

# **Impact of institutions on the performance of the flower industry in developing countries**

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## **Abstract**

In past decades, a number of developing countries experienced a rapid growth in their exports of highly perishable horticultural products to developed high-income countries. One example is the export of flowers from African countries to Europe. However, the development of the flower industry is unbalanced: in the same region, some countries experience a prosperous export growth while others have a mediocre growth or even show a decline. This paper addresses the question of the impact of institutions on the variation in market performances among internationally oriented flower industries. As institutions play a major role in enabling development, an interesting question is how the institutional environment supports the development of an internationally oriented flower industry. The empirical findings show a strong correlation between both the level and the growth of per capita GDP and institutions, in line with most empirical studies on the impact of institutions. Surprisingly, no relations between the growth of flower export and the same prevailing institutions are found. Reasons might be the special economic activity, the foreign input of knowledge and equipment and the negligible domestic market.

**Key words:** Institutions, growth, cut-flower industry, developing countries

## **1. Introduction**

In past decades, a number of developing countries experienced a rapid growth in their exports of highly perishable horticultural products to developed high-income countries. In general, this growth can be explained by comparative advantage. Batt (2000) concludes that ‘the basic factors of production are a great deal more important in the evolution than the literature would suggest’. Labor-intensive cut flowers are grown in low cost countries. Especially African countries have become very competitive for specific labor-intensive rose varieties and partly pushed European growers out of the market (Wijnands, 2005). In most developing countries a well-developed domestic flower market is absent, making production fully export oriented. Most African (South American) flower industries maintain a close link with the markets in Europe (the USA). The supporting and supplying firms fully rely on imports from developed

countries. The Netherlands and Israel are the main suppliers of flower varieties and advanced technologies. In addition, the Dutch flower auctions are the leading marketplace for African flowers (Wijnands, 2005). However, the development of the flower industry is unbalanced; in the same region one finds countries experiencing a prosperous export growth as well as countries that show a poor growth or even a decline. For example, in the period 1997/98 to 2003/04 Ecuador showed a strong growth of its share on the world flower market, whereas neighboring Colombia showed a decline of its share. What might be the reason behind this differential development?

To our knowledge, there has been no research on the impact of formal institutions on the flower industry in developing countries. This paper explores the relationship between the economic performance of the flower industry in developing countries and the formal institutional environment. The main research question is whether the export performance of flower industries in developing countries depends on the quality of the institutional environment. First, we analyze the impact of institutions on overall economic growth for a selected group of flower exporting developing countries. Second, we deal with the question whether the same institutions have a comparable impact on the performance of the flower industries.

The structure of the papers is as follows. Section 2 addresses the interaction between the quality of the formal institutional environment and sector performance based on the theory of New Institutional Economics. Section 3 discusses the hypothesis, the measurements of the indicators as well as the data found. The results are presented in Section 4, followed by discussion (Section 5) and conclusion (Section 6).

## **2. Theoretical background**

### *Institutions and economics*

New institutional economics analyses the role of institutions in economic development and growth. Institutions can be defined as the humanly devised constraints that structure political, economic and social interactions. They consist both of informal constraints, such as customs, traditions and common norms, and formal rules, such as laws and property rights (North, 1991: 97). Another definition emphasizes the rules that are needed to facilitate the game of economic exchange: institutions are the rules of the game. "Formal rules include political (and judicial) rules, economic rules and contracts. The hierarchy of such rules, from constitutions,

to statute and common laws, to specific bylaws, and finally to individual contracts defines constraints, from general rules to particular specifications” (North, 1990: 47). The rules of the game are important for two reasons. First, well-understood rules establish baseline conditions for human interaction, and give certain predictability to what other parties will do in a particular context, that permits the actions of different individuals to be coordinated, and efficient transactional agreements achieved. Second, rules can serve to discourage or rule out actions that, if widely practiced, would be economically costly, and encourage actions which, if widely taken, can be productive for all (Nelson and Sampat, 2001: 33).

According to the classification of economic transformations from local village exchange to globalization (North, 1991; Shirley, 2005: 613) an export oriented flower industry can be considered as a last stage in economic development. All economic actors carry out very specialized functions and coordination among these activities is obtained within a sophisticated network of mutual relationships. Efficient exchanges between the various actors require a set of institutions and organizations to keep transaction costs low. “International specialization and division of labor requires institutions and organizations to safeguard property rights across international boundaries so that capital markets (as well as other kinds of exchange) can take place within credible commitment on the part of the players” (North, 1991: 101).

An important aim of institutions is to reduce uncertainty by providing a structure that guides human interaction (North, 1990: 3). Uncertainties arise from incomplete information with respect to the behavior of other individuals in the process of human interaction, from computational limitations of individuals, as well as from the difficulty of measuring all the attributes of a product. By constraining human action in situations of uncertainty, institutions limit the choice set of actors, support economizing on information costs, and thus increase predictability of actions.

Williamson (2000) has distinguished four levels of institutions (Table 1). In our analysis, we focus on the formal institutions at the level of the institutional environment. This is the level of the rules of the game, such as defining and protecting property rights, the political decision-making structure, and the judiciary system. As the flower industry in most developing countries is fully export oriented, formal institutions are more important than informal ones. As Dixit (2004) has argued, the relative importance of formal institutions increases as the scope of market exchange broadens and deepens. One reason is that setting up formal institutions requires high fixed costs but low marginal costs, whereas informal institutions have high marginal costs.

Table 1 Four levels of institutional analysis

	Level	Frequency	Purpose	Theory
1	Embeddedness informal institution, customs, traditions, norms, religion	100-1000 years	Often non-calculative; spontaneous	Social theory
2	Institutional environment: formal rules of the game esp. property (polity, judiciary, bureaucracy)	10-100 years	Get the institutional environment right	Economics of property rights, positive political economy
3	Governance: play of the game – esp. contract (aligning governance structure with transactions)	1-10 years	Get the governance structure right	Transaction costs economics
4	Resource allocation and employment (prices and quantities; incentive alignment)	Continuous	Get the marginal condition right	Neoclassical economics/agency theory

Source: Williamson, 2000: 597

Before (international) exchange can take place, the marginal conditions (level 4 in Table 1) for economic activities should be right. Given the continuous growth of the flower industries in many developing countries, we assume that the resource allocation and employment conditions meet the requirements. Moreover, the world demand for flowers is still increasing (Wijnands, 2005, p66). At level 3 we find the governance structures, which are efficient organizational solutions to the problems of transaction costs. For the flower industry, governance structure choice is directly linked to marketing channel choice (Van der Lans, 2005). As producers target export markets they simultaneously have to decide on the governance structure and the market channel. It is a choice between the spot market of the Dutch auction or a contract with large retail companies.

#### *Growth strategies and institutions*

By the late 1980s, there was among economists and politicians a growing recognition that market liberalization and privatization may not be sufficient to ignite and sustain economic growth. Public policies promoting such structural adjustments (often summarized as the Washington Consensus) should be accompanied by policies that are more institutional in nature and targeted at the working not only of markets, but also of governments. The original list of policy recommendation was expanded to include items that range from anti-corruption and corporate governance to social safety nets and targeted anti-poverty programs. Still, even the augmented Washington list of key elements of a growth programmed does not necessarily explain economic growth. Numerous examples of countries, particularly in Asia, show significant and sustained growth without following the conventional recommendations of liberal markets and a restricted role for government (Rodrik, 2003).

Rodrik (2003) argues that first-order economic principles such as protection of property rights, market-based competition, appropriate incentives, and sound money, do not map into unique policy recommendation. As an alternative, he presents a list of market-sustaining institutions that can be obtained by various institutional arrangements (Table 2). The starting point for these institutions is the recognition that markets need not be self-creating, self-regulating, self-stabilizing, and self-legitimizing. The very existence of market exchange presupposes property rights and some form of contract enforcement. Next, markets require regulation to minimize abuse of market power, internalize externalities, deal with information asymmetries, establish product and safety standards, and so on. In addition, monetary, fiscal and other arrangements are needed to deal with business cycles and the problems of unemployment and inflation. Finally, market outcomes need to be legitimized through social protection, social insurance, and democratic governance most broadly. Together these four types of institutions may sustain markets. We will use this taxonomy of institutions as a starting point for our analysis.

Table 2 A taxonomy of market-sustaining institutions

Market-creating institutions	Property rights
	Contract enforcement
Market-regulating institutions	Regulatory bodies
	Other mechanisms for correcting market failures
Market-stabilizing institutions	Monetary and fiscal institutions
	Institutions of prudential regulation and supervision
Market-legitimizing institutions	Democracy
	Social protection and social insurance

Source: Rodrik, 2003

A number of other scholars have studied the relationship between economic development and institutions. The impact of the social infrastructure on the output per worker is the topic of the research of Hall and Jones (1990). Rodrik (1999) has found that domestic conflicts have negative effects on growth rates. Jütting (2003) and Shirley (2005) have reviewed several papers on the relationship between indicators of economic performance, such as growth, and incidence and quality of particular institutions. From these reviews, two issues are of main interest for our analysis: ‘How to measure institutions?’ and ‘What is the relationship between institutions and economic growth?’.

*How to measure institutions?*

Several indicators are used or constructed that are more or less related to the list of Rodrik (table 2). Hall and Jones (1990) use two indicators of social infrastructure: the Government

Anti-Diversion Policies (GADP) index and the openness of the economy. The GADP is based on the government's role to protect property against private diversion, indicated by the variables (1) law and order and (2) bureaucratic quality, and on government's possible role as a diverter based on the indicators (3) corruption, (4) risk of expropriation, and (5) government repudiation of contracts. The second indicator, the openness of the economy, is based on international trade indicators and government dominance in trade (socialist and export monopoly). Rodrik et al. (2004) measure institutions as perceptions of property rights and the rule of law. Sachs and Warner (1995) state that integration means not only increased market-based trade and financial flows, but also institutional harmonization with regard to trade policy, legal code, tax systems, ownership patterns, and other regulatory arrangements. Rodrik (1999) constructs the quality of governmental institutions based on variables from the International Country Risk Guide (ICRG) database. Cross-country estimations are rather common (see e.g. Hall and Jones, 1990; Rodrik et al., 2004; Easterly and Levine, 2002; and Sachs, 2003). Shirley (2005: 626) critically comments on the variables that are used in cross-country analyses: most variables do not measure institutions but outcomes of institutions (e.g., secure property rights is an outcome and not an institution). She pleads for more precisely defined variables. Despite her criticism, Shirley acknowledges the empirical evidence that institutions that increase political competition, civil liberties and promote cooperation contribute to an explanation of growth of per capita income.

#### *Is there causality between institutions and economic growth?*

What are the causal relations between economic growth and institutions? Hall and Jones (1990) discuss the causality. Openness of the economy is seen as an endogenous variable, perhaps depending on the output per worker. For instance, poor countries with limited ability to collect taxes may be forced to interfere with international trade. The growth of the Ethiopian flower sector has benefited from government support, such as tax exemptions, with the aim to earn foreign currency (MoFed, 2006). Rodrik et al. (2004) have emphasized that both determining the proper structural form of the equations and the endogeneity of variables result in many empirical caveats when seeking to explain economic growth.

#### *Research Approach*

A flower industry that aims at the high quality export market is recognized as an income generator for developing countries with abundant labor. Institutions are of major importance for these internationally organized chains. However, which institutions are appropriate, differs

between countries (Shirley 2005). Different institutions can host comparable outcomes. Jütting (2003) provides a useful definition of institutions. We will follow the framework of Jütting to analyze the impact of institution on sustained growth of the flower industry. The interaction between exogenous and endogenous variables as well as the impact of endogenous institutions and behavioral interaction determine outcomes of institutions. Figure 1 presents Jüttings framework

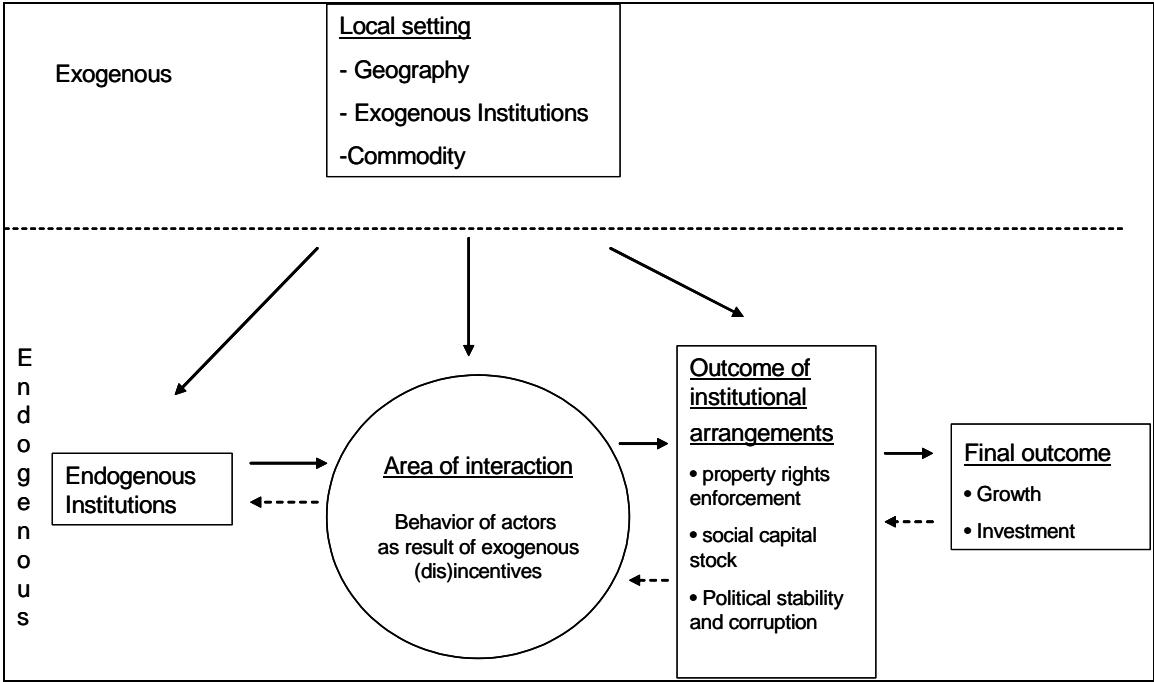


Figure 1 Framework for analyzing the impact of institutions on economic outcomes  
 Source : Jütting 2003

As institution are ‘humanly devised constraints’ to reduce uncertainty, the form will differ with the culture of a country. Behavior of actors complicate further measuring differences between countries. Cross-country comparison will be difficult or even impossible by using institutions and the behavior of actors as independent explanatory variables. In our approach, we aim at explaining the finale outcome (sustained growth) by the outcomes of institutions: the last stage in the approach of Jütting. Transparency in the outcomes is of major importance in global commodities chains. Gereffi et al. (2005) indicate complexity of information exchange and codification of transactions as important determinants in global commodity chains, such as the cut flower chain. Uncertainty in the outcome of institutions will complicate the governance structure of the chain. By using the outcomes of the institutions, endogeneity is not an issue. The disadvantage of this approach is that only relations between growth and institutions are shown. It does not give a causal relation, which means that we do not seek to explain growth by the quality level of the institutions.

### 3. Hypotheses, data and country selection

Based on the review of the theoretical and empirical literature above we pose the following hypotheses: *Sustained growth of real GDP per capita depends on the outcomes of institutions. Sustained growth in the share of the world export market of flowers depends on the outcome of the same institutions.*

#### Dependent variables

##### *Growth in flower exports*

The value added or production values are preferred as data for describing the growth of an economic sector. However, few statistics of the flower production value or even the production areas are available. FAO-statistics do not include flowers. The International Association of Horticultural Producers presents the data of a limited number of countries. Poor statistics in developing countries are the cause: the outcome of poor institutions. This is also the reason that export values are poorly recorded in the custom statistics. As most flowers are imported by high-income countries, the import values of all world countries originating from specific exporting countries are used as a proxy for export values. This indicator will be referred to as export by a country. The ITC/WTO trade database provides data from 1995 until 2005. The developments of the time series are in line with expert opinions on the developments in the international trade of cut flowers. As dependent variable, the growth of the share on the world market of the values between 1995 and 2005 is used. By choosing growth of world market share, we eliminate the influence of fluctuations in prices and the overall growth in world exports. A positive performance is measured if the export of a country grows faster than the total world exports.

Countries are selected with at least 1 million USD flower export average in 1995 and 1996 or in 2004 and 2005. The research is aiming at sustained growth and not at ignition of growth: therefore in both years should a registered level of flower exports. The threshold of 1 million USD is meant to select countries that are in business and are relevant on the world market. This resulted in 49 countries with a share of over 99.75% in the total exports. The Dutch share is 57%. A second selection identifies the developing countries. Countries are selected as developing country with a GDP per capita (in constant 2000 USD) below 10,000 USD in each year. The data are retrieved from the World Development Indicators database (WDI). This resulted in 32 countries, with a total market share of 34% in 2004/2005. This market share is considerable higher than the 28% in 1995/1996.



### *Gross domestic product per capita*

Following studies by Sachs (2003), Rodrik et al. (2004) and Aron (2000) the growth of GDP per capita in constant USD 2000 is used. The difference between GDP per capita in 1994 and 2004 is taken as indicator for the overall growth of an economy. The data are from the World Development Indicators (WDI) database. Using the GDP per capita eliminates the effect of a country's population size. This indicator might also be seen as proxy for labor cost. Flowers are labor intensive and lower labor costs should have a positive effect on export growth.

### Exogenous independent variables

#### *Distance*

The main consumption regions for cut flowers are Europe, USA and Japan. The distance of a country to consumption region determines the costs of logistics. E.g. the airfreight costs for flowers from Nairobi to Amsterdam amounts one third of the auction price (Wijnands, 2005: 51). Statistics show that the majority of flowers from Africa has Europe as destination, from South America the USA and in Asian region Japan (Wijnands, 2005). The distance is measured in km from country's capital to Amsterdam, Washington viz. Tokyo. The assumption is that the distance has a negative influence on the export growth.

#### *The Economic Freedom of the World (EFW) index*

This index is an overall indicator for the outcomes of all institutional arrangements (Gwartney and Lawson, 2006). A positive influence on the growth is expected and a strong correlation with the partial indicators discussed below. The indicators below are a specification of this overall indicator.

### Independent variables: outcomes of institutional arrangements

As independent variables, we use the outcome of market-sustaining institutions (Table 2). We will here discuss each variable and present the indicators used.

#### *Market-Creating Institutions*

##### a) Property rights

- A sector specific indicator is the protection of new flower varieties. Flower rootstocks and seedlings are important assets for growers. Markets demands innovative colors and shapes of flowers. Market access to new flower varieties and protection of the property rights of breeders will be enabled by a membership of the International Union for the protection of

new varieties of plants (UPOV). The UPOV provides the date of membership and the date of being party of the act. Enforcement of this act is complying with property rights. The expected sign is that the years at January 1<sup>st</sup> 2006 of complying with the act will positively influence the export growth.

- A general indicator is the ‘Protection of the intellectual property’ provided by the Fraser Institute (Gwartney and Lawson, 2006). The level of the index indicates the quality of institutions and is assumed of having a positive influence on the export growth.
- Corruption deals with the damage brought by bribes and means lower values of assets. Levels of corruption do not change sharply by short term actions. The 2000 Corruption Perception Index (CPI) is taken from Transparency International (TI, 2006). The index ranges from 0 (highly corrupt) till 10 (highly clean). A higher index influences positively the export growth.

#### b) Contract enforcement

The efficiency of contract enforcement is indicated by following the evolution of a sale of goods dispute and tracking the time, cost, and number of procedures involved from the moment the plaintiff files the lawsuit until actual payment. The rank for 2005 from ‘Doingbusiness’ is used: previous years are not available. Countries are ranked from best score starting with 1. The rank number will negatively influence the export growth.

### *Market-Regulating Institutions*

#### a) Regulatory Bodies

Spiller and Tommasi (2005. p538) emphasizes the understanding of institution of regulation ‘as facilitating entering into complex intertemporal agreements of among policy-makers, agreements that have direct consequence for firms’ incentives and performance’. The variables chosen are from doing business 2005. A higher rank number will negatively influence the export growth.

- Costs of starting a business. This topic identifies the bureaucratic and legal hurdles an entrepreneur must overcome to incorporate and register a new firm. It examines the procedures, time, and cost involved in launching a commercial or industrial firm with up to 50 employees.
- Costs of obtaining licenses. This topic tracks the procedures, time, and costs to build a warehouse, including obtaining necessary licenses and permits, completing required notifications and inspections, and obtaining utility connections.

#### b) Mechanism to correct market failure

Market failures deal with economic inefficiencies, even if the government does not block investments and entrepreneurship.

- Rodrik (2003) indicates learning and human capital as a major indicator. The education index of the human development report is selected. The index is based on the adult literacy rate and the combined gross enrolment ratio for primary, secondary and tertiary schools (HDR, 2006). It is expected that a higher rate has a positive influence on the export growth. People are then educated to do business in an international environment.
- The market externalities are the second group in which openness of the economy is a selected indicator. The index for trading across borders from Doingbusiness is used. The index 'looks at the procedural requirements for exporting and importing a standardized cargo of goods. Every official procedure is counted -- from the contractual agreement between the 2 parties to the delivery of goods -- along with the time necessary for completion'. A higher rank number will influence negatively the export growth.

#### *Market-stabilizing institutions*

##### a) Monetary and fiscal institutions

As an outcome of the institutional arrangement, the inflation level has been used. This index GDP deflator from WDI is taken. The indicator is the average inflation level from 1995 to 2003. Higher inflation decreases the export growth, thus a negative sign

##### b) Institutions of prudential regulation and supervision

The aim is to protect financial stability. As indicator is taken the indicator 'Price Controls' from the Fraser Institute (Gwartney and Lawson, 2006). The level of the index indicates the quality of institutions and is assumed of having a positive influence of the level.

#### *Market-legitimizing institutions*

##### a) Democracy

Democratic institutions and civil liberties can be seen as meta-institutions that help society to make appropriate selections out of economics institutions (Rodrik, 2003, p26). The index is based on Political rights and Civil Freedom. The data from 1999-2000, in middle of the performance measurement period, is taken from the annual survey of the Freedom House. The freedom index ranges from 1 (fully free) till 7 (not free), which means negatively correlated with the performance indicator.

## b) Social protection

The Fraser Institute provides an indicator based on an unemployment benefits system. The survey counts many missing values: 13 out of 32 are not available. The unemployment rate of the World Development Indicator (WDI) counts also many missing variable. More important is the bias. The WDI presents levels far below 20% for Zambia and Zimbabwe around the turn of the millennium whereas the CIA-fact book estimates 50 respectively 80% in 2006. For this reason, the estimates of the CIA fact book are taken.

Table 3 provides an overview of the data and the expected influence of the outcome of the institution on the export growth of flowers. Due to too many missing variables, Ethiopia and Yemen are excluded from the research, both countries with a strong export growth. The sample finally has 30 countries. Annex 1 shows the selected countries and the growth indicators.

Table 3 Summary of variables and expected influence on independent variable.

Taxonomy	Variable	Description	Average	Stdev	Expected influence
	Export growth	Growth of the export market share of flowers between 1995 till 2005 (Also the average export 1995-2005 is provided)	0.06	0.14	
	GDP Growth	Growth of Gross Domestic Production per capita in constant 2000 USD price (Also the average GDP 1994-2004 is provided)	388	463	(Negative for flower export)
	km	Distance from exporting to importing country (Only for flower exports)	5506	2248	Negative
	EFW	Overall Economic Freedom Indicator a)	6.06	0.90	Positive
Property Rights	UPOV	Years of membership at 1/1/2006 of UPOV (only for flower exports)	2.33	3.59	Positive
	IPR	Intellectual Property Rights protection a)	3.79	1.11	Positive
	CPI	Corruption Perception index a)	3.52	1.19	Positive
Contract enforcement	CE	Contract enforcement b)	100	38	Negative
Regulatory Bodies	Start	Starting a business B)	96	40	Negative
	License	Dealing with licenses b)	103	52	Negative
Market Failure	Edu	Education index. A higher index means higher education level	0.77	0.12	Positive
	Trade	Trading across borders b)	98	43	Negative
Fiscal institution	Infl	GDP deflator (inflation correction)	12.36	14.11	Negative
Prudential regulations	Price	Price control a)	4.82	1.80	Positive
Democracy	Democ.	The freedom index is used ranging from 1 (fully free) till 7 (not free)	3.72	1.50	Negative
Social protection	Unemp.	Social exclusion, based on unemployment rate	18.23	18.60	Negative

a) scale 1= low, 10 = high quality; b) Rank of countries: 1 is best performing

## 4. Results

Table 4 shows the correlations between the dependent variable growth of the export market share of flowers and the growth of the GDP and the selected independent variables. Growth of the GDP is positively correlated with positive outcomes of institutions: all signs are in harmony with the expected signs. From the selected 11 variables 4 are significant at  $p < 0.01$  level and 2 variables at  $p < 0.05$  level. The statistically significant and positive correlation of Corruption index and Democracy variable are in line with the conclusions of Shirley (2005, 627). In addition, the variables openness of the economy (trade), education and regulatory bodies (starting a business) are positively and significantly related to the growth of the GDP per capita. The two indicators 'Inflation' and 'Price control' representing market-stabilizing institutions in the framework of Rodrik (see table 2) are both not significant. The correlation between the average GDP and the growth is rather strong. The correlations show an even more significant impact of institutions on the average GDP per capita.

The overall Economic Freedom of the World variable (EFW) is, as expected, strongly and significantly related to many other variables representing the outcome of institutions.

Shirley (2005: 614) states that: 'In places where institutions increases the certainty that contracts will be honored and property protected, individuals will be more willing to specialize, invest in sunk assets, undertake complex transactions and accumulate and share knowledge'. Flower growing can be seen as highly specialized in developing countries. Flowers are highly perishable products and in most countries, there is no education or training for the production of high quality products for a domestic market. The transactions might therefore be seen as highly complex. It is quite remarkable that no empirical relation of the outcome of institution with the export market growth is found: all correlation coefficients are none significant and many have signs opposite to the expected. This suggests that the growth of this specific sector depends on different institutions. The strong and significant ( $p < 0.01$ ) correlation between the plant property rights (UPOV years) and the average export level indicates such a specific relationship.

Table 4 (Pearson) Correlation matrix of the selected variables (n=30)

	Av. export	Export growth	Av. GDP	GDP Growth	km	EFW	Upov years	IPR	CPI	CE	Start	Licens e	Edu	Trade	Infl	Price	Democ	Un-empl
Av. Export	1																	
Export growth	0.246	1																
Av. GDP	-0.046	-0.181	1															
GDP growth	-0.224	-0.145	<b><u>0.715</u></b>	1														
Km	-0.132	0.023	-0.174	-0.165	1													
EFW	-0.107	0.109	<b><u>0.442</u></b>	<b><u>0.428</u></b>	0.036	1												
Upov years	<b><u>0.481</u></b>	0.297	<b><u>0.383</u></b>	0.102	0.070	0.193	1											
IPR	0.067	0.022	<b><u>0.429</u></b>	0.289	0.159	0.181	0.299	1										
CPI	-0.172	-0.242	<b><u>0.626</u></b>	<b><u>0.587</u></b>	0.119	<b><u>0.487</u></b>	0.206	0.542	1									
CE	0.047	-0.204	-0.031	-0.033	-0.248	-0.264	-0.274	-0.160	-0.141	1								
Start	-0.014	0.227	<b><u>-0.383</u></b>	<b><u>-0.393</u></b>	-0.209	<b><u>-0.426</u></b>	-0.046	<b><u>-0.554</u></b>	<b><u>-0.671</u></b>	0.345	1							
License	-0.315	-0.201	<b><u>-0.399</u></b>	-0.253	-0.234	<b><u>-0.502</u></b>	<b><u>-0.513</u></b>	-0.333	-0.260	0.329	<b><u>0.485</u></b>	1						
Edu	0.160	-0.007	<b><u>0.634</u></b>	<b><u>0.548</u></b>	-0.098	0.318	<b><u>0.422</u></b>	<b><u>0.414</u></b>	0.343	-0.128	-0.185	<b><u>-0.435</u></b>	1					
Trade	0.263	0.176	<b><u>-0.594</u></b>	<b><u>-0.597</u></b>	0.067	<b><u>-0.422</u></b>	-0.161	<b><u>-0.475</u></b>	<b><u>-0.508</u></b>	0.041	0.310	0.141	<b><u>-0.488</u></b>	1				
Infl	-0.017	-0.163	-0.052	-0.119	0.089	<b><u>-0.385</u></b>	-0.175	-0.070	-0.034	-0.156	-0.091	0.241	0.014	0.217	1			
Price	0.025	-0.016	<b><u>0.370</u></b>	0.202	0.128	<b><u>0.563</u></b>	<b><u>0.376</u></b>	-0.131	<b><u>0.503</u></b>	-0.079	-0.210	-0.308	0.19	-0.084	-0.058	1		
Democ	0.051	0.104	<b><u>-0.472</u></b>	<b><u>-0.511</u></b>	-0.189	<b><u>-0.606</u></b>	-0.187	-0.306	<b><u>-0.460</u></b>	-0.033	<b><u>0.397</u></b>	<b><u>0.518</u></b>	<b><u>-0.415</u></b>	0.250	0.127	<b><u>-0.421</u></b>	1	
Unempl	0.016	0.094	<b><u>-0.496</u></b>	<b><u>-0.402</u></b>	<b><u>.485</u></b>	<b><u>-0.505</u></b>	-0.184	-0.130	-0.270	-0.268	0.147	0.213	<b><u>-0.371</u></b>	<b><u>0.631</u></b>	<b><u>0.499</u></b>	-0.205	0.311	1

**Number:** Correlation is significant at the 0.05 level (2-tailed).

**Number:** Correlation is significant at the 0.01 level (2-tailed).

## 5. Discussion

The growth in GDP per capita is strongly and significantly correlated to the outcome of institutions, but the export growth of cut flowers is not related at all to the quality of institutions (measured by the outcome of institutions). What might be the explanations for this?

1. Flowers might be a special economic sector. In most developing countries, the domestic market is negligible. The sector depends fully on foreign markets and therefore only a selected group of entrepreneurs is involved. Producing flowers for the international market requires a strong international orientation and very specific agronomic knowledge.
2. The flower growers in developing countries depend on foreign knowledge. The Israeli and Dutch are leading in the flower business. Mainly companies from these countries supply equipment, knowledge and marketing opportunities. It may be reasonable to expect that many institutional arrangements be strongly connected with the flow of goods and information. In Kenya about one third of the flower farms are managed by Dutch, one third by other nationalities and only one third by native Kenyan (van der Lans, 2005). Also in other countries the influence of the Dutch and Israeli is known, but has not been recorded into statistics.
3. As far as we know flowers are not grown in economic free zones, but special arrangements are made. Several countries stimulate flower growing and exporting in order to reduce unemployment and to earn foreign currency. Cut flower export is in the top 5 export products of countries like Kenya and Ethiopia. Producing high value export products, such as flowers, supports the employment of many people: approximately 25 employees per ha. Furthermore, the export value of 1 hectare roses is for instance USD 150,000 which is equivalent to 1000 tons of wheat or to 600 to 700 ha wheat land in Ethiopia.
4. Flowers are highly perishable products and transported by airfreight to the main consumer markets. Availability of sufficient air cargo capacity at competitive prices with a daily frequency is of high importance. While flowers fill the cargo space of outbound flights, other cargo has to be available for inbound flights. The Tanzanian flower sector for instance relies partly on Nairobi airport despite the presence of an international airport in the flower growing area. In this case, the air cargo capacity does not fit with the requirements of the flower exporters.

## 6. Conclusion

Instead of measuring institutions, which is quite difficult, we have measured the outcomes of institutions. Even with this simplification, it is hard to find comparable data for all countries. Simple macro-economic data like unemployment rates are not always available and official statistics differ compared to information from intelligence services such as World Development Indicators and CIA-factbook. Another limitation of the data is that we measure the quality of (outcomes of) institutions at one moment, while we measure economic performance over a period of time. Ideally, we would have to measure institutions at two moments at a longer time interval (above 10 years), but we do not have sufficient information to do that.

The growth of the GDP per capita is as expected positively correlated with the outcome of the quality of institutions. In this respect the selected developing flower growing countries do not differ with the mainstream results of other studies (Shirley, 2005, Jütting, 2003). The two indicators 'Inflation' and 'Price control' representing market-stabilizing institutions in the framework of Rodrik (see table 2) are both not significant. The other three institutions from the framework of Rodrik show significant correlations.

No evidence has been found that export growth of cut flowers is related to outcomes of institutions. We expect that the flower exporting industry is a special case that is rather unrelated to the rest of the economy. Due to the involvement of foreign knowledge, inputs and marketing the domestic institutions might be of less importance. The significant ( $p < 0.01$ ) correlation of the years of UPOV membership (International Union for Protection new plant varieties) with the level of flower exports supports this assumption.

Future research may focus on sector specific institutions, like membership of UPOV, codes of Good Agricultural Practice (BRC, EurepGAP) or transport infrastructure.

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Annex 1: Selected countries, flower exports and GDP per capita in constant 2000 USD.

	Average export (1,000 USD) in 1995/1996	Average export(1.000 USD) in 2004/2005	Difference in export market share 95-05	GDP per capita (constant 2000 USD)	GDP per capita (constant 2000 USD)	Growth GDP per capita (constant 2000 US\$)
Bolivia	1090	34	-0.027	926	1034	108
Brazil	1821	6506	0.073	3252	3564	312
Cameroon	164	1973	0.032	525	662	137
Chile	2723	4328	0.010	3946	5462	1516
China	1037	27308	0.476	600	1323	723
Colombia	562719	734633	-0.874	2012	2091	79
Costa Rica	23779	31920	-0.021	3558	4328	770
Côte d'Ivoire	2168	4227	0.022	579	574	-5
Dominican Rep.	1788	2569	0.002	1712	2476	764
Ecuador	123286	351705	3.318	1336	1459	123
Egypt	457	1648	0.019	1235	1615	380
Guatemala	10716	5697	-0.169	1554	1722	168
India	6260	9894	0.022	350	538	188
Indonesia	459	1890	0.023	774	906	132
Kenya	107343	325621	3.246	413	427	14
Malawi	3045	354	-0.071	124	153	29
Malaysia	12204	45228	0.520	328	429	101
Mauritius	6435	2819	-0.113	2955	4289	1334
Mexico	20932	17217	-0.219	5309	5968	659
Morocco	16355	3703	-0.350	1152	1349	197
Peru	6453	6881	-0.038	1848	2206	358
Poland	331	4750	0.079	3145	4890	1745
South Africa	14079	25512	0.109	2934	3312	378
Sri Lanka	565	1115	0.006	677	962	285
Tanzania	5130	14901	0.143	239	313	74
Thailand	73159	63154	-0.709	1906	2356	450
Turkey	14348	22644	0.050	2527	3197	670
Uganda	3841	27787	0.413	192	267	75
Zambia	7279	17847	0.142	311	336	25
Zimbabwe	54967	48548	-0.512	615	457	-158