajara, with milk yields that are 1-5 % below the Ajaran average (data for 2012-13).

The following table puts Georgia' milk production in the international context, showing each of the countries that produces at least 1 % of global milk output, together with Georgia and its neighbours:[22]

22. The table is labelled with litres per cow and million litres of total production; more accurately these are kg per cow and thousands of tonnes, though the difference is only 3 %.

Country	Total milk production		Yield per cow	
USA	84,114 m ltrs	14.6%	9,206 ltrs	410%
India	46,538 m ltrs	8.1%	1,159 ltrs	52%
Russia	31,797 m ltrs	5.5%	3,492 ltrs	156%
China	31,523 m ltrs	5.5%	2,760 ltrs	123%
Germany	28,990 m ltrs	5.0%	6,908 ltrs	308%
Brazil	27,750 m ltrs	4.8%	1,287 ltrs	57%
France	24,042 m ltrs	4.2%	6,258 ltrs	279%
New Zealand	16,146 m ltrs	2.8%	3,673 ltrs	164%
UK	14,175 m ltrs	2.5%	7,287 ltrs	325%
Poland	12,195 m ltrs	2.1%	4,586 ltrs	204%
Ukraine	12,111 m ltrs	2.1%	3,735 ltrs	166%
Turkey	11,633 m ltrs	2.0%	2,643 ltrs	118%
Netherlands	11,258 m ltrs	2.0%	7,373 ltrs	329%
Pakistan	11,016 m ltrs	1.9%	1,218 ltrs	54%
Italy	10,806 m ltrs	1.9%	5,869 ltrs	262%
Mexico	10,355 m ltrs	1.8%	4,508 ltrs	201%
Argentina	10,073 m ltrs	1.8%	4,723 ltrs	210%
Australia	9,642 m ltrs	1.7%	5,424 ltrs	242%
Canada	8,108 m ltrs	1.4%	8,105 ltrs	361%
Japan	7,988 m ltrs	1.4%	7,346 ltrs	327%
Colombia	6,573 m ltrs	1.1%	1,237 ltrs	55%
Spain	6,332 m ltrs	1.1%	6,840 ltrs	305%
Iran	6,120 m ltrs	1.1%	2,254 ltrs	100%
Belarus	5,978 m ltrs	1.0%	3,925 ltrs	175%
Azerbaijan	1,367 m ltrs	0.24%	1,189 ltrs	53%
Georgia	644 m ltrs	0.11%	1,030 ltrs	46%
Armenia	566 m ltrs	0.10%	1,958 ltrs	87%
Rest of world	129,295 m ltrs	22.4%	1,199 ltrs	53%
TOTAL	**577,132 m ltrs**	**100.00%**	**2,244 ltrs**	**100%**

Source: Geostat

• Unlike many of the crop products discussed in this report, milk production is not highly concentrated into a few leading countries, but instead most countries try to supply at least their requirements for fresh milk; thus the biggest 8 producers contribute 50 % of global milk supply, 27 countries produce 80 % and 44 different countries are involved in producing 90 % of the world's milk.

• Georgia ranks in 81st place, producing 0.11 % of global milk output.

• Yields per cow vary greatly. The highest yields are produced in three countries whose total milk output is low Israel with 10,300 litres per cow, then South Korea and Saudi Arabia followed by the USA which not only has very high yields per cow but is also the world's largest milk producer.

• Georgia's average of 1,030 litres is just 46 % of the world average of 2,240 litres/cow and lower than all of its neighbours.

Trade

It is rather complicated to analyse international trade in milk because the large amount of trade takes place in processed products such as cheese, skimmed milk powder and UHT milk, rather than as raw whole milk. The following table therefore shows the value of Georgia's dairy imports and exports over the 5-year period 2007-2011:

Country	2007	2008	2009	2010	2011	Average	Share
IMPORTS (VALUE)							
Ukraine	$ 11.2 m	$ 11.6 m	$ 5.0 m	$ 4.3 m	$ 6.0 m	$ 7.6 m	27.0%
Russia	$ 4.1 m	$ 4.5 m	$ 2.9 m	$ 4.1 m	$ 3.8 m	$ 3.9 m	13.8%
Belarus	$ 1.1 m	$ 1.7 m	$ 5.6 m	$ 2.1 m	$ 1.2 m	$ 2.4 m	8.3%
Netherlands	$ 1.9 m	$ 1.0 m	$ 1.2 m	$ 2.0 m	$ 2.5 m	$ 1.7 m	6.1%
Finland	$ 1.6 m	$ 2.7 m	$ 1.2 m	$ 1.7 m	$ 1.0 m	$ 1.6 m	5.8%
Germany	$ 1.0 m	$ 1.8 m	$ 0.8 m	$ 1.1 m	$ 1.5 m	$ 1.2 m	4.4%
Lithuania		$ 0.0 m		$ 2.1 m	$ 2.8 m	$ 1.0 m	3.5%
France	$ 0.1 m	$ 0.1 m	$ 0.1 m	$ 1.7 m	$ 2.3 m	$ 0.8 m	3.0%
Austria	$ 0.5 m	$ 0.9 m	$ 0.9 m		$ 1.2 m	$ 0.7 m	2.5%
Brazil	$ 0.9 m	$ 1.1 m	$ 0.3 m		$ 0.7 m	$ 0.6 m	2.1%
USA	$ 0.6 m	$ 0.8 m	$ 0.2 m	$ 0.4 m	$ 0.9 m	$ 0.6 m	2.1%
New Zealand	$ 0.3 m	$ 0.2 m	$ 0.8 m	$ 0.7 m	$ 0.9 m	$ 0.6 m	2.0%
Turkey	$ 0.3 m	$ 0.1 m	$ 0.2 m	$ 0.7 m	$ 1.4 m	$ 0.5 m	1.8%
Azerbaijan	$ 0.1 m	$ 0.5 m	$ 0.1 m		$ 0.0 m	$ 0.1 m	0.5%
Armenia	$ 0.0 m	$ 0.3 m	$ 0.0 m		$ 0.0 m	$ 0.1 m	0.3%
Rest of world	$ 3.9 m	$ 2.8 m	$ 2.7 m	$ 8.1 m	$ 6.0 m	$ 4.7 m	16.6%
TOTAL	**$ 27.9 m**	**$ 30.2 m**	**$ 22.1 m**	**$ 28.9 m**	**$ 32.3 m**	**$ 28.3 m**	**100.0%**
EXPORTS (value)							
Armenia	$ 0.7 m	$ 0.1 m	$ 0.1 m	$ 1.4 m	$ 1.6 m	$ 0.8 m	68.9%
Azerbaijan	$ 0.0 m	$ 0.5 m	$ 0.2 m	$ 0.4 m	$ 0.2 m	$ 0.3 m	23.1%
Turkmenistan	$ 0.1 m			$ 0.3 m		$ 0.1 m	6.5%
USA					$ 0.1 m	$ 0.0 m	1.5%
Rest of world		$ 0.0 m		$ 0.0 m		$ 0.0 m	0.1%
TOTAL	**$ 0.8 m**	**$ 0.6 m**	**$ 0.3 m**	**$ 2.2 m**	**$ 1.8 m**	**$ 1.1 m**	**100.0%**
Trade balance	**-$ 27.1 m**	**-$ 29.6 m**	**-$ 21.8 m**	**-$ 26.8 m**	**-$ 30.5 m**	**-$ 27.2 m**	

Source: Geostat

Items included are "*Butter, cow milk; Buttermilk, curdled, acidified milk; Cheese, processed; Cheese, whole cow milk; Milk, products of natural constituents not elsewhere specified; Milk, skimmed cow; Milk, skimmed dried; Milk, whole condensed; Milk, whole dried; Milk, whole evaporated; Milk, whole fresh cow*"

- Georgia is a regular and substantial net importer of milk and dairy products, with imports averaging $ 28 million and exports averaging just $ 1 million.
  - Almost half of total imports come from three former Soviet countries: Russia, Ukraine and Belarus. These, together with Turkey, supply most of the imported UHT milk.
  - Imports from the EU, USA, Brazil and New Zealand comprise two main groups of products: skimmed milk powder for reconstitution into liquid milk, and high-value cheeses of kinds not produced in Georgia.
  - Exports go almost entirely to neighbouring Azerbaijan and Armenia.

It is clear from this picture that dairy production in Georgia falls into the category of import substitution.

4.2.2 Cattle production and marketing

This section is largely based on the case study of Did-ajara village, with additional material from the consultant's own experience and from studies of the cattle and dairy sector in Georgia.

Cattle & milk yields

In the village of Did-ajara most farmers have 5-10 cows plus calves, which is markedly bigger than the Ajara average of 3.0 cattle, 1.6 milking cows.[23] The cattle are of indeterminate breed but look like a small cross between a Swiss Brown and a Jersey, both of which are in high demand from the newly-established AI service. The cows are small, appearing to weigh no more than 300 kg, which is half the size of a mature Holstein or Simmental.[24] Thus in making comparisons with the main European dairy nations, it is necessary to double everything the yield per cow and the amount of feed fed so a 10-cow herd here may be the equivalent of a 5-cow herd elsewhere.

The AgroService Centre advisors put the greatest stress on genetics, regarding the local cattle as in-bred and of low potential, and seeing the increased use of artificial insemination as the most immediate priority. However, to the consultant it seemed that nutrition is main limiting factor, and until the cattle are properly fed it will be impossible either to gauge the potential of the existing livestock or to exploit the full potential of improved breeds.

None of the farmers visited kept records of milk yields, and a major share of the total year's milk output is produced whilst the cows are up on the mountain pastures, far from the farm. One farmer spoke of yields ranging from 5-6 litres per day for a first-calf heifer, up to 12 litres per day for a mature cow, suggesting a lactation yield of 1,500-2,400 litres.[25] However, when testing these numbers against another farmer, he thought that annual yield was around 1,000 litres, whilst a representative of AgroService Centre reckoned that yields of 600-800 litres were common. Even allowing for the fact that these are “half cows”, this is still a very low yield and it is probable that the existing genetic stock could produce at least twice this yield if fed and managed properly.

Housing & milking

The barns themselves are made entirely of wood walls, floor and ceiling partly to provide insulation and partly because that is the material most readily available. All four barns viewed were of similar construction with a dung passage in the middle and are scraped regularly but not hosed down. Ceilings are quite low, just above head-height, and the cattle are tethered by the neck in front of a wooded trough, with dividers between each animal. Electric light was present in each case and there were small openable windows. There were no installed drinkers, so presumably buckets of water were placed in the feed trough at certain times. The levels of dust and ammonia in the air seemed within the normal range for cattle buildings.

---

23. Data provided by AgroService Centre to the Ajara Ministry of Agriculture. Single-cow farms account for 25 % of cattle farms and 9 % of cattle; herds of 2-6 cattle account for 70 % of farms and 80 % of cattle; herds of 7 or more account for just 3 % of farms and 11 % of cattle.

24. Small breeds are often well-suited to mountain conditions. As an example, the Scottish Blackface sheep on poor mountain pastures may weigh only half as much as a longwool breed on good hill grazing.

25. Calculated as 200 × peak daily yield or 305 × average daily yield.

The most immediate issue here is milk hygiene. The cattle are milked by hand at their stalls and although these cattle sheds were kept a lot cleaner than many the consultant has seen, it is very difficult to clean wooden structures thoroughly. There are likely to be large numbers of bacteria circulating on minute dust particles, as well as those that fall from the cow into the bucket during hand milking, so these farms would find it close to impossible to meet EU requirements for "Total Bacteria Count" in raw milk. One relatively low-cost solution would be to install a vacuum line and milk the cows by machine; they would still be milked in place but the milk would not be exposed to the air and so would be a lot cleaner. An alternative approach would be to build a separate milking area adjacent to the cowshed, with a washable concrete floor and rendered walls, and to bring the cows in one or two at a time for milking by a portable milking machine. This should produce a lower bacteria count than milking in place, but would involve more labour in moving the cows in and out.

The switch from hand to machine milking should also help to lower "Somatic Cell Count", the other main EU measure of milk quality, and an indicator of yield-lowering sub-clinical mastitis. The final stage in improving milk hygiene would be to introduce better milking practice: udder-washing before milking, use of a strip-cup to check for mastitis, teat-dipping after milking, and thorough washing and disinfection of the milking machine and all vessels and utensils that come into contact with milk.

However, with all the milk being processed on-farm and so not needing to satisfy any dairy's reception criteria, and with no official system yet in place to regulate milk quality, farms have no real incentive to improve milk quality; the only benefits they would see from the proposed changes would be the labour saved by machine milking (of greatest interest to larger farms) and a possible increase in yields if this formed part of an overall drive to reduce mastitis.

Animal health & welfare

None of the cows observed had any obvious signs of disease, but no veterinary information or test results were available to indicate the presence or absence of sub-clinical disease or parasite infection.

The availability of natural and artificial light in the barns, and the relatively easy access provided to the cows, meets the EU requirement that veterinary inspection and treatment should be possible at any time.

Whilst the practice of keeping cows indoors and tethered by the next appears to be contrary to the spirit of the "European Convention for the Protection of Animals kept for Farming Purposes", there is as yet no EU legislation in this area, and the practice of tethering is both legal and commonplace in many countries.

Although a number of commentators have regarded the low ceilings and lack of ventilation as a serious disease hazard, if the farmers actually opened the window then the ventilation might well be adequate, and it would not be particularly demanding to make a second opening to ensure a through-flow of air. However, this would mean trading off the comfort of the workers for the comfort of the cows.

Feeding

The total lack of records extended to feed as well as milk, so it was very difficult to get a reliable impression of the quantities of feed actually used.

The basis of the diet is meadow hay from the lower mountain pastures. This appeared to be of reasonable quality, cut before the grasses were too mature and lignified, and it had been stored indoors out of the rain, with no sign of bleaching or mould.

The other source of forage is maize stalks, which were piled up in every barn. One farmer had an old machine for crushing the stems, which would increase both palatability and digestibility, but

this seemed to be the exception rather than the rule; overall these maize stalks (or "corn stover") may supply almost as much energy but less than half the protein of the same weight of hay. With a probable maize yield of around 2.5 t/ha (see section 4.4.2 below), the farm would produce little more than a tonne of maize stalk from its 0.3 ha of cultivated land.

Concentrate feed is mixed on the farm from purchased maize meal (0.55 GEL/kg) and wheat bran (0.60 GEL/kg). They are mixed 50:50 (or sometimes 30:70) to produce a rather dusty feed costing 575 GEL/t ($320/t). The maize supplies just over half of the energy and the wheat bran two-thirds of the protein, to make a low-energy concentrate of around 12 % protein,[26] which will typically be insufficient to allow a dairy cow to maximise its potential in early to mid-lactation. The quantity fed was explained as a two scoops a day from a cut-down plastic chemical container, possibly around 2-3 kg/day; some farms feed even less than this, just 1-2 kg/day.

The basic principle of forage-based dairy production is that the forage provides cheap but dilute (i.e. bulky) nutrients, whilst the concentrate provides expensive but concentrated nutrients (hence the name). The key to profitability is to make large quantities of high-quality forage, to get the cows to eat as much of this as possible, and to top it up with the minimum quantity of concentrate necessary when the cows are unable to satisfy all their energy and protein requirements from bulky fodder alone. Supplementary feeding is particularly important in the early months of lactation when feed intake is low but potential milk yield high, to ensure that the cows achieve a high peak yield, since this will to a large extent dictate their milk output for the rest of the lactation.

One thing observed on each of the farms was that the all of the mangers were empty. Although many of the cows would have been dry at this time of year and so not needing a lot of feed, there were also new-born calves and thus cows in early lactation, and these too were standing in front of empty mangers. Clearly feed was being rationed to the cows, probably twice a day at milking time, and they were consuming less than their potential dry matter intake. Offering more hay to these cows would have increased their milk yields, and supplementing it with additional concentrate would have brought further increases.

Hay was seen for sale beside the road in various places, priced at 5-8 GEL per 20 kg bale (250-400 GEL/tonne, typically around 300 GEL/tonne). Per unit of energy hay costs 50-80 % as much as maize meal and 40-60 % as much as wheat bran, so the aim of feeding should be firstly to make maximum use of home-grown forages, then to supply as much energy as possible from purchased hay, and finally to top up the energy and protein with purchased concentrate as needed to fulfil the cow's potential at each stage of lactation.

Grazing & forage production

Due to the timing of the field visit, in early February, it was not possible to visit the hay meadows or high mountain pastures, but it was understood that no purchased inputs are used on these grasslands. Section 4.2.3 below discusses the theoretical potential to increase forage yields whilst section 4.2.4 discusses the challenges of common grazing and suggests some possible solutions for the Ajaran situation. Both of these would be important subjects to investigate on a future mission.

---

26. 11.6 % crude protein by fresh weight, 9.0 % digestible crude protein in the dry matter; metabolisable energy 10.6 MJ/kg DM; based on the INRA/CIRAD/AFZ/FAO "*Feedipedia*" database: http://www.feedipedia.org

The AgroService Centre expert estimated that hay yield on these pastures would be 2-2.5 t/ha and thought that the farmers depended very largely on home-grown hay, purchasing only when really necessary.

Milk cooling, storage & processing

When a farm produces milk for sale to a dairy, one of the big issues is ensuring that it is stored in a separate place away from the livestock, rapidly cooled to 8°C or below, and that good hygiene practice is observed throughout. However, on these farms the milk is processed into cheese immediately after milking and so neither storage nor cooling are required, neither for practical reasons nor by EU legislation.

Cheese-making takes places in the family kitchen, which under EU regulations would be regarded as food-handling premises. No milk was being processed at the time of the visit, so this operation could not be observed.

Output and marketing

There is no dairy in Khulo raion, so the principal marketed outputs from this system are cheese, butter and cottage cheese, which are made and stored on-farm and then transported to Batumi every week or so for sale. Around 70 % of total output is cheese, which currently sells for 7-8 GEL/kg, about 20 % is butter, selling at 8-9 GEL/kg, and the remaining 10 % is cottage cheese. It takes 7-8 litres of milk to produce 1 kg of cheese, so the annual output from one cow would be around 100 kg of cheese worth 800 GEL ($ 450) plus milk consumed by the family and fed to calves.

Transportation is provided by farmers from the village who own vans, and the dairy products are most usually sold in Batumi retail market. One farmer reported the transport cost to Batumi as 0.05-0.06 GEL/kg, though UNDP experts thought it might be closer to 0.10 GEL/kg.

Cows would typically be kept for many lactations, so less than half of the female calves would be needed as replacements and in most years there would be a calf to be sold or slaughtered for meat. Typically the spring-borne calves would be grazed with their mothers during the summer, probably suckling for some time, and then sold before winter. Sometimes buyers come to the farm, and sometimes farmers take their cattle to the livestock market held outside Khulo. Often male calves are exported for rearing and finishing in neighbouring countries.

According to an AgroService Centre expert, surplus calves are typically sold before the winter at an age of about 6 months and a weight of 50-80 kg, and fetch around 150-200 GEL, adding about an extra 20 % to the income from cheese sales.[27]

27. The Ajara Ministry of Agriculture forecast beef production in Khulo raion as 105 kg per breeding cow or buffalo in 2013. This equates to around 180 kg of liveweight, but will include the production from cull cows and from bulls reared for 18-30 months before slaughter, whereas the value here refers just to calves.

4.2.3 The potential to increase forage yields

Grass is a plant that responds heavily to nitrogen fertiliser. A large 4-year, 21-site cutting trial of perennial ryegrass in the UK found that an "optimum" application of 388 kg fertiliser nitrogen per hectare raised grass dry matter yields by just over 300 %, from an average of 2.7 t/ha to 10.9 t/ha. Response varied with soil type and rainfall, with heavy clay soils and high summer rainfall giving considerably higher yields.[28]

If such a result could be replicated in Ajara, then a fertiliser expenditure of less than 1,000 GEL/ha would result in an extra production of hay worth more than 3,000 GEL/kg. With four times as much hay produced from a given area, farms would be in a position to expand their milk production considerably, getting higher yields from larger cows and quite possibly increasing their herds.

However, a controlled trial on sown UK pastures is a world away from practical production on natural meadow pastures in Ajara. Applying fertiliser will shift the species composition of the grassland over time, with more responsive species taking over from less responsive, but a farmer who chose to start fertilising heavily would probably wish to deliberately improve the pasture in a number of ways, possibly including drainage, liming and re-seeding with preferred species. This would incur some costs, as would the possible need to apply some phosphorus, potassium and magnesium fertilisers and occasional herbicides. Practical difficulties of slope and access might limit the areas which could be re-seeded and fertilised.

Only practical trials can establish what is practical and profitable in the Ajaran situation, but it is quite probable that hay yields could be raised to several times their current level.

Environmental implications

Many people respond quite negatively to the idea of applying fertiliser to natural pastures, saying that it will poison the cows, pollute the water and destroy the environment. The reality is slightly different:

- Nitrogen fertiliser produces grass that is safe and highly palatable to cows, and forms the basis of dairy production throughout much of the developed world.

- The objective of fertilising is to get as much as possible into the plant and as little as possible into ground-water and streams. "Good Agricultural Practice" involves applying fertiliser when, where and in the amount needed and avoiding, for example, putting heavy applications of fertiliser on a slope when rain is forecast; the extension programme needed to teach farmers how to use fertiliser profitably should also include the principles of using it safely and with minimum risk to the environment.

---

28. The response of perennial ryegrass to fertilizer nitrogen in relation to climate and soil. J. Morrison, M.V. Jackson & P.E. Sparrow, 1980. Grassland Research Institute/ADAS/Rothamsted Experimental Station Technical Report No. 27. "Optimum" fertiliser application was calculated at the point where 1 kg extra N gave an increase of 10 kg grass dry matter, reflecting the relative prices of fertiliser, feeds and milk at the time.

Most nitrogen leaching in an outdoor cattle system comes from the concentrated patches of urine produced by grazing cattle, rather than from evenly-spread artificial fertiliser. In Khulo raion, the high levels of rainfall across the whole mountain range would massively dilute what nitrogen did leach into the ground from the relatively limited areas of intensive pasture, and overall levels of nitrate in water would be extremely low.[29]

- The biggest environmental effect of pasture improvement would arise from the change in species composition: in place of the current diverse mix of native grasses and wild flowers, the re-seeded and fertilised hay meadows would become almost a monoculture or oligoculture of commercial grass varieties. If the pasture improvement were restricted to the mid-altitude hay meadows of around 3 ha per farmer, then the amount of land affected would be in the order of 0.2 % of the total area of the raion, and the overall effect on biodiversity would probably be insignificant.[30]

  However, if fertilising were also extended to much larger areas of high mountain pasture, or if the mid-altitude pastures constituted key habitats for particular species not found elsewhere, then the environmental effects could be significant, and so any programme for pasture improvement in this region should include an element for environmental modelling and monitoring.

So, forget about poisoning the cows, forget about nitrate pollution, but teach farmers how to use fertiliser properly and keep an eye on species and habitats.

---

29. A comparison can be made with Montenegro, which is also mountainous, with very high rainfall and extensive grazing of cattle on mountain pastures. The EU-harmonised programme of water-quality monitoring, and analysis conducted in preparation of the country's "Code of Good Agricultural Practice", found that nitrate levels in rivers and lakes were typically well below one-tenth of the EU limit of 50 mg/litre. Where high nitrate levels were recorded, these were all downstream of major cities and almost certainly caused by human sewage. *Code of Good Agricultural Practice, Montenegro*. S. Goss/World Bank, 2012.

Simply dividing the total amount of nitrate-equivalent applied by the known rainfall for the region will provide a quick check on the maximum possible level of nitrate in water, and show that it is impossible to approach dangerous levels whilst the large majority of the land area does not receive fertiliser.

30. The director of Khulo AgroService Centre reported that there were 8,700 families in the raion. If 5,000 of these families each had 3 ha of mid-altitude grazing (which is believed to be an over-estimate), then the total area of 15,000 ha (1.5 km^2) would represent 0.2 % of the total raion area of 710 km^2.

4.2.4 The challenge of common pastures

The medium-altitude hay meadows are private property, opening the way for individuals to fence their grassland, manage the grazing, apply fertiliser and improve the sward. However, the high mountain pastures are still state-owned land used for common grazing, and a number of commentators have reported that this is a classic "tragedy of the commons", where the individual incentive to increase the number of cows conflicts directly with the common interest to limit livestock numbers to the carrying capacity of the pasture, and where nobody has any incentive to invest in those measures that could dramatically increase yields.

The need is to establish a method of regulating the grazing so at to maximise its total output, and to create some form of secure property rights so that an individual or group that invests in improvements such as fencing, fertilising, re-seeding or drainage can be sure that they will get to reap the benefits. In most parts of Europe, both goals are achieved through the private ownership of grassland. Attempts to privatise formerly state- or village-owned pastures have not always been successful, typically because the small farmers who used to graze these lands do not have the financial resources or political connections to buy the land or bid for concessions. Grazing associations have been tried as solutions on several continents, but more usually with failure than with success, partly because of issues of trust and culture, and partly because of the difficulty of setting and enforcing stocking limits when the interests of the individual are at variance with those of the group.

However, Ajara does have the advantage that its mountain pastures have not yet been subject to bad privatisation (which is almost impossible to reverse) so there is still time to develop a workable solution. The consultant would recommend exploring options based around the following:

- Allocation of grazing rights or shares in proportion to current or historical use (i.e. transfer of the entire resource to the customary users, without payment);
- Facilitating the trading of right between users, and after a period allowing their sale or rental to outsiders;
- Individual farmers would then have four options:
    - To club together and form a grazing association to manage one block of land;
    - To sell or rent their rights to another farmer, and reduce or quit dairy farming (the future that many will eventually choose in any case);
    - To buy additional rights and convert a block of land into private ownership;
    - To continue informal common grazing on the remaining land not managed by an association or converted to private ownership.

There are of course many issues to be tackled, such as dealing with different qualities of land and ensuring access of privatised blocks, and careful piloting would be necessary to develop a solution that works in the practical, economic and cultural conditions of Ajara. However, the potential benefits of better grassland management are considerable, and a successful solution would be well worth the effort.

4.3 Potatoes

Potato production was highlighted by both UNDP and the Ajara Ministry of Agriculture as an important issue, due to increasing concerns about competition from Turkish imports.

4.3.1 Key statistics

This section presents key production and trade data, based on official statistics from Ajara, Georgia and the FAOSTAT database.

Production

The following table gives key statistics for potato production in Georgia and Ajara, averaged from 2006-12:

Region	Harvested area		Production		Average yield	
Adjara AR	1,500 ha	6.8 %	20,000 t	9.0 %	13.6 t/ha	133 %
Kvemo Kartli	5,600 ha	25.7 %	51,800 t	23.2 %	9.3 t/ha	90 %
Samtskhe-Javakheti	10,000 ha	45.8 %	124,700 t	55.8 %	12.5 t/ha	122 %
Other regions	4,700 ha	21.8 %	26,700 t	12.0 %	5.6 t/ha	55 %
GEORGIA	**21,800 ha**	**100.0 %**	**223,300 t**	**100.0 %**	**10.2 t/ha**	**100 %**

Source: Geostat (Statistical Office of Georgia); http://www.geostat.ge; averages for 2006-10.

- Potato production in Georgia is mainly concentrated in three regions:
  - Samtskhe-Javakheti with 46 % of total area and 56 % of production,
  - Kvemo Kartli with 26 % of total area and 23 % of production,
  - Ajara with 7 % of total area and 9 % of production.
  - The remaining regions together account for 22 % of harvested area and 12 % of production.
- Whilst Georgia's average yield of just over 10 tonnes/ha is rather low, Ajara has the highest yields in Georgia, at an average of 13.6 t/ha.

The following table puts Georgian and Ajaran production in a European context, showing individually the nine countries that together produce more than 80 % of all Europe's potatoes, with data for the same period of 2006-12 as in the Georgian table above:

Country	Harvested area		Production		Yield	
Russia	2,372,000 ha	35.8 %	31,242,000 t	24.6 %	13.2 t/ha	69 %
Ukraine	1,433,000 ha	21.6 %	20,569,000 t	16.2 %	14.4 t/ha	75 %
Germany	261,000 ha	3.9 %	11,047,000 t	8.7 %	42.4 t/ha	221 %
Poland	495,000 ha	7.5 %	9,570,000 t	7.5 %	19.3 t/ha	101 %
Belarus	381,000 ha	5.8 %	7,834,000 t	6.2 %	20.6 t/ha	107 %
Netherlands	155,000 ha	2.3 %	6,879,000 t	5.4 %	44.4 t/ha	232 %
France	159,000 ha	2.4 %	6,835,000 t	5.4 %	43.1 t/ha	225 %
UK	143,000 ha	2.2 %	5,803,000 t	4.6 %	40.5 t/ha	212 %
Turkey	151,000 ha	2.3 %	4,460,000 t	3.5 %	29.5 t/ha	154 %
Rest of Europe	1,069,000 ha	16.2 %	22,586,000 t	17.8 %	21.1 t/ha	110 %
Europe total	**6,619,000 ha**	**100.0 %**	**126,824,000 t**	**100.0 %**	**19.2 t/ha**	**100 %**
Georgia	22,000 ha	0.3 %	223,000 t	0.2 %	10.2 t/ha	53 %
Ajara	**1,471 ha**	**0.0 %**	**20,000 t**	**0.02 %**	**13.6 t/ha**	**71 %**

Source: Europe data from FAOSTAT, http://faostat.fao.org; Georgian data from Geostat, http://www.geostat.ge; averages for 2006-10.

• Georgia as a whole produces 0.2 % of the amount of potatoes grown in Europe, with Ajara producing just 0.02 %.

• Ajara's average yield of almost 14 t/ha is similar to the levels achieved in Russia and Ukraine over the same period.

• However, Ajaran yields are significantly below the overall European average of 19 t / h a , and less than half of Turkey's 30 t/ha.

Trade

The following table shows Georgia's imports and exports of potatoes over the 10-year period from 2002-2011:

Country	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average	Share
IMPORTS (tonnes)												
Turkey	1,169	2,388	1,034	4,591	23,258	50,912	27,537	11,155	659	46,963	16,967	87.2%
Armenia		7	19		22	50	2,447	5,495		515	856	4.4%
Russia	2,581	2,598	235	155		191	5			140	591	3.0%
Netherlands		25	75	45	66	280	588	461	225	643	241	1.2%
Egypt							891			575	147	0.8%
Azerbaijan		48	60		203	537	347			138	133	0.7%
Iran	37				157		292	410	5	290	119	0.6%
Czech				150					1,037		119	0.6%
Germany	38	26	1	141	4	162	202	115	120	270	108	0.6%
Ukraine	30		21			101				690	84	0.4%
Rest	0	1	0	61	54	204	0	1	0	719	104	0.5%
Total	3,855	5,093	1,445	5,143	23,764	52,437	32,309	17,637	2,046	50,943	19,467	100.0%
EXPORTS (tonnes)												
Azerbaijan			410	144				638	7,396	939	953	81.9%
Ukraine				90	827				140		106	9.1%
Russia			620	417	1						104	8.9%
Rest			2	5	2			0	0	0	1	0.1%
Total	0	0	1,032	656	830	0	0	638	7,536	939	1,163	100.0%

Source: FAOSTAT

• Imports, at an average of almost 20,000 tonnes per year, are almost 17 times greater than exports, at an average of 1,100 tonnes per year.

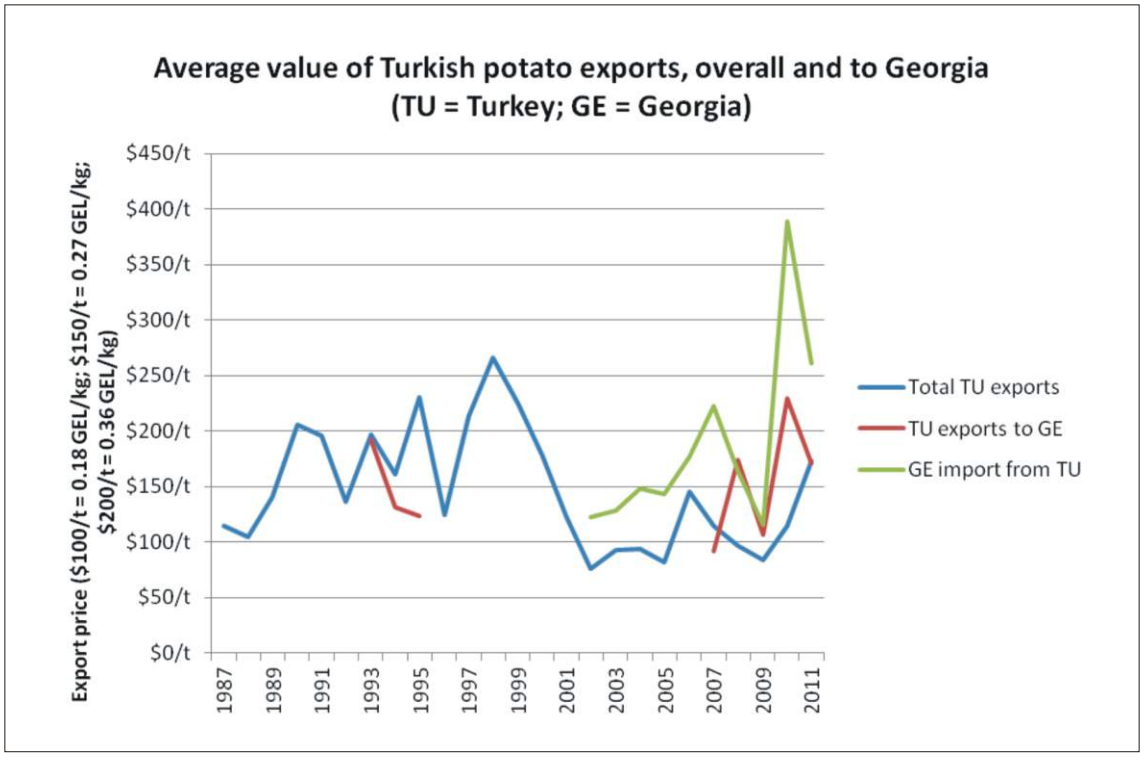
• Just three countries Turkey, Armenia and Russia account for almost 95 % of Georgia's potato imports, with the large majority coming from Turkey.

• The volume of imports varies greatly from year to year, from lows of 1,400 tonnes and 2,000 tonnes in 2004 and 2010 respectively, to highs of over 50,000 tonnes in 2007 and 2011. These trends show little correlation with potato production in Georgia, and are more likely to reflect production and prices in Turkey, the main supplying country.

• Just three countries Azerbaijan, Ukraine and Russia account for almost 100 % of Georgia's potato exports, with the large majority going to Azerbaijan.

• In many years there has been no export at all; only one year, 2010, showed a positive trade balance with 7,500 tonnes exported and just 2,000 tonnes imported.

The following chart shows the average value Turkish potato exports, both overall (blue line) and for exports to Georgia (red line); the green line shows the recorded import price of Turkish potatoes entering Georgia, after the various border-crossing costs and mark-up:



Source: FAOSTAT

- Turkish export prices fall into two main periods:
  - From 1989-2001 prices usually varied within the range $ 150-200/t (0.27-0.36 GEL/kg);
  - From 2001-2010 prices were normally towards the lower end of the range $ 100-150/t (0.18-0.27 GEL/kg).
- Prices started to rise again in 2011 and Georgian traders reported wholesale prices of up to 1 GEL/kg ($ 550) in 2013 but it would seem unwise to rely on such high prices continuing.
- As a basis for long-term planning, if an Ajaran producer can make a profit while selling at 0.20-0.25 GEL/kg ($ 110-140/t) then they should be alright in most years.

If farmers are unable to compete at this price level, then they will be in profit in some years but struggle when prices fall again. Such farmers should either look at increasing their yields, switch to another crop or find an alternative source of income. Fortunately, many of the potato growers in Khulo region already have another source of income in their dairy enterprise, and it is on this that their financial fortunes will mostly depend (see section 4.5 for estimates of total income coming from each farm enterprise).

4.3.2 Potato production and marketing

Seed

Most farmers use home-saved seed, which they set out to "chit" (sprout) on racks in their barns from early February, for planting out in late March as soon as the snow melts. The effective cost to them is the price they could have got for these potatoes on the wholesale market (currently around 0.20 GEL/kg), though some of the smaller seed potatoes might be hard to sell.

The problem with this approach is that home-saved seed can transfer virus diseases from crop to crop, and the director of Khulo AgriService Centre believed that potato yields in the region were deteriorating due to poor-quality seed. Georgian-grown potato seed is currently available at around 1 GEL/kg, but this would absorb a significant share of the total value of early potato production at current low prices, so farmers are reluctant to spend out on seed.

There is not yet an established seed potato industry in Georgia, though discussions are underway to set up a system in the higher aphid-free regions of Samtskhe-Javakheti raion. Once a domestic supply of certified virus-free seed becomes available, it would be useful to organise some on-farm trials and demonstrations to establish how much net benefit farmers would get by purchasing new seed every year or every second or third year.

The consultant discussed whether it might be possible to develop a seed-potato industry in Ajara, to take advantage of its altitude. Other consultants considered that this would be difficult to arrange with the small farm structures in Ajara, which would increase the certification cost per tonne of potatoes produced, and thought that it would be better to concentrate on Samtskhe-Javakheti raion.

Soil & cultivation

The fields examined had relatively heavy soil but were rich in organic matter, presumably from many years' application of cow manure, and so well-suited to potatoes. Water-logging was a problem during this period of snow melt, but almost all the land was on some degree of slope, which helps with drainage.

As noted above, the fields were traditionally cultivated by ox-plough until the recent introduction of motor cultivators. Seed potatoes are planted into furrows made by the cultivator, and thereafter weeding and harvesting is done by hand-hoe. The potatoes are planted close together and are not ridged.

Fertiliser & crop protection

No artificial fertilisers are used, but if all the manure from ten small cows is concentrated onto 0.3 ha of potato ground, then this should supply sufficient P, K & Mg so support a crop of 25-30 tonnes/ha. The nitrogen supply might be limiting, particularly early in the season before soil mineralisation gets underway, and so these crops might show an economic response to an early top-dressing of a N-rich fertiliser. The director of Khulo AgriService Centre reported that soil analyses had shown deficiencies of potassium and of some trace elements, particularly magnesium, but rough calculations suggest these should be adequately supplied by manure.[31]

Farmers reported that they routinely applied fungicides against potato blight and insecticides against Colorado Beetle. Weed control is performed manually so herbicides are not used.

---

31. The supply and utilisation of principal mineral nutrients was calculated as follows, based on the UK *Fertiliser Manual: RB209* (DEFRA, 2010) assuming low soil nutrient indices; manure quantities from the Montenegrin *Code of Good Agricultural Practice*, (Goss/World Bank, 2012); potato yields and cattle numbers from farmers in Khulo:

			kg/ha		
Item	Amount	N	P	K	Mg
Cattle FYM	10 t/ha	60	190	720	180
Potatoes, early	27 t/ha	-72	-113	-162	-54
Balance		**-12**	**78**	**558**	**126**

Crop rotation

The same two crops are grown each year: potatoes (early or maincrop) followed by late maize. This is liable to lead to a build-up of soil-borne pests such as wireworms and nematodes, particularly since no chemical control is used. No information on actual pest problems was obtained, but it is an issue that should be investigated by the extension services.

If soil-borne pests and diseases are an issue, then farmers should seek an appropriate break crop and switch to growing potatoes no more than every second year. The main issue is what can easily and profitably be grown, stored and marketed. Some kind of legume crop might be suitable, since these tend to suffer from a different range of pests and diseases, and also increase the nitrogen content of the soil.

Harvesting & storage

Potatoes are harvested by hand-hoe, which provides a good opportunity to remove weeds but does cause some mechanical damage. Early potatoes are marketed immediately; maincrop potatoes grown near the house are stored in the barns and those from mountain plots are stored in underground earth clamps, insulated with straw.

The barn storages seen were dry, dark and frost-free, with no evidence of storage losses. The traditional practice of clamping runs the risks of frost damage and loss from rodents, but if it is done well losses should be small. It was not possible to visit any of the clamps to assess how well they perform in practice in the Khulo region.

Early potatoes are harvested from late June to early July, and maincrop potatoes in August. It was difficult to get an impression of how much of the land was devoted to earlies and how much to maincrop, but given that all farmers talked about planting maize after potatoes, it seems that early potatoes are the rule around the village.

Hot weather can dramatically shorten the storage life of potatoes and in some hot countries, such as Cyprus, potatoes may be moved straight from the field to a cold store in order to prepare them for long-distance transport. Cold storage does not seem to be used or needed in Ajara, since early potatoes are shipped to market immediately and maincrop potatoes tend to be grown at higher altitude where the summers are cooler.

Transport & marketing

As mentioned earlier, around ten people in the village own vans which are used to transport produce to Batumi wholesale market. For this they charge 0.05-0.06 GEL/kg, at least one quarter of the selling price of 0.20 GEL/kg in February 2013. Potatoes will typically be sold by the sack-load to wholesalers, direct from the van, allowing the driver to complete the 5-6 hour round trip as soon as everything is sold.

One could envisage an assembly market in Khulo, to which farmers would bring their potatoes by car, van or tractor, and from which they would travel in lorries to Batumi. Owners of 5-6 tonne trucks typically charge 200 GEL to take a load to Batumi, equivalent to 0.03-0.04 GEL/kg, and larger 20-tonne lorries could reduce the unit price further. With total Ajaran potato production

averaging 20,000 tonnes per year and marketing carried out over many months, a few lorries could transport the whole crop, not just from Khulo but from other regions as well. The costs of such a system include the need to unload and re-load the potatoes in Khulo, and the possible introduction of another middleman to take risk and make margin. It is not a complex process, so a group of farmers could simply try it, and the livestock market outside Khulo might provide a suitable site for trading and trans-shipping the potatoes. In fact, a number of large lorries were seen at Batumi wholesale market selling Ajaran potatoes, so it appears that this may already be taking place to some extent.

One way to increase the returns from potato production is to harvest and sell them earlier, when prices are high. It was not possible to get a reliable impression of what prices can normally be achieved in June; farmers talked about receiving 1 GEL/kg last year, but this will depend partly on seasonality and partly on the significant year-to-year price fluctuations, as shown in section 4.3.1 above. The downside of early potato production is that yields are lower due to the shorter growing season, and that very early planting runs the risk of frost damage to the foliage.

Turkey is the main competitor on the Georgian market, and southerly, lowland areas of Turkey will always be able to produce potatoes earlier than the uplands of Ajara. Thus it seems that trying to produce extra-early potatoes in Khulo region would probably not be worth the risk and the yield reduction.

Yields & incomes

Potatoes fortunately do not suffer from alternate bearing, and annual yields are affected by rainfall, late frosts, summer temperatures and the incidence of pests and diseases. The official statistics quoted earlier show yields in Ajara ranging from 9-18 t/ha, with an average of 13.6 t/ha, making this the highest-yielding region in Georgia. One of the Khulo farmers claimed yields of 27 t/ha whilst the director of AgroService Centre said that yields could reach the equivalent of 40 t/ha on small plots; whilst such yields would be common in western Europe or even on good farms in Serbia, they differ markedly from the statistics and, in the absence of reliable farm records, it is hard to know how much farmers really produce.

Taking the claimed 27 t/ha at face value, and assuming a sale price of 0.20 GEL/kg and an average plot size of 0.3 ha gives a total annual income from potatoes of 1,600 GEL ($ 880). Section 4.5 gives some simple gross margins and discusses the potential to increase yields and margins.

4.4 Maize

Maize was not identified as a priority by either the Ajara Ministry of Agriculture or UNDP, so it has not been studied in detail. It is included here because it forms part of the integrated farming system in the case-study village of Did-Ajara and makes a small but significant important contribution to the household supply of food and feed.

4.4.1 Key statistics

Production

Basic statistics on maize production in Georgia are given in the following table. Most data are from GEOSTAT and show the average from 2006-12. However, the GEOSTAT database combines Ajara into a group of “Low production regions”, so data for Ajara are taken from its Ministry of Agriculture and are averages for 2012-13 (the only years available):

Region	Harvested area		Production		Average yield	
Samegrelo and Zemo Svaneti	34.700 ha	29.2%	75.300 t	29.1%	2.2 t/ha	99.7%
Imereti	40.800 ha	34.3%	74.000 t	28.6%	1.8 t/ha	83.4%
Kakheti	14.500 ha	12.2%	32.200 t	12.5%	2.2 t/ha	102.1%
Guria	8.100 ha	6.8%	29.800 t	11.5%	3.7 t/ha	169.1%
Kvemo Kartli	7.600 ha	6.3%	21.000 t	8.1%	2.8 t/ha	127.7%
Adjara AR	6.300 ha	5.3%	14.600 t	5.6%	2.3 t/ha	105.7%
Other regions	6.900 ha	5.8%	11.800 t	4.6%	1.7 t/ha	78.5%
GEORGIA	119.000 ha	100.0%	258,600 t	100.0%	2.2 t/ha	100.0%

Source: Ajara Min. of Agriculture average for 2012-13; rest of Georgia from GEOSTAT average for 2006-12

Ajara accounts for just over 5 % of Georgia's total maize area, and its average yield of 2.3 t/ha is very similar to the national average of 2.2 t/ha (given that different data sources and years are used, this comparison is only approximate).

Across the whole country there is notable year-to-year variation in the maize area, from a high of 141,000 ha in 2008 to a low of 100,000 ha in 2010, with some indication of a gradual overall decline in the harvested area. Yields fluctuate much more markedly, mainly due to weather, with a peak of 2.4 t/ha in 2009 being followed by a low of 1.4 t/ha in 2010.

The following table puts Georgia in a world context, showing average maize areas, production and yield over the five years from 2008-12. The first 12 countries listed each produce at least 1 % of the world's maize, and together account for 81 % of the total:

Country	Area		Production		Yield	
USA	33,255,000 ha	19.9%	308,727,000 t	36.2%	9.28 t/ha	182%
China	32,407,000 ha	19.4%	181,645,000 t	21.3%	5.61 t/ha	110%
Brazil	13,639,000 ha	8.2%	58,350,000 t	6.8%	4.28 t/ha	84%
Mexico	6,744,000 ha	4.0%	21,494,000 t	2.5%	3.19 t/ha	62%
Argentina	3,222,000 ha	1.9%	20,562,000 t	2.4%	6.38 t/ha	125%
India	8,420,000 ha	5.0%	20,199,000 t	2.4%	2.40 t/ha	47%
Indonesia	4,023,000 ha	2.4%	17,857,000 t	2.1%	4.44 t/ha	87%
Ukraine	3,018,000 ha	1.8%	15,537,000 t	1.8%	5.15 t/ha	101%
France	1,655,000 ha	1.0%	15,322,000 t	1.8%	9.26 t/ha	181%
South Africa	2,696,000 ha	1.6%	11,951,000 t	1.4%	4.43 t/ha	87%
Canada	1,223,000 ha	0.7%	10,852,000 t	1.3%	8.87 t/ha	174%
Italy	962,000 ha	0.6%	8,762,000 t	1.0%	9.11 t/ha	179%
Georgia	118,000 ha	0.07%	259,000 t	0.03%	2.19 t/ha	43%
Rest	55,707,000 ha	33.3%	160,800,000 t	18.9%	2.89 t/ha	57%
TOTAL	167,091,000 ha	100.0%	852,319,000 t	100.0%	5.10 t/ha	100%

Source: FAOSTAT, 2008-12

- The two biggest producers are the USA and China, each with almost 20 % of the total maize area, but America's yields are 75 % greater than those of China, so it produces 36 % of the world7s maize compared to China's 21 %.
- Whilst the EU does not have such a large maize area compared to the Americas and China, it does have very high yields: France's average of 9.26 t/ha and Italy's of 9.11 t/ha are almost equal to those of the US.

• Within the former Soviet Union, the biggest player is Ukraine, with 1.8 % of the world area, yields similar to the world average, and hence also 1.8 % of world production.

• Although not shown in the above table, Russia occupies 19th place in the world ranking, with 0.9 % of total area, 0.7 % of total production, and an average yield of 3.9 t/ha.

• In this company, Georgia is a very minor player. It harvests just 0.07 % of the world maize area and its yields of 2.2 t/ha are only 43 % of the global average (markedly lower than in Ukraine or Russia). Hence it takes 86th place in the world ranking and produces just 0.03 % of total maize.

Trade

The following table shows Georgia's maize imports and exports over the most recent 10 years available:

Country	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average	Share
IMPORTS (tonnes)												
Ukraine	360	436	612	12,535	33,782	12,218	13,324	25,760	13,479	13,745	12,625	71.6%
Russia		2,027	4	5,297	1,283	4,058	2,078	3,968		5,002	2,372	13.4%
Moldova				2,996	6,875					78	995	5.6%
Armenia							5,693				569	3.2%
Latvia										4,150	415	2.4%
Turkey			3	2	4	8	19	23	46	1,551	166	0.9%
Romania									1,003	582	159	0.9%
Switzerland				0				1,516	8	15	154	0.9%
Azerbaijan							1,023				102	0.6%
Austria						4	79	295		2	38	0.2%
Rest	1	5	7	4	30	112	22	5	76	230	49	0.3%
TOTAL	**361**	**2,468**	**626**	**20,834**	**41,974**	**16,400**	**22,238**	**31,567**	**14,612**	**25,355**	**17,644**	**100.0%**
EXPORTS (tonnes)												
Armenia		1,565	873	2,944	28,076	17,255	5,693	5,429	9,671	2,008	7,351	92.2%
Ukraine		4		5,123							513	6.4%
Azerbaijan							1,023	2	22	46	109	1.4%
Rest			2	5	2			0	0	0	1	0.0%
TOTAL	**10**	**1,569**	**873**	**8,067**	**28,076**	**17,255**	**6,717**	**5,432**	**9,693**	**2,077**	**7,977**	**100.0%**
NET IMPORTS	**351**	**899**	**-247**	**12,767**	**13,898**	**-855**	**15,521**	**26,135**	**4,919**	**23,278**	**9,667**	

Source: FAOSTAT, 2002-11

• Georgia is usually a net importer of maize, on average importing almost 18,000 tonnes and exporting 8,000 tonnes. There was a net export in just two years, 2004 and 2007, but in both cases the volume was less than 1,000 tonnes.

- Putting these trade flows in the context of annual production of almost 260,000 tonnes shows that Georgia normally comes out at 90-100 % self sufficient in this commodity.
- Three countries of the former Soviet Union Ukraine, Russia and Moldova on average provide more than 90 % of total imports.
- In most years, Georgia imports wheat from Russia, and the highest recorded export was just 10 tonnes in 2002, so Russia's trade embargo has not been relevant for this product.
- Exports go mainly to Armenia, with small quantities shipped to Ukraine and Azerbaijan in some years.

Overall, maize production in Georgia and hence in Ajara fulfils the role of import substitution. This also applies to the case-study village: although most of the maize produced is consumed on the farm rather than marketed, it substitutes for purchases from the market, which in turn helps to substitute for imports.

4.4.2 Maize in the Did-ajara case study

Since maize had not been identified as a priority product, quantitative production details were not collected for this enterprise. It essentially plays a supporting role, with the grain providing food for the farm family and the stalks constituting a useful source of winter fodder for the cattle, particularly when hay is in short supply. As a "catch crop" after potatoes, it produces food and feed from land that would otherwise be unused, but the short growing season must limit yields. Possible areas to investigate in search of increased maize yields include:

- Crop rotation, to control the build-up of soil-borne pests and diseases such as rootworm. This would require introduction of a new crop to be grown instead of maize in alternate years, possibly a legume.
- Fertilising, particularly applications of nitrogen, which will be largely depleted after the potato crop.
- Varieties, potentially switching to modern high-yielding hybrids if these are compatible with the late planting time.

Yield and output value

Geostat data for 2008-12 give the average maize yield for all of Georgia as 2.2 t/ha, and data from the Ajara Ministry of Agriculture show an overall average yield of 2.3 t/ha for 2012-13. Despite the altitude, short growing season and lack of purchased inputs, the Ministry of Agriculture data show maize yields in Khulo region to be around 2.5 t/ha, giving an average of 750 kg from a 0.3 ha plot.

The maize is used as human food, rather than feed, but if it were valued at the purchase price of maize meal (0.55 GEL/kg) then the total annual value of production from a 0.3 ha plot would be 410 GEL ($ 230). This is the value used in the final section of this chapter, on whole-farm incomes and potential.

4.5 Current and potential whole-farm incomes

The following tables give very approximate gross-margin budgets for the cattle, potato and maize enterprises, per cow and per hectare, as appropriate:

Item	Quantity	Price	Value
Cattle (per cow)			
Cheese	100 kg	8.00 GEL/kg	800 GEL
Calf	60 kg	3.00 GEL/kg	180 GEL
TOTAL INCOME			**980 GEL**
Maize stalk, home produced	150 kg	0.00 GEL/kg	0 GEL
Hay, home produced	600 kg	0.00 GEL/kg	0 GEL
Hay, purchased	200 kg	0.30 GEL/kg	60GEL
Maize meal, purchased	200 kg	0.55 GEL/kg	110 GEL
Wheat bran, purchased	200 kg	0.60 GEL/kg	120 GEL
Total feed cost			**290 GEL**
AI			20 GEL
Vet cost			40 GEL
Misc variable costs			**60 GEL**
TOTAL VARIABLE COSTS			**350 GEL**
GROSS MARGIN			**630 GEL**

Potatoes (per hectare)			
Potatoes	27,000 kg	0.20 GEL/kg	5,400 GEL
TOTAL INCOME			**5,400 GEL**
Sprays			100 GEL
Purchased seed	0 kg	1.00 GEL/kg	0 GEL
TOTAL VARIABLE COSTS			**100 GEL**
GROSS MARGIN			**5,300 GEL**

Maize (per hectare)			
Maize	2,500 kg	0.55 GEL/kg	1,375 GEL
TOTAL INCOME			**1,375 GEL**
No purchased inputs			0 GEL
TOTAL VARIABLE COSTS			**0 GEL**
GROSS MARGIN			**1,375 GEL**

Source: Author's calculations; see next section for assumptions used.

4.5.1 Quantity and price assumptions

A lot of assumptions were needed to prepare these budgets, many of them based on rather slim evidence. They are detailed below:

Cattle

- Output quantities and prices are from the text above. No allowance was made for the value of the cull cow, assumed to be roughly balanced by the cost of rearing a replacement heifer.
- Feed prices are from farmers and suppliers, as detailed in the text. Quantities of concentrate feed are from farmers and the AgroService Centre (ASC) representative. The quantity of purchased hay is assumed, and would vary according to the amount produced on the mid-altitude pastures.
- The cost of artificial insemination (AI) is taken from the 2013 price in the draft ASC strategy. Other veterinary costs are assumed to be twice the AI cost, as a typical ratio.

Potatoes

- The yield of 27 t/ha is from one of the farmers interviewed, but may be rather high. The selling price is from the same farmer.
- The purchased seed price of 1 GEL/kg is from a farmer, but everyone interviewed used their own home-saved seed, so a quantity of 0 kg/ha has been assumed.
- No data were collected on sprays, other than that they usually spray against blight. The cost is a typical cost for fungicides only, from the Balkans.
- No entry is made for fertiliser, as the fields receive only cow manure.

Maize

- Output quantity and value are from the text above; the decision to value maize at the same price as purchased maize meal may significantly under-value it, and it might be appropriate to at least double the price to represent food rather than feed.

Information was not collected on the growing practices for maize, but it is assumed that home-saved seed is used and that neither fertilisers nor sprays are normally applied.

4.5.2 Current whole-farm gross margin

The four farms visited for the case study each had 8-10 cows and 0.25-0.3 ha of potato/maize land. Taking the higher figures gives the following overall farm gross margin:

Enterprise	Gross Margin		No.	units	Total GM	(USD)	GM share
Cattle	630 GEL	/cow	10	cows	6,300 GEL	$3,500	88 %
Potatoes	5,300 GEL	/ha	0.3	ha	1,590 GEL	$883	19 %
Maize	1,375 GEL	/ha	0.3	ha	412 GEL	$229	5 %
FARM TOTAL					**8,303 GEL**	**$4,613**	**100 %**

Based on these very rough assumptions:

- Total annual farm income approaches 9,000 GEL ($ 5,000), which is significantly higher than the typical income of 2,000 GEL from growing mandarins or hazelnuts estimated in section 3.4.1 (though those estimates were for a single crop and did not include any allowance for the value of milk, maize, etc. also produced on the farm).
- The cattle enterprise is by far the most important part of the farm, accounting for about 75 % of total gross margin.
- With the rather high yield assumed here, potatoes provide almost 20 % of total gross margin.

Maize appears to make a very small contribution, with an income-saving effect equivalent to just 5 % of total gross margin, using the rather low imputed price.

4.5.3 Potential increase in gross margins

Potential to improve cattle gross margins

Four of the main ways to increase the profitability of the cattle enterprise, in order of priority, are:

- ***Increasing milk yield through better feeding***;
- ***Increasing forage production on the mid-altitude pastures***, starting by applying artificial fertiliser and possibly improving drainage and re-seeding with improved grass varieties, if conditions warrant this;
- ***Improving management and productivity of the high mountain pastures***, starting with controlled grazing to match stocking density to carrying capacity, and possibly also applying some fertiliser. Given that this land is still state-owned and grazed in common, the main challenges here are organisational rather than technical;
- ***Increasing genetic potential through use of artificial insemination***, allowing further increases in milk yield, supported by more purchased feed and home-produced forage.

As it was not possible to visit the mountain pastures in early February, no assessment could be made of the scope to raise forage productivity and so this section looks just at the first step: increasing milk yield from the existing cows through increased use of purchased feed.

It is assumed that milk yields could be at least doubled to 2,000 litres per cow. The amount of milk suckled by or fed to calves should remain unchanged, so all of the additional 1,000 litres of milk could be used to make approximately 120 kg more cheese. To support this extra production would

require around an increase in the use of each purchased feed, with an additional 150 kg each of maize meal and wheat bran and an extra 250 kg of hay.

The ration has not been modelled in detail, but this would provide around 25 % more energy than needed for the extra milk yield, allowing some to be partitioned to body reserves as liveweight gain. The increase in dry matter intake would be around 2 kg/day in early and mid-lactation, which should be achievable.

The gross margin budget at this higher level of production would look as follows:

Item	Quantity	Price	Value
Cattle (per cow)			
Cheese	220 kg	8.00 GEL/kg	1,760 GEL
Calf	60 kg	3.00 GEL/kg	180 GEL
TOTAL INCOME			**1,940 GEL**
Hay	450 kg	0.33 GEL/kg	149 GEL
Maize meal	350 kg	0.55 GEL/kg	193 GEL
Wheat bran	350 kg	0.60 GEL/kg	210 GEL
Total feed cost			**551 GEL**
AI			20 GEL
Vet cost			40 GEL
Misc variable costs			**60 GEL**
TOTAL VARIABLE COSTS			**611 GEL**
GROSS MARGIN			**1,329 GEL**

This shows a doubling of gross margin from 630 GEL/cow to 1,329 GEL, though in practice such an increase in productivity might require some additional costs for veterinary attention, parasite control and mineral supplements.

Potential to improve potato gross margins

A local agronomist estimated that potato yields could be increased to around 30 t/ha with better seed, fertilising and crop protection. Given that the claimed yields are already close to this level and that there would be additional costs associated with increasing the yield, these data do not suggest that there is great potential to increase the gross margin from potatoes. This would be a surprising conclusion, as there is almost always potential to increase yields and margins by intensifying traditional systems, but without solid data to go on, it has not been possible to model an alternative version of the potato enterprise.

Potential to improve maize gross margins

Even fewer data are available for maize, so no alternative is calculated for this crop.

Potential whole-farm gross margin with improved milk yields

With the cattle enterprise improved and the potato and maize enterprises left unchanged, the whole-farm gross margin would look as follows:

Enterprise	Gross Margin		No.	units	Total GM	(USD)	GM share
Cattle	1,376 GEL	/cow	10	cows	13,760 GEL	$7,644	88%
Potatoes	5,300 GEL	/ha	0.3	ha	1,590 GEL	$883	10%
Maize	825 GEL	/ha	0.3	ha	248 GEL	$138	2%
FARM TOTAL					**15,598 GEL**	**$8,665**	**100%**

Whole-farm gross margin has increased by 80 % to around 15,500 GEL ($ 8,600), with cattle now accounting for almost 90 % of the total margin.

Introduction of Jersey or Swiss Brown genes should easily allow milk yields to double again, to 4,000 litres per cow, but without any information on the potential for pasture improvement it is hard to say how much of this increase could be supported from the farm and how much would require bought-in feed. Over a number of years it might be possible for a good farmer to raise whole-farm gross margin to around 30,000 GEL ($ 17,000), but with four times as much milk to process the farmer would almost certainly want to introduce machine milking and might also have to invest in additional space and equipment for cheese-making. If many farmers in the area increased their milk output to this extent, Khulo might be able to support a small dairy, which would free farmers or their families from the time needed to sell their dairy products on Batumi market, but would also pass a significant share of the total margin to the dairy processor.[32]

4.5.4 Conclusion: The scope to increase cattle profitability

This very preliminary analysis suggests that there is considerable scope to increase the profitability of cattle production in the Khulo region, similar to the potential improvements identified for mandarin production and considerably higher than those for hazelnuts. The ability to increase profits stems from a number of factors:

- The current very low level of productivity suggests that rapid improvements should be possible;
- Genetic improvement is relatively cheap and easy for cattle herds, which are being continuously renewed and where artificial insemination works well, compared to the costs and difficulties of grubbing up and replanting a decades-old orchard or hazelnut plantation;
- Grass shows a very high response to nitrogen fertiliser, indicating that forage production could be greatly increased;
- Most importantly of all, cattle farmers can increase the effective scale of their operation by simply buying-in feed, without the absolute area limit that constrains crop production.

Introducing all of these improvements on the existing area of land might allow a farm family to approach the standard of living currently enjoyed in Turkey, but increases in income above this level would almost certainly require an increase in farm size, implying a smaller number of larger and more professional farmers.

32. Surveys in Serbia and Bosnia found that families which processed their milk on-farm and then sold their dairy products direct to consumers could double their income compared to supplying raw milk to a dairy, though with a considerable extra input of time and effort.

5 Honey

Honey is one of Ajara's traditional products, different from other forms of production in that beekeepers do not even need to own land and so are not constrained by the issues of holding size and land fragmentation that affect so much of agriculture. It is also an important export product, with the added complication that the export is almost entirely informal.

5.1 Key statistics

This section presents data on honey production and trade at a number of geographical levels, drawn from three main sources:

- The statistical institute of Georgia "GEOSTAT" http://www.geostat.ge
- The FAO global database "FAOSTAT" http://faostat.fao.org
- Statistics provided directly by the Ajara Ministry of Agriculture

5.1.1 Production

The following table gives honey production by region of Georgia from 2006-2012; data on the number of hives and yield are not available:

Region	2006	2007	2008	2009	2010	2011	2012	Average	
Adjara AR	100 t	100 t	200 t	400 t	500 t	200 t	600 t	300 t	11%
Imereti	400 t	500 t	400 t	800 t	300 t	300 t	200 t	414 t	15%
Kakheti	300 t	300 t	400 t	100 t	500 t	400 t	500 t	357 t	13%
Kvemo Kartli	100 t	200 t	100 t	0 t	200 t	200 t	200 t	143 t	5%
Samegrelo & Zemo Svaneti	100 t	400 t	300 t	500 t	1,100 t	1,100 t	1,200 t	671 t	24%
Samtskhe-Javakheti	100 t	300 t	300 t	400 t	500 t	200 t	300 t	300 t	11%
Low production regions	500 t	500 t	700 t	300 t	1,100 t	300 t	1,100 t	643 t	23%
GEORGIA TOTAL	**1,600 t**	**2,300 t**	**2,400 t**	**2,500 t**	**4,200 t**	**2,700 t**	**4,100 t**	**2,829 t**	**100%**

Source: GEOSTAT

- Total production varies considerably from year to year, with an average of 2,800 tonnes and a gradual rising trend.
- Production in Ajara averages 300 tonnes, 11 % of the total for Georgia, and tends to rise and fall in line with the rest of the country.

The following tables give more detailed information for Ajara, for a different source and a different, though overlapping, time period:

Region	Number of hives			Honey production			Yield per hive		
	2012	2013	Average	2012	2013	Average	2012	2013	Average
Kobuleti	7,100	7,150	7,125	150 t	155 t	153 t	21.1 kg	21.7 kg	21.4 kg
Khelvachauri	4,050	4,100	4,075	55 t	56 t	55 t	13.6 kg	13.5 kg	13.6 kg
Keda	2,500	5,511	4,006	36 t	55 t	46 t	14.4 kg	10.0 kg	11.4 kg
Shuakhevi	2,150	2,500	2,325	40 t	43 t	42 t	18.6 kg	17.2 kg	17.8 kg
Khulo	2,400	2,450	2,425	28 t	30 t	29 t	11.7 kg	12.2 kg	12.0 kg
Batumi	350	350	350	4 t	4 t	4 t	11.4 kg	11.4 kg	11.4 kg
Ajara	**18,550**	**22,061**	**20,306**	**313 t**	**343 t**	**328 t**	**16.9 kg**	**15.5 kg**	**16.1 kg**

Source: Ajara Ministry of Agriculture

- These data also show annual production in Ajara to average around 300 tonnes, but for 2012 (the year in which the data overlap) this is only half the value shown in the national statistics, possibly indicating weaknesses in the data set.
- There are around 20,000 hives in Ajara, each producing an average of 16 kg honey per year.
- The greatest concentration of hives is in Kobuleti, the main citrus region, and the lowest in the mountainous regions of Shuakhevi and Khulo (and the very small region of Batumi city). However, many producers move their hives up to the mountains for part of the year to harvest nectar from wild flowers, so these figures may underestimate the importance of mountain areas in total honey production.

The following table puts Georgia in an international context, showing each country that contributes at least 1 % of the world's honey supply, plus Georgia and its neighbours; data are averages for the same 7-year used in the GEOSTAT data above (2006-12):

Country	Number of hives	Honey production		Yield per hive
China	8,700,000	393,800 t	25.7%	45.3 kg
Turkey	5,362,000	83,500 t	5.5%	15.6 kg
Argentina	-	75,500 t	4.9%	
USA	-	70,300 t	4.6%	
Ukraine	-	67,700 t	4.4%	
Russia	-	56,700 t	3.7%	
Mexico	-	56,400 t	3.7%	
India	10,779,000	56,300 t	3.7%	5.2 kg
Ethiopia	-	45,200 t	3.0%	
Iran	3,500,000	44,600 t	2.9%	12.8 kg
Brazil	-	37,300 t	2.4%	
Canada	606,000	34,300 t	2.2%	56.5 kg
Spain	2,392,000	32,000 t	2.1%	13.4 kg
Tanzania	-	27,900 t	1.8%	
South Korea	1,810,000	24,800 t	1.6%	13.7 kg
Angola	-	24,200 t	1.6%	
Romania	-	20,600 t	1.3%	
Germany	-	20,100 t	1.3%	
Hungary	-	18,500 t	1.2%	
Georgia	-	2,800 t	0.18%	
Armenia	-	1,700 t	0.11%	
Azerbaijan	-	1,600 t	0.11%	
Rest of world	792,000	334,400 t	21.9%	
TOTAL	**N/A**	**1530,200 t**	**100.0%**	**N/A**

Source: FAOSTAT, 2006-12

- World honey production is very widely distributed, and the only country to have a large share of total production is China. The 19 countries that each produce at least 1 % of world honey together account for 78 % of the total.
- Georgia is a relatively minor producer of honey, occupying 57th place in the global ranking and producing 0.18 % of the total.
- Of Georgia's immediate neighbours, Turkey is the world's second-biggest producer with 5.5 % of the total, Russia is in 6th place with 3.7 %, whilst Armenia and Azerbaijan each produce less than two-thirds as much as Georgia.

The number of hives and yield per hive are only available for some countries, so no overall average can be calculated from these data. However, the Ajara average of 16.1 kg given earlier is very similar to the Turkish yield of 15.6 kg and somewhat higher than the Spanish yield of 13.4 kg, but only around a third of the level achieved in China.

5.1.2 Trade

The following table shows Georgia's imports and exports of honey over the 5-year period 2007-11, for every single country with which there was a trade. Data are reported by FAOSTAT to the nearest whole tonne; since the quantities traded are often less than a tonne, annual trade is expressed as value, with average quantities and prices shown at the right:

Country	2007	2008	2009	2010	2011	AVERAGE			
IMPORTS (value)						Value		Quantity	Price
Germany	$29,000	$18,000	$31,000	$16,000	$17,000	$22,200	56%	3.2 t	$6.90/kg
Estonia					$56,000	$11,200	28%	1.6 t	$7.00/kg
Netherlands	$2,000	$1,000	$4,000	$1,000		$1,600	4%	0.2 t	$8.00/kg
Russia	$6,000				$2,000	$1,600	4%	0.2 t	$8.00/kg
USA		$4,000				$800	2%	0.2 t	$4.00/kg
Luxembourg					$2,000	$400	1%	-	-
Spain		$2,000				$400	1%	-	-
Chile				$2,000		$400	1%	-	-
Italy		$1,000			$1,000	$400	1%	-	-
France	$1,000					$200	1%	-	-
Egypt		$1,000				$200	1%	-	-
Turkey				$1,000		$200	1%	-	-
TOTAL	$38,000	$27,000	$35,000	$20,000	$78,000	$39,600	100%	5.4 t	$7.30/kg
EXPORTS (value)						Value		Quantity	Price
Estonia					$61,000	$12,200	53%	1.8 t	$6.80/kg
Saudi Arabia				$40,000		$8,000	35%	1.0 t	$8.00/kg
USA		$4,000	$4,000			$1,600	7%	0.4 t	$4.00/kg
Germany	$3,000					$600	3%	-	-
Kazakhstan			$3,000			$600	3%	-	-
TOTAL	$3,000	$4,000	$7,000	$40,000	$61,000	$23,000	100%	3.2 t	$7.20/kg

Source: FAOSTAT, 2007-11

- The most striking fact is that, according to these data, the official external trade in honey is extremely small: imports and exports together represent only 0.3 % of Georgia's annual honey production, and trade with any one country never exceeds one lorry-load for a year.
- About the only consistent features of these data are the regular imports from Germany, with an average of just over 3 tonnes per year, and a very small but fairly consistent import from the Netherlands.

- The short supermarket survey reported in section **Error! Reference source not found.** found that two out of three supermarkets stocked only Georgian honey, whilst one devoted around a third of its shelf space to German honey and the rest to domestic production; markets and small shops in Ajara appear to sell exclusively Georgian honey. Thus the observed pattern of retail sales supports these data in indicating that honey imports are very low.
- The data for Estonia show no trade at all, and then an import of 8 tonnes and an export of 9 tonnes in the same year, 2011. This is hard to explain and might be some kind of data error.
- Import and export prices are only approximate, since quantities are given to the nearest whole tonne and values to the nearest thousand dollars. Both imports and exports show very similar prices of around $ 7.20/kg (13 GEL/kg), which is consistent with the supermarket price of 13-25 GEL reported in section **Error! Reference source not found.**.

Without independent confirmation from Georgia's own trade statistics, these data should be treated with some caution, and it is widely recognised that the most significant trade flow is the informal and unrecorded export of honey to Turkey (see section **Error! Reference source not found.**).

5.1.3 Consumption and supply balance

FAOSTAT report the *per capita* honey supply for Georgia as 0.6 kg. This is the same as in neighbouring Armenia and many European countries (Czech Republic, Denmark, Estonia, France, Luxembourg, Slovakia and the United Kingdom), higher than Russia (0.4 kg/head) and Azerbaijan (0.1 kg/head), and lower than Turkey (1.1 kg/head). Given that the FAOSTAT calculations depend on trade data which do not include informal exports, the true *per capita* honey consumption in Georgia may be slightly lower, perhaps 0.5 kg/head.[33] This figure is for total use, including that in bakery and confectionary products.

On this basis, domestic consumption of honey in Ajara would be around 200 tonnes per year, compared to annual production of around 300 tonnes. Thus around 100 tonnes per year should be available for export or sale to other parts of Georgia.

It should be noted that two of Georgia's regular trading partners have very high levels of *per capita* honey consumption: Ukraine is second in the world at 1.5 kg and Turkey in seventh place at 1.1 kg. However, both of these countries are significant net exporters and so offer rather limited scope as markets for Ajara, other than the specific Turkish demand for chestnut honey.

33. A survey carried out by ENPARD Ajara found that around 35 % of households were “regular users” of honey, consuming at least 3 kg annually. Some of these regular users will consume more than 3 kg/year, so the group average might be 4 kg, and the irregular users will also consume some honey, say 0.5 kg, suggesting an overall average per household of around 1.7 kg. Taking an average household size of 3.6 (UN data for Georgia) gives *per capita* consumption of 480 g.

5.2 Honey production

Production structures

No firm statistics are available on production structures but it is understood that most commercial producers have 40-120 hives, with a few having 200 hives or more, and the biggest up to 1,000. In addition, many people keep just a few hives to produce honey for their own use.

A "typical" producer with 80 hives, producing 16 kg of honey per year and selling for 15 GEL/kg, would generate a gross income of 19,000 GEL (just over $ 10,000) more than ten times the income of a typical mandarin or hazelnut producer. There may be up to 200 beekeepers in Ajara operating at this kind of scale, in addition to numerous small producers.

Hives

Beehives and combs form one of the largest costs of beekeeping. Traditional hives cost around 130 GEL and contain 10-14 combs (most commonly 12) costing 1-2 GEL each.

New designs can make the hives lighter and cheaper, whilst preserving the wood by boiling in wax rather than painting can extend their life from 10 to 20 years. The Ajara Ministry of Agriculture has been supporting the introduction of improved "thermal" hives.

Bees & health care

Ajaran bees are widely regarded as being of high quality and have been exported to many countries around the world, so the issues of variety and genetics that concern many agricultural sectors are not a limiting factor for honey production.

Bees are susceptible to a number of diseases, and beekeepers use specific veterinary medicines for prevention and cure. There is some concern that the substances used in Georgia are not the best, and may leave harmful residues in the honey (see section 5.4.4 below for the implications of residues on exports to the EU).

The USAID "NEO" project has provided its beekeeping beneficiaries with advice on various aspects of health control, focussing on the Varola parasite but also covering European and American Foulbrood, Nosema disease, Chalkbrood and various bee viruses. The materials used were adaptations of texts published in Arizona and so it is not immediately clear which of these diseases is believed to be a real problem in Georgia, though the clear emphasis on Varola indicates that this is seen as the biggest issue.

Hive location & harvests

Many producers move their hives two or three times during the season to allow the bees to harvest nectar from a succession of crops: acacia flowers growing around 300 meters above sea level, chestnut trees in the lower mountains, and alpine pastures at around 2,000 metres. Some producers harvest three times a year, once from each of these zones, whilst others harvest the produce from the acacia and alpine flowers as "May honey" and take a second harvest of "Chestnut honey" in August. Although the largest concentration of hives is recorded in Kobuleti region, the centre of mandarin production, many beekeepers prefer to keep their hives away from fruit orchards due to the risks from pesticides used on the trees.

Moving the bees around in this way significantly increases the annual honey production per hive, but also adds expense and the practical difficulties of negotiating steep and unmade mountain roads with a precarious load of sensitive bees. Some producers have flatbed trailers on which the hives stay all the time; other own or rent ordinary trucks and have to load and unload the hives with each move.

Once at a new location, large producers will typically set up 50-60 hives in one place, then move half a kilometre and unload or park the next group of hives, so that each has its foraging area.

Beekeepers without the capacity to move their hives around the country will keep them in a static location, getting one main harvest per year and so a lower annual production.

Management

Most Ajaran beekeepers are quite traditional in their approach, so a number of projects and organisations including the "Elkana" organic farming association and the Beekeepers' Association have tried to introduce new techniques. In addition to hive design and movement of the hives, much of the focus has been on technologies that save labour and speed up the process of honey extraction, including air blowers to clean bees from combs and radial separators instead of traditional square designs.

Some producers will feed sugar in the spring to help start the year's production, but it is still common to leave some honey in the hive as food at the end of the season rather than extracting it all and feeding sugar over the winter.

Honey yield

Estimates of annual honey production per hive vary considerably, and include the following:

- Elkana organic farming association: ***7-10 kg***, rising to ***15 kg*** when members move their hives throughout the season.
- Statistics of the Ajara Ministry of Agriculture (see section 5.1.1 above): ***16 kg***.
- ENPARD Ajara survey:
    - Khelvachauri region: ***10-15 kg***
    - Kobuleti region: ***15-20 kg***
    - Keda region: ***25 kg***
    - Shuakhevi and Khulo regions: ***30-35 kg***
    - Estimated potential yield: ***50 kg***
- Khelvachauri Beekeepers' Association: ***34-43 kg***.

It is probably fair to conclude that average production across all producers in Ajara is quite close to the statistical value of 16 kg, with some beekeepers producing only half this amount and the better beekeepers producing at least twice as much.

Mix of honey types produced

Estimates for the share of different honey types also vary considerably, in part due to regional differences:

- Elkana's estimate for Georgia as a whole was:
    - Acacia honey: 50 %
    - Field flowers (alfalfa, oilseed rape, etc.): 20 %
    - Chestnut honey: 10 %
    - Lime honey: 10 %
    - Alpine honey: 10 %
- The Beekeepers' Association, speaking for just the Khelvachauri region of Ajara, estimated that chestnut honey makes up 70 % of the total.

• ENPARD Ajara estimate that 70-75 % of total honey is produced in May, meaning that the later-flowering chestnuts cannot account for more than 25-30 % of the total.

The share of chestnut honey is important, because it has the highest sale value, is most in demand by Turkish purchasers, and has a strong flavour that it imparts to other, milder honeys (such as acacia) in blending. Based on the above rather conflicting data, it seems that chestnut honey might account for around one-third of Ajara's total production, i.e. about 100 tonnes per year.

Citrus honey also has a strong flavour and is useful for blending, but is produced in small quantities due to the pesticide risks associated with citrus orchards.

One of the issues for honey production everywhere is whether the consumer is being supplied with pure natural honey, or whether it has been diluted with sugar and water. The testing and marketing implications of this are discussed in the section 5.4 below.

5.3 Honey processing & marketing

This section discusses the main marketing routes currently in use, as well as some recent initiatives to improve the packaging and marketing of honey.

5.3.1 Marketing routes

The main routes for honey marketing are:

- Selling to a trader who comes to the farm
- Selling direct to local or passing consumers
- Selling at a market
- Bottling and supplying to small shops
- Bottling, labelling and supplying supermarkets

Selling to traders

Turkish traders, perhaps about to return to Turkey after delivering a lorry-load of goods to Georgia, will drive to the villages and negotiate direct with farmers to buy their honey in bulk. They demand almost entirely chestnut honey, and it is thought that the large majority of chestnut honey is sold in this way. In 2013 the price paid by such traders was 17-19 GEL/kg.

The Khelvachauri Beekeepers' Association reported that traders would actually pay higher prices when buying direct from the farm than when buying bulked honey from the association, this was explained as an issue of trust: traders feel more confident of what they are buying when they visit the farmer and can see the hives, than when dealing with an organisation. Presumably the fear is that the association may have adulterated the honey with sugar water or blended other types of honey in with the chestnut. This is somewhat ironic, given that the association carries out quality testing on all honey offered to it, but reflects the current state of development of the market. (The same counter-intuitive behaviour was reported in the hazelnut sector, with traders offering higher prices on the farm than at the collection centres).

As discussed in section 5.4 belowbelow, it is not legal to take this honey into Turkey so this trade takes place informally. There are some reports that Turkey is planning or even beginning to tighten up on this, which threatens Georgia's only significant export trade for honey.

If sales to Turkey are roughly equal to the amount of chestnut honey produced, then the total would be around 100 tonnes per year, with a sale value of 1.7-1.9 million GEL ($ 1 million). This figure is consistent with the broad estimate of supply balance in section **Error! Reference source not found.**.

It might be questioned why Turkey is so keen to buy honey from Ajara, when it has exports averaging 4,400 tonnes and officially imports just 250 tonnes per year. The answer probably lies in the strong and specific flavour of chestnut honey, creating demand both for direct sale and for blending with milder flavoured honeys. It seems quite plausible that much of the chestnut honey shipped from Ajara to Turkey is used for blending; whether the resultant product is labelled as "blended" or as "chestnut honey" is not known. If it is the latter, then increased enforcement of marketing and labelling standards in Turkey could have implications for the price traders are willing to pay for Ajaran chestnut honey.

Direct sale

Driving around Ajara, one sees many various local goods offered for sale at the side of the road, including honey in unlabelled glass jars of various sizes, typically from 1-3 kg. Farmers will also sell in jars or in bulk to regular customers, both local residents and city-dwellers who will drive out each year to purchase honey from their regular supplier.

Sale prices are believed to be around 12-15 GEL/kg, depending on the type of honey, but it is not known how much honey is marketed in this way.

Selling at markets

Batumi retail market, like other markets, has quite a large honey section where honey is offered for sale in a range of glass and plastic jars, typically from half a kilogramme upwards, with little or no labelling. Whole honey comb is also offered for sale.

Whilst theoretically a "farmers' market", it seems that most of the stallholders buy honey from other farmers for re-sale as well as marketing their own production. Farmers typically supply honey to these retailers in large reusable metal churns or plastic drums, from which the trader dispenses into smaller retail containers.

In January 2014, "May honey" was selling at 12 GEL/kg and chestnut honey at 15 GEL/kg; it was not possible to find out what share of this went to the farmer and how much to the retailer.

Supplying small shops

Small shops are likely to sell only Georgian honey, in the same range of relatively large, unlabelled jars as found in the retail market. These two routes markets and small shops still account for the majority of food sales in Ajara, and so presumably the majority of the honey supply to domestic consumers.

Supplying supermarkets

Supermarkets are growing fairly rapidly in Tbilisi, Batumi and other large cities. Section **Error! Reference source not found.** presents the results of a short survey of three major supermarket chains in Batumi, which found that two out of three supermarkets stocked only Georgian honey, whilst one devoted around a third of its shelf space to German honey and the rest to domestic production. The standard of packaging and presentation varied markedly between these three outlets:

- In the supermarket stocking German as well as Georgian honey, all honey was offered in well-labelled jars of 350-700 g, including the plastic "Bear" jars produced by the Khelvachauri Beekeepers' Association (see section 5.3.2 below). Prices ranged from 13 GEL/kg for "autumn honey" in the larger 700 g jars, to 25 GEL/kg for the 350 g plastic bears;

• In another there was only one kind of honey on offer, in 450 g glass jars with basic labelling, selling for 20 GEL/kg;

• The third supermarket took a different approach again, selling honey from its fresh produce counter. The honey was supplied in bulk metal churns, presumably direct from farmers, and the supermarket dispensed into simple plastic cups sealed with clingfilm. The price was 17.5 GEL/kg for both "Flower honey" and chestnut honey.

With the exception of this third outlet, farmers wishing to supply honey to supermarkets need a more sophisticated approach to packaging and labelling than they can manage individually on their farms, so some form of association or company must be involved in bulking, testing, packaging and marketing the honey. The way this has been addressed by one project-supported group, the Khelvachauri Beekeepers' Association, is discussed in section 5.3.2 below.

Balance of sales

The marketing outlets can be summarised in decreasing order of throughput as:

• The majority of honey is sold in very simple packaging direct to consumers in the countryside, at markets, and through small shops;

• Perhaps one-third of total production (but a large share of chestnut honey production) is sold in bulk to Turkish traders for informal export;[34]

• Sale of honey through supermarkets in small, well-presented retail packages accounts for a small but growing share of total output.

The total annual return to Ajaran beekeepers from all marketing channels is probably in the order of 4.5 million GEL ($ 2.5 million).

5.3.2 Marketing initiatives and opportunities

The USAID "New Economic Opportunities" project (NEO) has supported a number of beekeepers' associations, particularly seeking to build scale and establish a more professional approach to marketing.

Khelvachauri Beekeepers' Association

The Khelvachauri Beekeepers' Association mentioned above was established with USAID support in 2007 and constructed its premises in 2010 with the help of a 50 % grant from the Millennium Project. It currently has 20 farmers with a total of 400-500 hives and an annual production of around 17 tonnes of honey which, at 34 kg/hive, is twice the Ajara average. In 2011 the structure was changed to a limited company (in line with the original plan when the association was established), and it now has one paid director and three part-time staff.

The association has a small laboratory that carries out three important tests on honey supplied by its members:

34. A study by ENPARD Ajara estimated that at least 70 % of Ajara's honey was being exported to Turkey. However, there is widespread agreement that Turkish traders but almost exclusively chestnut honey, which accounts for only a part of total production, so it seems that the share being exported must be markedly lower than 70 %.

- Refractometer to check for added sugar and water;
- Microscopic examination for particulate contamination, such as soot particles from location too close to a busy road;
- Salt measurement, to check if the bees have been drinking from salty and possibly contaminated water.

The association has established its own brand and markets most of its honey in distinctive bear-shaped plastic jars, and has semi-automated dispensing equipment ensure that each jar contains the correct quantity. It currently buys chestnut honey at 17 GEL/kg from members and 15 GEL/kg from non-members, and incurs a processing cost of 0.5 GEL for the 350 g bear jars, equal to 1.5 GEL/kg. The association reported that it sells to supermarkets at the purchase price plus processing cost, and that the supermarkets add a mark-up of 2 GEL. The following table shows price formation based on these data and the observed selling price in the "Goodwill" supermarket chain:

Stage	Price per kg	Price per 350 g bear	Share of retail
Buying price	17.00 GEL	5.95 GEL	67%
Processing cost	1.43 GEL	0.50 GEL	6%
Wholesale price	**18.43 GEL**	**6.45 GEL**	**73%**
Supermarket margin	6.86 GEL	2.40 GEL	27%
Retail price	**25.29 GEL**	**8.85 GEL**	**100%**

The apparent supermarket mark-up of 37 % (of wholesale price) seems rather high by West European standards, though it must be remembered that this is the gross margin out of which supermarkets have to pay for their buildings, staff, transport and all other operating expenses in order to reach their net margin or profit.

The farmers' share of 67 % of the retail price is higher than that achieved in most sectors.

The association reported that their members usually prefer to sell to traders who come to their farm, since these offer higher prices, and the association finds it more profitable to sell in bulk to Turkish exporters, so packaging and selling to supermarkets is in fact the third preference for this association and its members.

Apart from its marketing activities, the association also has a machine to produce combs from recovered wax; it provides these free to its members and sells to non-members for 1.50 GEL/comb.

Other marketing associations

The Elkana organic farming association is involved in packaging, labelling and marketing of honey (not actually labelled as "organic" because they are currently unable to guarantee that the bees did not forage on pesticide-treated crops). They produce a range of different honeys in well-labelled small jars and supply them to supermarkets as well as selling through their own shops in Tbilisi and Ajara.

It is understood that a number of other associations have been or are being formed with the support of various projects, though none of these was visited.

Supply and demand for packaged honey

At present, associations and other processors seem more than able to meet the demand for well-presented retail packages of honey. As Georgia and Ajara continue their economic development,

both the throughput of supermarkets and consumers' quality expectations will continue to increase, resulting in steady growth in demand for packaged honey. Without conducting a much more detailed marketing survey, it is hard to quantify and forecast the demand, but it seems that the current project-supported activities are probably at about the right level: suddenly injecting a lot of new money to set up more honey-marketing associations might simply erode the margins of those already operating. It is probably best to continue the gradual process of establishing and expanding associations, coupled with marketing support to help them get more product onto supermarket shelves and other retail outlets.

The tourist market

The Ajara Regional Development Strategy reports that there were almost 1 million tourist visitors in 2010, staying for 3.8 million person-nights. The tourist sector is growing very rapidly, with the number of visitors increasing by 40-95 % each year from 2004 to 2010, and with hotel-building still continuing at a rapid pace. Numbers of 2-3 million visitors per year are now being talked about, implying around 10 million person-nights.

There has been considerable discussion of how Ajara's agricultural sector can best take advantage of this new opportunity, from having Ajaran mandarins presented in the restaurants to providing small packages of Ajaran honey at the breakfast buffet. A quick attempt to quantify the scope for honey is as follows:

- Typical daily consumption of honey is around 2 g per person (equalling the Georgian average of 0.7 kg/person/year).[35]
- 2 g/person/day × 10 million person-days = 20 tonnes.

Thus this appears to be relatively small in the context of Ajara's annual production of 300 tonnes, though with a high unit value.

Difficulties in accessing this market include the fact that almost all of the major hotel chains are run by Turkish managers, who often prefer to source Turkish goods from known suppliers, and the reluctance of some hotels to offer packaged honey and jams at all, as they have a tendency to disappear rapidly.

This looks like a potential niche market for one of the more enterprising associations to explore, though they would have to be prepared to put a lot of work into marketing and gaining access to the large hotels' buyers.

5.4 Exporting honey and other animal products to the EU

Honey is treated as an animal product in international trade and within the European Union, and so getting approval to export honey to the EU involves most of the same steps as for export of meat, milk or any other animal product. Essentially the system involves the following elements:

---

35. Only a proportion of total honey is consumed as pure honey at breakfast, with a significant share used in confectionary and bakery products, and some with herbal teas etc. often consumed in cafes. On the other hand, there will also be considerable wastage associated with the small individual packages, increasing apparent consumption. On balance the figure of 2 g/person/day is retained.

5.4.1 Central Competent Authority

The EU Food and Veterinary Authority (FVO) needs to be sure that it can trust the "Central Competent Authority" (CCA) of any country with which it trades. In most cases this is a food and veterinary agency or department of the Ministry of Agriculture; in Georgia it is the National Food Agency.[36]

The main questions the FVO asks are:

- ***Animal health***:
  - Does the CCA have a good understanding of the animal health situation in the country?
  - Does it have monitoring systems in place that will rapidly detect any outbreaks of serious diseases?
  - Does it have systems in place to deal with endemic diseases in line with EU regulations, and contingency plans to deal with the outbreak of any new serious diseases?
  - Does the CCA have the authority, resources and organisational capacity to respond quickly and effectively when problems arise?

- ***Public health***:
  - Does the CCA have an effective system of control of relevant establishments (dairies, slaughterhouses, meat processing plants, etc.)?
  - Does it have the power to carry out inspections and to suspend or close down an establishment when a serious problem occurs?
- ***General***:
  - Does the CCA have the authority, resources and organisational capacity to respond quickly and effectively when problems arise?
  - Can the CCA be trusted to be open and honest about problems that arise and actions it is taken, without attempting to conceal them from the FVO and its EU trading partners?

These include some quite sensitive and complex questions, and the answer is rarely as simple as yes or no. The greater the perceived risk to EU producers and consumers, the more stringent the FVO will be in its assessment of a third country's veterinary service.

The situation for honey is considerably simpler than for many other products, since none of the most serious epizootic diseases is concerned, establishments do not require approval, and the human health risks are arguably lower than with many other animal products. Thus the FVO might be more sympathetic when considering a request just for the export of honey.

---

36. The EU insists on dealing with a *central* competent authority, so the National Food Agency is the relevant authority for all of Georgia, including the Autonomous Republic of Ajara.

5.4.2 Animal health situation

The FVO wishes to ensure that the exporting country does not contain any serious epizootic diseases that could be introduced into the EU through trade in animals or products. The risk depends on the product being imported, with live animals typically representing the greatest risk, followed by meat and milk, and then processed products and honey having the least risk. Where animal health problems are present, the FVO may recommend that the EU allows imports of certain lower-risk products only.

Current EU legislation on bee health[37] provides for animal health certification and requirements for the movements of bees between Member States. These requirements are intended to prevent and control a number of bee diseases that can spread via the movement of bees:

- American and European foulbrood (present in the EU)
- Small hive beetle (*Aethina tumida*) and *Tropilaelaps* mite (exotic to the EU)

The EU also provides financial support to Member States to combat the important bee parasite *Varroa*. Certification and movement controls do not apply to this parasite, because it is present and well established in the EU (as in Georgia), so restricting bee movements would not limit the spread of this disease agent but would be a considerable burden on beekeepers.

5.4.3 Public health situation and approved establishments

When considering a request to export meat, milk or their products, an FVO team will visit to assess a relevant sample of dairies, slaughterhouses and processing plants. This is partly to assess the plants themselves and partly to check whether the country's CCA is doing its job of controlling its own establishments.

For many products, the EU sets and publishes lists of approved establishments that may export to the EU. In order to add new establishments to the list, the CCA must submit a request to the FVO, which may decide to send another inspection mission before making a decision.

Establishments involved in processing and packing honey do not require approval by the EU, so this step does not apply.

37. Directive 92/65/EEC laying down animal health requirements governing trade in and imports into the Community of animals, se-men, ova and embryos not subject to animal health requirements laid down in specific Community rules referred to in Annex A (I) to Directive 90/425/EEC (OJ L 268, 14.9.1992, p. 52).

5.4.4 Residue monitoring

Most animal products can potentially contain residues and other substances hazardous to human health. These include resides of both permitted and prohibited veterinary drugs, pesticide residues, and environmental contaminants such as heavy metals. Any country wishing to export animal products to the EU must implement a residue monitoring plan, drawn up in accordance with Council Directive 96/23/EC[38] and approved by the EU Commission. In order to get its plan approved, the CCA must make sure that the plan contains a sufficient number of samples, taken in the right way and submitted for the appropriate analyses, and that it has the laboratory capacity to carry out each of the tests with sufficient sensitivity to detect the often extremely low residue levels specified in EU legislation; sending samples to an approved laboratory in another country can be an acceptable and cost-effective way of dealing with some of the more demanding analyses.

Residue monitoring does apply to honey, where the EU is most concerned about three potential problems:

- Residues from veterinary medicines used to treat the bees;
- Pesticide residues from the flowers where the bees collected nectar;
- Heavy metal contamination, such as lead from bees foraging near busy roads.

Given the particular relevance of residue testing for honey exports from Georgia, some key elements of this Directive are summarised below:

Substances to be tested for

Annex 1 lists substances and residues to be tested for, under three groups, and Annex 2 lists which of these is to be tested for each of products. For honey, tests are required on five groups of substances:

- **GROUP A** - Substances having anabolic effect and unauthorised substance *None applicable to honey*
- **GROUP B** - Veterinary drugs and contaminants - *The following listed for honey*:
  - (1) ***Antibacterial substances, including sulphonamides, quinolines***
  - (2) Other veterinary drugs
    - …
    - (c) ***Carbamates and pyrethroids***
    - …
  - (3) Other substances and environmental contaminants
    - (a) ***Organochlorine compounds including PcBs***
    - (b) ***Organophosphorus compounds***
    - (c) ***Chemical elements***
    - …

38. COUNCIL DIRECTIVE 96/23/EC of 29 April 1996 on measures to monitor certain substances and residues thereof in live animals and animal products and repealing Directives 85/358/EEC and 86/469/EEC and Decisions 89/187/EEC and 91/664/EEC

Sampling plan

The annual sampling requirement for bee honey is set at 10 samples per 300 tonnes of annual production for human consumption for the first 3,000 tonnes, plus 1 sample for every 300 tonnes thereafter. Georgia's annual honey production is currently around 3,000 tonnes, so 100 samples would have to be taken each year and tested for each of these five groups of substances.

Maximum permitted limits

EU legislation lays down "Maximum Residue Limits" for each approved kind of veterinary medicine and pesticide, as well as for various environmental contaminants. When a substance is completely banned in the EU (such as steroid growth promoters), then the MRL is set at zero and any detectable residue represents a breach.

The EU sets MRLs for a few pharmacologically active substances in honey, including *tau-fluvalinate* and *amitraz* used to treat bee mites. Antimicrobial drugs are not authorised for the treatment of honey bees in the EU, and there is no MRL set for these substances in honey. These drugs are authorised in many non-EU countries, and if they are in use in Georgia, then they would be liable to be detected by the residue-monitoring plan, potentially leading to the suspension of exports to the EU.

Implications for control of veterinary medicines and pesticides

A residue-monitoring plan is simply a mechanism to check whether residue problems exist, but will not in itself prevent or cure such problems. In order to ensure that Georgian honey passes the test, the government will need to carry out a number of actions including:

- Reviewing its list of veterinary medicines approved for use in bees, and harmonising it with that of the EU;
- Improving its controls of the import and sale of pesticides, to ensure that non-approved products do not reach the market;
- Advise beekeepers on the safe use of veterinary medicines, and on the siting of hives to avoid problems from pesticides and chemical contaminants;
- Carry out similar work on the approval, import, sale and use of pesticides, to reduce the risk of pesticide residues in honey and to ensure that pesticides prohibited in the EU are not used in Georgia.

Publication of EU approval

The FVO considers applications made by third countries wishing to export animal products to the EU, and submits its recommendations to the EU Commission. Formal "Commission Decisions" (e.g. Commission Decision 2011/163 of 16 March 2011) are taken in accordance with Council Directive 96/23/EC and include an annex table showing country-by-country which groups of products are covered by an approved residue plan.

At present Georgia is not included in that annex and does not have an approved residue plan for any animal product. This means that no animal products may be exported to the EU, irrespective of Georgia's animal and health status or the effectiveness of its Central Competent Authority.

5.4.5 Marketing standards

EU marketing standards for animal products are covered by several pieces of product-specific legislation, with honey covered by Council Directive 2001/110.[39] This covers two main issues:

- ***Purity***, including minimum contents of fructose and glucose and maximum contents of sucrose and water, to ensure that it is pure honey and not adulterated with sugar and water;
- ***Labelling***, defining what may be described as "honey", allowing the use of additional descriptions for the types of flowers on which the bees fed &/or the region of origin, and requiring blended honey from multiple countries to be declared as such.

A country wishing to export honey to the EU must have the capacity to enforce these standards as well as meeting the veterinary and food safety standards discussed above.

5.5 Conclusions and recommendations

This section presents conclusions and recommendations in two main areas: a selection of actions to increase returns and decrease costs, and a specific recommendation to obtain access to the EU market.

5.5.1 Scope for improvement

Beekeepers may increase their profits through a combination of the following:

- Increasing honey yield per hive
- Increasing the number of hives
- Increasing the selling price of honey
- Decreasing unit costs

Increasing honey yield per hive

Section 5.2 aboveon production suggests that there may be scope to roughly double honey production per hive, from the current average of around 16 kg to 30-35 kg, with the best producers managing 50 kg or more. The main actions needed to achieve this, in decreasing order of priority, are:

- ***Siting the hives*** where they have good access to a food source throughout the season. For most beekeepers this will require moving the hives to two or three different location as different crops come into flower adding significant cost as well as increasing yield.
- ***Exercising good health control***, using integrated pest management and prevention as well as cure.

39. Council Directive 2001/110/EC of 20 December 2001 relating to honey

- ***Feeding the bees*** appropriately through the winter and at the start of the season, to maximise early-season honey production and increase the share of total honey production that can be harvested and sold.

Increasing the number of hives

Honey production is almost unique within agriculture, in that beekeepers do not even need to own land and so are not constrained by the issues of holding size and land fragmentation that most forms of crop and livestock production. Hives are normally located on public land, or occasionally on private land with the permission of the owner, and the beekeeping space has not yet become crowded; the expert from the Elkana association estimated that the number of beehives in Ajara could be at least doubled without producing serious completion for good locations.

The main constraint on expansion will be access to capital to buy new hives and combs, and the limitations of family labour availability though new technologies may help to increase the number of hives that one family can manage.

Increasing the selling price of honey

Section 5.3 on marketing suggests that farmers are already obtaining a good price for honey sold for export and a relatively high share of the retail price for domestic sales at least as far as chestnut honey is concerned.

For chestnut honey the priority must be to retain access to the Turkish market by meeting EU export requirements (which will simultaneously open up new EU markets for all types of honey); this important issue is discussed in section 5.5.2 below.

Marketing of other types of honey (accounting for perhaps two-thirds of total production) is rather more challenging, and detailed analysis is hampered by the lack of firm data on the quantities of different kinds of honey produced and sold. A survey by ENPARD Ajara suggested that significant quantities of (presumably non-chestnut) honey go un-marketed, but it was not possible to check this against other sources, and the relatively strong prices for all kinds of honey do not suggest a very high surplus of supply over demand. Whatever the true supply balance, one action that can be recommended is the continued gradual development of marketing organisations to supply well-presented packaged honey to the ever-growing supermarket sector.

It should be noted that an increase in total honey production through higher yield per hive &/or a greater number of hives would bring new marketing challenges. Once exports to Turkey are taken out of the equation, the domestic market is roughly in balance and it is unrealistic to assume a large increase in *per capita* consumption. An increase in total honey production will have to be balanced by increased exports of non-chestnut honey, either going to Turkey at a lower price than current chestnut-honey exports, or to new markets probably in the EU. Thus obtaining EU export approval is almost an essential pre-requisite for further expansion of this sector.

Decreasing unit costs

Some of the measures proposed above, such as moving hives throughout the season and giving improved health care, will undeniably require more work and increase production costs per hive. If the Ministry of Agriculture has to prohibit certain bee medicines currently in use but not permitted by the EU, this too could increase costs. The goal for the producer will be to increase honey yield faster than costs. Actions to reduce unit costs could include:

- Better and cheaper hive designs;
- Better and cheaper comb bases, such as those now being produced by the Khelvachauri Beekeepers' Association;
- Labour-saving technology, such as air blowers and radial separators;

- Lower transport costs, perhaps through beekeepers getting together to design and build transport trailers appropriate to their local conditions, or through an entrepreneurial supplier addressing the same challenge;

Lower costs of veterinary medicines, perhaps through group purchasing and perhaps through reducing transaction costs and increasing competition between importers and distributors.

5.5.2 Obtaining EU approval for honey exports

Currently Georgia does not have a residue-monitoring programme for honey and does not have approval to export honey (or any other animal product) to the EU. It is strongly recommended that the Ministry of Agriculture should, as a matter of priority, establish a residue-monitoring programme and apply for approval to export honey to the EU. This is recommended for three main reasons:

- Turkey, as part of its own accession process, is harmonising its import requirements with those of the EU, and will no longer accept imports of honey from any country that is not authorised to send this product to the EU. Georgia does not meet these requirements and so exports of honey from Georgia to Turkey are currently carried out informally; there is a significant risk that Turkey will one day clamp down on this trade, causing Georgian beekeepers to lose access to their biggest export market.
- Obtaining approval would allow Georgia to start exporting honey to the EU, entering higher-value markets and beginning to build recognition of the country as a supplier of high-quality food and agricultural products.

Sooner or later Georgia will want to export other animal products to the EU. The process of obtaining EU export approval for honey would be a most valuable pilot exercise, illustrating many of the steps required whilst being considerably less demanding than getting approval for meat or dairy products. The steps involved designing and implementing a residue-monitoring plan; upgrading and accrediting laboratories; improving the controls on veterinary medicines and pesticides; and advising farmers on relevant aspects of Good Agricultural Practice would be directly applicable to many other areas and would provide a solid foundation for a much wider programme of EU harmonisation and export approval.

6 Trout

Farmed trout production has many similarities with intensive pig or poultry production, in that a small area is used to convert purchased feed into meat. What is special about fish farming is its requirement for large volumes of high-quality water, which ties it to certain very specific locations. Within Georgia, many of these locations are in Ajara, and specifically in Keda raion, where producers have found themselves increasingly competing with trout imports from Turkey.

6.1 Key statistics

Fisheries and aquaculture tend not to have the same extensive range of statistics as agriculture, but this section seeks to bring together those data that are available on Georgia's production and trade in trout.

Production

The GEOSTAT database does not cover fish, so there are no official statistics available for overall production in Georgia.

Similarly, the main FAOSTAT database does not cover fish, but FAO's "Fisheries and Aquaculture Department" has the following data on aquaculture production in Georgia over the 10-year period 2002-11:

Species	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Av.
Common carp *Cyprinus carpio*	23 t	18 t	26 t	26 t	30 t	15 t	180 t	180 t	180 t	200 t	88 t
Siver carp *Hypophthalmichthys molitrix*	25 t	30 t	28 t	28 t	30 t	15 t	80 t	80 t	80 t	100 t	50 t
Catfish *Silurus glanis*	...	...	...	...	...	...	14 t	15 t	15 t	20 t	6 t
Sturgeon *Acipenseridae*	...	...	...	...	...	...	12 t	15 t	15 t	30 t	7 t
Bony fish (various) *Osteichthyes*	1 t	1 t	3 t	3 t	0 t	0 t	120 t	120 t	120 t	200 t	57 t
Trout *Oncorhynchus mykiss*	3 t	7 t	15 t	15 t	15 t	150 t	60 t	60 t	60 t	100 t	49 t
Total	**52 t**	**56 t**	**72 t**	**72 t**	**75 t**	**180 t**	**466 t**	**470 t**	**470 t**	**650 t**	**256 t**

Source: FAO *Fisheries and Aquaculture Yearbook*, 2013

- Trout production has risen markedly over this period, from an average of 10 tonnes per year in 2002-5, to 75 tonnes per year in 2008-2011.
- For Georgia as a whole, trout is not the most important farmed fish: the two species of carp account for 2-3 times as much output as trout.
- The category of *Osteichthyes* or "bony fish" includes trout so much of the production shown in that line may actually be trout (which would give a total of up to 300 tonnes in 2011).

The Ajara Ministry of Agriculture does have data on fish farms for two recent years:

	Trout farms				Fish production			
	Total		Operating		Total		Trout	
Region	2012	2013	2012	2013	2012	2013	2012	2013
Kobuleti	9	9	6	6	38 t	38 t	38 t	38 t
Khelvachauri	16	22	10	18	80 t	90 t	80 t	90 t
Keda	56	56	32	32	200 t	220 t	198 t	200 t
Shuakhevi	6	3	2	3	5 t	6 t	5 t	6 t
Khulo	2	0	1	0	2 t	0 t	2 t	0 t
Batumi	3	3	3	3	6 t	6 t	6 t	6 t
Ajara	**92**	**93**	**54**	**62**	**331 t**	**360 t**	**329 t**	**340 t**

Source: Ajara Ministry of Agriculture

- The data suggest something of a resurgence in fish farming in the region: whilst only one new farm opened in 2013, seven farms that had earlier ceased operating came back into production.
- Trout accounts for almost 95 % of total farmed-fish production, and rose by around 10 tonnes to reach 340 tonnes in 2013; this is greater than the country total reported by FAO, indicating some difficulties with the statistics.
- Keda region produces almost 60 % of Ajara's total output, with 200 tonnes in 2013.

A "Review of fisheries and aquaculture development potentials in Georgia" published by FAO in 2010[40] quotes a 2008 study for the number and of fish farms in the regions of Georgia *excluding Ajara*. This reported 41 fish farms, with a total of 2,450 ha of ponds and 23,500 m^3 of tanks. Comparing this with the number of fish farms now reported in Ajara suggests that Ajara accounts for a significant share of national capacity and production, as do the data above for production in Ajara and Georgia, respectively.

The interviewed ichyologist believed that Ajara is now producing 500-700 tonnes of trout per year, out of a Georgian total of around 1,500 tonnes, and that it has the potential to produce 1,000 tonnes per year if all the farms come back into operation. All of these figures are significantly higher than the statistics quoted above, but confirm the general impression that Ajara produces something like half of the country's total trout output.

Trade

The FAOSTAT database does not include trade data on fish, so the WTO "ComTrade" database[41] was used instead; the following table shows all recorded international trades in trout involving Georgia during the 5-year period 2009-2013:

40. FAO Fisheries and Aquaculture Circular No. 1055/1

41. http://comtrade.un.org

	Year					5-year average			
	2009	2010	2011	2012	2013	Quantity	Value		Price
	IMPORT (quantity)					Quantity	Value		Price
Fresh									
Turkey				6.2 t	61.7 t	13.6 t	$66,925	$4.90/kg	8.90 GEL/kg
Armenia	0.4 t					0.1 t	$246	$3.10/kg	5.50 GEL/kg
Netherlands			0.0 t	0.2 t	0.0 t	0.0 t	$778	$18.20/kg	32.70 GEL/kg
France					0.1 t	0.0 t	$533	$19.90/kg	35.80 GEL/kg
Total fresh	***0.4 t***		***0.0 t***	***6.4 t***	***61.8 t***	***13.7 t***	***$68,482***	***$5.00/kg***	***9.00 GEL/kg***
Frozen									
Chile	185.6 t	87.2 t				54.6 t	$191,627	$3.50/kg	6.30 GEL/kg
Denmark	28.1 t	7.8 t				7.2 t	$30,580	$4.30/kg	7.70 GEL/kg
Argentina	28.0 t					5.6 t	$7,280	$1.30/kg	2.30 GEL/kg
New Zealand		1.1 t				0.2 t	$598	$2.80/kg	5.00 GEL/kg
Turkey		0.1 t				0.0 t	$128	$6.90/kg	12.50 GEL/kg
Total frozen	***241.8 t***	***96.1 t***				***67.6 t***	***$230,213***	***$3.40/kg***	***6.10 GEL/kg***
Live									
Armenia	1.4 t		0.4 t	0.9 t	1.1 t	0.8 t	$6,487	$8.50/kg	15.30 GEL/kg
Turkey		0.7 t				0.1 t	$2,142	$15.50/kg	27.90 GEL/kg
Total live	***1.4 t***	***0.7 t***	***0.4 t***	***0.9 t***	***1.1 t***	***0.9 t***	***$8,628***	***$9.60/kg***	***17.20 GEL/kg***
TOTAL IMPORT	**243.5 t**	**96.8 t**	**0.4 t**	**7.3 t**	**63.0 t**	**82.2 t**	**$307,323**	**$3.70/kg**	**6.70 GEL/kg**
	EXPORT (quantity)					Quantity	Value		Price
Frozen									
Azerbaijan	10.0 t	2.8 t				2.6 t	$8,219	$3.20/kg	5.80 GEL/kg
Armenia	2.0 t					0.4 t	$1,040	$2.60/kg	4.70 GEL/kg
Total frozen	***12.0 t***	***2.8 t***				***3.0 t***	***$9,259***	***$3.10/kg***	***5.60 GEL/kg***
Live									
Azerbaijan		11.2 t	7.1 t			3.7 t	$9,139	$2.50/kg	4.50 GEL/kg
Total live		***11.2 t***	***7.1 t***			***3.7 t***	***$9,139***	***$2.50/kg***	***4.50 GEL/kg***
TOTAL EXPORT	**12.0 t**	**14.0 t**	**7.1 t**			**6.6 t**	**$18,399**	**$2.80/kg**	**5.00 GEL/kg**
	RE-EXPORT (quantity)					Quantity	Value		Price
Frozen									
Azerbaijan	8.0 t	0.0 t				1.6 t	$3,632	$2.30/kg	4.10 GEL/kg
Armenia	2.0 t					0.4 t	$1,040	$2.60/kg	4.70 GEL/kg
Total frozen	***10.0 t***	***0.0 t***				***2.0 t***	***$4,672***	***$2.30/kg***	***4.20 GEL/kg***
TOTAL RE-EXPORT	**10.0 t**	**0.0 t**				**2.0 t**	**$4,672**	**$2.30/kg**	**4.20 GEL/kg**

Source: ComTrade, 2009-2013

This is a complex table, which requires some explanation:

- The number of trades in trout is relatively limited, and many of them are very small ("0.0 t" indicates a recorded trade of less than 50 kg);
- Imports average 82 tonnes per year, considerably higher than average exports of 6.6 tonnes.
- In 2009, 10 tonnes of imported trout was re-exported to Armenia and Azerbaijan, and there was also an insignificant re-export in 2010;
- The pattern of imports has changed markedly over this period, showing three phases:
    - Up to 2010 most of the imports were of frozen trout, predominantly from South America but also some from Denmark;
    - In 2011 there were almost no imports;
    - From 2012 a new source of imports has developed: fresh trout from Turkey. Only 6 tonnes were imported in 2012 but in 2013 this increased tenfold to reach 62 tonnes. The import of frozen trout has ceased entirely since these fresh imports began;

- The average price of imported live fish is almost three times that of fresh or frozen, suggesting that these may include young fry or breeding fish.

- Up until 2011 Georgia regularly exported and re-exported some trout, both fresh and live, to Armenia and Azerbaijan. This trade also ended when fresh trout imports from Turkey began, suggesting that Turkey is supplying those regional markets as well.
- Looking at a longer time series, going back to 1996, shows that even before the events of 2006, exports to Russia were sporadic and extremely small. There were also a couple of exports to Ukraine but no established pattern of supplying that country. No exports at all took place to the EU (since Georgia does not yet have veterinary and sanitary approval to export any animal products to the EU), other than one export of 200 kg in 2005 recorded as going to Cyprus possibly the northern part.

The production of trout in Ajara is therefore mainly an issue of substituting for Turkish imports on the domestic market.

6.2 Trout production and marketing

It was only possible to visit one trout farm during this mission, located in Keda raion, and so the limited information in this section is compiled from that visit, the above-mentioned FAO report, a meeting with a local ichthyologist with considerable experience of the sector, and verbal information provided by the ENPARD Ajara team based on their recent survey of fish farms in the region. It is very much an initial assessment to identify important areas for further investigation.

Location and water supply

In Keda raion, most fish farms are located on tributaries of the Acharistskali river.

One of the key issues in fish farming is water quality. Some farms draw water from immediately upstream of the facility and discharge the used water a few metres downstream, whilst others are fed by pipes from a considerable distance upstream to reduce the risk of disease spread from other fish farms that have used the water before them.

The required throughput of a small farm is in the order of 1-5 m^3/minute so a reasonable river flow is needed to support production, and fish farms are sited where this flow can be guaranteed for most of the year, but may still struggle during a dry summer.

Water temperature is also important. The optimum for trout is around 16°C; at higher or lower temperatures the fish will eat less and grow more slowly, whilst the reduction in oxygen-carrying capacity at high temperatures can increase the risk of disease. Keda has become an important location for fish farming because its altitude provides water temperature around this optimum for much of the year, but they can still drop as low as 6°C in winter and rise to 22-25°C in hot summers.

Fish farm infrastructure

The visited farm, which is understood to be fairly typical of the region, appeared to have been built some years before, with basic concrete walls and cast-iron pipes. Investment seemed to be quite low, and the only building on the site was a small feed-store with a set of scales. There did not seem to be any obvious way to drain a pen entirely for cleaning and disinfection when necessary.

Feeding

The farm used imported feed, purchased in Batumi at 80 GEL per 25 kg sack ($ 1,780/t), using a variety of pellet sizes from 2-6 mm according to the age of the fish.

As with fish farms everywhere, feed makes up the greatest share of total costs and so feed conversion ratio is the most important technical coefficient. This farm used around 6 tonnes of feed to rear 5 tonnes of fish, giving a reasonably respectable feed conversion ratio of 1.2:1.

Most of the fish feed in Georgia is of Danish and Dutch brands, imported via Italy and Greece, but Turkish feed is now increasingly appearing on the market. The usual price range is 75-85 GEL per 25 sack. Farmers will often complain about the quality of the feed, but there is no regular programme of testing imported feed to check the content of protein, oil, etc. and no programme of feeding trials to see how well different feeds perform in Ajaran conditions.

Breeding & mortality

Most farms buy their fry from specialist breeders, but the visited farm had its own breeding stock and produced fry for their own use and for sale. From around 1 million fry hatched each year, they sell 200-300,000 at a weight of 2g and a price of 0.10 GEL, generating an annual income of around 25,000 GEL.

The breeds and techniques used in Ajara follow a natural cycle with once-per-year breeding and highly seasonal production, rather than the year-round breeding and production achieved in some countries such as the US. This is one indication of the rather outdated breeds used in Ajara.

Fish mortality is the second main technical factor, since death of growing fish implies loss of the money spent in buying or rearing them, waste of the feed used to grow them up to that point, and loss of potential production. Like most farms in the region, this one reported that mortality was high and extremely variable: on average perhaps 30-40 % of fry survived to maturity, but it was not unusual to suffer 100 % loss and have to restock a pen entirely.

As well as the direct losses just mentioned, this makes it very hard for farms to plan their production, and encourages them to buy and rear more fish than they would normally need, as an insurance against possible high losses. Given that over-stocking is a major cause of poor water quality and disease outbreaks, this can become a vicious circle.

One current concern is a viral necrosis believed to have been imported in stock coming from Turkey, Armenia or other parts of Georgia. Some of the treatments currently in use against parasites and diseases are no longer permitted in the EU, which would become an issue if Georgia ever sought approval for fish exports to EU Member States.

As well as direct transfer of disease organisms in discharge water, disease can also spread from farm to farm in free-living river fish and in those that escape from the farms.

Grading

In addition to feeding form once to several times per day, the other regular job on a fish farm is “grading”: sorting the fish in a pen by size and transferring the larger fish to a different pen so that they will not attack the smaller fish, and so that all of the fish in a pen are of similar size and able to compete equally for the feed. On this farm, grading is done manually with nets and sieves of different sizes. The two issues here are the time and labour involved, and the risk of stress and damage to the fish; various kinds of equipment are available that help to do this job quickly and limit the risk to the fish.

Records, forecasting, health care & disease prevention

In this farm there was no regular monitoring of any water-quality parameters other than temperature, plus occasional checks on dissolved oxygen performed by a Turkish feed supplier. The assumption seemed to be to keep the water flowing and well oxygenated, and all would be well.

There was also no systematic programme of health care or disease prevention, though an expert from a nearby large fish farm would provide treatment advice when disease problems arose.

There seemed to be no written records, for example of feed used or mortality, no regular sampling to assess stocking rates and fish sizes, and no obvious system for predicting when and how many fish would be available for marketing in the coming months.

The lack of planning and control of production, exacerbated by highly uncertain mortality rates, often also results in large numbers of fish becoming ready for market at the same time, in excess of demand. Farmers then have to keep feeding these fish, albeit at a reduced rate, until they can all be sold.

Output

This farm produces marketable fish of 200 g in 9-12 months. The size range produced in Ajara varies from 180-500 g, with the best farms producing a 180 g fish in about 5 months.

The farm claimed to produce around 5 tonnes of fish annually from 20 m^2 (12 m^3) of pens, which is considerably higher than the typical output of 30-50 kg per m^3; it is not clear whether the output may have been exaggerated or the volume under-estimated.

Marketing

This particular farm was located right by the main road, shortly before the tributary entered the main river. Whilst bringing problems of water quality and disease risk from other fish farms upstream, it allows them to market their fish to buyers who come to them. This includes final consumers, typically buying 2-5 kg of fish at a time, and middlemen who buy around 500 kg in one load, paying 6-8 GEL/kg and then selling in Batumi with a mark-up of about 1 GEL/kg. The price tends to drop to around 6 GEL/kg in summer when output is at its greatest, and rise to around 8 GEL/kg in other seasons.

The main markets for finished Ajaran trout are the restaurants of Tbilisi, and the tourist demand from Batumi and the coast during the summer season. Many farmers supply direct to restaurants and hotels by regular agreement, whilst others like this one sell to middlemen. Overall, it is believed that around half of production is consumed within Ajara and half shipped to the rest of Georgia.

Some of the fry and part-grown fish sold by Ajaran fish farms are shipped to producers in Gori, allowing them to re-stock and produce a second crop after they have marketed their main production of the year.

Margins

The following table gives a partial gross margin budget for the one farm visited:

Item	Quantity		Price		Value		
Sale of finished fish	5,000	kg	7	GEL/kg	35,000 GEL		
Sale of fry	250,000	fry	0.1	GEL/fish	25,000 GEL		
Total output					**60,000 GEL**	**$ 33.300**	100%
Feed	6,000	kg	3.2	GEL/kg	19,200 GEL		32%
Veterinary costs	Unknown						
Total cost					**19,200 GEL**	**$ 10.700**	32%
GROSS MARGIN					**40,800 GEL**	**$ 22.700**	68%

- Veterinary costs were not reported, but would normally be included in the gross margin.
- Fixed costs to be covered out of the gross margin included the salaries of two full-time staff, electricity, and transport of feed etc. from Batumi to Keda.
- One of the staff thought that feed accounted for around 60 % of total costs, implying a net margin of around 28,000 GEL ($ 16,000). Research by UNDP Ajara estimated total costs of production on Keda trout farms, including labour, to be 4-4.50 GEL/kg, with an average selling price of 10 GEL/kg in 2012 and 8 GEL/kg in 2013 which would tie up very closely with this estimate of net margin.

It must be stressed that this is a sample of one, and that the data are very approximate, but it appears to be a relatively profitable business. It is also by far the largest of the enterprises covered in this study, based on the following estimated outputs from a typical producer:

- Mandarins 1,600 GEL
- Hazelnuts 2,000 GEL
- Cattle-potatoes-maize 16,000 GEL
- Honey 19,000 GEL
- Trout 60,000 GEL

6.3 Conclusions and recommendations

What appears to be happening in the trout sector is that after the crises of transition and war, and supported by increasing consumer wealth and tourist demand, fish farmers have re-discovered how profitable trout production can be. They have started to re-open farms that had closed and to expand production on those already in production. Around 2012, Turkish producers realised how lucrative the Georgian market could be for them too, and started to supply fresh trout in rapidly-increasing quantities. For Ajaran producers, this means that the time of easy profits is over, and if they are to compete with imports, they will need to match the technical efficiency of Turkish producers and to obtain feed at competitive prices.

The range of issues to be addressed includes:

Production

- Siting of fish farms and water intakes, including controls on the opening of new farms to avoid creating new disease risk for established operators;
- Construction of fish farms for easier operation, better hygiene and less losses of fish into the river;
- Monitoring and controlling water quality;
- Checking of feed quality and carrying out practical feeding trials;
- Improving the quality and health of fry, including production of certified eggs at the top of the rivers where there is less risk of disease;
- Tackling disease through hygiene, prevention, diagnosis and cure;
- Reducing mortality, including through disease control;
- Better monitoring of fish stocks, sizes and mortality, and adjusting feed to requirements;

- Forecasting of market demand and planning production to suit;

Fish farming is a highly specialist area, and it is recommended that an appropriate expert be brought in to study the technical issues in greater detail and propose a programme of practical advice and demonstration, possibly including the construction of one or more demonstration farms.

There might also be a case for some targeted investment support to help upgrade facilities, particularly water intakes and discharge points to avoid the spread of disease between farms.

Markets

- Obtaining feed at competitive prices this requires analysis of the input market to see which barriers exist (e.g. lack of competition, lack of price transparency, inappropriate regulation and import controls, transport costs) and how they can be reduced;
- Developing more effective chains from producer to consumer so that production responds to demand and margins are distributed appropriately along the chain.

Solutions are likely to include action at several different points, some involving government, some involving supporting institutions (perhaps with a role for AgroService centre in providing market information), and some involving actions by farmers themselves, possibly including cooperative action. Given the major overlap between production and marketing issues, work in this area would ideally be linked to assistance on production.

Finally it should be remembered that in fish farming, as in intensive pig and poultry production, the farmer is essentially selling packaged feed; if he does not manage to buy feed at a competitive price and convert it efficiently into meat, then it will be almost impossible to make a profit, no matter how good the final marketing may be.

7 Summary and conclusions on competitiveness and export promotion

This study has looked at four kinds of farming systems in Ajara:

- Perennial crops in the coastal strip, focussing on **mandarins** and **hazelnuts**. Production is strongly **export oriented**, with citrus accounting for 94 % of Ajara's agricultural exports in 2009 and nuts for a further 2 %. Ajara is Georgia's dominant region for citrus production, producing 80 % of the total, so mandarins are very much an Ajaran issue. Hazelnuts, on the other hand, are found throughout Georgia with only around 3 % of production in Ajara, so issues of hazelnut development might best be addressed for the country as a whole. Given the over-riding importance of mandarins to Ajara's agricultural exports, it was looked at in more detail than any other product.
- Integrated farming systems based in the mountain valleys and harvesting natural pastures from the high mountains. These systems produce **cattle**, **potatoes** and a limited amount of **maize**. The study focussed on Khulo raion, where this is the dominant farming system; it is recognised that the lower mountain valleys in Keda and Shuakhevi regions share some of the characteristics of the coastal strip and are able to produce a wider range of crops, including a variety of fruits and vegetables. The main output from the cattle enterprise is dairy products, sold mainly in Batumi in competition with imports from abroad and from other parts of Georgia; potatoes are also sold in Batumi in competition with Turkish imports, so both of these are examples of **import substitution**. The maize is consumed entirely on farm, the grain being eaten by people and the stalks by cattle, so this is an example of household **expenditure substitution** and so indirectly of **import substitution**; given the rather small role played by maize in this farming system, this crop was not looked at in detail. Within Georgia, Ajara produces 6 % of all milk, 9 % of potatoes and 6 % of maize small shares of national production but important to the local economy where there is little alternative employment.
- **Honey** production is found throughout Ajara, with larger producers moving their hives to different regions throughout the year to take advantage of successive flowering periods. The bees mainly forage on forests and natural grasslands, so this system is largely independent from the rest of agriculture. Production is quite strongly **export-oriented**, with the large majority of exports going informally to Turkey. Ajara contributes 11 % of Georgia's total honey production.
- **Trout** production is carried out where appropriate water resources exist, primarily at mid-altitude in Keda raion. Production is based on imported feed and this enterprise has many of the characteristics of intensive pig or poultry production, though using water more than land. In most years Georgia is largely self-sufficient in trout, with few imports or exports, so when Ajaran producers send their trout to Tbilisi this functions like an **"export" to the rest of Georgia**. More recently, high prices have started to attract fresh trout imports from Turkey, and so Ajaran farmers currently face an issue of **import substitution**. Ajara produces a significant proportion of Georgia's trout, perhaps as much as half of total output.

These six main enterprises mandarins, hazelnuts, cattle, potatoes, honey and trout thus serve to illustrate almost all the issues of competitiveness, import substitution and export promotion faced by Ajara's agricultural sector. The key questions to be answered by this report are "*How competitive are Ajaran producers on their domestic or foreign markets?*" and "*How can they become more competitive?*"

This summary addresses the second question first, to see how and how much competitiveness might be improved, and then considers where Ajaran producers would stand relative to their competitors once they had made the most important improvements.

7.1 How can Ajaran agriculture become more competitive?

This section looks at the changes in production, processing and marketing that could realistically be implemented in each sector to increase its competitiveness.

Mandarins

The top priority here is to improve production on the farm. A two-year USAID initiative found that relatively simple improvements in pruning, fertilising, crop protection and orchard-floor management could increase yields by 300 % and raise product quality. Replacing dead and diseased trees and introducing new varieties would bring further improvements.

The next priority is post-harvest handling. Recent investments in sorting-packing-grading (SPG) equipment at newly-established "Consolidation Centres" have been rather inconclusive, sometimes appearing to add more cost than value. However, increasing demand for quality particularly on the recently re-opened Russian market will sooner or later make professional sorting and packaging a basic requirement to access export markets.

Marketing currently uses a combination of informal farmer cooperation, new company-owned Consolidation Centres, and one juicing plant structured as a private company. All business models might be considered farmers' associations, cooperatives, limited companies and private operators with no obvious advantage to any particular structure.

It is hard to quantify the potential gains from higher quality, but an overall improvement from farm to market might raise sale prices by perhaps 50-100 %. Whilst a very useful improvement, this is considerably less than the gains offered by higher yields, and unpredictable market fluctuations such as uncertain access to the Russian market are likely to have a greater impact on price.

One option for the industry is to extend the season through use of early-harvest varieties and through extended storage of the later harvest. This would allow some farmers to sell at higher prices as well as spreading the cost of SPG and processing facilities over a longer operational season. However, this should probably be seen as a means to diversify the industry and spread cost and risk, rather than as a panacea for all producers.

Hazelnuts

Here again the starting point is to improve production. Whilst the potential yield increase has not been quantified as clearly as for mandarins, increases of 50-100 % appear possible through improvements in plant spacing, pruning, fertilising, crop protection and plantation-floor management (a very similar "package" to that required for mandarins). In the longer term, new varieties might bring additional benefits.

Current systems of drying, storage, marketing and processing are crude but effective, and operate at very low cost. Simple extension messages could help to alleviate the greatest risks, such as aflatoxin development during drying and storage, and it is hard to see how additional investments or group activities could bring an economic return in current conditions.

Georgia's hazelnut exports fetch on average 20 % less per kilogram than supplies from EU countries. Capturing this last 20 % would probably require quality improvements throughout the chain, in production, storage, processing and marketing.

Cattle

Production issues are again paramount for the dairy sector, particularly in relation to forage and feeding. No local trial information is yet available, but it seems quite plausible that milk output per hectare could be raised as much as 400 % through a combination of fertilising, pasture management, increased use of purchased feed, and better ration formulation according to cow

potential and stage of lactation. In the longer term, breed improvement through artificial insemination will allow higher yields per cow, but it is important to tackle the nutrition constraint before introducing new breeds that might well fail to thrive on the existing poor diets.

A critical issue is to improve the land tenure and management of the mountain pastures that are currently used for common grazing. Farmers will only invest in the inputs and capital works needed to increase forage yields when they have secure property rights which guarantee that they will enjoy the benefits of their labours. The cattle section of this report proposes a new model that could be piloted in Ajara as a possible solution to this issue.

The traditional system of on-farm milk processing and sale through retail markets is probably appropriate to current farming conditions, consumer expectations and the small scale of production. However, if milk production were dramatically increased, then it might become necessary to establish small dairies in the main milk-producing regions. This would allow products to meet EU hygiene standards but would pass a significant share of the overall margin from the farmer to the processor. More than half of annual milk production occurs during the summer months when the cows are on high mountain pastures; daily milk deliveries to dairies are impractical in these conditions so traditional cheese and butter production would have to continue, giving dairies the additional challenge of covering all their fixed costs from just six months of operation per year.

Up to a third of cattle farmers' current incomes comes from the sale of calves, with many of them being exported live for further rearing and fattening (though it was not possible to analyse this value chain under the current study). As milk yields increase, the relative importance of calf sales will decline, but there will still be scope to increase margins from this part of the enterprise.

Potatoes

One difficulty here is establishing exactly what yields Ajaran farmers currently achieve, with estimates ranging from a statistical average of 14 t/ha, through one farmer's own estimate of 27 t/ha, to an extension director's figure of 40 t/ha. A local agronomist reckoned that yields of 30 t/ha (the Turkish statistical average) should be regularly achievable. This would represent an increase of perhaps 50 % on current performance, and would require increased use of certified seed, judicious applications of artificial fertiliser, and better crop protection.

Early potatoes are marketed immediately after harvest, whilst maincrop potatoes are stored in barns or traditional earth-and-straw clamps. No estimate could be made of post-harvest losses, but well-managed barns and clamps are probably a cost-effective solution for the small quantities of potatoes produced by each farmer. The potato areas of Khulo raion are around 3 hours' drive from Batumi wholesale market, and transport costs currently absorb at least a quarter of the total sale price. Better organisation and the user of larger lorries might bring costs down by around a third, and so make a useful contribution of farmers' margins.

The large majority of potatoes are still sold loose, with only one of four Batumi supermarket chains offering even simple pre-packaging. Potentially a group of farmers might find a niche in jointly packaging and transporting potatoes to market, but with such a price-sensitive stable food the additional margin is likely to be small until growing consumer wealth increases demand for such value-added products.

Honey

It is probably possible for producers to raise honey output per hive by around 100 %, if they are able to start moving their hives around during the season to get two or even three reasonable harvests per year. Transportation will add cost, but a number of practical improvements in hive construction and labour-saving equipment can help to reduce costs in other areas. The other main issue for increasing production is improved health control, where the choice of veterinary

medicines used may also have important implications for the ability to export.

There are some good recent examples of cooperative actions to consolidate, package and market honey to the growing supermarket sector, and these well-presenting products are standing up well against import competition. This seems to be an area where cooperative actions are an appropriate response to the situation in Ajara.

Unlike other forms of agriculture, honey producers are not limited by the small size of farms or by land fragmentation, and the main limits to scale are family labour and capital. It is estimated that Ajara could support twice the number of hives it has now, and if this were combined with higher yields per hive, Ajara's total honey output could reach as much as four times its current level.

The top current priority for the honey sector is to obtain EU export approval, both to allow exports to develop to new, high-value European markets and to ensure continued access to Turkey, where harmonisation with EU standards poses an imminent threat to Ajara's main export destination. The honey section of this report discusses in some detail the steps needed to gain EU approval, and recommends this as a useful pilot exercise for other livestock products as well as its immediate importance for the honey sector.

Trout

It was not possible to quantify how much trout production could be increased, but simply bringing mothballed facilities back into production would increase the number of farms by 50 %. However, more urgent than this is to improve technical performance through better disease control and production planning, increasing survival rates and feed conversion ratios and ensuring a regular supply of finished fish closely matched to the demand of hotels and restaurants. Such improvements will increase output per farm and, more importantly, reduce unit costs and help producers to compete with rapidly-increasing Turkish imports.

Trout production is a highly specialist business, and it is strongly recommended to bring in some experts to do a thorough technical review and recommend a programme of demonstration and advice. This might be reinforced by some targeted investment support, particularly in “club good” areas such as re-routing water inlets and outlets to reduce disease spread between farms.

7.2 Can Ajara compete?

This section considers how likely it is that the changes outlined above will actually be carried out, and if they were, whether they would make the sectors strong enough to compete on export markets, against imported products, and against alternative uses for the farmers' time and resources.

Mandarins

Ajaran mandarin producers *are* competitive; they regularly take first place on the Ukranian market and they enjoy geographical advantages in both production and in transport to southern Russia and Ukraine. There is considerable scope to increase yields and some scope to increase unit value, both of which will help to make Ajara more competitive. However, the real limiting factor is the small size of most mandarin orchards: even the best of producers would struggle to generate a gross income of more than $ 5,000 from 0.25 ha of orchard before costs such as saplings, sprays, hired labour, packaging and transport.

Whilst there are so few economic alternatives, the opportunity cost of family labour will remain close to zero and so farmers will continue to produce mandarins on their small plots. However, as the non-farm economy picks up and job opportunities increase, mandarin production will find it

increasingly hard to compete, not with other mandarin producers but with alternative uses for the farm family's time, energy and capital. Given that mandarin production is concentrated along the coastal strip, with reasonably good road access to Batumi and other urban centres, non-agricultural developments will tend to impact these villages some years before their effects stretch further inland.

If Georgia manages to develop a well-functioning land market, then it may be possible for mandarin production to consolidate into the hands of a smaller number of large, professional producers, which would in turn support a more concentrated post-harvest structure and facilitate export marketing.

However, if the land market continues to stagnate, or if current landowners do not believe that developments in the non-farm economy are secure and sustainable, then people will tend to hang onto their mandarin plots even whilst generating the majority of household income from other sources. Such part-time producers will not be highly motivated to invest in their orchards, so even those productivity achievements that are readily achievable may fail to materialise.

One strength of Ajaran mandarin production is that it has achieved a certain “critical mass” of investment and trade, of government and project attention. This means that there are a number of external drivers for change, ranging from the recent USAID project, to sapling production by AgroService Centre, to the Ajara government's provision of premises for new citrus “Consolidation Centres”. This concentration of drivers gives some cause to hope that mandarin growers and traders will be motivated to make improvements, possibly allowing this sector to move ahead more rapidly than the surrounding non-agricultural economy and so continue to compete for the farmers' attention at least for a time.

Hazelnuts

Whilst Georgian hazelnut production is dwarfed by that of neighbouring Turkey, it still occupies fifth place in the world ranking and exports regularly, with the majority of its sales going to demanding EU markets. Thus Georgia as a whole is competitive, and since Ajaran hazelnut yields are at or above the Georgian average, Ajara would appear to be reasonably competitive in this product as well as in mandarins. With one of the world's biggest hazelnut buyers, Ferrero, looking to diversify its supply base away from Turkey, the future for Georgian producers looks reasonably bright.

There seems to be significant scope to increase yields through relatively simple improvements in farming practice, even if the yield gap is not as pronounced as that for mandarins. Hazelnuts also have an important cash-flow benefit for farmers, in that they are easy to store, transport and sell, so a sack of hazelnuts in the house is like money in the bank.

No detailed size breakdown is available for hazelnut plantations, but a visit to two villages in the Kobuleti hazelnut heartland suggests that the average producer has something between 0.25-0.5 ha. Thus the maximum potential income per holding is again in the region of a few thousand dollars per year and so, as with mandarins, the real competition will come from alternative uses for the family's time, energy and capital, again facilitated by ready access to the main coast road. Hazelnuts are seen as a relatively easy crop to produce, store and market, and farmers can simply hire day labourers for the hard work of picking up the nuts. Thus in this case it is even more likely that existing farmers will be reluctant to sell or rent out their plantations, and so hazelnut production may become an increasingly part-time occupation as families come to depend more on the non-agricultural economy. Ajara's hazelnut sector has nothing like the critical mass of its mandarin production, so this sector is likely to progress a lot more slowly than citrus, with a higher share of farms stagnating rather than progressing.

Cattle

Dairy production in the hills and mountains of Ajara can never match the yields per cow or per hectare of intensive lowland farmers, but that is not the point and is no fundamental barrier to competitiveness. The Ajaran cattle system developed as a means of harvesting large areas of low opportunity-cost natural forage and of concentrating the output into cheese and butter that are easy to store, transport and sell. As such it is economically more comparable with extensive sheep grazing in the Scottish highlands or ranching in Australia, than with intensive dairying in the Netherlands or Denmark. The system can be profitable and hence competitive as long as land costs remain low and it gives a reasonable return on purchased inputs and capital, and most importantly an acceptable return on labour.

Trans-humant dairy systems such as those in Ajara or in parts of the Alps developed at a time when there were few alternative economic opportunities, and so both the opportunity cost of labour and families' income expectations were low: they were prepared to spend long hours herding, milking and making cheese in return for a traditional lifestyle and a low but reasonably secure level of income. Once farmers start to expect higher wage rates and overall incomes, then the system needs to change. In most countries, upland farmers have abandoned labour-intensive dairy production (which relocates to large and heavily-mechanised lowland farms). Many have abandoned the villages entirely, whilst those that remain have switched to extensive production of beef and sheep, keeping large numbers of animals on vast areas of grazing in order to generate an acceptable income for the family.

If one had to look ahead for several decades, one might predict a similar future for Ajara's uplands: a decline of dairying, depopulation of the higher villages, and a switch to extensive beef production. However, such a change is likely to happen only slowly because the key driver new economic opportunities in the non-farm economy is largely absent. Whilst a mandarin or hazelnut farmer on Ajara's coastal strip can be in Batumi in less than an hour, and at other coastal towns even sooner, Khulo town is two-and-a-half hours' drive from Batumi. The cattle-keeping villages are a further drive from there, along roads that for much of the year are impassable to anything other than a truck or a 4×4. Daily commuting to Batumi or Kobuleti is not an option, and even supplying goods or services to the towns is strongly hampered by the travel distance and cost. The economic development of Ajara is likely to start in Batumi and spread up the coast to Kobuleti, bringing new wealth and opportunities to the towns and villages along the way. Only then will it begin to stretch inland, first to Keda, then to Shuakhevi and finally to Khulo. People, particularly young people, will move away in search of work, going to the coast, to Tbilisi, to other parts of Georgia and abroad. Of those who get to study in a city, very few will return to the inland villages. Thus the spread of entrepreneurship and investment into Khulo raion is likely to proceed only slowly. Employment opportunities will be limited and wage rates lower, with the public sector being the main levelling factor.

Against such a backdrop, the option of continuing to work the family dairy farm does not look so unattractive, and so the challenge for at least the next generation is how to increase the incomes of those who whether by choice or by lack of choice continue to keep cattle in the uplands of Ajara. Fortunately there is considerable scope for improvement, partly because existing yields are so low and the potential for pasture improvement as yet untapped, partly because artificial insemination offers a relatively quick and low-cost route to genetic improvement, but mainly because cattle farmers are able to buy-in feed and so circumvent the absolute limit to scale that is such a block to small mandarin and hazelnut producers. Whilst most small orchard owners would struggle to reach an annual income of $ 5,000, a 10-cow farm could fairly rapidly reach $ 10,000, with the potential to double this again through gradual genetic improvement and a modest increase in herd size. Looking ahead to the next generation, further increases in family income would require a degree of consolidation into a smaller number of larger farms, which implies that

the movement out of agriculture would have to gather pace.

To return to the question of competitiveness, it seems that upland dairy producers can continue to profitably exploit their unique agro-ecological niche for many years to come, even if the ultimate outcome will be a concentration of milk production into intensive lowland farms.

Potatoes

Of all the products examined so far, potatoes face the biggest problem of competitiveness. The supply of low-cost potatoes from Turkey is unlikely to go away and the scope to increase yields appears to be relatively modest, perhaps a 50 % increase, with much of the extra income being spent on purchased inputs. Already potatoes contribute less than 20 % of overall farm income, and if the cattle and potato enterprises were simultaneously improved, then the relative share from potatoes would drop even further.

On the other hand, the current system of upland potato production is highly resilient: cash expenditure for production is almost nil just some blight sprays, insecticide and fuel for the cultivator and the cost of transport does not arise until the day the produce goes to market and the income comes in. The big cost in the system is labour, starting with a walk-behind cultivator and then planting by hand, weeding by hand, harvesting by hand and moving the filled sacks by hand. All of these tasks are fully or partially mechanised on a modern lowland potato farm, but the small size of upland farms and plots precludes the use of sophisticated machinery, and most farmers do not even have a tractor to use more basic machinery such as planters and spinner-harvesters. As with the other enterprises, the system will be viable so long as the opportunity cost of labour remains close to zero, but experience from other countries suggests that cash-crop production is one of the first things to disappear from the uplands once wage costs begin to rise.

If these farms start to focus on dairying as their main source of income, and so became busier with the cows and forage crops, it is likely that the enthusiasm for producing potatoes will decline. The land structure, with small plots near to each house and barn, does not lend itself to consolidation into large potato fields, so a more likely scenario is that farmers would reduce their potato area to that needed just for family consumption and use the rest of the field for a forage crop or for grazing calves. Probably the easiest solution would be not to bother with a spring crop at all, but to plant maize in May rather than July so as to get a higher yield of grain for food and of stalks for fodder.

It is still worthwhile doing some extension work for potatoes, running demonstration plots and giving advice on seed, fertiliser and sprays, but the returns to effort are likely to be lower than for other enterprises. In terms of competitiveness, potatoes may sooner or later fail to compete with cattle and forage crops for the farmers' limited land, labour and attention.

Honey

Honey is one of Ajara's most competitive agricultural products, with Turkish traders ready to buy as much chestnut honey as producers want to sell, and with output increasing to meet this demand. However, there are too major threats to its current position. The first is the risk that Turkey may stop the import of Georgian honey if it is not authorised for export to the EU, and the second is how to market the growing volume of non-chestnut honey for which there is little Turkish interest.

Obtaining EU export approval would help to combat both these threats, allowing continued sale of chestnut honey to Turkey and opening the way to find new EU markets for other types. Improved packaging and marketing will be important for maintaining and expanding domestic sales, and a pre-requisite for exporting to the EU. If Georgia acts quickly to gain EU access and continues existing group marketing initiatives, then the competitive position of Ajaran honey producers seems relatively secure. However, if it is slow to tackle the challenges of EU standards, then the sector's recent growth could come to an abrupt halt.

Trout

Ajara's trout sector enjoyed a brief period of little competition and good margins, but now that fresh Turkish trout is reaching the market in rapidly-growing quantities, it faces serious competition. With the majority of production costs made up by imported feed, even if farmers assign a very low value to their own labour, they will still struggle to compete at current levels of technical performance. Perhaps more than any of the other products looked at in this study, Ajara's trout sector is one that must change if it is to survive.

7.3 Recommendations

This study has considered a very diverse range of products, from mandarins to trout, but the same kinds of issues arise repeatedly and lead to a small group of recommendations to increase competitiveness and promote exports:

Advisory service

There is considerable scope to increase on-farm productivity for all the sectors covered. In some cases this will require new investment but in every case it will requires a change of actions and attitudes by the farmers concerned. Therefore an affective farm advisory system should be the starting point. The focus should be on reaching the large number of small farms that dominate production in Ajara, using printed materials, media-based extension, demonstration farms and work with farmer groups as the main delivery mechanisms, and reserving the relatively expensive tool of individual farm visits for where it is clearly necessary.

Forming groups of farmers to learn together may have the added value of creating networks and building the trust that will allow these same farmers to start working together in storing, packaging and marketing their products.

A very rough estimate of the potential to increase yields in Ajara suggests that:

- Mandarin yields could be increased by 300 %, generating an extra 90 million GEL;
- Hazelnut yields could be increased by 50-100 %, giving an extra 4 million GEL;
- Milk output per hectare could be increased by 300 %, an extra 250 million GEL;
- Potato yields could be increased by 50 %, an extra 2 million GEL;
- Honey output per hive could be increased by 100 %, an extra 4 million GEL.

The combined potential increase in output from just these five enterprises is around 350 million GEL per year. Productivity increases are also possible for maize and trout, though they could not be quantified in this study, and there is sure to be scope to increase yields of other products as well.

Few farmers will transform their businesses overnight as a result of a single contact with the advisory service, but the more proactive ones will join groups, seek out information, and begin to make changes. These lead farmers will be noticed by their neighbours, who will realise that they could be doing better than they are, and start to consider changes they too could make. The scope for productivity improvement in Ajaran agriculture is so great that it would need only a small proportion of farmers to fulfil their potential, to justify the costs of the extension service many times over.

Farm survey

One of the biggest challenges faced by this study was the shortage of reliable information on farm performance and, even more lacking, financial data on profit margins. A regular farm business survey would establish the actual levels of inputs, outputs, costs and gross margins on average farms and on the best performers. This would let farmers see how they compare with their peers and help them identify what the best farmers do differently that contributes to their success. This would support one of the primary goals of extension: to change farmers' attitudes and give them a new and higher expectation of what is a "normal" yield.

The focus on gross margins should become a key element of all extension work; if farmers are being advised to plant a new variety, apply more fertiliser or use more feed, they will want to know how much it is going to cost them and how much benefit it will bring. Using gross margins as a matter of routine in advisory materials and demonstration activities will help to keep advisors and farmers alike focussed on the key goal of becoming more profitable and competitive.

Market information system

If the first priority is to increase farm yields, the second is to improve the efficiency of markets so that farmers pay a more competitive price for their inputs and get a higher price for their output. The things that have to change are different in each value chain but a common need is timely and accurate information about agricultural markets. This requires a market information system covering Ajara, the rest of Georgia, and key export markets such as Ukraine for mandarins and Turkey for honey.

Plant pest monitoring and forecasting service

Pest and disease control is an important part of all crop production, including mandarins, hazelnuts and potatoes. Growing concerns about pesticide use are leading to increasing emphasis on "Integrated Pest Management" (IPM), where the choice of varieties and cultivation techniques helps to reduce susceptibility to pests and diseases, and where the decision whether or not to use pesticides is determined by the actual level of pest or disease threat. This approach can help to reduce costs, protect the environment and reduce the risk of harmful pesticide residues in food, but requires a more sophisticated approach than a routine programme of preventative spraying.

Underlying this must be a national or regional programme of plant pest monitoring and forecasting, together with an effective system to convey timely information to farmers about when and what to spray. The advisory service can help to train farmers in this new approach, and similar mechanisms can be used to disseminate both market and plant pest information, but a specialist unit will be needed to manage the overall monitoring and forecasting service, supported by a network of weather stations, pest traps and field reporters.

Consolidation, sorting, packing & grading

The extent to which post-harvest handling is a weak point in the value chain varies considerably from product to product. A number of group initiatives in packaging and marketing honey have yielded good results, and their scope should be expanded in line with increasing supermarket design. The new "consolidation centres" for mandarins are a significant development that should be monitored closely and assistance provided if necessary, with the key goal being to ensure that the benefits outweigh the costs. The marketing arrangements for hazelnuts and trout are rather basic and informal, but they seem to meet current needs at quite low cost, and it is doubtful whether any group marketing initiative would bring sufficient extra benefit to keep farmers motivated and involved. For dairy and potato production in the mountain valleys, the main scope for cooperation is in keeping the unit cost of transport to market as low as possible.

Regulation

Adopting EU marketing standards for mandarins would help to establish a level playing field between the different consolidation centres and other buyers, and make Ajara ready to respond to more stringent demands from its foreign customers.

However, the most pressing regulatory need is to obtain EU export approval for honey before Ajara loses access to its crucial Turkish market. This will require Georgia developing and implementing an EU-compatible residue monitoring programme, and improving its controls on pesticides and veterinary medicines to prevent problems arising in the first place. This is not a trivial task but it is one that will have to be tackled sooner or later, and it is strongly recommended that it should be sooner.

Land market

For the first two enterprises considered in this study (mandarins and hazelnuts), the most binding limit on potential income lies not in technical performance or processing or marketing, but in the very small size of the holdings: for most families producing these crops, agriculture can never match the income provided by a decent job in another sector. Thus a critical policy goal must be to develop an effective land market so that as existing growers increasingly turn their attention in other directions as they inevitably will the land passes into the management of those who have chosen to make farming their career. This involves a complex set of issues, including land registration, taxation, transaction costs and inheritance law; whilst initial moves have been made in several of these areas, it is clear that sometimes one policy works against another, so there is some way still to go.

The oft-discussed issue of land fragmentation is more of a problem for arable farming than for labour-intensive mandarins and hazelnuts plantations, and the small plots of cultivated land in the cattle-potatoes-maize system stem more from the smallness of the overall land holdings than from fragmentation. What is important for these mountain farmers is to find an appropriate and effective means of allocating the common pastures to individuals or groups, so that it can be managed efficiently and its output increased.

Annexes

Annexes 1. Survey of Batumi retail marketing

This annex records the price and availability of various products of interest at the main Batumi retail market and in three main supermarket chains, in the last week of January/first week of February 2014.

a. Retail market

This is the main market complex in Batumi, with a wholesale market one and a retail market near to each other. The retail market included both outdoor stalls and a large covered area divided into different product sections.

Potatoes

All from Ajara, sold loose at: 1.10-1.20 GEL/kg

Citrus (open market)

Georgian mandarins:

- So-called "Super", effectively standard size mandarins, making up 2/3 of the total on offer: 1:20 GEL/litre
- "Non-standard" very small mandarins, 1/3 of total: 0.80 GEL/kg

Navel oranges:

- From Kobuleti: 0.80 GEL/kg
- Imported: 1.50 GEL/kg

The large majority of citrus fruit on offer was Georgian mandarins.

Honey (section in covered market)

Georgian honey in both usually-unlabelled glass jars of various sizes, mainly large:

- Chestnut honey: 15:00 GEL/litre
- "May honey": 132.00 GEL/litre

There was no imported honey on display.

Cheese (section in covered market)

Ajara cheese:

- 7.00 GEL/kg

b. "Goodwill" supermarket

Georgian-owned supermarket, founded around 2004

Reasonable presentation

Potatoes

Georgian potatoes sold in net bags: 1.70 GEL/kg

No imported potatoes on sale

Hazelnuts

Georgian hazelnuts sold loose:

- In-shell: 5.20 GEL/kg
- Shelled kernels: 14.30 GEL/kg

Fruit juices

Georgian:

- Orange juice: 2.65 GEL/litre
- Mixed citrus juice (including orange, grapefruit & mandarin): 3.49 GEL/litre

German:

- Multivitamin juice: 6.50 GEL/litre
- Orange juice: 5.99 GEL/litre

Russian:

- Orange juice 2.61 GEL/litre

Around 90 % of shelf space was devoted to Georgian and Russian juices, 10 % to higher-priced German products.

The Georgian mixed citrus juice was the only product marked as containing mandarin juice.

Honey

Georgian honey in jars:

- Chestnut honey in 450 g jars with reasonable labelling on jar and lid: 8.95 GEL (19.99 GEL/litre)
- "Autumn honey" in 700 g jars with similar labelling: 9.10 GEL (13.00 GEL/litre)

Georgian honey in 350 g "bears" from the Beekeepers' Association:

- Linden: 7.80 GEL (22.29 GEL/litre)
- Acacia: 6.75 GEL (19.29 GEL/litre)
- Chestnut: 8.85 GEL (25.29 GEL/litre)

Around two-thirds of shelf space was devoted to Georgian honey, the remainder to German.

Fish

No fresh fish on sale.

c. "Yalçin" supermarket

Turkish-owned, established in 2013.

Potatoes

Georgian:

- Loose potatoes of three different varieties, many damaged in harvest or handling: 1.40-1.70 GEL/kg

No imported potatoes on sale

Mandarins

Georgian mandarins:

- Very poor quality, unsorted: 0.90 GEL/kg

No imported mandarins on sale.

Fruit juices

Turkish:

- Orange juice on sale: 2.60 GEL/litre
- Orange juice at normal price: 4.45 GEL/litre

Only Turkish and Russian juices on sale, in roughly equal quantities, with no Georgian.

Milk

Georgian:

- UHT milk in a range of fat contents, all priced at 2.85 GEL/litre
- Pasteurised, from Tbilisi: 2.70 GEL/litre

Russian:

- UHT milk, with the label unclear as to whether it was packed in Georgia or Russia: 3.45 GEL/litre

Turkish:

- Pasteurised milk in 1 litre plastic bottles: 2.35 GEL/litre
- UHT: 2.50 GEL/litre

There was also some Ukranian milk on sale.

The origin of milk was not always clear, as one Russian brand appeared to have some packages filled in Russia and some filled in Georgia, with slightly different labelling.

Honey

Georgian.

- One remaining 450 g jar of rather poorly-labelled honey: 9.00 GEL (20.00 GEL/kg)

Fish

No fresh fish on sale.

d. "Willmart" supermarket

An old but recently rebranded Georgian chain.

Potatoes

Georgian:

- Loose GE potatoes from Khula, two different varieties: 1.50-1.70 GEL/kg

Mandarins

Georgian:

- Sorted, standard mandarins: 1.20 GEL/kg

No imported mandarins on sale, though there were imported oranges.

Fruit juices

Russian:

- "Parmalat" orange juice: 4.60 GEL/litre

Georgian and Russian fruit juices were on sale, with roughly equal shelf space.

Milk

Ukranian:

- UHT milk: 3.50 GEL/litre

Georgian:

- "Eco-food" pasteurised milk in tetra-packs: 2.60-2.80 GEL/litre (2.5-3.2 % fat)

Two Georgian brands were found in Tetrapacks:

- "Sante" from Tbilisi
- "Wimm Bill Dann", a Russian brand but apparently filled in Georgia, though this was not entirely clear

Honey

The fresh produce counter bought Georgian honey in bulk and sold it in simple plastic cups with cling-film as a lid:

- Chestnut honey: 17.50 GEL/kg
- "Flower honey": 17.50 GEL/kg

Fish

No fresh fish on sale.

Frozen sea fish from 5 GEL/kg

Annexes 2. EU citrus marketing standards

Commission implementing regulation (EU) 543/2011 is attached.

Empowered lives.
Resilient nations.

United Nations Development Programme

Georgia Country Office
UN House, 9 Eristavi Street
0179 Tbilisi Georgia
Tel.: +995 (32) 251126
Fax: +995 (32) 250271
E-mai: registry.ge@undp.org
Web: www.undp.org.ge