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# **Revealed Comparative Advantage of Pakistan's Agricultural Exports**

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## Executive Summary

Pakistan is widely believed to be underperforming as far as its agricultural export potential is concerned. However, analyses to support this allegation are very few, in part due to the lack of easily accessible data. In this paper we provide the first necessary step in the analysis of Pakistan's comparative advantage in agricultural export markets. We use Balassa's measure of Revealed Comparative Advantage to determine the competitiveness of selected agricultural products in overseas export markets. Unlike many other studies that analyze comparative advantage only at the world level, we were able to access detailed data from the IMF that allowed us to determine the degree of competitiveness of Pakistan's agricultural products in specific export markets. The results indicate that at the world market level Pakistan has a comparative advantage in cereals (especially rice) and horticultural products but not in livestock products. However, once specific markets and individual products are considered, the picture is considerably more nuanced. For example, Pakistani meat does have a comparative advantage in the relatively nearby Gulf countries and dairy products from Pakistan compete well in other South Asian countries. Cheese produced in Pakistan even has made an inroad into high-income countries such as the USA and Europe which demonstrates the potential of moving up the processing chain. For horticulture products a picture emerges that suggests that while several Pakistani products (vegetables, dates, mango) are able to compete in fresh form in nearby markets (South Asia, Gulf countries) they are not competitive in more distant markets (Europe, USA). This is not only due to more stringent SPS standards in these markets: lack of consistent and high-quality supplies, and poor marketing strategies also play a role. On the other hand processed horticultural products have had more success in these higher income markets. The case of citrus is special in the sense that Pakistan has a strong competitive edge in *kinnow* mandarins but not oranges. But despite Pakistan being the world's largest exporter of *kinnow* mandarins, these have trouble entering developed country markets, possibly due to their excessive seed content. Pakistan's strongest overall comparative advantage lies in Afghanistan where geographical proximity, cultural ties and the continuing conflict situation make consumers rely heavily on products from Pakistan.

Finally, this study is just a first step; more in-depth and market-and product-specific research will be needed to determine the specific investments and policy measures needed to increase Pakistan's competitive advantage in promising export markets and expand its market share.

## **I. Introduction**

Many analysts of the Pakistan economy in general the agriculture sector in particular believe that the country is punching below its weight as far as agricultural export performance is concerned. Specifically it is often argued that Pakistan has a comparative advantage in a number of agricultural commodities but fails to exploit this advantage to its fullest potential in overseas markets.

However, little or no analysis has been done that sheds some more light on this issue, in the sense of better specifying in which commodities and which markets Pakistan's comparative advantage is strongest. This paper attempts to start filling that void by quantifying the degree of comparative advantage of Pakistan agricultural export products in major overseas markets. This quantification is a necessary first step in getting a better handle on the factors that may limit the extent to which Pakistan is able to enter markets where it has a comparative advantage. Expansion of Pakistan's share in overseas export markets is crucial for further development of the country's agricultural sector.

The main objective of the paper is to identify products where Pakistan has demonstrated comparative advantage, and to provide a first step towards understanding the factors that at present limit possibilities for further exploiting that advantage. The paper analyzes actual export flows and calculates measures of revealed comparative advantage. The focus in this paper being on agricultural trade, the analysis is based on international trade data that incorporates a unique degree of detail not seen before in trade analyses for Pakistan.

## **II. The Concept of Revealed Comparative Advantage**

Revealed comparative advantage (RCA) indices offer a useful way of analyzing a country's comparative advantage, based on demonstrated (i.e. actual) export performance. This contrasts with other popular measures such as the domestic resource costs coefficients (DRCs) that are considered indicators of potential comparative advantage and often used in *ex-ante* types of analysis of export possibilities.<sup>1</sup>

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<sup>1</sup> The DRC ratio of a traded product is the ratio of the domestic social costs of export production to foreign exchange earned (Bruno, 1963). The numerator is domestic resources and non-traded inputs valued at their opportunity costs, and the denominator is the net foreign exchange earned or saved (i.e. value added) by producing the product domestically. The DRC can be loosely interpreted as "the domestic resources needed to generate one unit of foreign exchange". Since output and tradable inputs are valued at border (world market) prices, a DRC ratio smaller than one is indicative of "efficient" national production giving the country a "comparative advantage" in the product in question.

The original RCA measure was proposed by Balassa (1965) who defined the export performance of a specific product/industry from a country – as measured by revealed comparative advantage index – as the relative share of the country’s export of the product in the world export of the same product, divided by the overall share of the country in world exports. More specifically, the revealed comparative advantage index of product j exported from country i ( $RCA_{ji}$ ) can be expressed as follows:

$$RCA_{ji} = (X_{ji}/X_{jw}) / (X_i/X_w) \quad (1)$$

where

- $X_{ji}$  = exports of product j from country i
- $X_{jw}$  = world exports of the product j
- $X_i$  = exports of country i
- $X_w$  = world exports

The RCA index ranges from 0 to infinity with 1 as the break-even point. That is, a RCA value of less than 1 means that the product has no export comparative advantage, while a value above 1 indicates that the product has a “revealed” comparative advantage.<sup>2</sup> It should be noted that the RCA index is not symmetrical in the sense that one cannot compare both sides of the break-even point.<sup>3</sup>

The conceptual RCA index defined above is quite flexible in terms of both product definition and geographic coverage of the markets considered. Various definitions of the ‘product’ can be used to compute the value of the index. For the purposes of this paper, the Standard International Trade Classification (SITC<sup>4</sup>) was used because it allows products to be defined at various levels of aggregation. Moreover, the flexibility of the index with respect to geographic coverage means that relative export performance can be studied at global or at regional levels.

The analysis in this paper spans a ten year period from 1999-2008 and the data were obtained from IMF’s trade database.<sup>5</sup>

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<sup>2</sup> Note that  $RCA_{ji}$  can also be written as  $(X_{ji}/X_i) / (X_{jw}/X_w)$  which when larger than one can be interpreted as “country i has a revealed comparative advantage in product j because the share of product j in country i’s total exports exceeds the share of product j in total world exports”.

<sup>3</sup> The aspect of symmetry was addressed by Laursen (1998).

<sup>4</sup> The SITC system was developed by the UN in 1962 with the intention of classifying traded products not only on the basis of their material and physical properties and stage of processing but also their economic functions in order to facilitate economic analysis. From 2007 onwards the SITC consists of 10 one-digit sections, 67 two-digit divisions, 262 three-digit groups, 1,023 four-digit groups, and 2,970 five-digit headings. Section “0” is “Food and Live Animals”. For detailed information see Shaw (2009).

<sup>5</sup> See <http://www.imfstatistics.org/DOT/>.

### **III. Comparative Advantage of Pakistan's Agriculture in the World Market**

#### **III.1 Pakistan's main agricultural export categories**

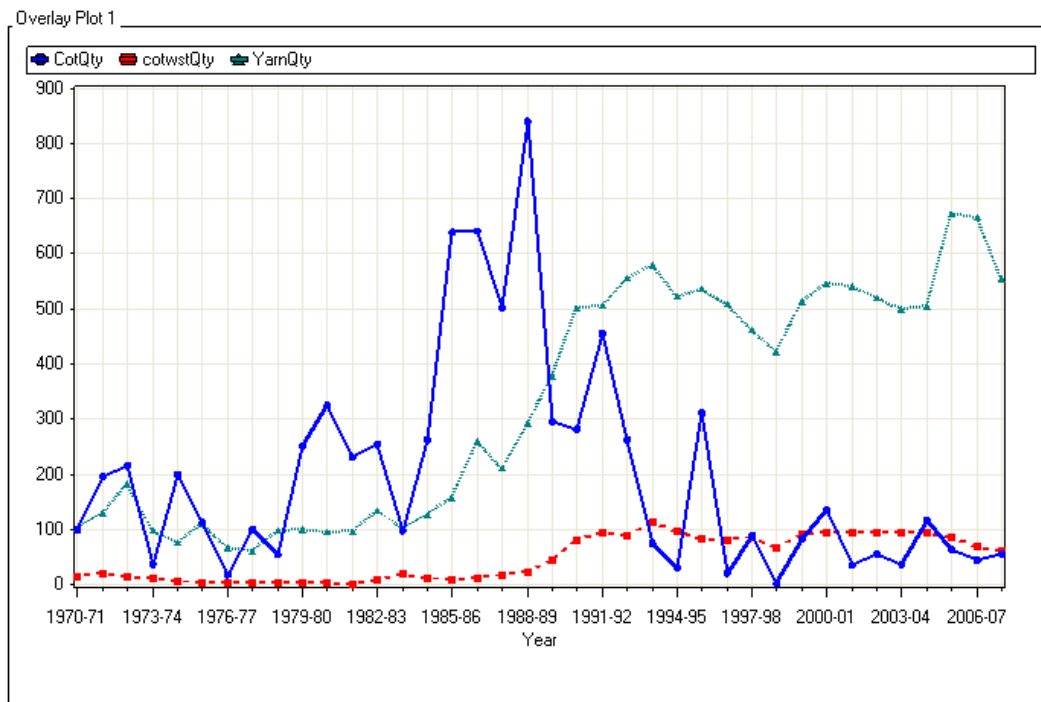
For the purposes of this study, Pakistan's agricultural exports were taken to be products listed under the SITC's 'Food and live animals' (code=0) category. However, not all of the sub-categories of products listed under this code are equally important from the perspective of analyzing Pakistan's trade performance. The following categories were therefore selected at the SITC 2-digit level:

- 01 - Meat and meat preparations
- 02 - Dairy products and birds' eggs
- 04 - Cereals and cereal preparations
- 05 - Vegetables and fruit

Each of these categories has several sub-categories and more than 20 disaggregated products were considered for this study. On the other hand, in this preliminary investigation also some other agricultural products were excluded. Among these are cotton (SITC code 263) which is a key cash crop in Pakistan; fish (SITC code 03); hides and skins (SITC code 21); and cut flowers and foliage (SITC code 292.7). But while some of these are important products in the domestic market, their share in agricultural exports is relatively low.

In this regard, the case of cotton is particularly interesting. Cotton exports declined drastically over time (see Figure 1) as the domestic textile sector absorbed an increasingly large share of domestic cotton production. However, moving up the value addition chain is only part of the more complex cotton situation in Pakistan. The other and perhaps more revealing aspect is that export performance deteriorated because cotton output stagnated, and even declined in some years, leading to progressively smaller and eventually vanishing exportable surpluses. The main reasons behind output stagnation were the leaf curl virus and other pest attacks, and country's slow and unregulated adoption of BT cotton. Unlike India which has rapidly transformed itself into the second-largest exporter of cotton in the world, Pakistan's cotton exports have been lagging. Pakistan's cotton and textile economy has been the subject of a detailed recent study (Cororaton and Orden, 2008) and will receive no further attention in this paper.

**Figure 1: Pakistan exports of cotton and cotton products**



Source: Pakistan Economic Survey 2007-08

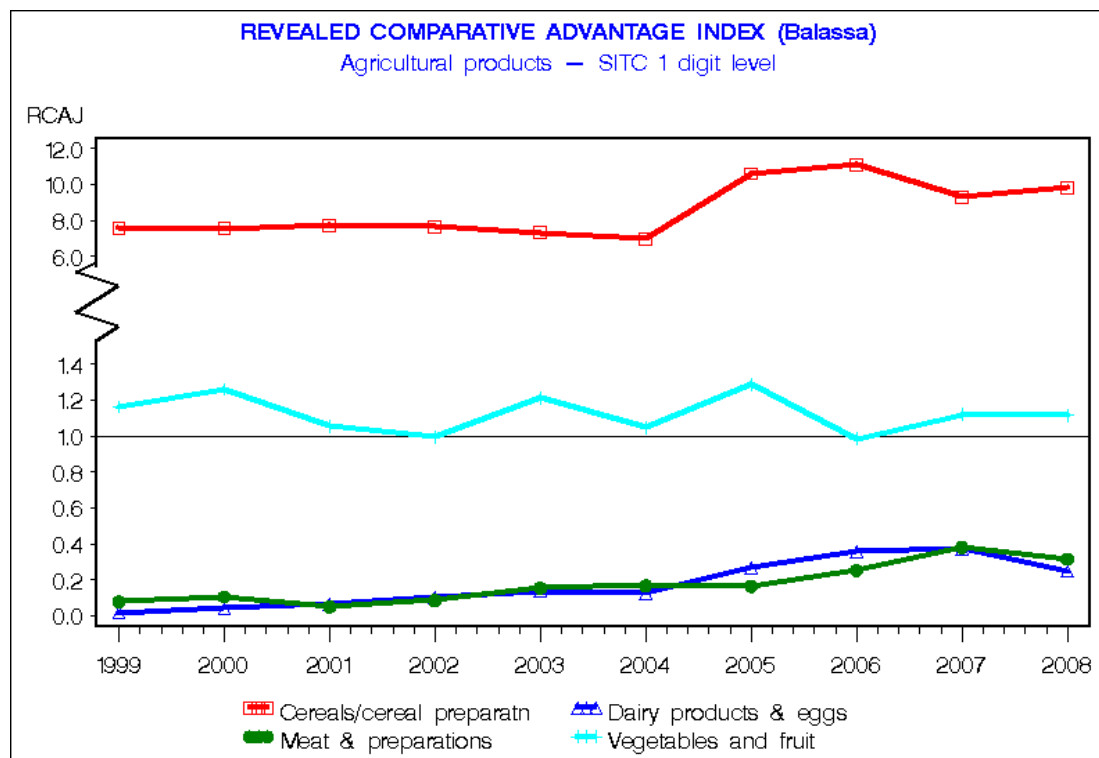
### III.2 Revealed comparative advantage in world markets

Figure 2 presents the evolution of the RCA index over the period 1999-2008 for all SITC 1-digit level agricultural products mentioned above. Over the last decade Pakistan did not enjoy relative comparative advantage in livestock products. The RCA index for 'Meat & meat preparations' and for 'dairy products & eggs' did not exceed 0.4 which is significantly lower than the threshold level of 1.0. Given that Pakistan has a large bovine population and the country is the fourth largest producer of fresh milk in the world, the low levels of relative export performance in this product category merit close attention.

The RCA index for the 'vegetable and fruits' group remained above 1.0 throughout the decade (Figure 2). This suggests a revealed comparative advantage in the export of these products, which is according to expectations given Pakistan's favorable agro-climatic conditions for horticulture production. However, a wide range of products originating from different regions in the country are included in this group. Therefore, identification of key export products among them is required in order for the analysis to have practical implications. An equally important issue concerns the export performance of specific products in specific markets. Both issues will be addressed in the more disaggregated analysis below.

During the previous decade, Pakistan also enjoyed a substantial comparative advantage in ‘cereals and cereal preparations’ (Figure 2). The RCA index for this category fluctuated between 7.0 and 11.0. The two key cereals in Pakistan are wheat and rice. Wheat is the main staple food in Pakistan and while rice is consumed mainly in rice growing districts, most rice is exported. Pakistani rice is of two types – the premium basmati rice, and the regular IRRI rice varieties. Unfortunately, the SITC data do not provide a break-up by type of rice. Apart from cereals (grains) the ‘cereals and cereal preparations’ group also includes cereal preparations, especially those made from wheat.

**Figure 2: Relative export performance of main agricultural products**



Source: Calculations based on IMF data

### III. Disaggregated Analysis

#### IV.1 Livestock products

##### IV.1.1 Meat & meat preparations

A more disaggregated analysis of the meat & meat preparations category was conducted for selected products at the three digit level including ‘Beef, fresh/chilled/frozen’ (SITC 011) and ‘Meat n.e.s., fresh/chilled/frozen’ (SITC 012). The RCA index for meat (012) did not exceed 0.4 throughout the decade (Table 1). The relative export performance of beef products (011) was similar to that of meat for most of the period under review even though RCA index values reached 0.6 by 2007.



More data are needed to determine if this trend can be sustained. The analysis of RCA in individual trading partner markets in section IV.1 below sheds more light on future export prospects for beef products.

**Table 1 RCA values for beef and meat**

<b>Year</b>	<b>RCA for beef, fresh/chilled/frozen</b>	<b>RCA for meat n.e.s., fresh/chilled/frozen</b>
1999	0	0.1
2000	0	0.2
2001	0	0.1
2002	0.1	0.1
2003	0.1	0.2
2004	0.1	0.3
2005	0.1	0.2
2006	0.2	0.3
2007	0.6	0.4
2008	0.6	0.2

#### **IV.1.2 Dairy products and eggs**

The RCA index for dairy products and eggs was consistently low throughout the decade even at the disaggregated level, except for 2002 when the RCA index for exports of the sub-category ‘Eggs, albumin’ (SITC 025) reached a value of 0.8. However, this momentum was lost in subsequent years and the RCA index had dropped to almost zero by 2008. The picture is somewhat more optimistic with respect to the sub-category ‘milk and cream and milk products other than butter or cheese’ (SITC 022) whose the RCA index reached a value of 0.7 in the second half of the past decade. Even though at the world market level Pakistani dairy products and eggs do not seem to have a competitive advantage, the situation is different once specific export markets are considered (see section VI.1 below).

#### **IV.2 Cereals and cereal preparations**

As noted earlier, Pakistan enjoys significant revealed comparative advantage in the production of cereals. However, it is necessary to look separately at the performance of wheat and rice and to disentangle asymmetric effects of domestic demand on their respective export performances.

Pakistani rice (SITC 042) exhibited a strong export performance during the past decade as evidenced by the RCA index of between 45 and 146. The highest values occurred towards the end of the decade – a period marked by the international

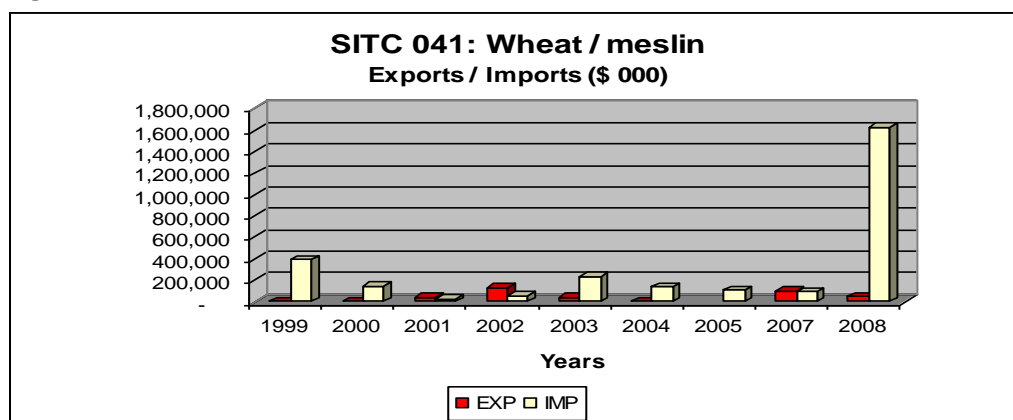
commodity price boom.<sup>6</sup> A significant feature of this period consisted of the restrictions on rice exports by many exporting countries in an attempt to protect domestic consumers. Since the main staple food in Pakistan is wheat, increases in domestic rice prices did not quite have the same implications. Pakistan is a rice exporter and was able to increase its share in the thin international rice market as international supplies from competitors were reduced.

**Table 2 RCA values for rice**

Year	RCA rice
1999	48.9
2000	56.3
2001	49.3
2002	44.8
2003	54.0
2004	50.8
2005	70.6
2006	75.5
2007	65.1
2008	146.0

Compared with rice, the relative export performance of wheat and wheat products is more complex. During the past decade the number of years in which Pakistan was a net wheat importer exceeded the number of years in which the country was a net wheat exporter (Figure 3). The huge increase in the value of wheat imports in the year 2008 was to a significant extent due to tripling of international wheat prices (World Bank, 2010).

**Figure 3 Pakistan's wheat trade 1999-2008**



<sup>6</sup> The export performance of rice was particularly strong during 2008 helped by the huge price increases of rice in the world market. See World Bank (2010).

Despite this erratic export performance, RCA indices for wheat (SITC 041) are significantly above 1 for four out of the nine years between 1999-2008, with the highest value of 5.6 recorded in the year 2002 (Table 3). The main reason for the fact that Pakistan's revealed comparative advantage in wheat is significant while unstable at the same time, is that although the country is a large wheat producer (wheat production was 23.1 million tons in 2007-08) it also has a large and rapidly growing population (170 million) to feed. As a result even relatively small discrepancies in supply and demand can not only significantly change the value of the RCA index but also reverse trade flows altogether.

The other important issue relates to the largely undocumented wheat exports to Afghanistan. Wheat is routinely smuggled to Afghanistan from Pakistan in addition to any official exports. During 2007-08 the gap between Pakistani domestic and other countries' domestic prices of wheat became increasingly large and sizable flows of wheat to neighboring countries (Afghanistan in particular) took place. Therefore RCA estimates that rely on official figures only (such as ours) tend to underestimate the relative export performance of Pakistan's wheat sector. On the other hand, given that wheat prices have come down substantially after 2008, sustained increase in yields would be required to consolidate the comparative advantage in wheat.

**Table 3 RCA indices for wheat and wheat products**

Year	RCA wheat /meslin	RCA flour/meal wheat/meslin
2000	0.2	2.1
2001	1.8	15.3
2002	5.6	19.4
2003	1.6	15.2
2004	0	14.9
2005	-	25.6
2006	-	34.3
2007	2.4	20.5
2008	0.5	0.3

In addition to wheat grain, Pakistan also exports wheat flour. Data for the sub-category flour/meal wheat/meslin (SITC code 046) suggest that Pakistan enjoys a substantial RCA. Except for 2008<sup>7</sup>, the RCA index for wheat flour exports was consistently above 1. In fact, in nearly all years the value of RCA index for this sub-category exceeded 15, with a highest value of 34.3 in 2003.

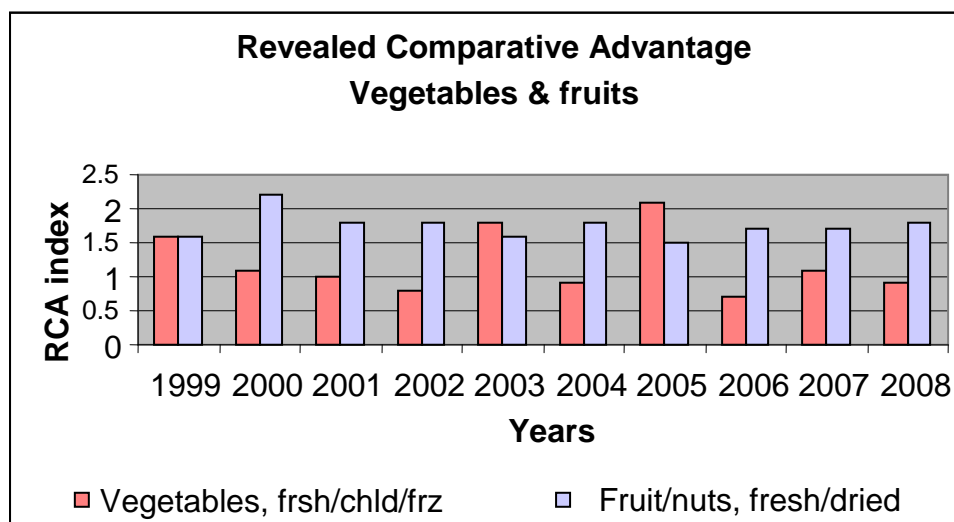
<sup>7</sup> However, since only data regarding official exports are available, the RCA value for 2008 is likely to be an underestimate.

Considered together with the export performance of wheat grains, the strong comparative advantage of wheat flour exports raises a number of questions. For wheat flour to have greater revealed comparative advantage than wheat grains, either the wheat milling sector has to be efficient, or there have to be market distortions that influence trade flows. Pakistan's wheat milling sector is widely recognized to be substantially over-capitalized and therefore cannot be considered very efficient. Many mills receive wheat at officially controlled release prices that includes a substantial subsidy element. This issue is explored further in the discussion regarding bilateral trade between Pakistan and neighboring countries in section VII.1 below.

### IV.3 Vegetables and fruits

As mentioned above, Pakistan is widely considered to have a comparative advantage in horticulture production (SITC code 05). This is indeed confirmed by the average value of the RCA index of 1.13 during 1999-08 (see also Figure 2). Figure 4 separates out vegetables (SITC code 054) and fruits (SITC code 057). For the period 1999-2008 the average RCA index for vegetables was 1.2 and that for fruits was 1.75. Thus Pakistan had revealed comparative advantage in both vegetables and fruits but its competitiveness is stronger in the latter.

Figure 4 RCA indices for vegetables and fruits

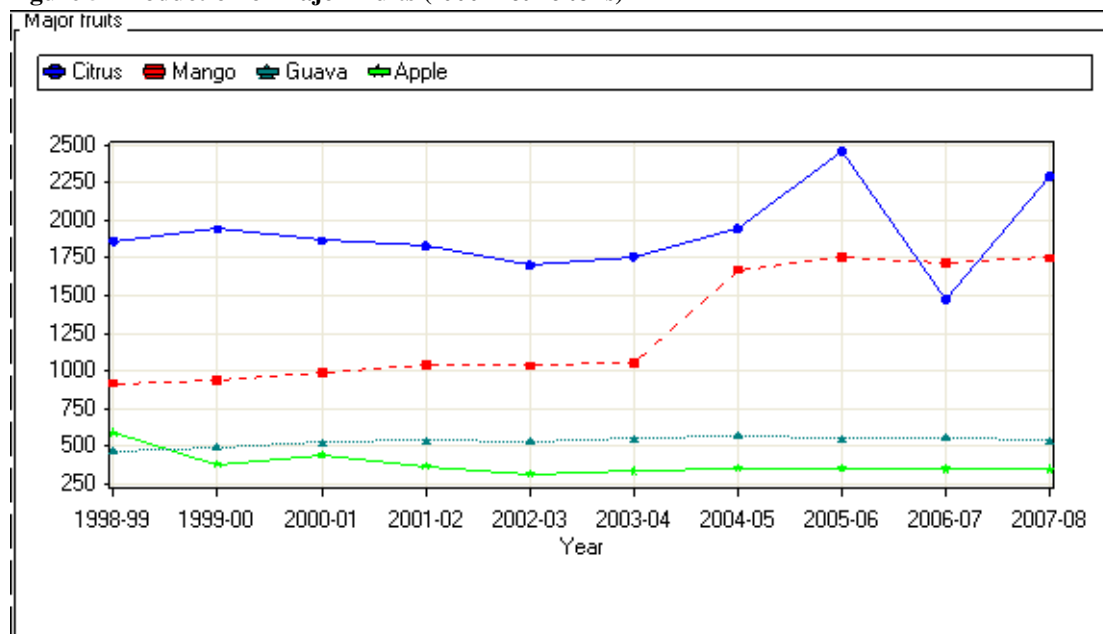


Pakistan's major fruits include citrus, mangoes, dates, guava and apples. The production of citrus and mango exceeds that of other fruits<sup>8</sup> and dominates Pakistan's fruit exports (Figure 5). Pakistan produces a wide range of citrus varieties including several types of oranges (SITC code 05711 and consisting of several varieties such as

<sup>8</sup> Over the 1999-08 period average annual production of citrus, mango, guava and apple was respectively 1.9, 1.3, 0.5 and 0.4 million MT approximately; the combined annual average production of banana, apricot, and grapes during the same period was about 0.4 million MT.

Succri, Mausami, Washington Navel, Jaffa, Red Blood, Ruby Red and Valencia Late) and mandarins (SITC code 05712).<sup>9</sup> The latter consist mainly of the *Kinnow* variety which dominates citrus exports and indeed the relative export performance of other citrus species (oranges) is poor (Table 4). The increasing RCA values for mandarin (*Kinnow*) in recent years point towards growing prospects for trade expansion.

**Figure 5 Production of major fruits ('000 metric tons)**



Pakistan is the world's fourth largest producer and the second largest exporter of dates (SITC code 05796) (Jalbani, 2003). Not surprisingly the RCA analysis indicates that Pakistan enjoys a significant revealed comparative advantage in this fruit (RCA index varied between 46.2 and 109.2 during the period 1999-2008). Dates are grown throughout Pakistan and each region has its own varieties: Aseel, Karbala, Fasli, and Kupro date varieties are found in Sindh province; Balochistan province's varieties include Begum Jangi, Muzawati, Jann Swore, Kehraba and Rabai; while Dhakki and Gulistan varieties are produced in North West Frontier Province (NWFP).

Finally, Pakistan is an important producer and exporter of mangoes (SITC code 5797). Although SITC code 5797 lumps mango, guava and avocados, Pakistani exports under this category consist largely of mangoes. Pakistan's relative export performance in this category is quite strong (Table 4).

<sup>9</sup> See: [www.pakistan.com/english/allabout/orchards/citrus/citrus.basic/major.citrus.growing.areas.html](http://www.pakistan.com/english/allabout/orchards/citrus/citrus.basic/major.citrus.growing.areas.html).

**Table 4 RCA values for selected fruits**

<b>Year</b>	<b>Oranges fresh or dried</b>	<b>Mandarins etc fresh or dried</b>	<b>Dates fresh or dried</b>	<b>Mango/guava /avocado/ fresh</b>
1999	0.3	4.5	81.3	8.3
2000	0.2	6.5	109.2	13.4
2001	0.1	7.6	71.8	13.3
2002	0.0	9.2	78.8	11.1
2003	0.1	7.5	56.6	11.8
2004	0.0	9.6	60.9	12.9
2005	0.0	5.4	46.2	11.4
2006	0.0	12.1	57.2	7.3
2007	0.0	8.4	54.3	10.1
2008	0.0	29.9	56.2	17.0

## **IV. Regional Revealed Comparative Advantage Indices**

### **V.1 Defining regional markets**

This section introduces a spatial dimension into the analysis by calculating RCA indices for key regional export markets for key agricultural products from Pakistan. For this purpose, a regional classification of countries was developed based on the UN regional classification and other major economic groupings. The economic groupings selected were the European Union (EU), South Asian Association for Regional Cooperation (SAARC), Association of South East Asian Nations (ASEAN) and the Gulf Cooperation Council (GCC).

Some of the regional groupings such as the EU have highly uniform trade policies and no barriers to trade between member states. Other economic groupings have varying degrees of common trade policies. For example, while SAARC member countries are gradually introducing preferential trade arrangements for other members under the South Asia Free Trade Agreement (SAFTA), many obstacles remain (for an in-depth discussion of SAFTA, see Chapter III in World Bank 2010). In most cases, however, countries within a particular regional grouping have some common characteristics. For example, the EU is dominated by highly developed industrial economies and a number of economies in transition; ASEAN comprises mostly newly industrialized countries; and GCC is a grouping of oil-rich Middle Eastern states. These common characteristics generate similar demand patterns that provide a strong rationale for constructing regional (synthetic) RCA indices.

In addition to economic groupings, countries were also classified based on their respective geographic sub-regions. These sub-regional groups included Central Asia, North Africa, Sub-Saharan Africa and Latin America. Broad similarities in levels of economic development and other geographic characteristics within sub-regions provide some justification for this classification.

Partial overlap of economic groupings and regions made it necessary to classify countries in a sub-region that were not in the relevant regional economic grouping into ‘Rest of’ regional groups. The latter include Rest of East Asia (RO EASTASIA), Rest of Europe (RO EUROPE), Rest of Middle East (RO Middle East) and Rest of the World (RO World). Finally, some large countries were treated as entirely separate markets including USA, China, Japan, Russian Federation, Australia, Canada and Mexico.<sup>10</sup>

#### IV.2 Measuring regional revealed comparative advantage

The RCA index presented earlier in Section II (equation (1)) uses the world market as the reference market. In order to enable disaggregation of the analysis of revealed comparative advantage at the regional and bilateral levels, equation (1) was adapted as follows:

$$RCA_{ji}^R = \left( X_{ji}^R / X_i^R \right) / \left( X_{ji} / X_i \right) \quad (2)$$

Here  $RCA_{ji}^R$  is the revealed comparative advantage index for exports of product j from country i into region R, and

$X_{ji}^R$  = Exports for product j from country i to region R

$X_i^R$  = Exports of country i to region R

$X_{ji}$  = Total exports of product j from country i

$X_i$  = Total exports of country i

If  $RCA_{ji}^R$  exceeds one then we conclude that the country i has a comparative advantage in the export of product j to the reference market R. This is so because a

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<sup>10</sup> Mexico was taken as a separate market because the remaining two North American countries – USA and Canada – were similarly treated. The other possibility would have been to lump together all three as North American Free Trade Agreement (NAFTA) countries. However, the size of the US market and the importance of its trade relations with Pakistan weighted in against doing this.

value of this index greater than unity implies that the share of product  $j$  in country  $i$ 's exports to region  $R$  exceeds the share of product  $j$  in the country's total exports.<sup>11</sup> The reference market may be a region such as the EU or SAARC, or alternatively it could be a single country such as the USA or UAE.

## V. Spatial Patterns of Revealed Comparative Advantage

Having defined regional RCA in the previous section, the current section present patterns of comparative advantage for main categories of Pakistani agricultural exports with a view to identify product and market combinations where relative export performance has been demonstrably strong. The various tables in this section mention only those regions where Pakistani export products have a revealed comparative advantage (i.e. markets where RCA values exceed 1).

### VI.1 Meats and meat products

Although livestock contributes over half of Pakistan's agricultural GDP, the country does not have a worldwide comparative advantage in meat and meat products (see Table 1 in section IV.1 above). Low productivity in the livestock sector, sizeable domestic demand, and the inability to meet overseas SPS requirements are some of the factors that explain the modest export performance. However, once comparative advantage is analyzed on a regional basis, it turns out that beef and meat exports from Pakistan do enjoy a comparative advantage in the GCC region with RCA indices exceeding 5 for both product categories (Table 5). This can largely be explained by the geographical proximity of the GCC region to Pakistan. In addition various types of meat offal find good markets in China and East Asia.

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<sup>11</sup> Note that  $RCA_{ji}^R$  can also be written as  $(X_{ji}^R/X_{ji})/(X_i^R/X_i)$  which resembles Balassa's original measure but narrows it down to the RCA of a country (in this case Pakistan) in a particular geographical area (in this case region R).



**Table 5 Regional RCA of Pakistani meat products in different regions**

SITC code	Product category	Region	RCA
011	Beef, fresh/chlld/frozn	GULF COOP COUNCIL	5.52
012	Meat n.e.s., fresh/chld/froz	GULF COOP COUNCIL	5.48
016	Meat/offal preserved	GULF COOP COUNCIL	5.20
017	Meat/offal presvd n.e.s.	CHINA	2.07
017	Meat/offal presvd n.e.s.	GULF COOP COUNCIL	1.80
017	Meat/offal presvd n.e.s.	RO_EASTASIA	2.29
017	Meat/offal presvd n.e.s.	SAARC	3.06

Table 6 indicates that the dairy products and eggs category (SITC code 02) have strong revealed comparative advantage in the SAARC market only. The same is true for SITC code 022 which mainly consists of milk powder. On the other hand, a number of other sub-categories representing processed dairy products (milk powder, butter, cheese and curd) also enjoy a comparative advantage in several other markets, including some in developed countries. For example, butter, cheese and curd products (SITC codes 022 and 023) have strong revealed comparative advantage in both SAARC and GCC regions with the RCA measure approaching 4 in both cases. This is followed by good relative export performance in East Asia (non-ASEAN countries). But perhaps even more importantly, Pakistani exports of butter, cheese and curd enjoy a certain degree of comparative advantage in the high-income EU and US markets where consumers are particularly quality-conscious. This suggests that moving up the processing chain can allow penetration into markets of high-income regions.

**Table 6 Regional RCA of dairy products&eggs and sub-categories**

SITC code	Product category	Region	RCA
02	Dairy products & eggs	SAARC	4.57
022	Milk products excl buttr/cheese	SAARC	5.07
023	Butter and cheese	EU	1.08
023	Butter and cheese	GULF COOP COUNCL	1.63
023	Butter and cheese	RO_ESTASIA	2.47
023	Butter and cheese	SAARC	2.93
024	Cheese and curd	GULF COOP COUNCL	3.75
024	Cheese and curd	USA	1.41
025	Eggs, albumin	GULF COOP COUNCL	1.23
025	Eggs, albumin	RO_MIDEAST	1.27
025	Eggs, albumin	SAARC	3.80

## VI.2 Cereals

Although Pakistan is a large producer of wheat, it is not a significant wheat exporter mainly because of high domestic demand. Nevertheless, wheat exports to Afghanistan – through official and informal channels – take place on a regular basis, mainly driven by Afghanistan’s traditional (but highly variable) food grains deficit and Pakistan’s relative geographic proximity.<sup>12</sup> This situation is reflected in the relatively high value of the RCA index of 2.4 for the SAARC region a whole (Table 7).

**Table 7 Regional RCA for cereals**

SITC code	Product category	Region	RCA
041	Wheat/meslin	ASEAN	1.37
041	Wheat/meslin	GULF COOP COUNCIL	1.21
041	Wheat/meslin	NORTHAFRICA	1.16
041	Wheat/meslin	SAARC	2.42
041	Wheat/meslin	SUBSAHAFRICA	1.71
042	Rice	GULF COOP COUNCIL	2.31
042	Rice	SUB SAHARAN AFRICA	1.10
043	Barley grain	GULF COOP COUNCIL	1.96
043	Barley grain	SAARC	4.54
044	Maize except sweet corn.	ASEAN	3.86
044	Maize except sweet corn.	GULF COOP COUNCIL	1.95
044	Maize except sweet corn.	RO_WORLD	6.36
044	Maize except sweet corn.	RO.WESTASIA	1.27
044	Maize except sweet corn.	SAARC	1.59

Rice is Pakistan’s largest food export earner. From a regional perspective, promising export destinations for this product are in Middle East and sub-Saharan Africa (Table 7). However, at a more disaggregated level there are several individual countries that are good markets of Pakistani rice, as will become clear from the discussion of bilateral RCA indices in section VII below.

Over the last decade, maize productivity in Pakistan has been on an upward trend mainly due to the increased use of hybrid seeds. Table 7 shows that the RCA index for maize is highest in “Rest of the World” region (6.36), followed by the ASEAN region (3.86) and the Gulf countries (1.95). Just like rice the export performance of Pakistani maize in high income country markets is also fairly robust (see section VII).

<sup>12</sup> The links between food security in Pakistan and Afghanistan are discussed in detail in World Bank (2010).

Barley grain exports seem largely to result from the proximity advantage in the SAARC (mainly Afghanistan) and GCC markets.

### VI.3 Vegetables

Exports in the fresh, chilled, and frozen vegetable category (SITC code 054) show revealed comparative advantage in South Asian and Gulf countries (Table 8). This pattern of revealed comparative advantage is a result of the transport cost advantage, limitations imposed by perishability of vegetables, and relatively lower SPS standards in these markets. At the same time the latter two factors also prevent exports to farther away (but higher value) markets in Europe and North America, at least for the time being. The transport cost advantage of Pakistani vegetable exports is less in the Gulf than within South Asia which is reflected in a lower value of the RCA index.

**Table 8 Regional RCA for vegetables and processed vegetable products**

SITC code	Product_category	Region	RCA
054	Vegetables, fresh/chilled/frozen	GULF COOP COUNCIL	1.38
054	Vegetables, fresh/chilled/frozen	SAARC	3.48
056	Vegetable root/tuber preparations/preservatives	EU	2.89
056	Vegetable root/tuber preparations/preservatives	RO_EUROPE	1.65

Processed vegetable products not only have much longer shelf life and are less bulky, but the higher degree of processing also makes it possible to conform to more stringent quality requirements. Vegetable preparations and preserved vegetables enjoy relatively strong comparative advantage in the EU and non-EU European markets. This again underscores the fact that processing can help opening up markets in more developed countries.

### VI.4 Oranges and mandarins

Pakistan is the largest exporter of *Kinnow* mandarin in the world. On the other hand, exports of (sweet) oranges are relatively minor, and strong export performance of *Kinnow* is limited to regional markets in the ASEAN and Gulf countries (Table 9).

**Table 9 Regional RCA for oranges and mandarins**

SITC code	Product_category	Region	RCA
05711	Oranges, fresh or dried	ASEAN	1.44
05711	Oranges, fresh or dried	CANADA	3.11
05711	Oranges, fresh or dried	GULF COOP COUNCIL	1.57
05711	Oranges, fresh or dried	RO_WORLD	1.71
05711	Oranges, fresh or dried	SAARC	2.84
05711	Oranges, fresh or dried	SUB SAHARAN AFRICA	2.40
05712	Mandarins etc fresh/dried	ASEAN	2.02
05712	Mandarins etc fresh/dried	GULF COOP COUNCIL	1.73

Outside of these regions there are individual country markets such as Iran where *Kinnow* exhibits strong relative export performance (see section VII). However, the strong revealed comparative advantage of *Kinnow* does not seem to exist in developed country markets. The reasons for this are more stringent SPS requirements, higher degree of bitterness in taste compared to oranges, and large numbers of seeds in the fruit.

## VI.5 Other fruits and fruit preparations

Pakistan has a substantial comparative advantage in the export of dates (SITC code 0596) to countries in the SAARC region (Table 10). In the case of Pakistan the category fresh ‘avocado/mango/guava’ (SITC code 0597) represents primarily mango exports. The revealed comparative advantage in this category is strong in markets in Europe and the Gulf countries (Table 10). For Pakistan this is the only example of a product with a rather modest level of processing<sup>13</sup> that has strong revealed comparative advantage in developed country markets. This is attributable to the high quality of mango varieties grown in Pakistan. On the other hand, equally noteworthy is the fact that similar inroads have not been made into the US market, possibly due to more stringent SPS requirements and transport disadvantages. It has been observed that mangoes from Pakistan have ‘excellent eating qualities’ but inconsistent quality and relatively short shelf life (see e.g. Jansen 1991). As a result Pakistan mangoes fetch relatively low prices even in high quality markets (Collins et al., 2006). Table 10 also shows that preserved fruits, fruit preparations, and fruit juices have substantial revealed comparative advantage in the high income EU and GCC markets.

<sup>13</sup> Mango processing largely consists of grading, cleaning, and packaging.

**Table 10 Regional RCA for mangoes, other fruits, and fruit preparations**

SITC code	Product_category	Region	RCA
0596	Dates, fresh/dried	SAARC	4.91
0597	Avocado/mango/guava fresh	EU	1.19
0597	Avocado/mango/guava fresh	GULF COOP COUNCIL	4.13
058	Fruit preserved/fruit preps	EU	1.13
058	Fruit preserved/fruit preps	GULF COOP COUNCIL	1.76
058	Fruit preserved/fruit preps	SAARC	1.12
059	Fruit/vegetable juices	EU	1.78
059	Fruit/vegetable juices	SAARC	2.39

## VI. Bilateral trade between Pakistan and Neighboring Countries

This section presents and discusses patterns of revealed comparative advantage with Pakistan's principal neighbors: Afghanistan, China, India and Iran.

### VII.1 Afghanistan

Pakistan provides the main transit trade route for land-locked Afghanistan. The most diversified pattern of comparative advantage of Pakistani products exists in the Afghan market (Table 11). Wheat flour has a RCA index value of 33. Grains from Pakistan, particularly wheat, also have strong comparative advantage in Afghanistan as indicated by RCA index values in the high teens and twenties. Although the RCA index value of 2.0 for rice indicates comparative advantage, the value is an order of magnitude smaller than that for other grains, reflecting preferences of the Afghan population that consumes mostly wheat. Milk powder is another product with a very high comparative advantage. Strong revealed comparative advantage is also evident in a range of processed products including butter and cheese, fruit/vegetable juices, preserved fruits and fruit preparations.

**Table 11 RCA with Afghanistan**

SITC code	Product category	RCA
017	Meat/offal preserved n.e.s.	11.6
022	Milk products excluding butter/cheese	34.9
023	Butter and cheese	29.1
025	Eggs, albumin	18.4
041	Wheat/meslin	17.0
042	Rice	2.1
043	Barley grain	29.8
044	Maize except sweet corn	16.0
045	Cereal grains n.e.s.	20.1
046	Flour/meal wheat/meslin	33.2
047	Cereal meal/flour n.e.s.	9.9
048	Cereal etc flour/starch	4.4
054	Vegetables, fresh/chilled/frozen	4.0
058	Fruit preserved/fruit preparations	3.9
059	Fruit/vegetable juices	9.6
05712	Mandarins etc fresh/dried	1.7

## VII.2 India

India is a huge potential market where Pakistan enjoys a transportation cost advantage. The figures in Table 12 indicate the products with the strongest revealed comparative advantage: these include dates, vegetables and fruits (especially oranges). Exports of fruit and vegetable juices to India have shown a growing revealed comparative advantage since 2004.

**Table 12 RCA with India**

SITC code	Product category	RCA
023	Butter and cheese	1.9
025	Eggs, albumin	3.1
041	Wheat/meslin <sup>1</sup>	9.9
054	Vegetables, fresh/chilled/frozen	26.0
057	Fruit/nuts, fresh/dried	30.2
059	Fruit/vegetable juices	2.4
05711	Oranges, fresh or dried	14.8
05796	Dates, fresh/dried	90.4

<sup>1</sup>The RCA index value for wheat is based on a one-time export in 2007.

### VII.3 Iran

Rice exports provide a degree of stability to the otherwise rather erratic pattern of Pakistani exports to Iran (Table 13). Over the past decade, the RCA index for rice has been consistently high with an average of around 9, indicating strong revealed comparative advantage of Pakistani rice in Iran.

**Table 13 RCA with Iran**

SITC code	Product category	RCA
042	Rice	9.1
048	Cereal etc flour/starch	1.2
054	Vegetables, fresh/chilled/frozen	5.6
057	Fruit/nuts, fresh/dried	2.0
059	Fruit/vegetable juices	4.8
05712	Mandarins etc fresh/dried	7.0
05797	Avocado/mango/guava fresh	1.5

Even though Pakistani vegetables also exhibit revealed comparative advantage in the Iranian market, the year-to-year pattern is highly variable. The same holds for fruit juices and fresh or dried fruits/nuts. The Iranian citrus market has opened up for Pakistani exports only recently. RCA index values for mandarin (*Kinnow*) were in excess of 10 during 2006-08 although the average for the past decade was 7.0. However, the risk of instability cannot be ruled out even in this category. For example, in early 2009 Iran raised import duties on *Kinnow* mandarins even though this increase was undone later that same year.

### VII.4 China

Meat offal (SITC code 017) is the only agricultural product from Pakistan whose exports to China are significant as indicated by a RCA index value of 11.6. Even though the aromatic long-grain Basmati rice is a key export product from Pakistan to many countries throughout the world, it does not have market in China due to different preferences among Chinese rice consumers. Vegetables also have limited potential because China is not only the world's largest producer and consumer of vegetables but also a large exporter. Pakistan may want to explore the prospects of mango exports to China. Pakistani mangoes have done well in high income markets in western countries and also in Brunei. There may well be good potential for Pakistani mangoes for developing a niche in the Chinese market.

## VII. Top Export Markets for Selected Products

This section identifies export markets for selected Pakistani agricultural products where revealed comparative advantage exists. The selected products include mangoes, *Kinnow* mandarins, and dates. For the purpose of market identification, two filtering criteria were employed. First, the selected markets have an average RCA greater than one during the period 1999-2008. Second, Pakistan has exported the product in question to the specific market during six or more years during that same period.

### VIII.1 Mangoes

Mango exports from Pakistan exhibit strong revealed comparative advantage in Oman, Saudi Arabia, United Arab Emirates and Brunei. The value of the RCA index for mango for the Oman market is 15 and in the remaining three markets it ranges between 5 and (nearly) 7. In addition there are several other Middle Eastern markets where RCA index values are high. An interesting aspect of mango exports is their penetration into European markets. The RCA index value is 3.7 for Norway, 2.9 for Switzerland, and 2.8 for the UK. Pakistani exporters may want to team up with major supermarket chains in these countries to further increase their market share.

**Table 14 RCA of mango in different markets**

Market	No of years exported during 1999-2008	Mean RCA
Oman	10	15.0
Saudi Arabia	10	6.8
United Arab Emirates	10	5.9
Brunei	8	5.5
Bahrain	10	4.4
Qatar	10	4.1
Norway	10	3.7
Maldives	10	3.6
Switzerland	10	2.9
United Kingdom	10	2.8
Kuwait	10	2.6
Singapore	10	2.0
Malaysia	10	1.0



## VIII.2 *Kinnow* mandarins

The top markets for Pakistani *Kinnow* mandarins have been the Philippines and Indonesia with RCA index values of 39.2 and 25.0, respectively (Table 15). However, exports values to the Philippine market and the resulting RCA index values have been rather variable during the latter part of the 1999-2008 period.

**Table 15 RCA of *Kinnow* mandarins in different markets**

Market	No of years exported during 1999-2008	Mean RCA
Philippines	10	39.2
Indonesia	10	25.0
Singapore	10	8.3
Iran, Islamic Rep.	8	7.0
Sri Lanka	10	6.3
Malaysia	10	3.6
Bahrain	10	3.4
Saudi Arabia	10	3.0
Mauritius	10	2.9
United Arab Emirates	10	2.7
Romania	6	2.3
Afghanistan	10	1.7
Oman	9	1.3
Kuwait	10	1.2

The next tier of important markets for mandarins would include Singapore, Sri Lanka, and Iran where average RCA index ranged from 6.0 to 8.0. The Iranian market opened up only in 2006 and has a tremendous potential for future development. On the other hand, the comparative advantage of Pakistani mandarins in the Singaporean, Sri Lankan and also the Malaysia markets has eroded somewhat in the second half of the 1999-2008 period. The factors that are responsible for this decline in export performance are not quite clear and need to be identified through further research.

## VIII.3 Dates

India is the largest importer of Pakistani dates. The transportation cost advantage and strong demand translate into an overwhelming revealed comparative advantage (RCA index value of 90) for Pakistani dates in India (Table 16). Although the size of the Nepali market is small compared to the Indian market, relative export performance of Pakistani dates there has also been quite strong. Pakistani dates also have revealed

comparative advantage in Denmark where export performance has been quite consistent in recent years. Pakistan exports dates to Paraguay but the performance in that market has been rather unstable.

**Table 16 RCA of dates in different markets**

Market	No of years exported during 1999-2008	Mean RCA
Denmark	10	1.2
India	10	90.4
Maldives	7	1.1
Nepal	9	31.0
Paraguay	6	2.0

### **VIII. Summary, Conclusions and Recommendations**

Given its relatively fertile soils, diversity of agro-ecological conditions and significant water resources from the Indus Basin, Pakistan is widely believed to be underperforming as far as its agricultural export potential is concerned. However, analyses to support this allegation are very few, in part due to the lack of easily accessible data. In this paper we provide the first necessary step in the analysis of Pakistan’s comparative advantage in agricultural export markets. We use Balassa’s measure of Revealed Comparative Advantage to determine the competitiveness of selected agricultural products in overseas export markets. Unlike many other studies that analyze comparative advantage only at the world level, we were able to access detailed data from the IMF that allowed us to determine the degree of Pakistan’s agricultural competitiveness for disaggregated products in specific export markets. The results indicate that at the world market level Pakistan has a comparative advantage in cereals (especially rice) and horticultural products but not in livestock products. However, once specific markets and individual products are considered, the picture becomes considerably more nuanced.

Whereas relatively low yields in wheat and cotton combined with poor public policies towards these crops limit their export performance, Pakistan has traditionally been a significant player in the world rice market. However, even the relatively high value of the RCA index for rice is to a significant degree attributable to the fact that rice trades in a thin international export market. Further efforts may be made to further strengthen the revealed comparative advantage in rice by brand name marketing, better quality control, and measures of economic diplomacy (with a possible role of Pakistan’s embassies) aimed at increasing market access for Pakistan’s Basmati rice variety in high-end markets in Europe and North America.

Our analysis suggests that there is considerable scope for further strengthening Pakistan's already considerable revealed comparative advantage in mandarin (*Kinnow*). Adoption of improved agronomic practices, control of citrus diseases, and targeted trade promotion campaigns in East-Asian and Central Asian markets can help. Development of seedless varieties of *Kinnow* and diversification into other citrus varieties (e.g. Clementine) with a view to penetrate the high-end citrus markets should be a medium term policy objective. Pakistan should also capitalize on the recently opened up Iranian market for mandarins. A measure of economic diplomacy would be needed to ensure that exports are not disrupted by sudden changes in import duties and other taxes in the importing country.

Besides fresh fruits exports, there exists considerable potential for increasing exports of processed citrus products. The citrus processing industry in Pakistan, while highly export oriented, is currently limited to grading, polishing and packing. In order to capitalize on the potential, there is need for developing a wide range of processed citrus products, including *Kinnow* juice and pulp, and by-products such as citrus peel oil. But serious quality control issues have to be addressed before the citrus processing industry diversification can be achieved. At present, the lowest quality *Kinnow* fruits are used for making juice, which is sold in the domestic market. This type of juice and other products of similar quality cannot be exported and there is a need to upgrade this industry before exports can be successful.

The relative export performance of mango is quite strong. Adoption of "good agricultural practice" protocols and subsequent certification by importers would help enhance export performance further. High quality mangoes should be marketed more aggressively in high-end markets; for example, Pakistan has high quality mangoes that may find a niche in Chinese fruit market if appropriate market development efforts are made. Choice brands of high quality mango nectar could also be developed as niche products for certain export markets.

Dates are one product where not only Pakistan has an extremely strong revealed comparative advantage but whose production is spread across all provinces. Dissemination of post harvest technologies among farmers in remote date-growing regions, and investments in modern processing and packaging facilities can help leverage this advantage. Pakistan may also try to expand the range of marketed date products.

Other fruits such as apples, peaches, grapes etc that are grown in Balochistan and NWFP have much weaker export performance. Access to modern marketing channels would seem essential for improving export volumes of these products.

Even though Pakistan has a revealed comparative advantage in vegetable exports, most of these exports go to neighboring countries which represent mostly low-value markets. There already exists some vegetable cultivation in tunnels in Pakistan but

most of this production is sold during the off-season in domestic markets. However, there is a need for investigating the prospects for exporting these vegetables during the off-season in overseas import markets.

Improved post harvest technologies and better cool chain infrastructure are needed to address perishability issues that currently limit the scope for exports of vegetables to more distant markets. Penetration into high-income developed country markets also requires mainstreaming good agricultural practices, certification and traceability. The traditional wholesale marketing system where produce is sold in the local *Mandi* markets before exports take place makes traceability virtually impossible. Institutional innovation that involves contract farming by, or on behalf of, exporting firms may help to resolve marketing obstacles.

Dairy products are another area of weak relative export performance. This is mainly caused by the predominance of traditional marketing channels that make quality assurance difficult, low milk yields from inadequately fed and mostly non-descript breeds of animals, and high domestic demand. The dairy processing sector is mostly inward-looking and where it does export (e.g. to Afghanistan) the main export product is UHT milk. In other words the industry currently seems to overlook the potential for exporting a wider range of dairy products (e.g. butter and cheese, and milk powder). But for this to happen there is need for technical improvements in the milk processing sector. On the other hand relatively small quantities of cheese produced in Pakistan have made an inroad into high-income countries such as the USA and Europe which demonstrates the potential of moving up the processing chain.

Analysis of bilateral and regional trading patterns reveals that processed products have relatively better prospects for penetrating high-income markets. These are precisely the products that use inputs acquired through non-traditional marketing channels. In the dairy sector, these channels are typically operated by large commercial dairy firms. But the product quantities that move through them are a very small proportion of total output. Expanding the coverage of non-traditional channels requires investments in cool chain infrastructure – preferably under public private partnership modalities – and improving the efficiency of private dairy firms so that they could sell more to middle income strata in urban areas.

With the exception of some limited exports to the Gulf, meat products are another area of weak export performance. Although domestic demand for meat is high, the real impediment to meat exports are SPS concerns: Pakistan needs to improve/upgrade its abattoirs and establish cold chains. Most importantly, it needs to ensure a disease-free livestock population. As a first step, disease free areas should be established and later expanded as animal health coverage improves. Moreover, efforts should be made to develop more productive animal breeds and improved fodder varieties.

Finally, it must be stressed that this study is just a first step; more in-depth and market-and product-specific research will be needed to determine the specific investments and policy measures needed to increase Pakistan's competitive advantage in promising export markets and expand its market share.

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## Annex I Detailed RCA index values

### SITC 2-digit products

Year	Product	Product_name	RCA index
1999	01	Meat & preparations	0.1
2000	01	Meat & preparations	0.1
2001	01	Meat & preparations	0.1
2002	01	Meat & preparations	0.1
2003	01	Meat & preparations	0.2
2004	01	Meat & preparations	0.2
2005	01	Meat & preparations	0.2
2006	01	Meat & preparations	0.3
2007	01	Meat & preparations	0.4
2008	01	Meat & preparations	0.3
1999	02	Dairy products & eggs	0
2000	02	Dairy products & eggs	0
2001	02	Dairy products & eggs	0.1
2002	02	Dairy products & eggs	0.1
2003	02	Dairy products & eggs	0.1
2004	02	Dairy products & eggs	0.1
2005	02	Dairy products & eggs	0.3
2006	02	Dairy products & eggs	0.4
2007	02	Dairy products & eggs	0.4
2008	02	Dairy products & eggs	0.2
1999	04	Cereals/cereal preparatn	7.6
2000	04	Cereals/cereal preparatn	7.6
2001	04	Cereals/cereal preparatn	7.7
2002	04	Cereals/cereal preparatn	7.7
2003	04	Cereals/cereal preparatn	7.3
2004	04	Cereals/cereal preparatn	7
2005	04	Cereals/cereal preparatn	10.6
2006	04	Cereals/cereal preparatn	11.1
2007	04	Cereals/cereal preparatn	9.3
2008	04	Cereals/cereal preparatn	9.8
1999	05	Vegetables and fruit	1.2
2000	05	Vegetables and fruit	1.3
2001	05	Vegetables and fruit	1.1
2002	05	Vegetables and fruit	1
2003	05	Vegetables and fruit	1.2
2004	05	Vegetables and fruit	1
2005	05	Vegetables and fruit	1.3
2006	05	Vegetables and fruit	1
2007	05	Vegetables and fruit	1.1
2008	05	Vegetables and fruit	1.1

### SITC 3-digit products

Year	Product	Product_Name	RCA Index
1999	011	Beef, fresh/chlld/frozn	0
2000	011	Beef, fresh/chlld/frozn	0
2001	011	Beef, fresh/chlld/frozn	0
2002	011	Beef, fresh/chlld/frozn	0.1
2003	011	Beef, fresh/chlld/frozn	0.1
2004	011	Beef, fresh/chlld/frozn	0.1
2005	011	Beef, fresh/chlld/frozn	0.1
2006	011	Beef, fresh/chlld/frozn	0.2
2007	011	Beef, fresh/chlld/frozn	0.6
2008	011	Beef, fresh/chlld/frozn	0.6
1999	012	Meat nes,fresh/chld/froz	0.1
2000	012	Meat nes,fresh/chld/froz	0.2
2001	012	Meat nes,fresh/chld/froz	0.1
2002	012	Meat nes,fresh/chld/froz	0.1
2003	012	Meat nes,fresh/chld/froz	0.2
2004	012	Meat nes,fresh/chld/froz	0.3
2005	012	Meat nes,fresh/chld/froz	0.2
2006	012	Meat nes,fresh/chld/froz	0.3
2007	012	Meat nes,fresh/chld/froz	0.4
2008	012	Meat nes,fresh/chld/froz	0.2
1999	022	Milk pr exc buttr/cheese	0
2000	022	Milk pr exc buttr/cheese	0.1
2001	022	Milk pr exc buttr/cheese	0.1
2002	022	Milk pr exc buttr/cheese	0.1
2003	022	Milk pr exc buttr/cheese	0.2
2004	022	Milk pr exc buttr/cheese	0.2
2005	022	Milk pr exc buttr/cheese	0.5
2006	022	Milk pr exc buttr/cheese	0.7
2007	022	Milk pr exc buttr/cheese	0.7
2008	022	Milk pr exc buttr/cheese	0.5
1999	025	Eggs, albumin	0.1
2000	025	Eggs, albumin	0.3
2001	025	Eggs, albumin	0.7
2002	025	Eggs, albumin	0.8
2003	025	Eggs, albumin	0.5
2004	025	Eggs, albumin	0.4
2005	025	Eggs, albumin	0.3
2006	025	Eggs, albumin	0.1
2007	025	Eggs, albumin	0
2008	025	Eggs, albumin	0
2000	041	Wheat/meslin	0.2
2001	041	Wheat/meslin	1.8
2002	041	Wheat/meslin	5.6
2003	041	Wheat/meslin	1.6
2004	041	Wheat/meslin	0



### SITC 3-digit products

Year	Product	Product_Name	RCA Index
2007	041	Wheat/meslin	2.4
2008	041	Wheat/meslin	0.5
1999	042	Rice	48.9
2000	042	Rice	56.3
2001	042	Rice	49.3
2002	042	Rice	44.8
2003	042	Rice	54
2004	042	Rice	50.8
2005	042	Rice	70.6
2006	042	Rice	75.5
2007	042	Rice	65.1
2008	042	Rice	146
2000	046	Flour/meal wheat/meslin	2.1
2001	046	Flour/meal wheat/meslin	15.3
2002	046	Flour/meal wheat/meslin	19.4
2003	046	Flour/meal wheat/meslin	15.2
2004	046	Flour/meal wheat/meslin	14.9
2005	046	Flour/meal wheat/meslin	25.6
2006	046	Flour/meal wheat/meslin	34.3
2007	046	Flour/meal wheat/meslin	20.5
2008	046	Flour/meal wheat/meslin	0.3
1999	054	Vegetables,frsh/chld/frz	1.6
2000	054	Vegetables,frsh/chld/frz	1.1
2001	054	Vegetables,frsh/chld/frz	1
2002	054	Vegetables,frsh/chld/frz	0.8
2003	054	Vegetables,frsh/chld/frz	1.8
2004	054	Vegetables,frsh/chld/frz	0.9
2005	054	Vegetables,frsh/chld/frz	2.1
2006	054	Vegetables,frsh/chld/frz	0.7
2007	054	Vegetables,frsh/chld/frz	1.1
2008	054	Vegetables,frsh/chld/frz	0.9
1999	057	Fruit/nuts, fresh/dried	1.6
2000	057	Fruit/nuts, fresh/dried	2.2
2001	057	Fruit/nuts, fresh/dried	1.8
2002	057	Fruit/nuts, fresh/dried	1.8
2003	057	Fruit/nuts, fresh/dried	1.6
2004	057	Fruit/nuts, fresh/dried	1.8
2005	057	Fruit/nuts, fresh/dried	1.5
2006	057	Fruit/nuts, fresh/dried	1.7
2007	057	Fruit/nuts, fresh/dried	1.7
2008	057	Fruit/nuts, fresh/dried	1.8

### SITC 4 digit products

<b>Year</b>	<b>Product</b>	<b>Product_Name</b>	<b>RCA Index</b>
1999	0571	Citrus fruit fresh/dried	2.1
2000	0571	Citrus fruit fresh/dried	3
2001	0571	Citrus fruit fresh/dried	3.2
2002	0571	Citrus fruit fresh/dried	4
2003	0571	Citrus fruit fresh/dried	3.3
2004	0571	Citrus fruit fresh/dried	4.2
2005	0571	Citrus fruit fresh/dried	2.6
2006	0571	Citrus fruit fresh/dried	5.6
2007	0571	Citrus fruit fresh/dried	4.1
2008	0571	Citrus fruit fresh/dried	8.5

### SITC 5 digit products

<b>Year</b>	<b>Product</b>	<b>Product_Name</b>	<b>RCA Index</b>
1999	05711	Oranges,fresh or dried	0.3
2000	05711	Oranges,fresh or dried	0.2
2001	05711	Oranges,fresh or dried	0.1
2002	05711	Oranges,fresh or dried	0
2003	05711	Oranges,fresh or dried	0.1
2004	05711	Oranges,fresh or dried	0
2005	05711	Oranges,fresh or dried	0
2006	05711	Oranges,fresh or dried	0
2007	05711	Oranges,fresh or dried	0
2008	05711	Oranges,fresh or dried	0
1999	05712	Mandarins etc frsh/dried	4.5
2000	05712	Mandarins etc frsh/dried	6.5
2001	05712	Mandarins etc frsh/dried	7.6
2002	05712	Mandarins etc frsh/dried	9.2
2003	05712	Mandarins etc frsh/dried	7.5
2004	05712	Mandarins etc frsh/dried	9.6
2005	05712	Mandarins etc frsh/dried	5.4
2006	05712	Mandarins etc frsh/dried	12.1
2007	05712	Mandarins etc frsh/dried	8.4
2008	05712	Mandarins etc frsh/dried	29.9
1999	05796	Dates, fresh/dried	81.3
2000	05796	Dates, fresh/dried	109.2
2001	05796	Dates, fresh/dried	71.8
2002	05796	Dates, fresh/dried	78.8
2003	05796	Dates, fresh/dried	56.6
2004	05796	Dates, fresh/dried	60.9
2005	05796	Dates, fresh/dried	46.2
2006	05796	Dates, fresh/dried	57.2
2007	05796	Dates, fresh/dried	54.3
2008	05796	Dates, fresh/dried	56.2
1999	05797	Avocado/mango/guava frsh	8.3

2000	05797	Avocado/mango/guava frsh	13.4
2001	05797	Avocado/mango/guava frsh	13.3
2002	05797	Avocado/mango/guava frsh	11.1
2003	05797	Avocado/mango/guava frsh	11.8
2004	05797	Avocado/mango/guava frsh	12.9
2005	05797	Avocado/mango/guava frsh	11.4
2006	05797	Avocado/mango/guava frsh	7.3
2007	05797	Avocado/mango/guava frsh	10.1
2008	05797	Avocado/mango/guava frsh	17