September 2013

UN ESCWA
United Nations
Economic and Social Commission for Western Asia

Partnership in Production Opportunities Within the ESCWA Region

Scouting the ESCWA region for competitive production opportunities useful in the global value chain for regional partnerships and/or outsourcing

Table of Contents

Table of Figures

Acknowledgments

This report was written by Ms. Hana Hallaj, UN ESCWA Technology Centre Consultant.

List of Acronyms and Abbreviations

AFA	Arab Fertilizer Association
CAGR	Compound Annual Growth Ratio
DAP	Diammonium Phosphate
ESCWA	Economic and Social Commission for Western Asia
FDI	Foreign Direct Investment
FRBKC	Federal Reserve Bank of Kansas City
GAFTA	Greater Arab Free Trade Area
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GPCA	Gulf Petrochemicals & Chemicals Association
GVC	Global Value Chain
ICT	Information and Communication Technology
IFA	International Fertilizer Association
IFDC	International Fertilizer Development Centre
K	Potassium
MAP	Monammonium Phosphate
MNE	Multinational Enterprise
MOP	Potassium Chloride
N	Nitrogen
NP	Nitrogenous Phosphate
P	Phosphorous
STI	Science, Technology and Innovation
TFP	Total Factor Productivity
TSP	Triple Superphosphate

Executive Summary

❖ Industrial Production in the ESCWA Region

High productivity is an important element for macroeconomic competitiveness. However, it is ultimately linked to the sophistication of its business environment and the integration of its parts under a clear vision. Governments should open up their countries' production to new markets and strengthen their networks focusing on key sectors for growth. The ESCWA region is considered a fertile hub for manufacturing industries to proliferate and grow due to a number of abundant components attractive for foreign and local investors such as cheap labor and energy, raw materials, geographic proximity and market size (local and export).

Even though, industrial production already plays a large role in the ESCWA region (up to 60% of GDP in some countries), there are disparities in industrial indicators between member states. Regional trade agreements that have been established have still to reach momentum in terms of participation and establishment of trade unions. They need to be coupled with strong production clusters that are integrated into the global value chain in order to achieve their regional economic growth target. There is a need to endorse modern regional sector strategies that can aggregate higher economic gains, reap larger benefits and generate more employment.

The report is built on the main assumptions that the identification of rewarding production sectors has been made on the bases of a set of variables that allow the region to be more competitive on a global frontier. These variables include: value of exports, market growth, the strength of the ESCWA region as a key player in the global value chain, value-chain breadth for the identified sector (opportunities for up-stream and down-stream), and job creation. The sectors identified are the fertilizers, chemicals and bio-fuels, jewelry, textiles, machinery, and electric and electronic equipment. These sectors have still yet to reach their full potential (moving up-stream and down-stream) engaging all stakeholders in the value chain and developing a clusters infrastructure to become more competitive. A geographic map representation of promising production sectors per ESCWA country has also been developed in Chapter I.

❖ The Agro-chemical and Agro-food Sector

The fertilizer sector is a very promising sector for the region, not only because it has the most abundant and competitive raw material to produce fertilizers in the world, but because the region is pursuing achieving greater self-sufficiency in food-production as well. ESCWA countries' fertilizer exports are already growing especially in the following key markets such as Brazil, India, USA and South Africa. The two main fertilizers that are dominant in the region, nitrogenous (N) and phosphate (P) have been examined in detail in Chapter I. The report points out to the climbing rise in global demand and prices of both fertilizers and food products. Hence, it urges that fertilizer production needs to grow vertically and horizontally in order to compete with Chinese expansion plans and cater to growing food demand in the world especially coming from BRICS and African nations and benefit from agro-

chemical shrinking capacities in Western Europe. P and N fertilizer producers in the region can play a global leadership and macro-decisive role especially through providing regional agro-chemical solutions to local and growing markets.

Arab countries are the largest net importers of cereals in the world according to UN trade data 2012. And even though trade within the region has grown in recent years, and a number of investments in agriculture have been made, the Arab World needs US$ 80.65 billion in agricultural investment to close the widening food gap as quoted by H.H. Sheikh Hamdan bin Rashid Al Maktoum, Deputy Ruler of Dubai and UAE Minister of Finance.[1] Research completed by the World Bank also points out to the opportunities in agro-food manufacturing that are still at an infant stage as oppose to plain agricultural investments that have already started. Chapter II indicates the profitability of agro-businesses in Mashreq and Maghreb countries and the complementary characteristics of agricultural endowments making the agribusiness sector a source of inter-Arab economic integration and development.

- **Suggested Programs for Production Partnerships**

The conclusion is that there are opportunities for agro-chemical (chemicals used in agriculture) and agribusiness investment in the region in general, and primarily, in upstream and downstream opportunities. This paper also urges to innovate into new agro-business sectors such as bio-fuels and extend agro-food processing methods through networks and partnerships. The lack of engagement of all stakeholders (public and private) and inadequate coordination and consultation between them into effective sectorial clusters has led to weak incentives to support and develop the agro-chemical and agro-food sectors in the region. A proposed framework has been established as a step towards building a holistic agro-chemical and -food cluster and integrating it into the worldwide agro-network. The framework is deducted from Turkish and East Asian inspiring experiences that have adopted a long-term vision of strong industrial policy combined with an outward market direction and export diversification. The 2 steps in the model include the labels “Co-opetition” and “Global-Integration”.

Foreign Direct Investment (FDI) in agriculture improves food supply and increases export revenues and consequently, stabilizes food prices, food security and increases food income. However, the Agro-food sector is one of the least destination sectors for FDI in the region. A need for FDI in the agribusiness sector is vital in order to create more employment and spread the use of modern manufacturing techniques and technology, and access to global markets. Multinational firms play a prominent role in global value chains because of their numerous affiliates abroad and global presence. Leading multi-national corporations have moved on to applying the new notion of “shared value” by creating economic value that also creates social value by tackling the needs and challenges of the society. The report recommends promoting the region as a valuable cost-effective rent for agro-FDI and outsourcing solutions as appose to independent exporters of fertilizer or basic agro-food.

[1] http://halalfocus.net/uae-arab-world-needs-over-80-bn-in-agricultural-investment-to-fill-food-gap/ 2013

Examples show that in the absence of significant integration into the value chain, liberalization of manufacturing did not enable Egypt and Morocco to gain access to global markets (Taha 2012) [2] as local companies are still in the stage where they lack the knowledge, skills, funds and technology needed to integrate into the global value-chain. This is why the regional agro-cluster should seek to attract large multinational food conglomerates such as Kraft and Nestle or others in BRICS countries with a growing food consumption that are also striving from the other end to find rich labor and agro-resource locations for its off-shore investments.

- **Moving Forward**

The explicit application of co-opetition between agro-cluster members and the use of special ICT and facilitated transportation to support it represents a practical and applied tool for production integration between ESCWA members and as a consequence production innovation. As presented in the report, trade enhancement coupled with production integration with a market focus will pave the road to more economic growth and the formation of a knowledge economy. Instead of the government picking "winners and losers" for co-opetition, the marketplace should make decisions regarding firms worthy of investment. However, a basic criterion for selecting paramount agro-chemical enterprises with a potential for global commercialization has been identified in Chapter II and a list of companies has been supplied in the Annexes. Chapter II also lists the principal stakeholders in the structure of the co-opetition model to be investigated further by Arab government bodies.

The adopted notion of "shared value" and investing in developing the community to develop their business is seen as a win-win initiative that has succeeded by many multi-national conglomerates in developing countries. As previously mentioned, the Agro sector is still under developed in the under saturated market of the ESCWA region even though the inputs and raw material are prevalent. This study calls for more foreign investment in the dominating processed food area to be located in the region in order to acquire modern technical skills and knowledge, attain transparent market distribution, generate more employment, and access to global channels. A list of large MNEs in food production is listed in the Appendix 4. A next step would be creating the right business environment and contacting these multinational entities for potential joint ventures and investments in the region.

[2] CMI, World Bank, EIB, ISESCO; Transforming Arab Economies: Traveling the Knowledge and Innovation Road (2013)

Introduction

In an increasingly fast and competitive globalized economy, developed countries have succeeded in focusing on key strategic sectors for achieving economic growth. Even though their policies and approaches differed according to socio-economic, financial and institutional dimensions, many relied on innovation or more specifically on the term we use in this report "production innovation" to thrive in economic throughput. They have evaluated their core-competences, identified value-added sectors and formed aggregations and clusters enabling them to achieve economies of scale and scope and hence play a pivotal role in the global value chain.

Innovation creates ideas, manufacturing multiplies them, and trade diffuses them admitting them into larger markets. Consequently, manufacturing is regarded as the key driver to ameliorating the economy and creating jobs. Larger corporations and clusters play a significant role both on a micro and macro scale as they have stronger commercial bargaining power, which tends to minimize the impact of stand-alone SMEs. "Clusters are defined as groups of industries with high levels of co-location in terms of employment." They usually concentrate in particular regions and sell products across countries and regions. Analysis of (Mercedes Delgad, Michael E. Porter, Scott Stern; 2011) also suggests that the functioning of strong clusters in a region enhances growth opportunities in other industries and clusters and leads to stronger regional economic performance.[3]

Clusters represent a new way of thinking about local and regional economies, and they necessitate new roles for companies, governments, and other institutions in enhancing competitiveness. Clusters have been further induced by new advancements in ICTs (Information and Communication Technologies), which have marginalized the traditional importance of location. Economic regions have realized the need to harness science, technology and innovation (STI) in developing their manufacturing capabilities and adapting to new markets.

In addition to innovation and the agglomeration of clusters, studies on applied Global Value Chains (GVC) along the production chain have proliferated in modern literature. Globalization has increased competition on the national scale and national corporations have been seeking new efficient models of economic practice in order to achieve cost-cutting on the supply side and manifestation in unsaturated markets on the demand-side." GVC's have proven to link a growing number of enterprises, industries, activities and countries in international production networks. Today, success in international markets depends as much on the capacity to import high-quality inputs as on the capacity to export." [4]

Governments can play a key role in the valorization of their country's production through opening up and integrating into new markets, utilizing new production technologies, and strengthening networks and co-operation. Outsourcing, off-shoring and outward foreign and national investment all offer solutions to boost export

[3] Mercedes Delgad, Michael E. Porter, Scott Stern; Clusters, Convergence, and Economic Performance (2011)
[4] Interconnected Economies: Benefitting from Global Value Chains; OECD (2013)

competitiveness and access to new market locations by integrating operations in the global value chain. GVCs also incorporate small and medium-sized enterprises (SMEs) in niche areas of the value chain that may contribute indirectly to the exports of larger firms. [5]GVCs trigger the development of higher production standards and employment, and area means of knowledge and technology sharing.

The ESCWA region is considered a fertile hub for manufacturing industries due to a number of abundant components attractive for foreign and local investors such as cheap labor and energy, raw materials, geographic proximity (linking Europe, Asia and African continents) and entrepreneurial culture. However, efforts of targeted economic collaboration between members are hardly solid. Preferential trade agreements between member countries have been ratified and implemented such as AGADIR and GAFTA seeking to strengthen regional co-operation and trigger more trade activity. Studies have indicated the impact of these trade policies was undeniably positive yet below available capacity and insufficient to influence overall regional economic growth[6].Trade agreements and custom facilities need to be coupled with clusters, GVC enhancement and strategic investments in order to acquire economic growth through regional integration.

Developing economies such as the majority of the ESCWA members can focus more on innovation in production in order to tackle trade deficits and unemployment, and attain dynamic regional integration. Few studies have approached the region with an eagle-eye seeking lucrative sector opportunities and identifying collaboration investments and partnerships in regional production in order to enhance growth. We have attempted in this paper to highlight competitive production networks within the ESCWA Region with the aim of illuminating the importance of these sectors, matching them with the requirements of international and regional markets, and pave the way for the creation of Regional Sector Strategies. This paper also puts forth global value chain candidates and regional key players for inter and intra-regional partnerships and/or outsourcing.

The report is built on the main assumptions that the identification of rewarding production sectors has been made on the basis of a set of variables that allow the region to be more competitive on a global frontier. These variables include: value of exports, market growth, the strength of the ESCWA region as a key player in the global value chain, value-chain breadth for the identified sector (opportunities for up-stream and down-stream), and job creation. A funnel approach has been designed as a methodology to be used from allocating promising industry trends, to assessing the demand and supply of ESCWA countries, to identification of sectors and their value-chains, and finally to pinpointing key enterprises and partnership opportunities.

Some data constraints arise from the industry-specific indicators that are outdated in the countries of the ESCWA region. This point inevitably leads to the importance of sustaining production data for the ESCWA region. Nonetheless, the real challenge in this project lies in developing a useful taxonomy for regional production integration or a partnership model to be adopted in the ESCWA region taking into account the social and economic disparities between member countries.

---

[5] Interconnected Economies: Benefitting from Global Value Chains; OECD (2013)

[6]Chemingui M.; Trade Facilitation in ESCWA Region: Challenges, Future Opportunities and Policy Options (2013){DRAFT}

The report shall not claim to be comprehensive in the sense that it will highlight a number of growing core production sectors and their supplementary sectors. However, it will tackle only 1 sector in detail that is deemed to be the most strategic. Primarily, according to the aforementioned criteria, the sector that stands out as the most prudent and rewarding on a regional scale is the fertilizers (Agro-chemical) and its direct linkages with the Agro-Food sector.

The report has 2 main chapters: Production Opportunities in the ESCWA region, and Linking Enterprises. Chapter I shall use the above methodology to highlight potential sector opportunities for strengthening production in the ESCWA region. Chapter II shall discuss partnership options for economic growth tying the macro analysis to the micro industry level by identifying a list of key players in the region for the development and the global commercialization of these sectors. It will also attempt to propose business linkages to be pursued and promoted by these companies and their regional and international partners. Finally, the conclusion will summarize the main findings and propose steps for implementation of the discussions and recommendations.

I- Production Opportunities in the ESCWA Region

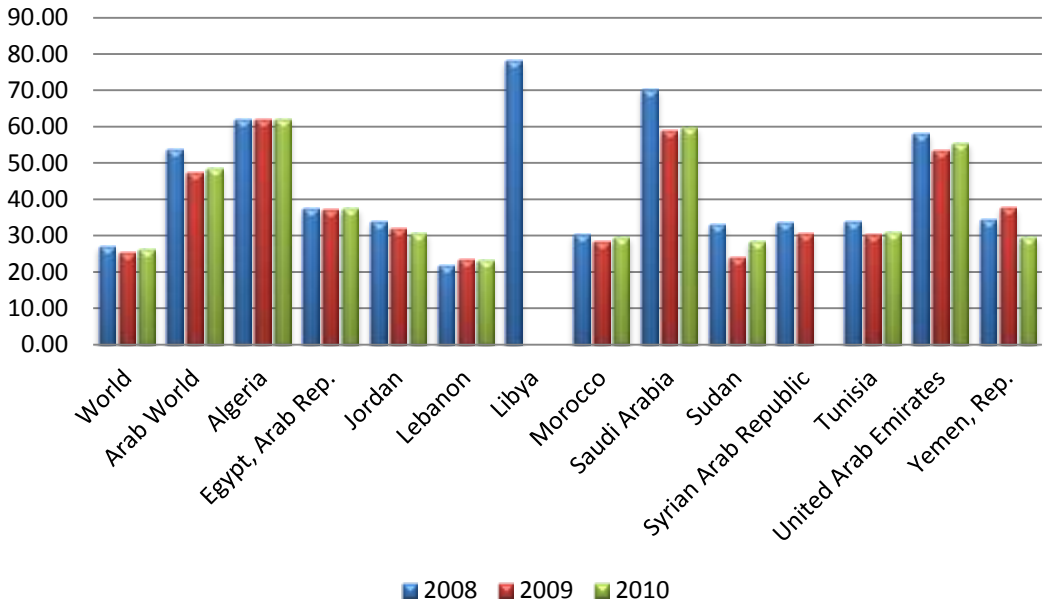
1.1 Industrial Production in the ESCWA Region

Industrial production is the manufacturing production (the value-added output of manufacturing companies) coupled with the supply of energy and water, and output of mines, oil wells and quarries and additional industry groups such as technology, innovation, and knowledge intensive industries.[7] It generally excludes agriculture, trade, transport, finance and all other services. The difference between manufacturing and industrial production is the added mining and quarrying fields that increase production by an additional 10% of GDP on average and is usually bigger where the energy-producing sector is large in a country. Industrial production is considered an indication of the state of the economic cycle and economic fluctuations. In our study, we will be searching the ESCWA region for attractive sectors of industrial production based on regional competitive advantage, value of exports, value-chain breadth, market growth, and job creation.

According to World Bank statistics 2010, the share of total industry mining and manufacturing of the Gross Domestic Product (GDP) in Arab member countries, varied between 23% and almost 60%, the lower ratio percentage in Lebanon and the higher ratio in Saudi Arabia. Libya, Algeria, and the UAE are also considered heavily reliant on industry with industry representing over 50% of their country GDP. Libya in 2008 had the highest Industry as a percentage of GDP in the world according to World Bank statistics. It is interesting to compare these ratios with some of the world's strongest growing economies such as BRIC Countries and Turkey in 2010 (Brazil 28%, Russia 37%, India 28%, China 47%, and Turkey 27%), which leads to conclude that industrial production in the region is a key source of GDP as it stands higher than the average world ratio of 25%. Figure 1 illustrates the ratio of Industry % of GDP for Arab Countries where there is available data.

FIGURE 1: INDUSTRY AS A % OF GDP

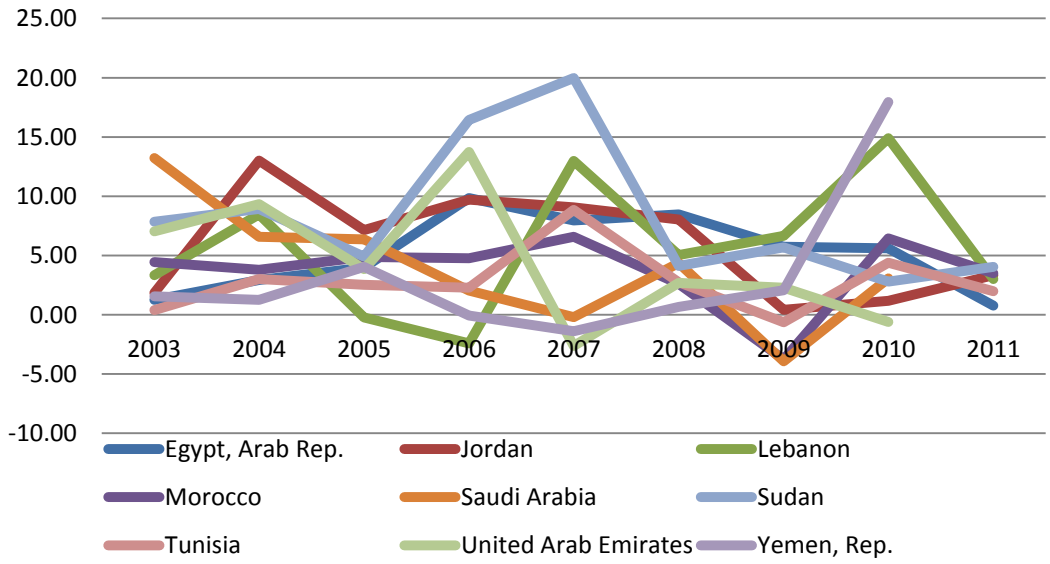
[7] As defined by World Bank Development Indicators and the International Standard Industrial Classification of All Economic Activities (ISIC) Version 3



Source: World Bank Data 2010

Industry annual growth % in the ESCWA Region has been recovering slowly after the global financial crises. The highest growth rate in 2012 can be seen in countries such as Kuwait and Yemen followed by Lebanon, Jordan and Sudan and the lowest in UAE. Sudan has experienced a remarkable increase in 2007 by around 20% before the division between North and South. Figure 2 demonstrates the negative effects of the Arab Spring on industrial growth in the region especially in countries such as Egypt, and Lebanon.

FIGURE 2: INDUSTRY YEARLY GROWTH %



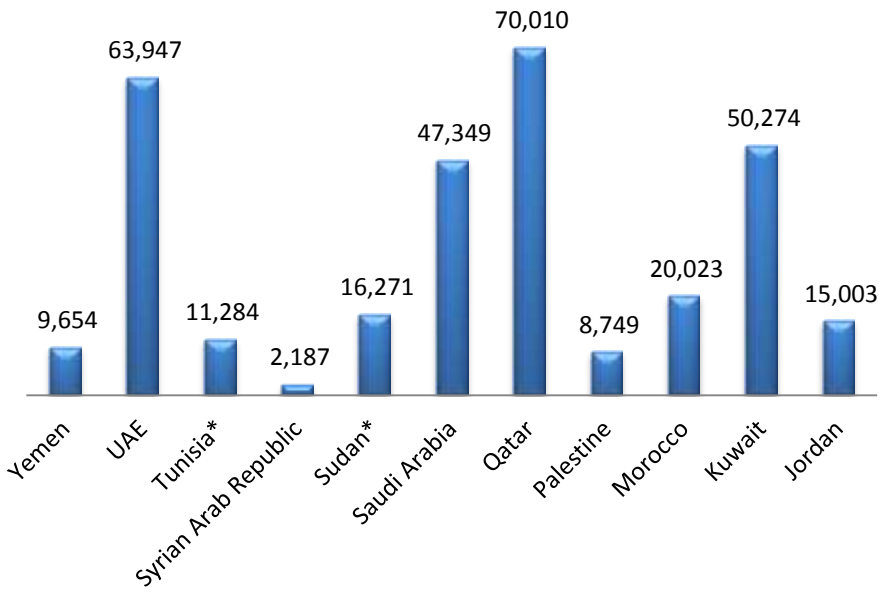
Source: World Bank Data

Labor productivity is the amount of goods and services that a worker produces in a given amount of time and it is in direct proportion to GDP. It is also an indication of

performance and efficiency if benchmarked with labor productivity of countries with similar economic background and sectors.

Calculating the total industrial labor productivity at the aggregate level in the ESCWA region cannot be made due to incomplete data in the number of workers in the mining, quarrying and manufacturing industries in several Arab countries. However, it can be noted that the highest level of labor productivity in the mining and quarrying was in Saudi Arabia, while the highest level of labor productivity in the manufacturing industries was in Qatar in 2009. Figure 3 shows the disparities of labor productivity among some of the ESCWA members. It is fair to state that the manufacturing productivity in Qatar and UAE is a lot higher than its fellow energy-resourceful GCC member states, which directly reflects an increase in GDP. On the other hand, labor productivity in Morocco and Sudan compared to Syria, Palestine and Yemen, for example, roughly testifies that smaller number of workers is required to perform the work in Morocco and in Sudan than in the rest of the Mashreq and Maghreb states.

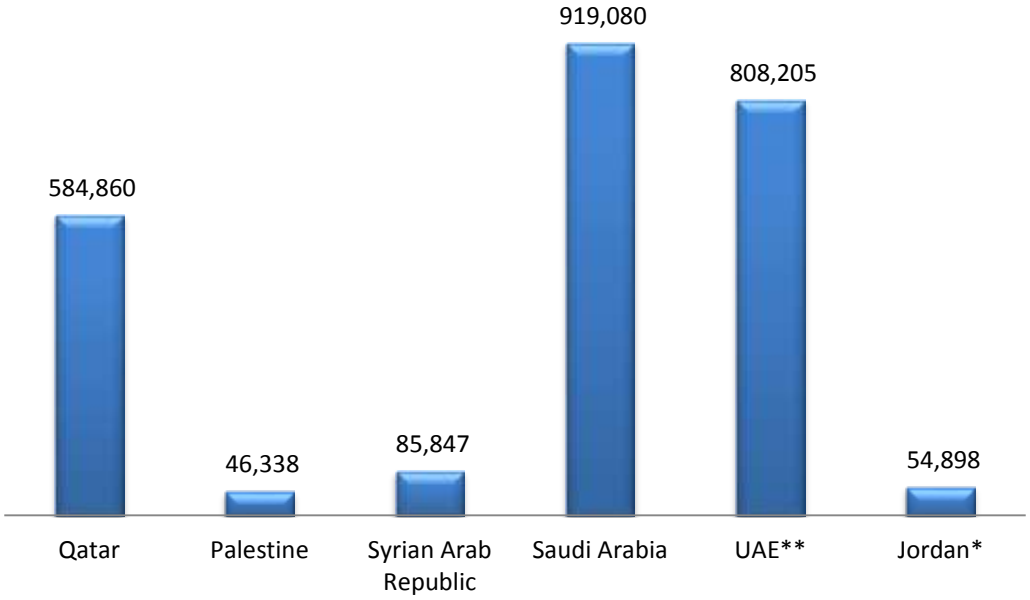
FIGURE 3: LABOR PRODUCTIVITY
(Value added of manufacturing per employee in constant 2005 US $)



Source: Bulletin of Industrial Statistics for Arab Countries; 7th Issue
(2009, *2007)

Labor productivity in mining and quarrying has been calculated separately for resource-rich ESCWA members as shown in Figure 4.

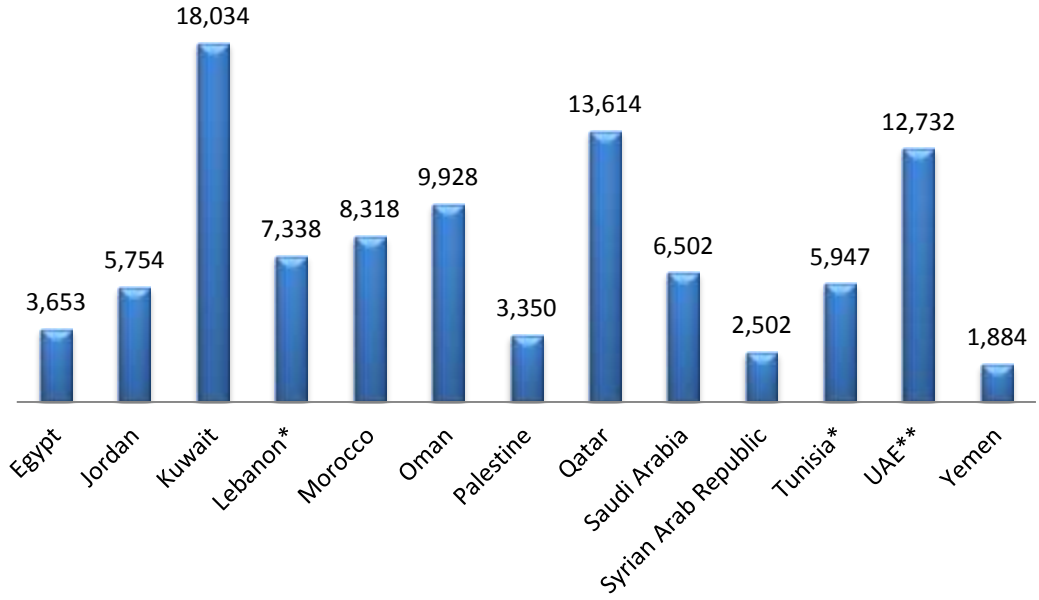
FIGURE 4: LABOR PRODUCTIVITY
(Value added of Mining & Quarrying per employee in constant 2005 US $)



Source: Bulletin of Industrial Statistics for Arab Countries; 7th Issue (2009, **2008, *2007)

Figure 5 illustrates that the highest yearly average wage is observed in Kuwait with US $18,034 followed by Qatar with an average rate of US $13,614 and Oman with an average rate of US $9,928. Figure 5 also indicates the countries with the lowest wages in the manufacturing sector are Yemen, Syrian Arab Republic, Palestine and Egypt .[8] By comparing figures 3 and 5, we can find the direct link between the two (i.e. generally speaking, the lower the productivity in a country, the lower the wages).

FIGURE 5: AVERAGE WAGE OF EMPLOYEES IN MANUFACTURING INDUSTRIES US $

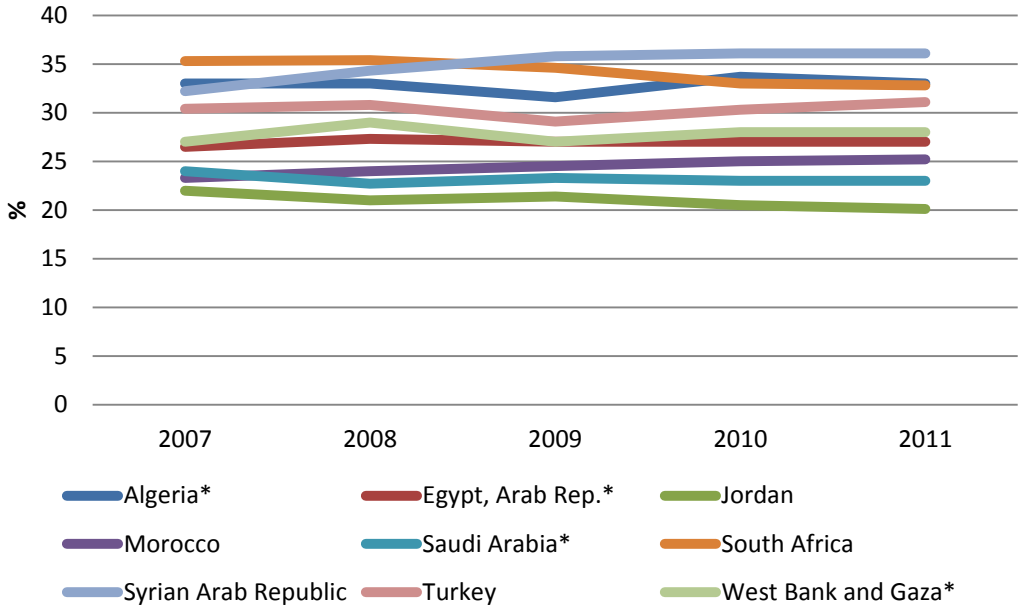


[8] Bulletin of Industrial Statistics for Arab Countries 2004-2010; 7th Issue; July 2012; ESCWA & Arab Industrial Development and Mining Organization

Source: Bulletin of Industrial Statistics for Arab Countries; 7th Issue
(2009, **2008, *2007)

Counting employment in industry is often hard due to the different national registration of labor and social security measures. Especially in the ESCWA region and from 2008 onwards, data has not been continuously updated. Employment in industry pertains to people who work for a public or private employer in industry and receive remuneration in wages, salary, commission, tips, piece rates, or pay in kind. Figure 6 displays the number of male employees in industry as a percentage of total male employment in some Arab countries compared to 2 growing economies such as Turkey and South Africa. It is fair to note that countries with a percentage of males in industry over 30% are few such as Syria and Algeria. Most of the ESCWA countries have a low labor participation in industry even though industry accounts for a high proportion of its GDP. Turkey and South Africa for example, both have an industry % of GDP ratio of approximately 28%. In addition, both countries have a ratio of 30% or over of male employees in industry. This leads us to conclude that countries with high economic growth have succeeded in employing a larger number of employees in industry in comparison with ESCWA countries that have a higher industry % GDP ratio. This can be elaborated that mineral fuels, oils and earth resources contribute to the high industry % GDP ratio in the region.

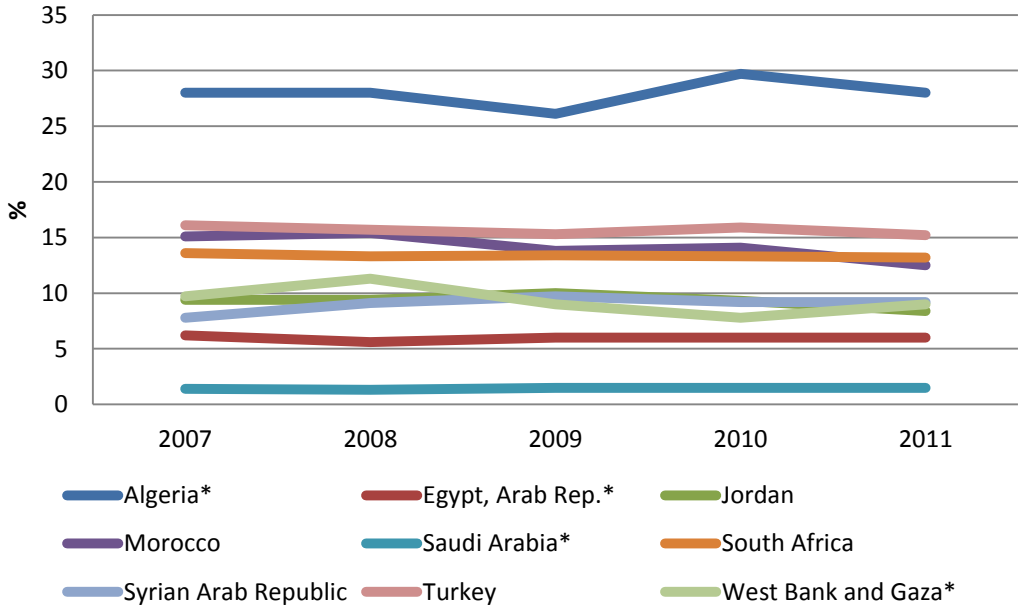
FIGURE 6: MALE EMPLOYEES IN INDUSTRY (% OF MALE EMPLOYMENT)



Source: World Bank Data
(Countries with asterisk * have missing year entries which were averaged by previous or proceeding years)

Figure 7 displays the number of female employees in industry as a percentage of total female employment in some Arab countries compared to 2 growing economies such as Turkey and South Africa. Algeria again proves to have the highest number of female involvement in industry (between 25-30%) even higher than Turkey and South Africa. Morocco falls right under with percentage between 12 and 15. Saudi Arabia and Egypt have the lowest involvement of women in industry.

FIGURE 7: FEMALE EMPLOYEES IN INDUSTRY (% OF FEMALE EMPLOYMENT)



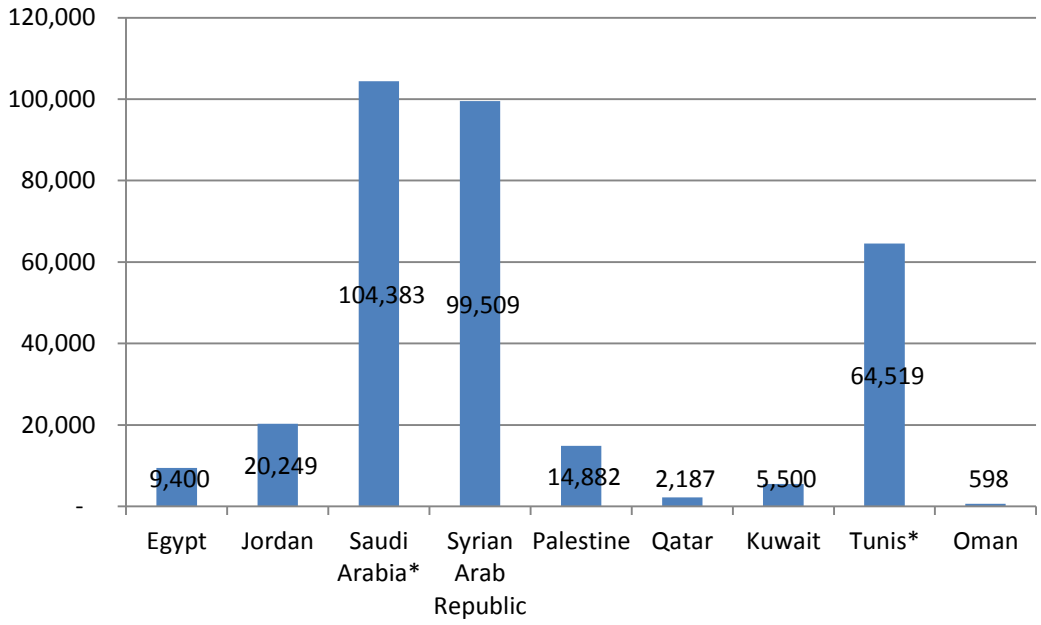
Source: World Bank Data
(Countries with asterisk * have missing year entries which were averaged by previous or proceeding years)

The information in this section reveals 2 poles of industrial sophistication in the ESCWA region. The more sophisticated energy-rich countries such as the United Arab Emirates, Saudi Arabia, Qatar and Kuwait have a higher output, labor productivity and wages in industry. Saudi Arabia slightly steps aside from this group with relatively lower employment and wages in industry. Algeria, still not an ESCWA member, stands out in the Arab region with a high Industry % GDP and employment in industry ratio. Unfortunately, Libyan numbers are not comprehensive enough for analysis even though data in 2008 shows a remarkable increase in industry % of GDP ratio. Industrial growth opportunities are foreseen in countries such as Kuwait, Jordan, Yemen, Sudan, and Lebanon as per Figure 2.

Number of industrial enterprises is usually used as an indicator of the industrial sector. However, due to the fact that over 95% of establishments in most developing countries are classified as micro companies (less than 10 employees) and SME (between 10-250 employees) (EU classification), [9]this ratio can be hard to quantify and make use of. We can roughly say from figure 8, that the number of industrial establishments is higher in high population ESCWA countries except Egypt. Qatar, Kuwait and Oman have a relatively low number of enterprises even though all these countries have an industry % of GDP higher than 50%, which indicates that they have a lower number of SMEs and micro-industries.

FIGURE 8: NUMBER OF INDUSTRIAL ENTERPRISES (MINING AND MANUFACTURING)

[9] EU classification - Guide to EU definition of SME Document (1/1/2005)

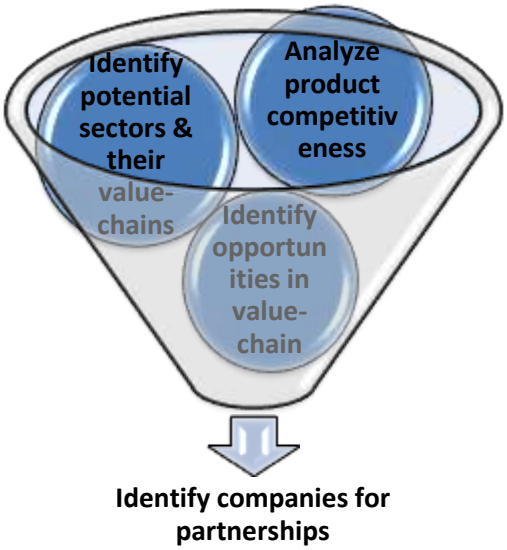


Source: Bulletin of Industrial Statistics for Arab Countries; 7th Issue (2010, *2008), UN Data

1.2 Analyzing product and country competitiveness with trade flows

Analyzing product competitiveness through trade flows helps determine a set of implications such as product portfolio diversification, the product integration process, the extent of which a country's exports twin with the needs of imports of another country and it helps to identify trade partners. This step is the first step in our approach (check figure 9: funnel approach) designed as a methodology to be used to pinpoint key enterprises and partnership opportunities in the region through a filtering process based on assessing the global impact of production sectors, to assessing the demand and supply of ESCWA countries, to allocating promising industry sectors and their value-chains.

FIGURE 9: FUNNEL APPROACH



1.2.1 Main Exports and Imports

This paper relies on international trade statistics as oppose to industrial data for analysis of competitive product sectors for a number of reasons. Firstly, trade data available is more up-to-date, second, trade customs enforce the registration of products as they enter and leave and hence product data accuracy is more controlled. Third, the input and output analysis of trade can highlight key production opportunities for investment and development. Finally, almost 200 countries representing about 98 per cent of world trade use the HS code (unified classification of products according to the Harmonized Commodity Description and Coding System)as a basis for the trade negotiations, collecting international trade statistics, and statistical and economic research and analysis making the assessment and comparability between nations' products easier and more accurate. In any case, there is a link between the ISIC (International Standard Classification) and the HS Code is based on the fact that the goods and services, which are produced in an industry under one category, can be normally combined with the other.

We have identified the top 10 ESCWA product exports according to value of export from recent UN-Comtrade data 2012 extracted through ITC (International Trade Centre) databases. (Check Annex 2 for data sheets on ESCWA exports and imports) 82% of ESCWA Exports fall under mineral fuels and oils. 3% falls under pearls and precious stones and metals, 2% fall under plastics and 2% fall under organic chemicals.

The main competitive strengths of the region and potential investment opportunities worth tapping into and investigating in detail are highlighted below.[10]

1. Mineral Fuels, Oil, and Distillation products
   - *The Arab countriesconstitute nearly 30% of the world exports of this product group (Annex 2). However, 80% is in the form of crude petroleum oil. This ratio has been stable in the past few years as there is no data indicating efforts to decrease this ratio. Egypt is the main importer of non crude petroleum oils in the region followed by UAE, Saudi Arabia and Morocco.*
   - *Petroleum gases comes second place as the region alone makes up 23% of world exports of petroleum gases (Annex 2). Qatar leads the way, with UAE and Saudi Arabia following. However, constant new reserves are being discovered in other countries such as Iraq, Lebanon, and Syria.*
2. Pearls, precious stones, metals, coins
   - *UAE represents 5% of world exports of pearls, precious stones, metals and coins in value (UN trade data 2012). The main lump, (80%) is in the form of unwrought gold or semi-manufactured diamonds or un-mounted sets especially imported from India, Turkey and China and re-exported mainly to India, and the rest of the world. Lebanon, Egypt, Saudi Arabia, Jordan and Qatar follow UAE consecutively in terms of export from region. New discoveries of natural gold mines have been reported in Sudan.*
   - *This seems to be a promising sector for development and growth due to the visible role some of these countries play in the global value chain. However, more comprehensive research needs to be made in order to identify possible opportunities where countries of this region can deliver additional value-added production and services and move up-stream into design and imitation of articles and parts of jewelry manufacturing.*
3. Plastics and Articles thereof
   - *Polyolefins are a family of polymers derived from propylene and ethylene. They make up the highest volume of thermoplastic products in the world. They form tough, flexible plastics with a large variety of uses.*[11]*Saudi Arabia exports 3% of the world's plastics. In the region, it leads followed by the UAE, Qatar and Egypt.*

[10] The views and opinions expressed in this paper are those of the authors and do not necessarily reflect the official views or position of the UN ESCWA. They should not be investigated in real-world cases as they are based only on open source information.

[11] http://www.sabic.com

- *There are many diversified subsectors of plastics manufacturing that can be identified, analyzed and "clusterized" such as plastics for industrial use, household plastic products, plastics for mechanical products, plastics for electrical products, plastics recycling. These sub-sectors are believed to be scattered and have a weak relation with large B2B Polyolefin suppliers.*

4. Organic Chemicals
   - *Saudi Arabia exports 4% of the world's organic chemicals especially Acyclic Alcohols and their derivatives such as Methanol and Industrial Ethanol (UN Trade Data 2012). Methanol is a key commodity and an essential part of our global economy. It is considered as the basic chemical building block of paints, solvents and plastics, innovative applications in energy, transportation fuel and fuel cells. From a volume perspective, methanol is one of the top 5 chemical commodities shipped around the world each year. Purified industrial ethanol, on the other hand, is a component of many pharmaceuticals, cosmetics, insecticides and organic solutions.*
   - *Global methanol demand stood at 26.6 million tons in 2000, before increasing to 44.9 million tons in 2010 at a CAGR (Compound Annual Growth Rate) of 5.4% and global demand for methanol will increase to reach 122.6 million tons by 2020, demonstrating a CAGR of 10.6% during 2010-2020.*[12]
   - *There are a number of references and studies recommending moving-up the chemical sector value chain in the ESCWA region in order to create more jobs and reap more value-added through chemical sub-sector clusters and establishments. For example, even though the pharmaceutical industry has proved to be relatively sufficient in supplying basic local demand for the region, it has still not fully utilized its export potentials especially to African and South American Continents. Raw materials and R&D for pharma industries are still imported from East Asia and Europe.*
   - *Bio-fuel in 2010 provided 2.7% of the world's fuels for road transport, a contribution largely made up of ethanol and biodiesel. Bio-fuel production is rising and is incurring positive added-value on the food industry. The ESCWA region has no study of obtaining bio-fuels from sugar-cane (naturally abundant in Egypt and Sudan). Bio-ethanol goes in the production of fuel, food and alcoholic beverages, and many other industries.*
5. Electric and Electronic Equipment
   - *The Arab Aggregation exports 0.5% of the world's electric and electronic sector especially in Tunisia followed by UAE, Morocco and Egypt, which is mainly due to the production of insulated wire/ cable. Diversifying in electric and electronic production is very strategic to the region as it is considered the 3rd most imported product in the region (8% of imports) after machinery (12% of imports) and vehicles (10% of imports).*
6. Fertilizers

[12]Dominik Stephan Process Worldwide; China and the Middle East compete for Leadership in Methanol, (2012)

- *The fertilizer sector is a very promising sector for the region, not only because it composes 13% of world exports (main players in the region are Morocco, KSA, Qatar, Egypt, Jordan, Oman in order) (UN Trade Data 2012) , but because the region has the resources to proclaim a full and self-sufficient Agro-Food chain (The GCC countries, Morocco and Jordan have large capacities to produce fertilizers, while Maghreb and Mashreq countries have a high arable land as % of total land area)*[13].
- *The most common fertilizers are mixtures of nitrogenous or phosphorous fertilizers. Together, Morocco, Jordan, and Syria represent 82% of world's supply of phosphate reserves.* [14] *Chemical mixtures of nitrogenous fertilizers are derived from a chemical process on natural gas, a key product in the gulf region.*
- *ESCWA countries' main exports of fertilizers are to Brazil, India, France and USA (UN Trade Data 2012).*
- *The region exports 4% of the world's inorganic chemicals in the form of Disphosphoruspentaoxide, phosphoric acid and polyphosphoric acid and Ammonia (UN Trade data 2012) that are considered as intermediary components in the fertilizers supply chain.*

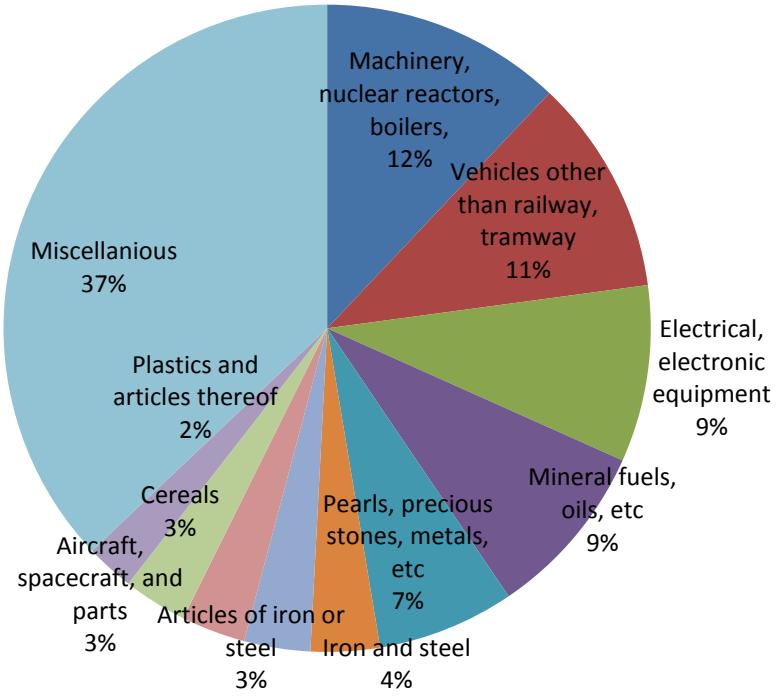
7. Aluminum
   - *The Arab Aggregation exports 6% of the world's Aluminum articles (Annex 2). This industry thrives in the UAE as it claims half of these exports. Bahrain and Qatar follow suit according to UN Trade Data 2012. However, most of these exports are labeled as unwrought Aluminum.*
8. Articles of Apparel , accessories
   - *The ESCWA region exports 3% of articles of apparel not knitted of crochet type mainly in the form of garments (Annex 2).*
   - *Despite the fact that Morocco and Tunisia are the two main contributors to this ratio. Raw material such as cotton is substantially available in Syria and Egypt and it could turn into a very promising sector especially with mass production. However, the industry is not blossoming as it should be due to the lack of skilled design, management and marketing skills (i.e. all labor and staff related).*
9. Salt, Sulphur, Earth, Stone
   - *Natural rock mining in the Arab region makes up 13% of world exports. Morocco and Jordan composing 6.5 % of it due to the rich reserves of natural and phosphate chalk (also known as rock phosphate check point 6. Fertilizers) (UN Trade Data 2012)*
10. Vehicles
    - *Vehicle products have only in 2012 appeared in exports list of the ESCWA region mainly in the form of cars (including station wagons) and parts of motor vehicles (0.5% of total exports to the world) (UN Trade Data 2012). Oman and Morocco are the key players in the region with a growing automotive industry based on off shoring key manufacturers from Europe and Japan.*

[13] CMI, World Bank, European Investment Bank, ISECO; Transforming Arab Economies: Traveling the Knowledge and Innovation Road (2013)

[14] International Fertilizer Development Center (IFDC)

The top ten imports value of the ESCWA region can be observed in figure 10 by percentage. The majority of product imports (12%) are machinery, nuclear reactors, boilers, data processing machines and optical readers, turbo-jets, turbo-propellers and other gas turbines. Vehicles come as a second import followed by electrical and electronic equipment. Electric and electronic equipment is the second most traded product in the world especially by China and the United States and it has been growing on a steady pace since 2009. *These 3 sectors are regarded as potential sectors for growth due to the heavy reliance on import and consumption. However analyzing these sectors in view of local capacity and global competition is key to selectively grow one or more production sectors towards lowering value of imports. Electric and electronic equipment manufacturing has proved to be rewarding especially in Maghreb countries and the UAE in particular due to the competitive labor costs. Very little noticeable industry is classified into machinery and technology even though the ESCWA region is dependent on this sector for developing its economy.*

FIGURE 10: TOP TEN IMPORTS OF ESCWA REGION



Source: Trade Map Data 2012

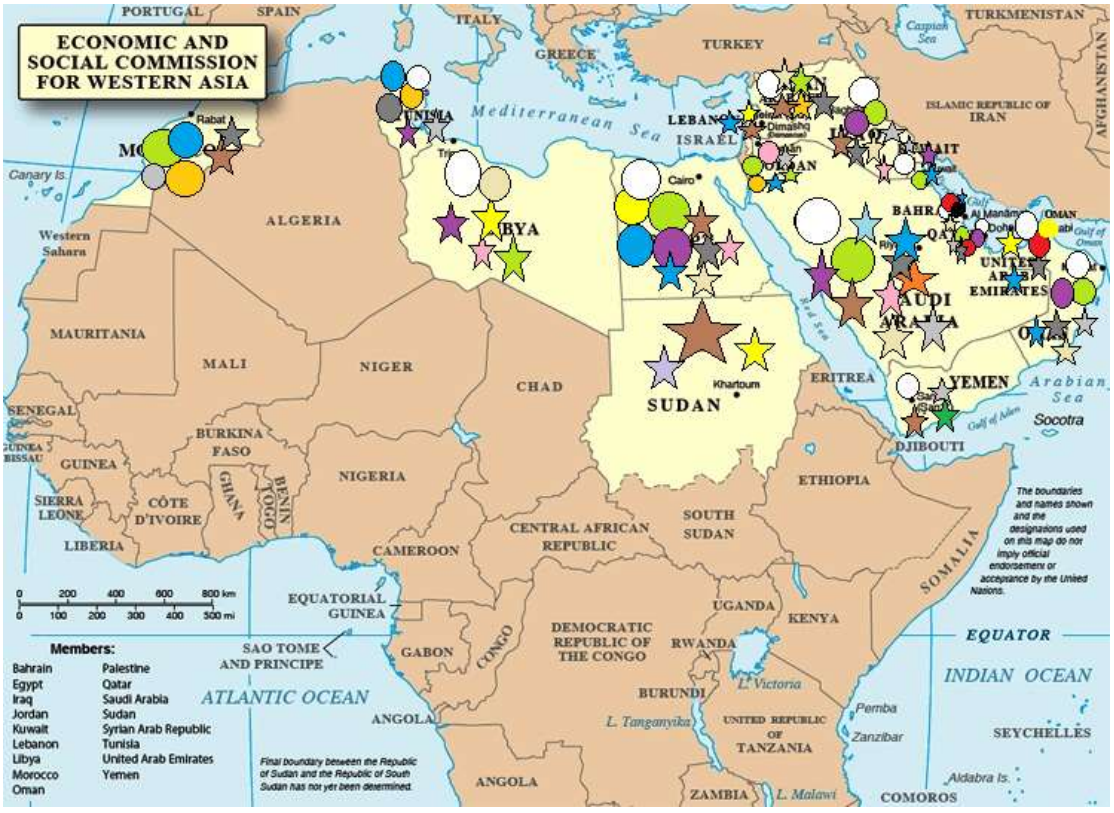
The ESCWA region is an energy-rich and resource abundant region that relies heavily on mineral fuels and oils for export. However, the bulk of its exports are in the form of crude oil and natural matter. And its imports are concentrated on heavy-duty technology and manufactured goods. The GCC and Maghreb countries in particular have succeeded in the past 2 decades in developing new industries that rely on the region's core resources such as the petrochemical, fertilizers, and textile sectors. However, these sectors are only merely starting to gain global influence and still need more concentration to be exerted towards economies of scale, scope and knowledge.

1.2.2 Map of Industrial Production Opportunities in the ESCWA Region

The identification of promising production sectors has been made on a set of criteria that allow the region to be more competitive on a global frontier. These criteria have been used by high growth developing economies such as China and Turkey as yardsticks for national investment decisions. These criteria include: value of exports, market growth, profitability, the strength of ESCWA region as a key player in the global value chain, value-chain breadth for the region (opportunities for value-added) and job creation for the region as a whole. Due to the short time-frame of this project only 1 product family that has the highest impact will be studied Fertilizers and its linkages to the global food chain.

Annex 1 presents a synopsis of Country Business Profiles for each of the ESCWA members. Each profile attempts to aggregate the newest available data on key performance, industry, business, trade, education and technology indicators in order to roughly summarize the business environment and structure of each country. Recent trade data has been used to understand the main products' composition and trade partners for each economy. Figure 11 illustrates the main industry sectors and growing potential sectors projected on the map of the ESCWA region. (Please refer to Annex 1 for reference to core sectors and opportunities).

FIGURE 11: MAP OF INDUSTRIAL PRODUCTION OPPORTUNITIES IN THE ESCWA REGION



Source: Authors extrapolation from Annex 1: Country Business Profiles

Key:

Circles: Leading sector, Stars: Growing potential
Agro-food, Jewelry, Natural essences and cosmetics, Electric and electronic equipment, Fertilizers, Textiles and apparel, Vehicles, Pharmaceuticals, Fuel and energy, Plastics, Dyes and paint, Bio-fuel, Machinery and boilers, Construction, Aluminum, Aircraft and parts, Printed material and books.

Table 1 describes the main findings in figure 11.

Table 1: Leading and potential sectors per ESCWA member country

Country	Leading sectors	Attractive sectors	Comments
Bahrain	- Mineral fuel and oil - Aluminum - Aircraft	- Electric & electronic equipment -	- Strong business environment
Egypt	- Mineral fuel and oil - Fertilizers - Precious metals and jewelry - Electric & electronic equipment - Plastics	- Agro-food - Construction - Pharmaceuticals - Machinery - Electric and electronic equipment	Precious metals and jewelry - 101% growth in export esp. unwrought or semi-finished gold and silver Fertilizers - 1.86% of world export - 105% growth in export esp. nitrogenous minerals Electric and Electrical equipment - 163% growth in export esp. Insulated cable/ wire
Iraq	- Mineral fuel and oil - Fertilizers - Plastics	- Construction - Vehicles - Agro-food - Pharmaceuticals and health - Machinery - Paint, dyes and adhesives	- 137% growth in Cyclic hydrocarbons and Acyclic alcohol exports (i.e. more downstream chemical industries are needed)
Jordan	- Fertilizers - Textiles & apparel - Pharmaceuticals	- Fertilizers - Electric and Electronic Equipment -	Phosphate Rock - 1.55% of world export - 34% Increase in export
Kuwait	- Mineral fuel and oil - Fertilizers - Plastics	- - Electric and electronic equipment - Chemicals	- 2.79% of world exports of fuel - 26% growth in Sulphur export
Lebanon	- Precious metals - Electric and electronic equipment -	- Jewelry - Electric and electronic equipment - Machinery	A noticeable growth in export can be found in: - Beverages, spirits and vinegar
Libya	- Mineral fuel and oil - Iron and steel - Ammonia	- Fertilizers - Plastics - Pharmaceuticals -	Iron and steel production - Ferrous products - Semi-finished - Flat-rolls

	- Precious metals		- Pig iron
Morocco	- Fertilizers - Electric and electronic equipment - Apparel - Phosphate Chalk	- Agro-food - Home textiles(Increase in import of carpets 36%) - Machinery - Construction (Iron and steel)	Apparel (1.42 % of World export) Fertilizers - 3% of world exports - 27% increase in exports - 1.49% of world exports – Phosphoric acid and phosphoric pentoxideand22% growth in exports - 17% growth of imports of Ammonia from Ukraine - 45% increase of Sulphur import Phosphate Rock - 3.66% of world exports&15% increase in export
Oman	- Mineral fuel and oil - Fertilizers - Plastics	- Construction - Electric and electronics - Vehicles	- 137% growth in exports esp. Cyclic hydrocarbons and Acyclic alcohol
Qatar	- Mineral fuel and oil/Gas - Fertilizers - Plastics - Aluminum	- Aluminum - Pharmaceuticals - Plastics -	- 249% growth in aluminum export - 24% growth in plastics export (Polymers of ethylene, in primary forms)
Saudi Arabia	- Mineral fuel and oil (Crude) - Fertilizers - Plastics - Methanol	- Agro-food - Pharmaceuticals - Dyes and paints - Machinery - Construction - Plastics - Electric & Electronic appliances (electric and heat energy material)	Mineral Fuels - Crude Petroleum Oil 12% growth of exports - Not Crude 45% growth of imports Fertilizers - 33% growth of Ammonia exports - Nitrogenous fertilizers 13% growth in exports - 16% Sulphur export growth 25% growth in plastics exports (Polymer of ethylene and propylene)
Sudan	- Mineral Fuels - Oil seed - Gold	- Agro-food (esp. confectionary) - Jewelry (Gold) - Natural Essences and cosmetics	– 18% growth of unwrought gold export
Syrian	- Mineral Fuels	- Textiles and apparel	– 20% growth in rock

Arab Republic	and oil - Phosphate rock - Cotton	- Home textiles - Agro-food - Cosmetics and health - Fertilizers - Construction - Machinery	phosphate exports
Tunisia	- Electric and electronic equipment - Mineral fuels and oils - Apparel and footwear - Machinery	- Plastics - Vehicles - Electric and electronic equipment	
United Arab Emirates	- Mineral Fuels and oil - Pearls and precious metals - Aluminum	- Machinery and boilers - Jewelry - Electric and electronic equipment -	Pearls and Precious metals - 5% of world exports - 43% growth in export esp. Gold - 29% growth in import esp. Jewelry Aluminum - 2.7% of world exports - 14% growth in export esp. unwrought Aluminum
Yemen	- Mineral Fuels and Oils - Fish , crustaceans, mollusks…	- Agro-food (esp. confectionary) - Printed material and books - Fertilizers	

1.3 Competitive Production in Fertilizers

The global population is expected to reach 9.2 billion by 2050 according to the United Nations, most of this increase will happen in less developed regions[15]. This growth trend will inevitably lead to a rapid growth of food demand and increased efforts to eradicate the global food crises in least developed countries and improve food diets in developed countries. In proportion, fertilizer consumption will most likely continue to increase. Economic growth and environmental legislation are also creating a supply push for consumption. However, while demand for food keeps growing, per capita Arab land available for cultivation is shrinking. Since 1960, the use of mineral fertilizer is the major reason why global cereal yields have increased, and this trend is expected to continue**.**[16]

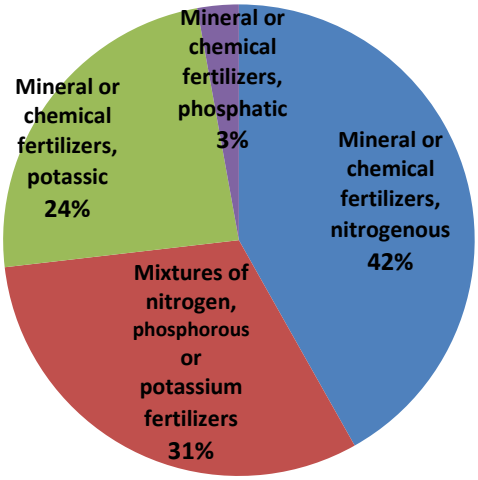
Morocco, China, United States, and Russia meet two thirds of world Phosphate (P) demand, while Canada, Russia, and Belarus contribute to half of Potash (K) mine production. Nitrogen (N) fertilizer production, which relies heavily on natural gas, is concentrated in energy-rich countries', P, and K make up the majority of nutrient inputs/ fertilizers necessary to sustain current crop yields. Managing these inputs efficiently is essential in today's agriculture and will be even more important in years to come. These three main nutrients have different agricultural purposes as follows:

•"Nitrogen (N), the main constituent of proteins, is essential for growth and development in plants. Supply of nitrogen determines a plant's growth, vigor, color and yield
• Phosphorus (P) is vital for adequate root development and helps the plant resist drought. Phosphorus is also important for plant growth and development, such as the ripening of seed and fruit
• Potassium (K) is central to the translocation of photosynthesis within plants, and for high-yielding crops. Potassium helps improve crop resistance to lodging, disease and drought."[17]

The key nitrogen, phosphate and potash products are urea, Diammonium phosphate (DAP) and Potassium chloride (MOP).Urea is the world's most exported fertilizer, it contains 46% nitrogen, and nitrogen demand is rising. DAP contains 46% phosphate and 18% nitrogen. Monammonium phosphate (MAP) contains 46% phosphate and 11% nitrogen and MOP contains 60% potash. Figure12 illustrates the percentage of different fertilizers by value of export in the world in 2012. Nitrogenous fertilizers such as urea are exported by 42% and mixtures of nitrogenous and phosphate fertilizers such as DAP and MAP are exported by 31%.

FIGURE 12: PERCENTAGE OF WORLD FERTILIZER EXPORTS

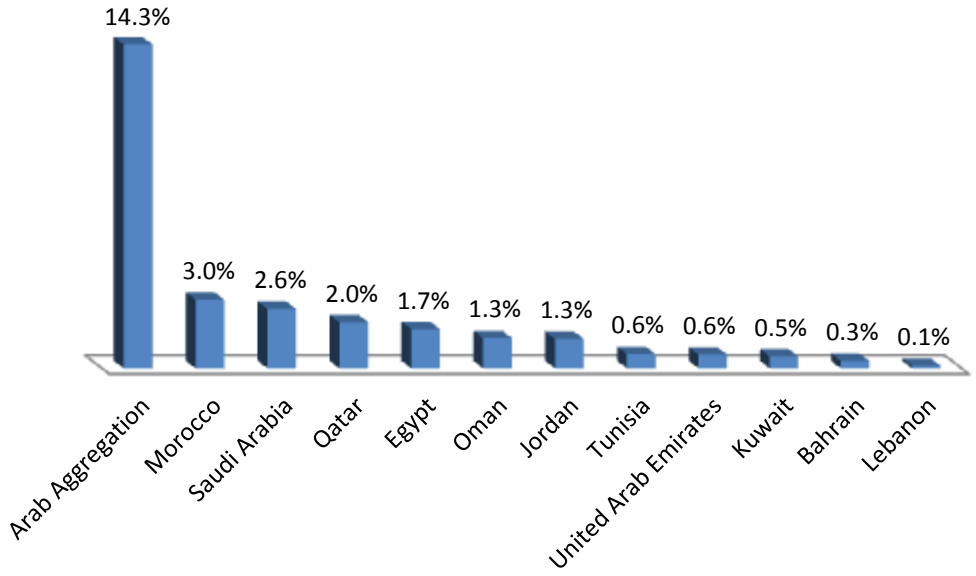
[15] www.unpopulation.org
[16] Yara Fertilizer Industry Handbook; February 2012
[17] Ibid



Source: Trade Map Data, 2012

Russia is a leader in world fertilizer export followed by Canada, China and USA together composing 42% of world fertilizer export. Top importers by value according to 2012 UN trade data are United States, Brazil, India, China, France, Thailand, and Indonesia in order. The Arab Aggregation occupies 14.3% of the world export of fertilizers. As shown in figure 13, Morocco, Saudi Arabia, Qatar and Egypt are the main producers and exporters.

FIGURE 13: FERTILIZER EXPORTS IN ARAB REGION



Source: Trade Map Data, 2012

A joint initiative among the 8 Gulf States under the name Gulf Petrochemicals and Chemicals Association (GPCA) was founded with an objective to provide its members with effective opportunities and industry networking, sharing of information and knowledge, and strengthening partnerships in the petrochemical sector. Within it,

the fertilizers committee's activities are geared towards addressing issues related to fertilizers' production, safety, lobbying, health and environment. In 2011, GCC fertilizers capacity reached 27.4 million tons which is a 36% increase over 2010 level. In the past few years the GCC regional fertilizers industry grew at CAGR (Compound Annual Growth Ratio) of 11%. However, with no fertilizer capacity additions in Kuwait and UAE their share in regional capacity declined to 6%. Oman, on the other hand, expanded at a CAGR of 14% in 2011. [18]

From another side, Morocco, Jordan, Tunis, Algeria and Syria are major players in the mining, quarrying and production of phosphoric fertilizers. Morocco and Western Sahara alone have over 70% of the world's quality phosphate rock reserves. However, forms of collaboration and partnerships between these countries (Mashreq and Maghreb) are not common. Moreover, their supply does not cater to their local agricultural needs at reasonable prices due to expensive storage and transport. Egypt is also among the top world exporters of nitrogenous mixtures of fertilizers. However, its local production is stand-alone and exported mainly to China.

The International Fertilizer Association (IFA) forecasts nitrogen fertilizer demand growth at 1.9% per year through 2015. A growth rate of 2.4% a year is estimated for phosphate and 3.7% for potassium. For urea a higher growth rate is expected as this product is taking market share from other nitrogen products.[19]

However, according to our research, fertilizer consumption pattern is changing. Fertilizer consumption is declining or stable in wealthy countries such as in Western Europe and North America as farmers have been growing more food with less fertilizer. However, between 1970 and 2012, the demand more than doubled in the developing world. The changes in demand patterns are crucial to direct investments in fertilizer production capacity, and thus affect the regional supply-demand balance. Complex fertilizers or mixes of specific fertilizers are also absorbing the raw material of the region into the destination country's production line.

Table 2 forecasts the growth trend of the different fertilizer nutrients according to region. Even though Nitrogenous fertilizers demand is expected to rise by 1.7%, Latin American demand and central Asia are expected to grow by over 3%. Phosphorous fertilizers demand, on the other hand, are expected to grow by 3.3% in Africa, 3.8% in Latin America, 4.5% in central Europe and 3.5% in east Europe and central Asia.

Table 2: World and regional growth in fertilizer demand

[18] GCC Petrochemicals & Chemicals Industry; Facts & Figures 2011: Gulf Petroleum and Chemicals Association

[19] Yara Fertilizer Industry Handbook; February 2012

World and regional growth in fertilizer demand, 2011 to 2015

Region	Annual growth rate (Compound)			
	N	P_2O_5	K_2O	Total ($N+P_2O_5+K_2O$)
World	**1.7%**	**1.9%**	**3.1%**	**2.0%**
Africa	1.9%	3.3%	4.3%	2.5%
America	1.6%	2.3%	2.3%	1.9%
- North America	0.8%	0.9%	1.2%	0.9%
- Latin America	3.1%	3.5%	3.3%	3.3%
Asia	1.9%	1.7%	4.0%	2.1%
- West Asia	2.9%	2.9%	6.7%	3.2%
- South Asia	2.6%	2.9%	2.7%	2.7%
- East Asia	1.4%	0.9%	4.4%	1.8%
Europe	1.3%	1.7%	2.1%	1.5%
- Central Europe	2.3%	4.5%	3.2%	2.8%
- West Europe	-0.2%	-0.7%	1.0%	-0.1%
- East Europe & Central Asia	3.5%	3.5%	3.2%	3.4%
Oceania	1.0%	2.8%	4.3%	2.1%

Source:[20]

The fertilizer industry is very universal meaning that given the right technology and transport, the price is invariable. Fertilizer prices generally follow raw material prices (Phosphate and Natural Gas) that are less expensive in the ESCWA region (The region is an importer of Potash Fertilizers). Urea is nearly the same everywhere adjusting for transportation and gas costs. Phosphate, on the other hand is heavily reliant on mining and transport costs. Consequently, it is important to focus on the global industry and its supply-demand balance and transportation costs.

In general, fertilizer costs have decreased in the last two years and represent between 6%-22% of the total production cost of major crops. New studies proved that the correct use of fertilizers in agriculture could have up to 670% return on investment. For example, using different quantities of nitrogen in fertilizers can generate different revenues on the same input cost and area of land.[21]

Table 3 shows the average price indices of fertilizers and basic agro-food. We notice a rise in the prices of both products in the first half of 2011 especially in food products such as cereals, oils and fats and sugar. DAP and MOP prices have also witnessed a sharp increase in the same period.

[20] Current world fertilizer trends and outlook to 2015;FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (Rome, 2011)
[21] Yara(2012)

Table 3: Output and fertilizers price indices

Output and fertilizer input price indices (2002-2004 =100)

	2007	2008	2009	2010	2011(January-June)
Output price index[1]					
Cereals	167	238	174	183	257
Dairy	212	220	142	200	230
Meat	125	153	133	152	175
Oils & Fats	169	225	150	193	265
Sugar	143	182	257	302	371
Food	**159**	**200**	**157**	**185**	**233**
Fertilizer input price index[2]					
Urea	222	362	184	206	269
DAP	228	515	176	263	323
MOP	182	573	541	293	363

Source:
[1] **World** *Food Situation: Food Prices Index,* FAO, Rome, (http://www.fao.org/worldfoodsituation/FoodPricesIndex/en/)
[2] Calculated from average FOB prices quoted in various Fertilizer Trade Journals.

1.3.1 Phosphorous Fertilizers

Food production is essential for our survival, yet we continue to extract the world's supply of phosphorus, a critical ingredient in growing food. Today, phosphorus is mainly obtained from rock phosphate, which is found predominantly in China, the United States and Morocco that are considered the world's largest miners of phosphate rock. "China is drastically reducing exports to secure domestic supply, US has less than 30 years left of supplies, while Western Europe and India are totally dependent on imports."[22]

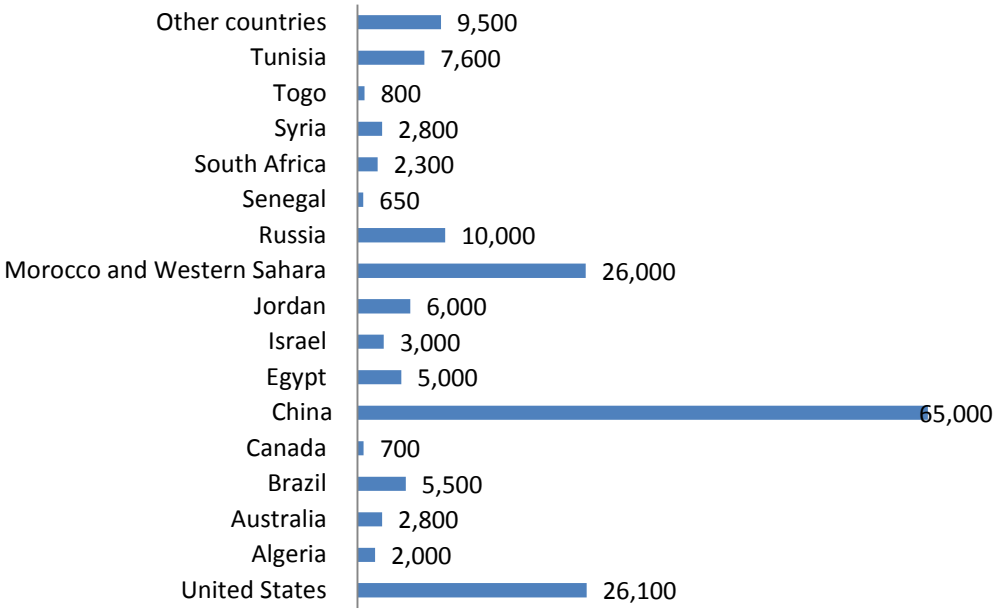
Despite the growing annual consumption (twice as fast as the population growth), and despite the fact that phosphorous is a non-renewable compound, phosphate rock concentrate reserves to produce fertilizer will be available for the next 300-400 years according to studies,[23] this sector is considered as a very strategic sector. Hence, growing and sustaining this industry must be regarded as a top priority and developed accordingly.

As mentioned earlier, Moroccan and Western Saharan reserves represent more than a third of the world's supply of high-quality phosphate rock. However, technological and transportation impediments prevent the African continent from obtaining accessible fertilizers for food production. African soils have the lowest application rate of P fertilizers in the world averaging 9-23kg/ha. Agricultural production loses in

[22]Dana Cordell a,b, Jan-OlofDrangert, Stuart White; The story of phosphorus: Global food security and food for thought-Global Environmental Change; (2009)
[23]Steven J. Van Kauwenbergh, World Phosphate Rock Reserves and Resources; IFDC, September (2010)

Africa reach around 45%.[24]This highlights the importance of phosphorus accessibility and outreach. Indeed, the average sub-Saharan farmer has less purchasing power to access fertilizer markets, yet phosphate fertilizers can cost an African farmer 2–6 times more than they cost a European farmer due to higher transport and storage costs (Runge-Metzger, 1995; Fresco, 2003).[25]In general, previous reserve and resource studies completed by the IFDC point toward the incomplete exploration of rock phosphate in Morocco, and North African and Middle eastern producers.[26]

FIGURE 14 SHOWS THE WORLD PHOSPHATE MINE PRODUCTION IN 2010 IN THOUSAND METRIC TONS

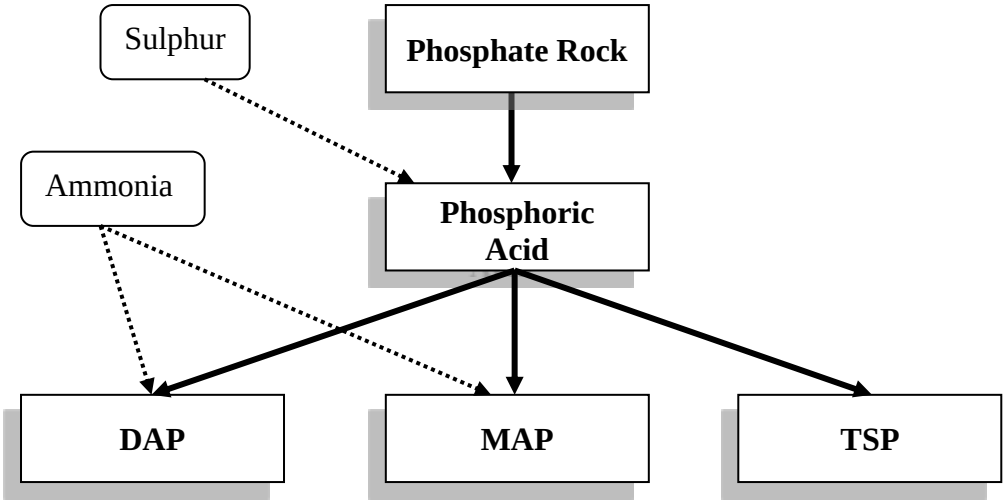


Source: IFDC[27]

Figure 15 maps out the chemical process of phosphate production and obtaining the 3 main phosphate finished fertilizer products which are Diammonium Phosphate (DAP), Monammonium phosphate (MAP) and Triple Superphosphate (TSP), all of which are based on phosphate rock transported and processed via intermediate production of phosphoric acid.[28]

[24]Dana Cordell, Jan-OlofDrangert, Stuart White; The story of phosphorus: Global food security and food for thought; Global Environmental Change 19 (2009) 292–305
[25]Steven J. Van Kauwenbergh, World Phosphate Rock Reserves and Resources; IFDC, September (2010)
[26] Ibid
[27]International Fertilizer Development Center (IFDC)
[28]Yara , (2012)

FIGURE 15: PHOSPHATE FERTILIZERS PRODUCTION CHAIN

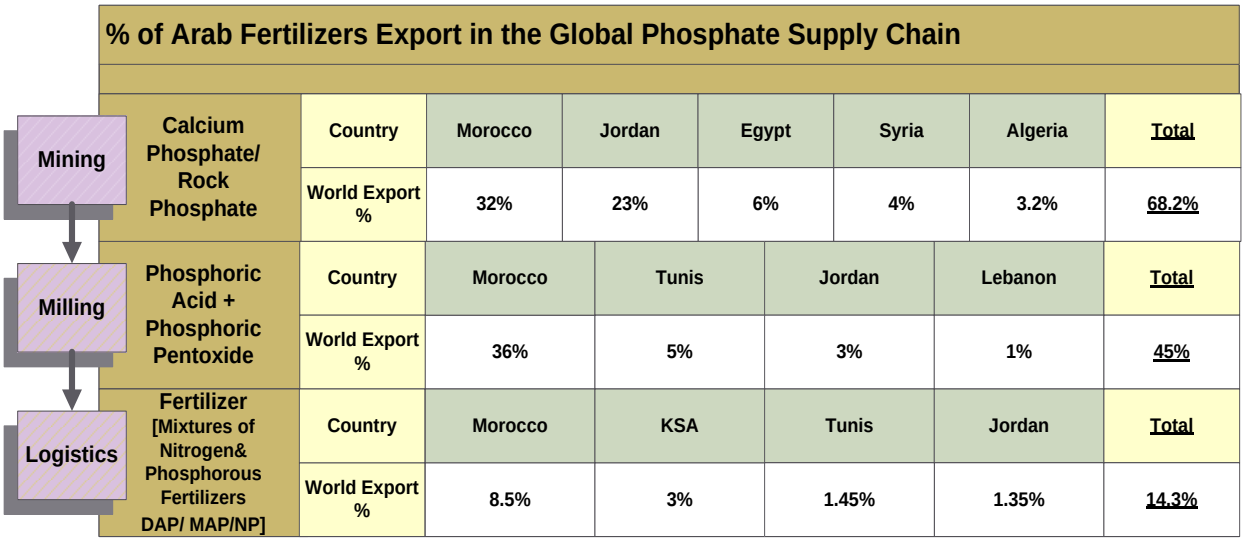


Vertical integration of phosphate rock mining and processing provides several advantages to integrated producers including potential savings in transportation and handling, improved consistency and continuity of supply, potentially higher overall recovery and return on investment. Vertical integration of phosphate rock mining and processing and production innovation is a necessary component to compete in the world phosphate fertilizer market. More research needs to be done as there are no comprehensive studies analyzing global flows of phosphorous, and the importance of phosphorous accessibility and physical scarcity.[29]

Figure 16analyses the phosphate fertilizers supply chain in the Arab region according to the global export of 3 products acquired from mining, milling, and chemical processing. Rock Phosphate is the raw material extracted from mining, Phosphoric Acid and Phosphoric Pentoxide is the intermediary inorganic chemical derived from milling, and DAP, MAP and NP are the most common mineral fertilizers derived from Phosphate. As illustrated in figure 16 below, Morocco, Jordan, Syria and Algeria exported 68.2% of world phosphate rock. Morocco alone exported 32% and Jordan 23%. On the other hand, Jordan exported 3% of phosphoric acid and 1.35% of the world phosphate fertilizers. Morocco's exports of phosphoric acid increased to 36% and down to 8.5% of finished fertilizer product even though, 80% of Phosphoric acid is used for fertilizer manufacturing in general. The total export of the Arab countries also went down as more production processes were involved. The total Arab exports of intermediary phosphoric acid were 45% in 2011 and 14.3% for phosphoric fertilizers. *Figure 16 illustrates the loss in value-added along the supply chain of phosphorous fertilizers and hence, the opportunities for investing in more vertical integration of production in all of the stated countries.*

FIGURE 16: ANALYSIS OF PHOSPHATE SUPPLY CHAIN BY EXPORT

[29] Dana Cordell, Jan-OlofDrangert, Stuart White; The story of phosphorus: Global food security and food for thought; Global Environmental Change 19 (2009) 292–305

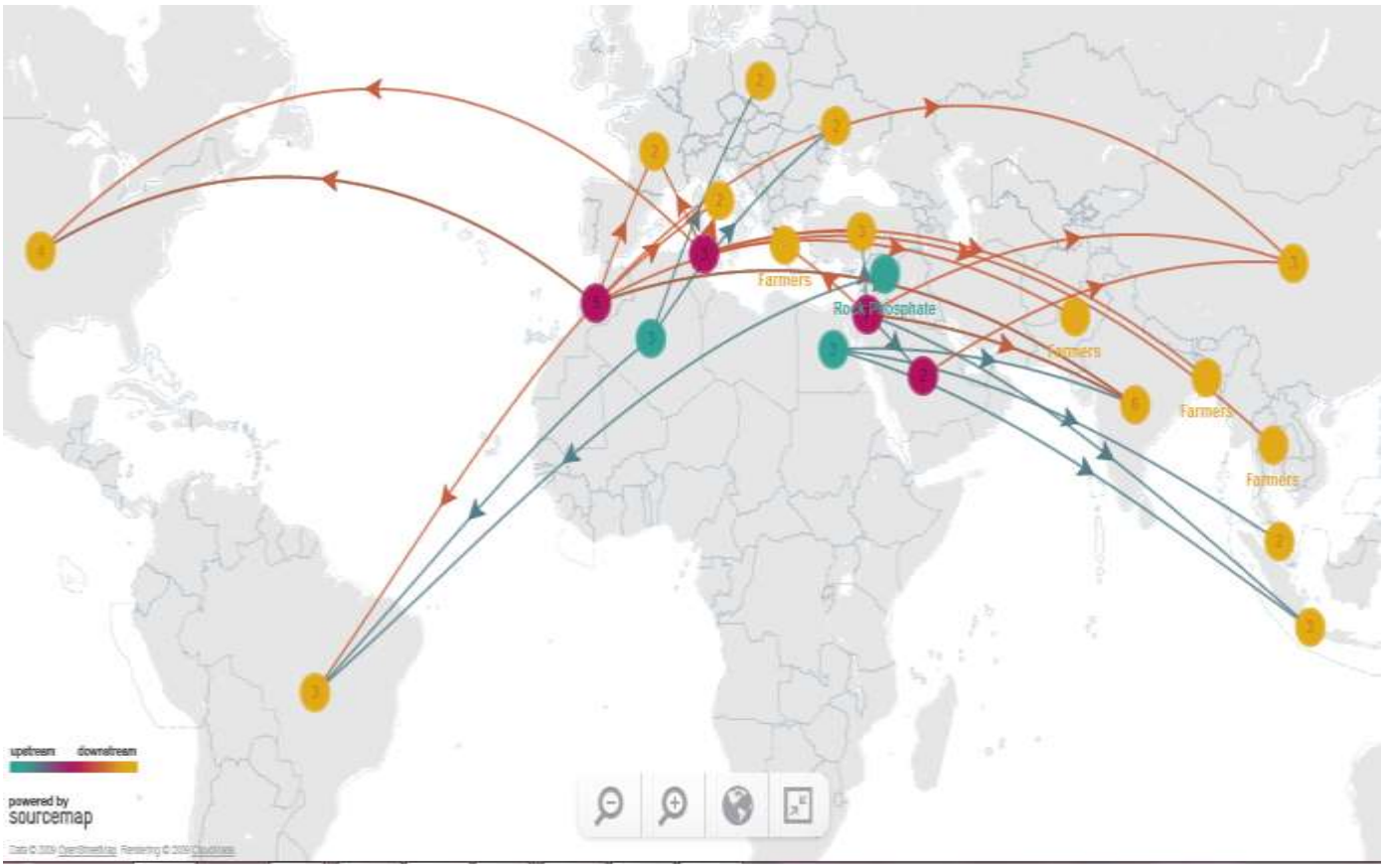


Source: Author's extrapolation from TradeMap Data, 2011

Figure 17 illustrates the trade routes of the phosphate fertilizers industry in the Arab Region. It is a geographic projection of the value chain of phosphorous and phosphorous products starting from upstream rock phosphate mining and the export of crude phosphate rock to milling plants around the world (green code), to the export of phosphoric acid from Arab countries (purple code), to the export of fertilizers to farmers around the world (yellow code). The numbers on the circles indicate the number of occurrences in the value chain. For example, Poland has the number 2 signifying that rock phosphate (green arrow) is imported from Algeria as a first phase and is manufactured into fertilizer as a second phase.

A few points float on to surface from our analysis. *Firstly, Algeria, Egypt and Syria are potential locations for phosphate fertilizer manufacturing due to the availability of raw material and reserves, and the fact that they are exporting directly without value-added. Secondly, most of the Arab exports are in the form of rock phosphate exported to several manufacturing mills currently running in East Asia (esp. India, China, and Indonesia), Brazil, Turkey, and USA. Thirdly, manufacturing facilities in Morocco, Jordan and Egypt can be further expanded to produce more phosphate fertilizers. Jordan for example, exports a large percent of its phosphoric acid production to factories in Saudi Arabia. Saudi Arabia manufactures phosphate fertilizers and exports them to its trade partners such as China. Saudi Arabia and the Gulf region already have established trade relations with East Asia due to its Nitrogenous fertilizer global business. Fourth, there are no signs of collaboration between phosphate rich countries in the region. Tunisia for example, has ventured with a large Indian Corporation in order to produce phosphoric acid and DAP, enabling it to play a global role in the value chain (Check Figure X) even though its crude resources are limited. Fifth, Africa is also an emerging market that seeks opportunities for low-cost fertilizer solutions.FAO, 2011 also estimated the highest CAGR Compound annual growth rate 2011 to 2015 for world and regional phosphate fertilizer demand forecasts should be in Africa at 3.4%. Finally, intensified efforts for R&D in waste reduction, capacity utilization byproducts, and recycling of phosphate rock should be emphasized and sought in order to guarantee a sustainable life span of this product.*

FIGURE 17: VALUE CHAIN OF PHOSPHATE FERTILIZER IN ARAB REGION



Source: Author's extrapolation of Trademap data 2012 on Sourcemap

The cost of phosphate rock is going to increase in the long run as lower cost phosphate rock deposits are mined out and producers have to move to more overburden, process lower grade ores, open new mines and employ increasingly expensive technology and additional raw material such as water to produce concentrates[30]. This will lead to an increase in prices. However, new alternative forms and technologies in mining are constantly evolving.

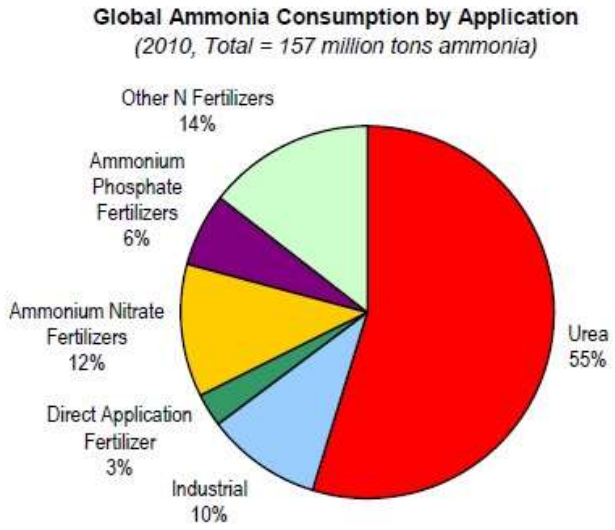
Price of DAP internationally fluctuates around 450 US $per ton on Fob bases. Prices in Morocco and Jordan are similar 480 US $/ ton, while USA prices are 460 US $/ ton. Chinese prices are usually slightly higher at 500 US $/ ton according to FMB Fertilizer index on week-3 July 2013. However, this price is oscillatory and changes every week. [31]

[30] World Phosphate Rock Reserves and Resources; 2010
[31]FertilizerWEEK, FERTECON and FMB Fertilizer-Index

1.3.2 Nitrogen Fertilizers

Ammonia is one of the largest chemicals in volume in the world [32] and is the main intermediary agent between natural gas and fertilizers such as urea, ammonium nitrates, and ammonium phosphates. Ammonia is also a building block for the manufacture of many industrial applications such as pharmaceuticals, synthetic resins and fibers, polyurethanes, refrigeration, cleaning products, and explosives. However, about 90% of ammonia is used for fertilizer production (Check figure 18 below). Consequently, ammonia demand is driven primarily by urea/fertilizer demand.

FIGURE 18: GLOBAL AMMONIA CONSUMPTION BY APPLICATION



Source:[33]

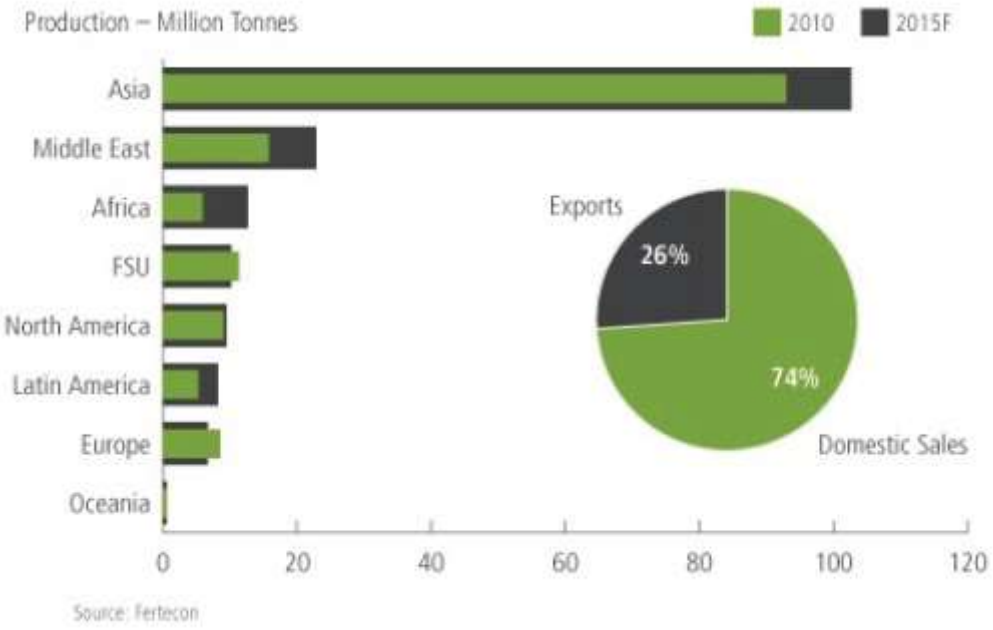
Urea consumes approximately 55% of global ammonia production and is known to be the most traded fertilizer in the world. In addition, solid urea is easier to transport and at a significantly lower cost than ammonia. Asia is undoubtedly, the largest producing region as China alone accounts for approximately 35 percent of the global market. It is rapidly building new capacities in order to meet rising domestic demand and to upgrade its current inefficient nitrogen plants. Overall, nitrogen fertilizer production has increased in recent years, mainly in East and Central Asia and declined in North America[34]and Europe that have closed some of their inefficient or noncompetitive production units. Natural gas costs in these regions in recent years have made nitrogen production unfeasible." The majority of new export-oriented urea capacity is expected in the Middle East and North Africa, due to the availability of lower-cost natural gas."[35]

Figure 19 illustrates the world regional production in 2010 and the prospected growth for 2015 in millions of tons. Approximately 26% of urea production in the world is

[32] Ammonia and Urea: Strategic Business Analysis 2012/2013 Prospectus; Nexant (2013)
[33] Ibid
[34]Arovuori, K., Karikallio, H; Consumption Patterns and Competition in the World Fertilizer Markets (June 20-21, 2009)
[35] Potash Corp 2011Industry Overview

exported. Expansion in production is expected in Asia, Middle East and Africa and less expansion in Latin America.

FIGURE 19: WORLD UREA PRODUCTION



Source: PotashCorp via Fertecon[36]

Figure 20 demonstrates the Arab nitrogenous supply chain by percentage of world export of natural gas, ammonia and nitrogenous fertilizer. The Arab region exports nearly 30% of the world's natural gas with Qatar, Algeria and the UAE constituting 24% of it. Saudi Arabia leads in the export of ammonia (9% of world exports) and Algeria comes second (4% of world export). Nitrogenous fertilizers and urea are the focus of Qatar's export and Saudi Arabia follows suit. The ESCWA region exports 30% of the world Urea and 17% of N fertilizers (UN Trade Data 2012). *This diagram ensures the importance of sustaining regional leadership in UREA and N Fertilizer export through expansion and developing economies of scale. Algeria and Libya do not participate in Arab export of N/ Urea fertilizers even though they have abundant raw material. Future investments in N fertilizer production in these countries are deemed to be very strategic.*

FIGURE 20: ARAB FERTILIZER EXPORT IN THE GLOBAL NITROGENOUS SUPPLY CHAIN

[36] Potash Corp 2011Industry Overview

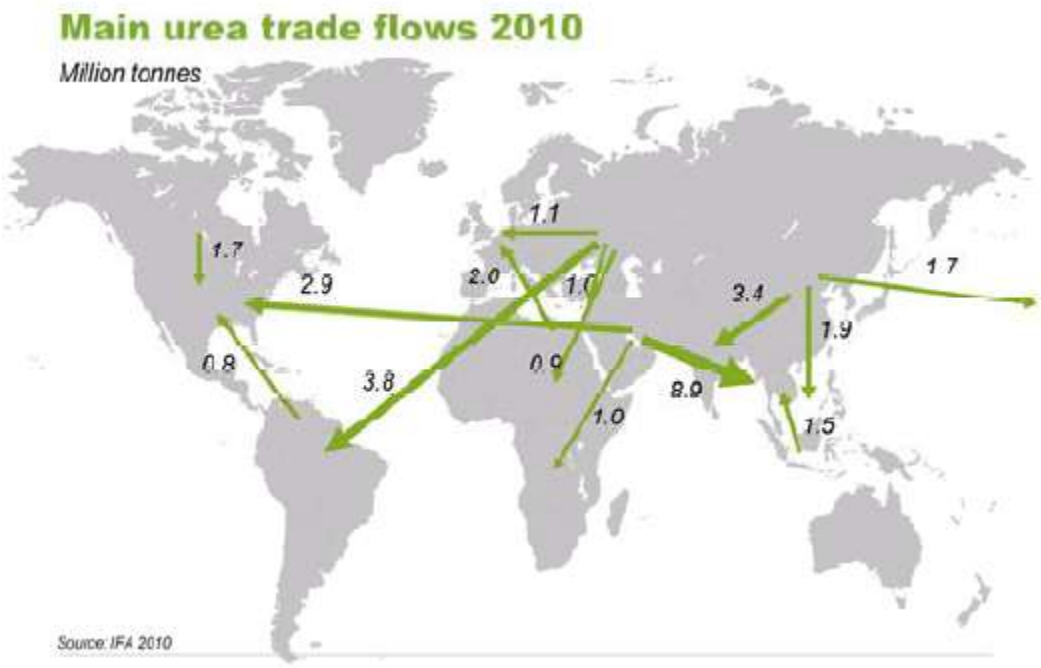
% of Arab Fertilizers Export in the Global Nitrogenous Supply Chain								
Petroleum Gasses/ Natural Gas	Country	Qatar	Algeria	UAE	KSA	Oman	Libya	Total
	World Export %	14.2%	6.5%	3.2%	1.7%	1%	1%	27.6%
Ammonia	Country	KSA	Algeria	Qatar	Egypt			Total
	World Export %	9%	4%	4%	2%			19%
Fertilizer [Nitrogenous-Mineral or Chemical*]	Country	Qatar	Saudi Arabia	Egypt	Oman	Kuwait		Total
	World Export %	5%	4.1%	4%	3.3%	1%		17%
UREA (60%% of *)	Country	Qatar	Saudi Arabia	Egypt	Oman	Kuwait	UAE	Total
	World Export %	8.2%	7%	6%	5%	2%	2%	30%

Source: Author's extrapolation from TradeMap Data, 2011

Figure 21 shows the main urea trade flows in millions of tons. It also illustrates that the main 2 hubs in the urea trade market, the Black Sea and the Arab Gulf. These 2 hubs generally determine the global prices according to supply and demand. The Black Sea exports feed Europe (1.1 m tons), Latin America (3.8 m tons) and Africa (0.9 m tons), while the Arab Gulf exports feed North America (2.9 m tons), Asia/Oceania (9.9 m tons and Africa (1 m tons) according to the International Fertilizer Association 2010. All the other flows are considered of more regional nature, such as Indonesia to other Asian countries and Venezuela to USA etc. They have a considerable effect on trade flow for example, in the case that China reduces its export; the price of urea will rise as the Arab Gulf will not be able to supply Asia on its own and the Black Sea will need to supply urea flow to Asia. Volume of urea export to the regional destinations determines the relative pricing between Black Sea and Arab Gulf. "If the main drive is from Latin America/Europe/Africa, Black Sea will lead. If it is Asia/North America, Arab Gulf will lead. The fertilizer market balance and capacity utilization are other key factors that impact prices for urea and other N-fertilizers."[37]

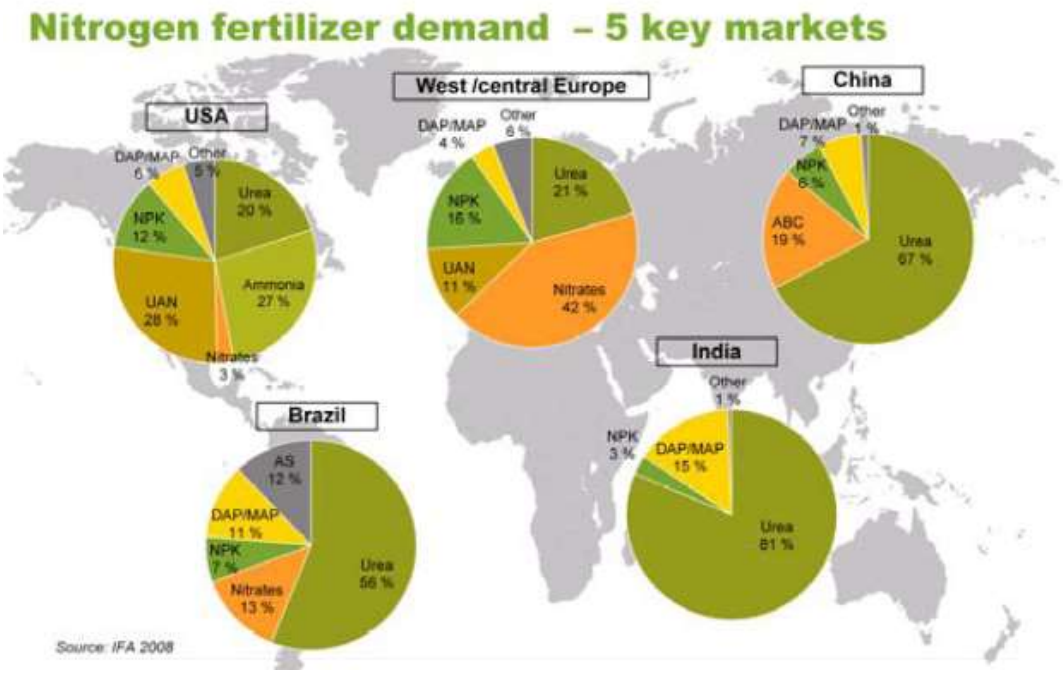
Figure 21: Urea Trade flow Pattern, 2010[38]

[37] Yara (2012)
[38] Ibid



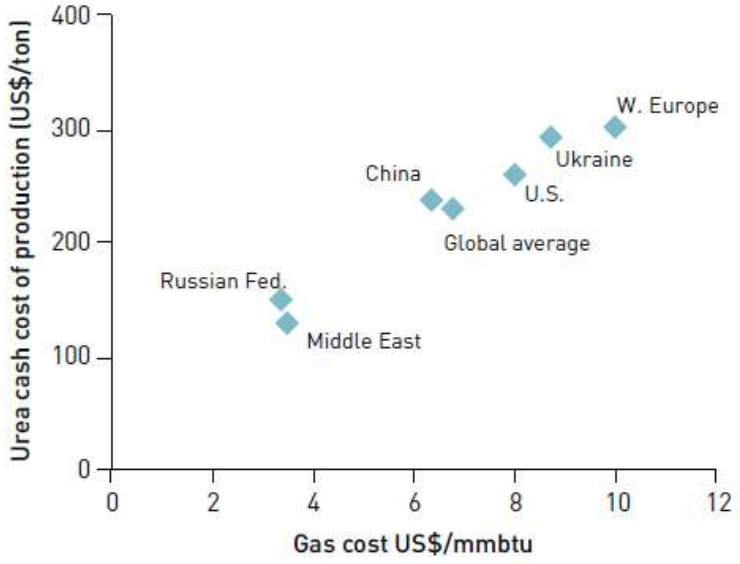
The highest rates of urea demand growth is in regions where agriculture is a major sector in its macro-economies such as China, India and South America. In general, urea is more popular in warm climates. Figure 22 demonstrates the composition of fertilizer demand in 5 main global markets. *There is no doubt that market demand is a main determinant of fertilizer mixtures and its export, and therefore a geographical marketing structure is fundamental to export development. We can also draw from figure 22 that India and China are the least demanding in terms of fertilizer compositions while USA and Europe have the most complex demand. The African market is still not matured.*

FIGURE 22: FERTILIZER DEMAND IN 5 KEY MARKETS



Variable costs such as raw material, energy and freight constitute 90% of operating cash costs of N fertilizer production plants. [39]Figure 23 shows the different regional gas cost to cash cost of producing urea in 2012. *The Middle East and Russian Federation are cost leaders in the N fertilizer production. China is constantly seeking to expand into economies of scale in order to be more cost competitive.*

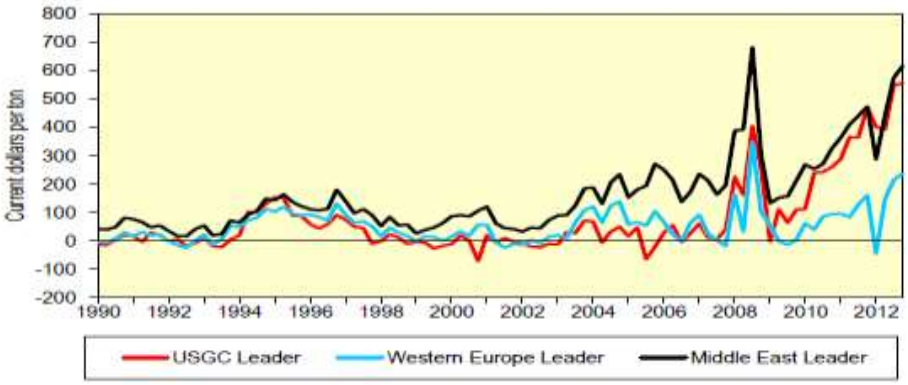
FIGURE 23: GAS COST AND THE CASH COST OF PRODUCING UREA IN 2012 (ESTIMATED)[40]



Source: Morgan Stanley, Bloominvest.

Variations in grain price (corn, rice or wheat) explain approximately 50% of the variations in urea and fertilizer prices making the fertilizer sector an integral part of the agro-food sector. Logistical savings have great impact on purchasing price. Figure 24 shows how the profitability of ammonia and urea producers in the United States, Western Europe and the Middle East has surged in the past 4 years. The United States is closely following the Middle East in Ammonia profitability.

FIGURE 24: AMMONIA HISTORIC PROFITABILITY (CASH COST MARGINS)[41]



The data above signals the growing profitability of ammonia and the race to produce more cost effective urea and N fertilizers. It also points out the direct and decisive

[39]Yara (2012)
[40] CMI, World Bank, EIB, ISESCO; Transforming Arab Economies: Traveling the Knowledge and Innovation Road (2013)
[41] Ammonia and Urea: Strategic Business Analysis Nexant 2012/2013 Prospectus;

effect that fertilizers have on food grain and the food chain in general. Supply Chain Management and logistical implications also correspond a great deal to the purchasing price of the fertilizer commodity.

1.4 Summary

High productivity is an important element for macroeconomic competitiveness. However, it is ultimately linked to the sophistication of its business environment and the integration of its parts under a clear vision. Governments should open up their countries' production to new markets and strengthen their networks focusing on key sectors for growth.

Industrial production plays a large role in the ESCWA region (up to 60% in some countries), however, it is not synchronized and there are some disparities in industrial indicators such as industry maturity levels, growth, labor productivity and wages, and number of industrial enterprises. Regional trade agreements that have been established are still developing in terms of participation and trade unions. However, they need to be equipped with strong production networks and integrated into the global value chain in order to achieve its regional economic growth target. There is a need to endorse modern regional sector strategies that can aggregate higher economic gains, reap larger benefits and generate more employment.

After reviewing product competitiveness in the region through trade (import and export analysis), a number of industrial sectors are believed to be candidates for growth in the Arab countries. These sectors have a continuously growing global market demand and are considered strategic to the development of current regional resources and requirements. The potential production sectors for development are: fertilizers, methanol and bio-fuels, plastics, jewelry, textiles, machinery, and electric and electronic equipment. These sectors have still yet to reach their full potential (moving up-stream and down-stream) engaging all stakeholders in the value chain and developing a clusters infrastructure to be more competitive.

The fertilizer sector is a very promising sector for the region, not only because it has the most abundant raw material to produce fertilizers in the world, but because the region has the resources to proclaim a full and self-sufficient Agro-Food chain. Arab countries' fertilizer exports are growing especially in the following key markets: Brazil, India, USA and South Africa. The two main fertilizers that are dominant in the region are nitrogenous and phosphate. The chapter recommends more production integration and value-added development to key establishments in the fertilizers in the region through adopting a regional cluster approach and integrating down-stream agribusinesses into the holistic agro food business in the region.

In the following chapter we identify the main fertilizers and methanol players in the region and discuss suggested programs for production partnerships.

II- Linking Enterprises

2.1- Benefits of Regional & International Production Integration

2.1.1 Clusters

"A cluster is a geographically proximate group of interconnected companies and associated institutions in a particular field, linked by commonalities and complementarities" as defined by Michael Porter. It can be in many forms such as specialized suppliers, providers of specialized services, downstream or channel industries, or related industries. Regions can specialize in different groups of clusters and depending on the strength of the cluster it can directly impact regional performance. This entails that each region needs its own distinctive competitiveness strategy and action agenda, which includes business climate development and cluster utilization.

Clustering is a tool for economic policy and it serves as a medium for collaboration among government, private sector, trade associations, educational, and research institutions bringing together firms of all sizes, including SME's. It is a means for constructive influential business dialog, a tool to identify new opportunities and investments, solve problems, follow-up on economic policies, and most importantly foster greater competition rather than have a dispersed market. [42]

Industries participating in a strong cluster register a higher growth of employment, wages, number of establishments and patenting. Industry and cluster level growth also increases with the strength of related clusters in the region and with the strength of similar clusters in adjacent regions. Importantly, we find evidence that "new regional industries emerge where there is a strong cluster environment. Analysis also suggests that the presence of strong clusters in a region enhances growth opportunities in other industries and clusters. Overall, these findings highlight the important role of cluster-based agglomeration in regional economic performance."[43]

Jordan has made some progress in cluster development endorsed by the Ministry of Planning and International Cooperation. One of its largest achievements has been in the tourism and medical tourism cluster. National and International efforts were exerted to uplift the entire sector, enforce international health standards and develop the support services that embrace it such as the establishment of medical and nursing institutes and accreditation of hospitals. Even though a large growth has been witnessed in the medical tourism industry up to 2008, some challenges still hinder its maturity such as poor co-ordination across the cluster and shortage in marketing and communication skills.[44]

---

[42] RichBryden; U.S. Regional Cluster MappingInstitute for Strategy and Competitiveness Harvard Business School (October 2012)

[43] Mercedes Delgado, Michael E. Porter, Scott Stern; Clusters, Convergence, and Economic Performance (March 2011)

[44] Jeremy Fischer, Imran Khan, Tulika Khemani, Diane Mak, Rosita Najmi; Jordan Tourism Cluster - Microeconomics of Competitiveness (May 2009)

"Morocco is promoting with some initial success clusters in robotics, informatics, electronics that seem to be closely linked to universities but as totally independent administrative units."[45] Many Arab universities are not research universities, even if it is stated in their bylaws. Research should be clearly identified and integrated into national budget and economic development plans. "The specialization areas in research at national levels in Arab countries justify with evidence the advantages of regional complementary collaboration in research"[46], hence Arab countries must exploit regional frameworks and regional research institutions to support sectors of growth in the region.

Box 1 includes a quick snapshot of the clustering approach that Turkey used to develop its mass production and reduce its costs in the textiles and apparel sector.

BOX 1

Turkey's Textiles and Apparel Cluster[47]

Turkey has a wide range of clusters, including textiles, tourism, automotive and construction. These clusters are mainly focused in the north-western region where there is a reliable backbone of support services such as technical, logistical educational and infrastructure. Recently, the government has launched various incentive programs to increase investment and cluster development in the eastern regions.

The textiles and apparel sector is widely regarded as the vehicle of the Turkish economy. Turkey is the fifth largest textile exporter in the world and the third largest apparel-exporting country in the world. Proximity to leading European markets and large, mature textile and clothing clusters has fueled the growth of the textiles and apparel industry.

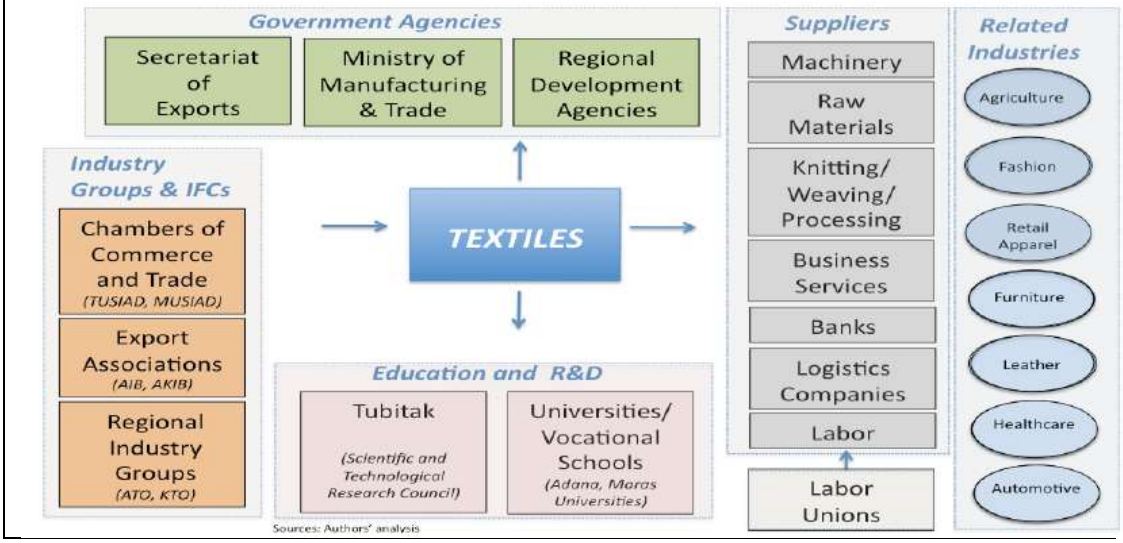
"The most important turning point for Turkish textile industry occurred in 1995. WTO's Agreement on Textiles and Clothing (ATC) required removal of all MFA agreements and all trade barriers by 2005. This meant emergence of China as a major competitor in the international textiles scene." The Turkish textiles industry, historically a successful and profitable one, was in need to develop a mechanism to reach economies of scale in export.

In order to augment small and medium businesses, Turkey adopted a clustering strategy, which combined the efforts, skills and resources of textiles firms in order to enhance productivity and improve competitiveness (Check figure 25 below).Clustering proved to be an effective strategy, particularly because the value chain was composed of buyer-driven networks that operated through fragmented players and difficult communication.

Turkey's international success in textiles and clothing demonstrates the impact of clustering on the development of small and medium-sized businesses (SMB) in emerging countries. Turkey took one step forward and utilized ICT effectively in integrating SMBs. The results were evident in the improvement of productivity, optimization of value chain and stronger integration of value chain partners.

[45]FouadMrad, Sari Hanafi, RigasArvanitis; Scientific Production in the Arab Countries- July 2013
[46] Ibid
[47] Murat Kutluksaman, Ipek Mutlu, Jason Saunders, Esra Unluaslan; Turkey's Textiles and Apparel Cluster May (2012)

FIGURE 25: THE TEXTILES CLUSTER STRUCTURE IN TURKEY [48]



2.1.2 Global Value Chains

Globalization, faster transportation, advanced technology and tariff reductions have led to better exploitation of global value chains. This rapid globalization has significantly changed the business practices of the world economy. "International production, trade and investments are increasingly organized within so-called global value chains (GVCs) where the different stages in the production process are located across different economies."[49] The manufacture of the iPod or iPhone, for example, clearly demonstrates the value creation across countries. China's specific role is the assembly of the imported intermediates into the final product. The largest part of the value added is completed by the producers of high value components (United States and Japan) and the seller of the iPod (Apple in the United States).

The concept of GVCs is not merely supply or distribution activities but incorporating all activities in the sector including production, distribution, sales and marketing, R&D, innovation, etc. GVCs are useful for industry motivation such as cost reductions, entry into new emerging markets and the access to foreign skills, knowledge and strategic assets. "Dynamics in GVCs cause actors and linkages to change over time as (smaller) firms might upgrade their activities and reinforce their positions within GVCs."

Multinationals have historically played an important role in global value chains through foreign direct investment, outsourcing or other partnership means. These partnership investments are not only restricted to catering to the local markets in the host country, but have become important hubs for serving regions and manufacturing inputs for other partners in the production network. “The growing importance of GVCs has increased the attention for input-output (I/O) analysis, as I/O-tables offer (complementary) information on the value of intermediate goods and services. An important advantage of I-O tables is that they classify goods according to their use (as input into another sector’s production or as final demand)". Input-Output data clearly

[48] Ibid

[49] Koen De Backer, Norihiko Yamano; international and comparative evidence on global value chains; OECD 2012

shows the growing spread of international production networks and the fragmentation of production across borders through specialization of economies. However, existing trade data should be detailed enough to analyze the international fragmentation and GVCs.[50]

Linking SMEs to GVCs plays a large role in granting SMEs the opportunity to attain financial stability, increase its production size and gain access to new markets. In addition, cooperation within a network of upstream and downstream partners can enhance a firm's exposure, quality standards, learning possibilities; and introduce new business practices and more advanced technology. However, SMEs' involvement in value chains demands greater managerial and financial resources, bargaining power, experience in intellectual property rights (IPRs), innovation skills, and dealing with international requirements. To meet these challenges, even in developed countries SMEs need the support of their governments (OECD, 2007).A small example would be the software industry in Egypt (the Microsoft case), it is connected to a GVC on a downstream level with the objective of adapting existing software packages for the regional market. "The challenge for Egyptian companies is to enter other segments of the software value chain, where, as the Indian experience shows, a much bigger potential for job creation and export earnings exists. For the Egyptian Government, an opportunity exists to further improve the education system in terms of agility and responsiveness, to tackle the serious skills shortages affecting the industry."[51]

Box 2 illustrates a successful case of implementing value chain analysis on the Malaysian national rubber industry and the ensuing strategies that the government is taking to secure its competitiveness along the chain.

BOX 2

Value Chain Strategies in the Malaysian rubber industry[52]

The Malaysian government has succeeded over the years in developing national strategies that enabled growth and sustainability for the local rubber industry, encompassing both the rubber upstream and downstream sectors. "In 2011, the industry contributed RM39.8bil in terms of export earnings, 200% higher than RM13.27bil in 2000 reflecting an annual average growth of 16.7%."*The government analyzed each stream of the rubber value chain separately in order to innovate, find cheaper rents and develop stronger linkages between support industries and main rubber producers.*

Upstream Strategies

The Malaysian upstream national rubber sector has contracted in size as investors shifted their investments to ventures that indicated a better profit potential. Despite efforts to improve productivity, output for national rubber still declined by 8% to 9% in 2012 due to unfavorable weather conditions. Moreover, productivity still remained low due to the use of old and low yielding clones, ageing smallholders that do not comply with good agriculture practices, unskilled harvesters and low adoption of latest latex harvesting technologies and low mechanization. Consequently, through the Economic Transformation Programme (ETP), the Malaysian Government initiated two Entry Point Projects to the rubber sector for increasing

[50]Koen De Backer, Norihiko Yamano; International and comparative evidence on global value chains; OECD (2012)

[51] Integrating Developing Countries' SMEsinto Global Value Chains; United Nations (2010)

[52]http://rubberjournalasia.com/new-strategies-set-to-push-malaysian-rubber-industry/ March, 2013

average national rubber productivity to 2,000 kg per ha per year by 2020 and ensuring sustainability of the upstream rubber industry to address these issues.

Downstream Strategies

On the downstream sector, the implementation of minimum wage of around 29%, gas tariff hike, natural rubber feedstock prices, labor shortage and growing environmental-related issues were analyzed to be affecting output. In consequence, capital and technological expenditures intensified in order to address unskilled labor with automation and industry players attempted to deal with shortage of local labor by hiring foreign workers. In addition, to meet the rising orders of latex-based products, which account for an estimated 80% of export earnings of rubber product sub-sector, both the midstream and downstream sectors are expected to depend on third party subcontracting of latex or dry rubber from the neighboring rubber producing countries such as Indonesia.

The government included plans to extend R&D activities into further downstream and new products. In this respect, training in polymer technology will be enhanced. This will facilitate the industry in acquiring the required skills to cater for the development of new materials and products, for example, high precision products, and research into the linkages of polymers and metals. In addition, this research will be directed towards expanding the export market for Malaysian rubber products; encouraging outward investments for low value-added rubber products to countries with lower costs of production and availability of natural rubber; diversifying the product range by developing the industrial and general rubber products sub-sector; and upgrading the existing technology, especially in process automation. R&D activities will be intensified to ensure Malaysian latex products meet international standards in health and safety.

Moreover, greater focus on R&D in advanced manufacturing technologies and higher value-added products was promoted, such as: bridge and seismic bearings, engine mountings and marine fenders, advanced, nano and smart materials and environment friendly rubber products.

Linkages and support services

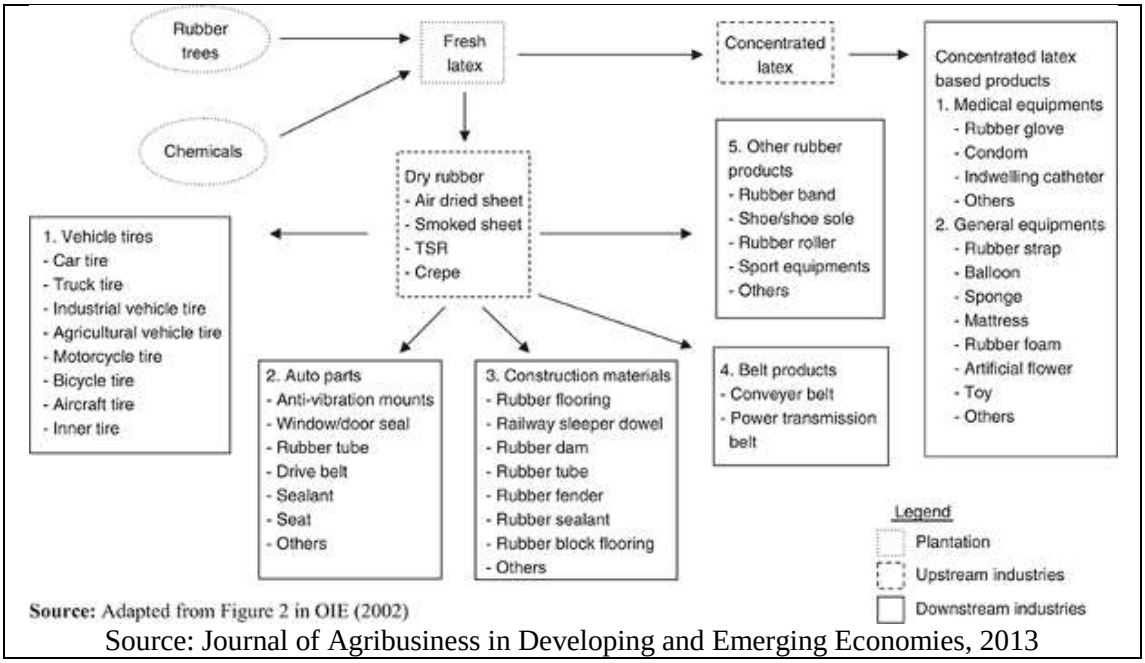
There are strong linkages between the rubber products industry and industries in plastics, metals, chemicals, packaging materials, machinery and equipment, moulds and dies, automotive products and construction. To enhance the linkages, support industries, such as rubber chemicals, tools and dies, and packaging, will be further developed. The setting up of a production facility for ethylene propylene rubber will be promoted to enable Malaysia to produce high value-added and advanced products.

To strengthen the support services for the industry, Malaysia will develop a regional and global centre for the testing and certification of rubber products, especially for use within ASEAN. Testing facilities of the Malaysian Rubber Board will be upgraded. Greater collaborations will be encouraged among institutions of higher learning, research institutes and the private sector to develop the required expertise.[53]

FIGURE 26: VALUE CHAIN OF THE RUBBER INDUSTRY[54]

[53]Malaysian Chamber of Industry;Ch17: Rubber;

[54] Journal of Agribusiness in Developing and Emerging Economies, The rubber industry of Thailand: a review of past achievements and future prospects; (2013)



Source: Journal of Agribusiness in Developing and Emerging Economies, 2013

Transportation is a building block to enhance economies of scale and scope through vertical product integration. However, transportation costs between Arab countries are considered relatively high especially in marine transport. This pertains to weak infrastructure, institutions and ICT utilization along the logistics chain in Arab countries. "Moreover, data and evidence suggest that the Arab countries have among the highest trade costs in the world".[55]

The gulf countries have already initiated several projects in land, marine and rail investment fields in order to speed up and lower costs of the transport of goods and intermediary products among them. In July 2013, Bahrain Minister of Transportation announced a new 10 billion US $ project to link the Gulf rail transport among the 8 gulf members. The project will be implemented over the course of a length of about 2177 km, and will start from Kuwait City to Muscat. The prospected finish date is by year 2018. The project is considered to be one of the main pillars for strengthening contribution to economic integration in GCC.[56]

Similar projects in Maghreb and Mashreq blocks are still not tangible. However, an Agreement has been concluded in 2002 to implement an Arab Mashreq International Railway Network via 2 axes; the North-South axes linking North Syria to Yemen and the East-West axis linking the Gulf to Egypt through rail. The objective was the construction and development of an international railway network in order to meet future transport needs, protect the environment and facilitate the movement of goods and passengers and, as a result, increase the exchange of trade and tourism in the Arab Mashreq, which will greatly promote Arab regional integration.[57]The project has not been fully implemented.

[55]Chemingui at al.; Trade Facilitation in the ESCWA Region: Challenges, future opportunities and Policy Options- (2013)
[56]http://www.ifpinfo.com/Top-MiddleEast-Arabic-3143
[57] Agreement on International Railways in the Arab Mashreq- UN ESCWA (April 2002)

2.2 Suggested Programs for Production Partnerships

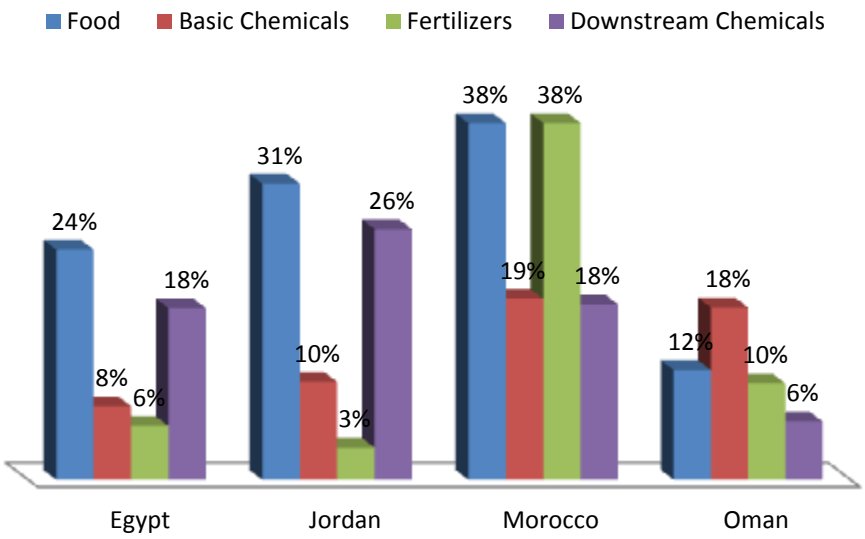
More and more, emerging global economies are realizing that economic growth on the basis of enhancing network capabilities is more rewarding than mere development of internal resources. The occasion of having a global competitive advantage and becoming a leader in it will enable it to capture worldwide business opportunities and utilize them to the fullest. As in the case of China, for example, that has harnessed its low-cost labor and mass production capacities to become the world leader in outsourcing solutions to large multi-national conglomerates. It has identified itself as the cheapest rent for innovative outsourcing capabilities worldwide based on its array of socio-technological resources.

This region is energy and resource-rich with a geographic competitive advantage of being physically close to Europe, Asia and Africa and with access to different marine trade routes. *It can supply energy and resource dependent production faster and cheaper than any other region as it has the potential to be the best rent for energy and resource dependent outsourcing solutions. However, in order to establish itself as a leader, it needs to utilize the production capacities of the region as a whole and extend its global trade networks.*

We have identified in the previous chapter the fertilizers sector as a key sector in the region. However, its potential has not been fully employed and its exportation to international markets is fragmented into separate entities or groups (GCC, Morocco, Egypt, and Jordan). In addition, they have overlooked their local agricultural capabilities or the full potential of integrating downstream in order to enlarge their scope of competitive advantage. If we take a close look at figure 27, we can study the value-added effect of the following industries: food, basic chemicals, fertilizers, and downstream chemicals as a % of total value-added in manufacturing for each country. In the case of Jordan and Egypt, we notice that the domestic value-added of food and downstream chemical manufacturing is higher than the value-added of basic chemicals and fertilizers. This gives us a clear indication that investing in food and agro-food production in countries such as Morocco, Jordan and Egypt is economically profitable in general terms. Value-added of production of fertilizers in Jordan is less than expected compared to its ample raw material and in benchmark to Morocco for example. On the other hand, in Oman, basic chemicals takes up 18% of total value-added in manufacturing while value-added in downstream chemical production is less than expected also in comparison to Jordan for example.

Figure 27 also leads us to see the potential of growing the fertilizer industry more in some of the Arab countries and the profitable opportunities of investing in downstream food and agri-business as well as downstream chemicals such as pharmaceuticals, dyes, cosmetics, and paints among others.

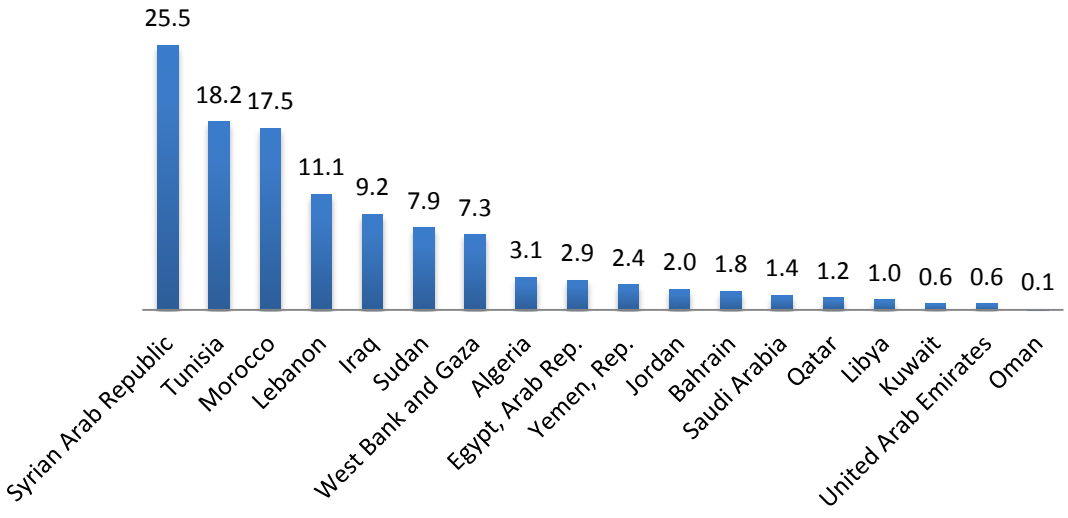
FIGURE 27: RATIO OF FOOD, BASIC CHEMICALS, FERTILIZERS AND DOWNSTREAM CHEMICALS VALUE-ADDED AS A % OF TOTAL MANUFACTURING VALUE ADDED FOR EACH COUNTRY



Source: Calculation from UN Data 2010

"Because of complementary variations in agricultural endowments, the agribusiness sector can be a source of inter-Arab economic integration."[58]Figure 28 shows to a large degree these variations on the bases of arable land as a percentage of total land area. While Mahsreq and Maghreb countries have large capacities of arable land, the GCC countries have negligible arable land (figure28). This highlights the potential of industrial partnership opportunities in the agri-business sector where GCC countries (that are net importers of food) can supply fertilizers and agricultural chemicals to Mashreq and Maghreb countries in barter for agro-food products or through direct investments.

FIGURE 28: ARABLE LAND AS A % OF TOTAL LAND AREA, 2010



Source: World Bank, World Development Indicators,2012

Arab countries are the largest net importers of cereals in the world according to UN trade data 2012. And even though trade within the region has grown in recent years,

[58] CMI, World Bank, EIB, ISESCO; Transforming Arab Economies: Traveling the Knowledge and Innovation Road (2013)

and a number of investments in agriculture have been made, the Arab World needs US$ 80.65 billion in agricultural investment to close the widening food gap as quoted by H.H. Sheikh Hamdan bin Rashid Al Maktoum, Deputy Ruler of Dubai and UAE Minister of Finance.[59]

Foreign Direct Investment in agriculture improves food supply and increases export revenues and consequently, stabilizes food prices, food security and increases food income. However, the Agro-food sector is one of the least destination sectors for FDI in the region. For example, in Morocco, agriculture accounts for more than 20% of its GDP, and it has received less than 1% of FDI flows. In Sudan, there is a calling need for the redirection of investments from oil to soil in order to increase the yield per feddan and rural income, and capitalize on the huge potential identified. It is interesting to note the growth in agricultural FDI in Sudan, especially by Arab direct investments (91.3% of total foreign direct capital investment in agriculture in Sudan), however, non-Arab FDI has increased job creation at a higher ratio than Arab investments due to special production techniques[60], global exposure to markets and technology spillovers.

Research completed by the World Bank also points out to the opportunities in agro-food manufacturing that are still at an infant stage as oppose to plain agricultural investments that have already started. Future forecasts indicate that the "biggest shift in terms of the world food map is a departure from foods in the primary form"…."such a shift carries with it a change in the composition of the food basket to more processed, convenience and higher value-added products(FRBKC report). "Brazil, Russia, India and China compose more than 40% of the global food consumption and food industry in the BRICs is growing at a fast pace especially in baked products, dairy, frozen and dry food, and ready-made food. Brazil is already leading in food self-sufficiency.[61]

In the absence of significant integration into the value chain, however, liberalization of manufacturing did not enable Egypt and Morocco to gain access to global markets (Taha 2012). [62] Small companies lack the knowledge, skills, funds and technology needed to integrate into the global value-chain. This is why specialization and vertical outsourcing through fragmenting production makes the regional productivity more competitive. Many studies also imply that deepening regional integration via intermediate goods from the viewpoint of value creation and distribution[63] reaps higher benefit than intra-regional trade of finished goods.

In total, "FDI projects in the agribusiness sector created no more than 38 direct jobs for every million Euros invested between 2003 and 2010 (ANIMA 2011). And the scale of investment flows remains small. The sector represented only 1.5 percent of total FDI flows between 2003 and 2010 in the Mashreq region and 1.9 percent in the

[59] http://halalfocus.net/uae-arab-world-needs-over-80-bn-in-agricultural-investment-to-fill-food-gap/ 2013

[60] AysenTanyeri-Abur, Nasredin Hag Elamin; International Investments in Agriculture in the Near East; Evidence from Egypt, Morocco, and Sudan; FAO (2010)

[61] http://www.foodprocessing-technology.com/features/feature129790

[62] CMI, World Bank, EIB, ISESCO; Transforming Arab Economies: Traveling the Knowledge and Innovation Road (2013)

[63] Bo MENG1, Yong FANG2, Norihiko YAMANO; Regional Economic Integration and Global Value Chains: An International Input-Output Analysis http://www.iioa.org/

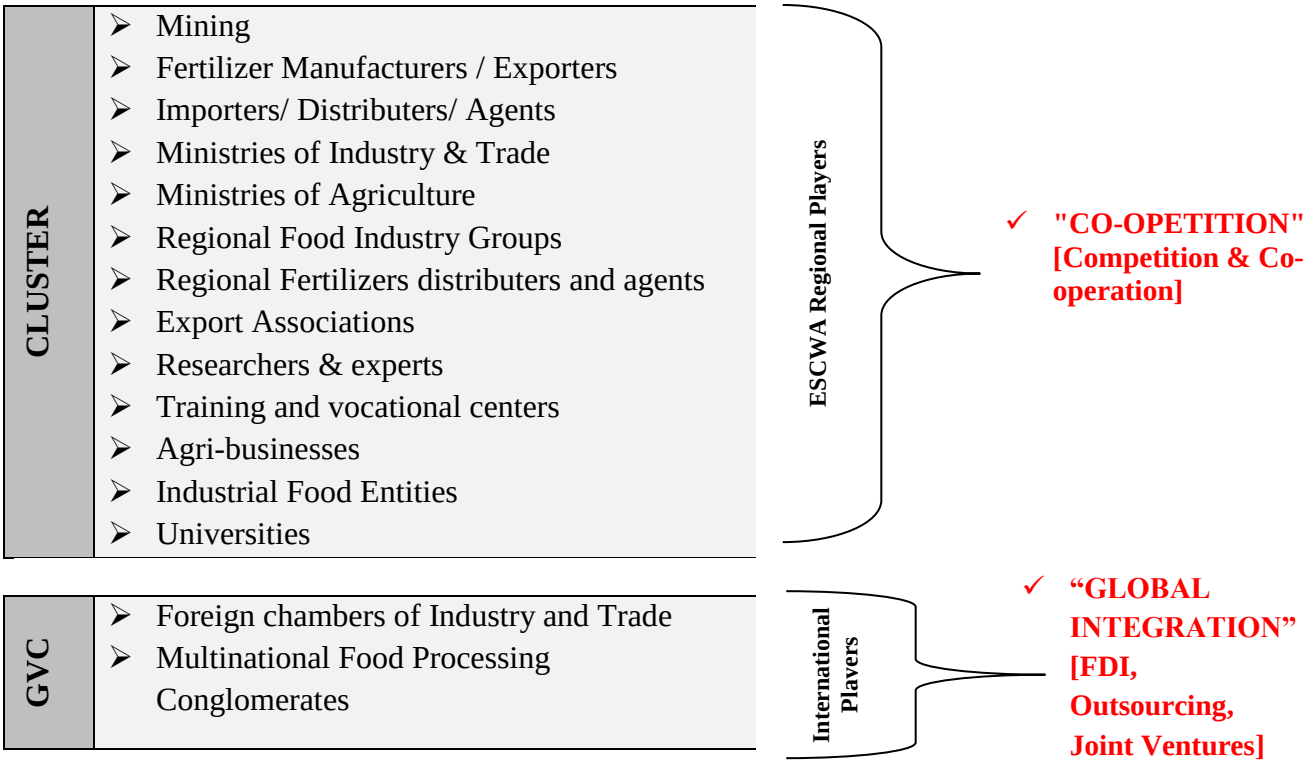
Maghreb, compared to 4 percent in Turkey and Israel." [64]*The conclusion is that there is a big room for agribusiness investment in the region in general, and primarily, in upstream and downstream opportunities. This paper also urges to innovate into new agro-business sectors and extend agro-food processing methods through networks and partnerships.*

In benchmark with the success of the Turkish experience in reviving and growing the textiles and tourism sectors among others and taking the similarity between the socio-economic compositions in Turkey with the Arab countries, this paper suggests a similar approach in managing the fertilizers and agro-food sectors. Although the region has initiated several forms of partnerships (such as AFA- Arab Fertilizers Association and joint investment companies such as Rakha- Rakha for Agricultural Investment and Development), most of these initiatives are traditional in their mission and services to their members and do not trigger positive competition or assembly co-operation. They can also be considered as small industry groups/ unions with a support nature rather than a leading role. The lack of engagement of all stakeholders (public and private) and inadequate coordination and consultation between them into effective sectorial clusters has led to weak incentives to support and develop the Agro-Chemical (chemicals used in agriculture) and Agro-Food sectors in the region.

A proposed framework has been established as a step towards building a holistic Agro-Chemical and -Food cluster and integrating it into the worldwide Agro-Network. Figure 29 explains this framework into 2 blocks on the bases of 2 forms of partnership modes: "Co-opetition" and "Global-Integration".

[64] CMI, World Bank, EIB, ISESCO; 2013 Transforming Arab Economies: Traveling the Knowledge and Innovation Road

FIGURE 29: PROPOSED FRAMEWORK FOR REGIONAL AND INTERNATIONAL PRODUCTION PARTNERSHIPS IN THE FERTILIZER AND AGRO-FOOD SECTOR



Source: Author

2.2.1 Co-opetition

Co-opetition is the term recently used to describe cooperative competition. Co-opetition occurs when entities agree to interact in order to create a positive outcome from their conflict of interest or rivalry. They cooperate with each other to reach a higher value creation, based on shared learning experience and collaboration.

Studies show that co-opetition can work on 3 levels: Micro, Meso and Macro. Micro (between divisions or workers in a firm)Meso (between firms) and Macro (between clusters of firms). All three levels engage in the creation of value on different frontiers such as knowledge, economic and public value.

Several advantages can be foreseen from co-opetition on a Macro level in the form of clusters working together to enhance communication and information flows, inter-industry knowledge and technology transfer, cost reduction, economies of scale, and new knowledge creation. Coo-option on a macro level aims to reduce aggressive rent seeking, profit and fund sharing settlements. It is based on the notion that if a sector is growing, the stakeholders are growing with it. On the Meso level, advantages sought include workforce training, investment, agreement on standards, reduced time-to-market, joint R&D, joint production and supply chain co-opetition, and co-development.[65]

[65]http://en.wikipedia.org/wiki/Coopetition

In Figure 29 above, the suggested co-opetition model is the Agro-Chemical and Agro–Business cluster which is basically composed of suppliers (mining companies), main players and competitors (fertilizer manufacturing companies), customers (Exporters, Importers/ distributers and Agents, Agri-businesses and Food industries), and complementors (Ministries of Industry and Trade and Agriculture, regional industry groups, researchers and experts, training and vocational centers, universities). This type of cluster is expected to support value creation, economic exchange and networking along the vertical and horizontal value-chain. Co-opetition also links R&D to production because as it disseminates opportunities and innovation at the right timing. [66]Dynamics of co-opetition would be thus shaped by industry and partner conditions as well as the cluster's capabilities to pursue a win-win approach, manage the tension, and balance the relationships.

Box 3 depicts an example of a success case of co-opetition between two giants in technology Sony and Samsung.

Box 3

A Case Study of Two Tech Giants

At the time the TV industry was facing a radical technical shift in paradigm, Sony felt it needed to address a critical gap in its TV division. Even though, Sony was a leader in the traditional CRT TV market for a long time, it was trailing behind in the growing flat-screen market. Sony team realized that a stable supply of LCD panels was vital in order to capture the flat-panel TV market segment. In 2003, Samsung was technologically ahead in LCD panel production (Kim, 2006), however it was not a mass producer. Both Samsung and Sony needed to form a partnership in order to achieve economies of scale and win the battle for setting the technological standard. Samsung–Sony created a co-opetition that resulted in substantial value for both firms. "Before S-LCD produced LCD panels, Sony and Samsung were ranked as the 3rd and 4th LCD TV makers (behind Sharp and Philips). In the 4th quarter of 2008, however, Samsung and Sony were ranked, as the 1st and 2nd, and the market share of the whole LCD segment grew rapidly from 13% in the 3rd quarter of 2005 to 68.4% in the 3rd quarter of 2009. As a result, LCD has clearly taken the lead in the large flat panel TV segment." [67]

In summary, the co-opetition model is recommended to include all the above stakeholders and collaborate on the following main points and activities:

- The establishment of an effective cluster for the Agro sector (see figure 29 above) in order to cover the needs of the Arab region and international markets especially Brazil, India, China and Africa on the bases of *cost leadership*.

[66]Giovanni Battista Dagnino, Giovanna Padula- Coopetition Strategy; A New Kind of Interim Dynamics for Value Creation- May 2002

[67]Co-opetition between giants: Collaboration with competitors for technological innovation Devi R. Gnyawali□, Byung-Jin (Robert) Park

- Knowledge and experts exchange programs especially with the United States, China, West Europe, and India
- Seek outsourcing opportunities of end product fertilizers from diminishing fertilizer establishments in West Europe and unattained demand in India and China as an added-value to export of raw and intermediary material
- Advanced research and studies in fertilizer production for specific soil and yield production in partner markets especially in key global crops such as (Rice, wheat, barley, and corn)
- New investments and joint ventures in fertilizer production in resource-rich Arab states such as Iraq, Syria, Jordan, Algeria, and Libya with under-capacity utilization.
- Excavation and exploration of new fertilizer raw material reserves for exploitation such as (phosphate, natural gas, sulphur, ..)
- Develop and promote the role of fertilizer traders and local agents and distributers in order to play a larger role in the global and regional agri-business value chain
- Enhancing agricultural investments in fertile countries by developing partnership agreements. Examine barter agreements "fertilizer for food"
- Regional and expatriate investments in large-scale agricultural projects for the production of major food crops as well as agricultural seeds.
- Collaboration with Arab universities to generate more tertiary and postgraduate students and studies in the chemical, fertilizers and agro-food fields.
- Investments and financing of infrastructural projects needed to reinforce the interconnection among Arab countries. There are great opportunities to invest in the logistics system and cruise lines, roads and railways in order to increase the chances of trade and production integration between Arab countries. The establishment of Arab transportation and logistics companies is encouraged between members.

2.2.2 Global Integration

The fragmentation of the production process across different countries has led to a considerable restructuring in firms including outsourcing and offshoring of certain functions and divisions. Initially, companies strived to outsource to avoid certain types of costs. Some outsourced the non-core activities while others outsourced complete solutions or divisions. Among the reasons companies choose to outsource includes cheaper energy or labor costs, lower fixed costs, reduced government taxes, less burdensome regulations, and availability of expertise. Many companies intend to keep the manufacture of their core product or parts in-house and outsource the rest of the production to several vendors that offer specialization at a lower cost. It has been observed that outsourcing leads to a diversification of the company's portfolio due to the shift from managing of production to management of outsourcing.

When most of the reasons above combine, and transportation costs are cheaper, companies are finding it more profitable to go one-step ahead and offshore their products and services. In this case, jobs may leave the home country for foreign countries as in the case of many apparel companies that offshored to China to lower their costs and efficiency rates, or many construction companies that chose to be close to their suppliers. Offshoring thus includes both international outsourcing (subcontracting activities to independent third parties abroad) and international insourcing (to foreign partners).

Trade and foreign direct investment (FDI) are still the key channels for economic growth and global integration. New ICTs have played an essential role in changing the scope of FDI and the internationalization of business and trade liberalization.FDI plays an undeniable role in global business and was considered as an essential instigator for growth as in the case of Turkey, Hong Kong, Singapore and Malaysia[68]. It provides new markets and channels, access to technology, cheaper production facilities, skills and financing and supplies a fast impetus to economic development. However, the deregulation and privatization of many industries has been the most important stimulator for FDI expansion and growth. Both market size and growth rate of an economy along with government policy and profit returns have been viewed as the most important indicators for outward and inward FDI decisions.[69]

In general, large corporations are seeking more benefits from their global growth initiatives. Today, these companies not only expand with a product-driven objective but also go overseas with a more strategic and market-driven vision tackling untapped or unsaturated markets with a plentiful of labor and often rich with natural resources and energy. A win-win business partnership on the bases of investing and benefiting the chosen market has been gaining momentum in the past decade. This notion has also been supported by economic literature on Total Factor Productivity (TFP), which is often seen as the real driver of growth within an economy. Basically, improvement

[68] CMI, World Bank; Transforming Arab Economies

[69] A Comparison of Inward and Outward Foreign Direct Investment Determinants in Turkey International Journal of Business and Social Science Vol. 2 No. 20; November 2011

of the institutional framework and the expansion of the knowledge economy are the key drivers to improving TFP. The first entails economic governance issues and the business climate (open and transparent markets), and the later includes technical efficiency change and innovation. Both drivers are a direct consequence of the benefits of FDI. On the whole, outward FDI has had an average positive long-run effect on TFP in developing countries.[70]

Multinational firms (MNEs) play a prominent role in global value chains because of their numerous affiliates abroad and global presence. Leading multi-national corporations have moved on to applying the new notion of "shared value" by creating economic value that also creates social value by tackling the needs and challenges of the society. This idea or new perspective is believed to provide the next wave of global growth. Many large conglomerates known for their mega-capitalistic ways of doing business are initiating shared-value schemes in order to generate larger prospects of growth and innovation and also benefit the society. They realize that societal needs are what determine economic needs and attempted to expand their scope of economic and social value. There are 3 proposed ways that companies can create shared value opportunities:

1) By reconceiving products and markets, for example Thomson Reuters in India has provided a service for 2 million farmers in India in order to enable them to have access to crop pricing, weather information and agricultural advice increasing by it the incomes and businesses of the majority of the farmers. These approaches to capitalism in poorer communities create new opportunities for social and economic development and the impact is larger and can trigger fundamental innovations.

2) By redefining productivity in the value-chain, for example Nestle is establishing smaller plants closer to its markets in order to maximize the use of local resources. Olam International a leading cashew producer preferred to open local processing plants and train employees in Tanzania, Mozambique, Cote d'Ivoire and Nigeria that employed 17,000 people and cut transportation costs by 25%. They established deeper roots in these communities by creating a much larger shared value for the rural areas in these countries.

3) By enabling local cluster development, Nestle for example, utilized a clusters approach to make the procurement practices for Nespresso more effective, productive and efficient. It established agricultural, financial, technical and logistical entities and capabilities in each coffee-producing region and supported them with finance facilities, training and coaching on more sustainable and efficient production techniques and supplied access to fertilizers and agro-equipment for higher-value production.[71]

Figure 29 provides a preliminary framework for integrating the suggested Agro-chemical and food cluster into the GVC through marketing the region as a resource-rich and cost-leader in agribusiness outsourcing solutions for multi-national corporations through its vast network of agro-technological resources. The main idea

[70]Herzer, Dierk (The long run relationship between outward FDI and TFP: Evidence for developing countries proceedings of the German Development Economic Conference) Berlin 2011, No. 41

[71] Michael E. Porter, Mark R. Kramer; Creating Shared Value- How to reinvent Capitalism and unleash a wave of innovation and growth; Harvard Business Review (2011)

is to strive to sell a solution rather than independent agro-products and chemicals in order to secure a higher added value for the region as a whole. *The figure proposes to link the agro-cluster (described in the previous section) with already established channels and markets for its "Agro-solutions".* This model of integration into world economy has been derived from inspiring country experiences of East Asia and Turkey especially Malaysia that had adopted a long-term vision of strong industrial policy combined with an outward market direction and export diversification.

The entities involved in this link shall be multi-national food conglomerates, and foreign chambers of trade and industry. The regional agro-cluster should seek to attract large multinational food conglomerates such as Kraft and Nestle or others in BRICS countries with a growing food consumption that are also striving from the other end to find rich labor and agro-resource locations for its off-shore investments.

2.3- Enterprises for Partnerships

2.3.1- A Developed Criterion and Selection of Enterprises

Instead of the government picking "winners and losers" for co-opetition and global integration, the marketplace should make decisions regarding firms worthy of investment and participation. As a rule, ministries and chambers of industry have registries of all the companies working in particular sectors and their size of work. Often, in Arab countries the directorate of Industry in the cities may possess a more comprehensive list. Ministries of commerce also have records of the main food importers and distributers for each country and can be approached by Multinational Agro-food conglomerates seeking partnerships. However, a basic criterion for selecting paramount agro-chemical and agro-food enterprises with a potential for global commercialization is listed below; once obtained by the government body, it can give a reasonable indication on the level of sophistication of the regional company being evaluated for partnership.

Table 4: Criterion for selection of production enterprises in Arab countries

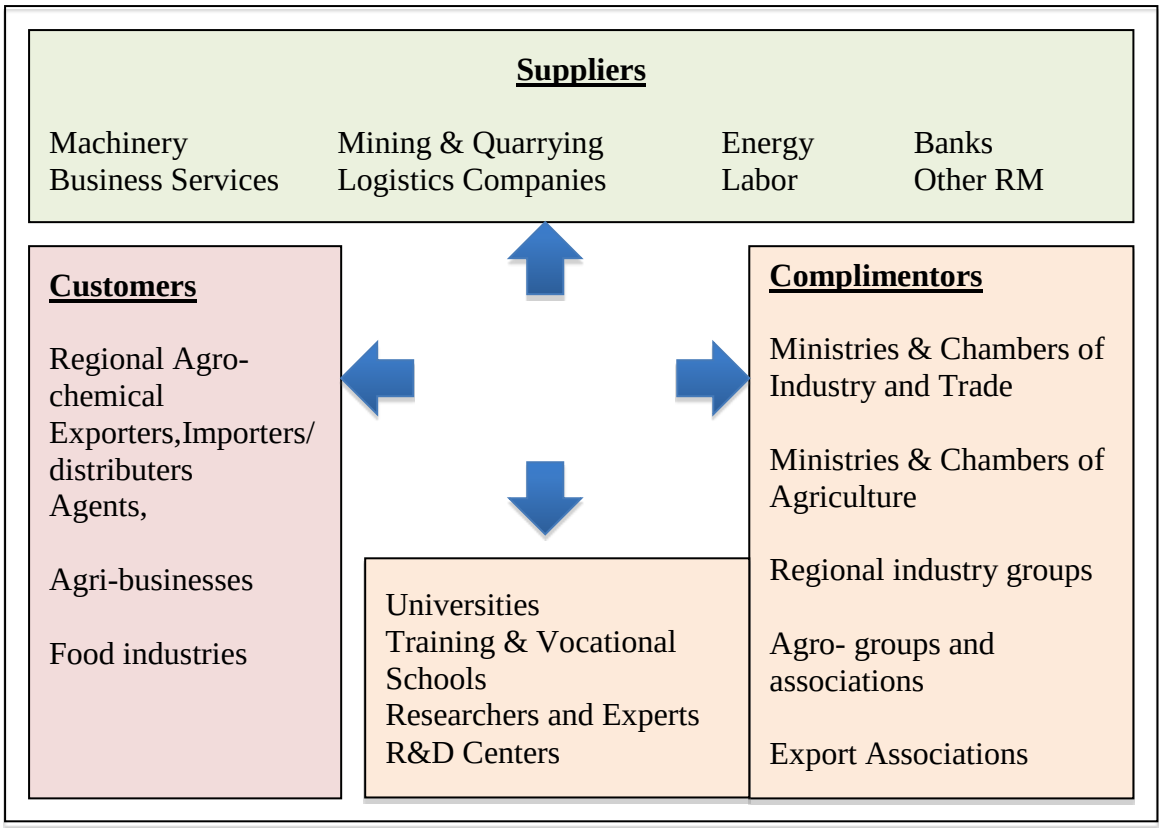
	Criteria	**Indication**
1	Products	Quality and refinement of products and product portfolio
2	Certification	Quality Management certification attained such as HACCP, ISO 2000, ISO 22000…etc.
3	Export/ Marketing	Proven record of export over a period of time and/ or proven local market share of over 20% from the food sub-sector.
4	Employee and staff numbers	Should be proportional and Company should be medium-large in employee size- Check EU classification http://ec.europa.eu/enterprise/policies/sme/files/sme_definition/sme_user_guide_en.pdf
5	Turnover and Balance sheet	Disclosed turnover and balance sheet for the past 3 years showing growth in turnover and amount of assets and liabilities
6	Communication Material	High quality of communication material

7	Internet	Strong commercial presence on the internet
8	Feasibility	Ability to present a sound feasibility report to the interested Multinational Company
9	Top Management	Open-minded and qualified Top Management

Fertilizer mining and manufacturing requires large amounts of capital and financing and hence are limited to large-scale public, public-private or large enterprises that are well known in the region. A list of companies producing fertilizers in the ESCWA region has been supplied in Annex 3.

The suggested co-opetition model for the Agro-Chemical and Agro–Business clusters displayed in Figure 30 presents an elaboration to Figure 29 by describing the main stakeholders in more detail. Th[Agro-chemical **Manufacturers & Competitors**]at all stakeholders are partners in practical terms. The co-opera will create steady supply and economies of scale, which wil more cost effective. At the same time, competition will enable t ards of fertilizers to rise, as each manufacturer will strive to supply better fertilizer solutions to customers. By suppliers we mean machinery manufacturers, mining & quarrying enterprises, energy sources, banks, business services, logistics and transportation companies, labor and other raw material suppliers. Governments in the region should strive to develop a reliable database of suppliers, customers, manufacturers and complimentors for the regional sector as a whole in order to allow equal opportunity for all input and priority for the best. Harnessing expertise from Turkey and Malaysia to assist in setting up the foundation for the cluster and exchanging experience for benchmarking purposes can also be of benefit at this stage.

FIGURE 30: AGRO-CHEMICAL CO-OPETITION MODEL



Source: Author

The selection of Multinational Corporations working in Agro industry and food was based on a simple methodology of targeting companies from developed countries who already have strong economic ties with the region. Also, we tried to select some of the largest enterprises working in agro-food with an extensive outreach and branches around the world. A list of suggested Multinational giants was selected for potential partnerships as a reference in Annex 4. Some of these Corporations already have manufacturing establishments in the region especially well known European and American Food companies. Some other suggestions have very limited presence in the region and hardly any presence in North Africa. The list also includes large agro-food manufacturers in India, China, Pakistan, Peru and South Africa that are considered giants in downstream agro-processing and are believed to have a constant growing demand.

2.3.2- Proposed Business Linkages to be Pursued and Promoted

The explicit application of co-opetition between agro-cluster members and the use of special ICT and facilitated transportation to support it represents a practical and applied tool for production integration between Arab countries and as a consequence production innovation. As presented in the report, trade enhancement coupled with production integration with a market focus will pave the road to more economic growth and the formation of a knowledge economy. It is recommended for governments in the region to look into the ASEAN model in order to develop a similar example for the Agrochemical and Agro food cluster in the region.

The adopted notion of “shared value” and investing in developing the community to develop their business is seen as a win-win initiative that has succeeded by many multi-national conglomerates in developing countries. As previously mentioned, the Agro sector is still under developed in the under saturated market of the region even though the inputs and raw material are prevalent. This study calls for more foreign investment in the dominating processed food area to be located in the region in order to acquire modern technical skills and knowledge, attain transparent market distribution, generate more employment, and access to global channels. A list of large MNEs in food production is listed in the Appendix 4. A next step would be holding a comprehensive investment forum for agro-industries in the region and multinational agro-food producers worldwide for potential joint ventures and investments in the region.

A developed taxonomy for potential partnership opportunities in industrial production can be found in Figure 31. Figure 31 attempts to classify the ESCWA countries into 4 fields according to 2 variables (fertilizer production and agricultural). Consequently, each classification has its options of adopting certain partnership models that we have described earlier. Countries falling into Class A such as Morocco, Tunis, Syria, and Lebanon are more likely to endeavor in co-opetition, FDI and shared value initiatives. Class B countries, such as Jordan, KSA, Qatar, Algeria, Kuwait, Oman, Bahrain, UAE, that are rich in fertilizer production yet have limited agriculture are set to invest in barter, co-opetition, and offshoring to A and C Countries opportunities. Class C Countries such as Iraq, Sudan, and the State of Palestine that have agricultural resources but no fertilizer production are more attractive to FDI, RDI (Regional

Direct Investment) and shared value initiatives. Final group, Class D such as Libya and Yemen, have more tailored requirements. Libya for example, has many gas resources yet is still behind in fertilizer production facilities and endowments. On the other hand, there are some opportunities for food processing in Yemen such as dried food processing and packaging.

FIGURE 31: THE FERTILIZER X AGRO FOOD MATRIX FOR PARTNERSHIP INVESTMENTS

Agr \ FP	P	NP
Ag	A- Morocco, Tunis, Syria, Lebanon	C- Iraq, Sudan , Gaza
N Ag	B- Jordan, KSA, Qatar, Algeria, Kuwait, Oman, Bahrain, UAE	D- Libya, Yemen

Source: Author

III-Conclusion

Indeed, achieving economic growth by innovating in production methods and selecting strategic sectors for development and expansion is one of the main routes to reducing the volatility of exports revenues. Fostering growth of output through production partnerships and linkages will speed up the growth of the sector vertically and horizontally. We have reached a conclusion that, even though industrial production has a strong presence in the region, it still needs a lot of work in order to be more efficient (in terms of productivity and capacity utilization), generate more employment opportunities and establish stronger international networks. The purpose of this paper was to emphasize the advantages sought from innovation in production especially through clusters and GVC, and as a means for regional integration along with enhancement of trade. In addition, it aimed to locate potential industry sectors worth investing in and presented the audience with a model for regional sector development to be pursued by the stakeholders that have been identified in this report.

Obviously, the ESCWA region is a global leader in both N and P fertilizer production, and therefore there is a need to maintain this leadership and develop it further. The report examines this sector in detail looking into strengths and weaknesses, and future growth and aggregation opportunities in production of fertilizers and development of its knowledgebase. It continues to find more opportunities as it links the agro-chemical sector downstream with the agribusiness sector to conclude that the region has complimentary resources to proclaim a complete agro-value chain. It also, looks at global market trends that are witnessing positive rise in demand and prices of both fertilizer and agro-food production, as well as changes in global food preferences, and puts forward growing consumer markets that are thirsty for production partnerships. Clearly, the importance of this union between Agro-chemicals and agro-industries has long been expressed by one of the gurus of production, Henry Ford as quoted on March 1933- "For a long time now, I have believed that industry and agriculture are natural partners and that they should begin to recognize and practice their partnership. Each of them is suffering from ailments which the other can cure. Agriculture needs a

wider and steadier market; industrial workers need steadier jobs. Can each be made to supply what the other needs? I think so. The link between is Chemistry. “

This paper analyzed one sector, the fertilizer and food sector, as an example and attempts to emphasize its global strategic importance and regional profitability tackling areas where more development and innovation can be attained. Specifically, we have laid down a two-step model as a proposal for integrating countries of the region involved in the value chain of fertilizers and agro food, essentially, where there is potential for growth. In effect, the suggested model is comprised of 2 directions for development:

- Upstream: Economics of scale and horizontal production integration through “co-opetition”
- Downstream: Vertical production integration and diversification through FDI, outsourcing and joint ventures enabling more value-added gains to be addressed

In summary, the paper reflected on the Turkish and Malaysian growth strategies in their upward development paths to develop the Turkish textiles and apparel sector and the Malaysian rubber sector and link them to global value chains enabling them to assert their global presence. It also touched upon the Chinese policy of identifying itself as the cheap rent for innovative outsourcing capabilities worldwide based on its array of socio-technological resources. As a consequence, the report calls for the region to adopt a similar marketing policy to promote the region as the best rent for energy and resource dependent outsourcing solutions, specifically, agro-solutions. Surely, the report proves the loss of value-added opportunities in the value-chain and urges to invest more in downstream agro industries as oppose to classic export of fertilizer raw material (especially Phosphate), and even basic fertilizer in general.

Governments play a large role in leading economic collaboration initiatives between Arab countries in order for the region to play a pivotal role in the GVC. Governments are urged to explore the “co-opetition” model in more detail in order to invigorate development of the sector and approach the parties poised to participate in a regional goal on the bases of competition and cooperation principles. Again, the report stresses on the importance of logistics and updated transportation channels to achieve efficiency in production integration in the region. Ultimately, a review of the regional business climate should be completed in order to attract more investments in the region and hence, more access to new technology and global network channels. In conclusion, the region should think globally in terms of building sectorial clusters, endorsing linkages, ICT and governance issues and attract Multinational companies that are striving to distribute shared value in partner countries.

Acknowledgment:

ESCWA Technology Centre Acknowledge the preparation effort of this report by Ms. Hana Hallaj.

Bibliography

Arovuori, K., Karikallio, H(2009) Consumption Patterns and Competition in the World Fertilizer Markets

AysenTanyeri-Abur, Nasredin Hag Elamin (2010)International Investments in Agriculture in the Near East; Evidence from Egypt, Morocco, and Sudan; FAO

Bo MENG1, Yong FANG2, Norihiko YAMANO Regional Economic Integration and Global Value Chains: An International Input-Output Analysis

Chemingui M.et al. (2013)Trade Facilitation in ESCWA Region: Challenges, Future Opportunities and Policy Options {DRAFT}

CMI, World Bank, EIB, ISESCO.(2013)Transforming Arab Economies: Traveling the Knowledge and Innovation Road

Dana Cordell a,b, Jan-OlofDrangert, Stuart White (2009)The story of phosphorus: Global food security and food for thought- Global Environmental Change;

Devi R. Gnyawali, Byung-Jin R. Park(2011) Co-opetition between giants: Collaboration with competitors for technological innovation. Research Policy 40

Dominik Stephan(2012)Process Worldwide; China and the Middle East compete for Leadership in Methanol http://www.process-worldwide.com

ESCWA & Arab Industrial Development and Mining Organization Bulletin of Industrial Statistics for Arab Countries 2004-2010; 7th Issue; July 2012

FAO (Rome 2011) Current world fertilizer trends and outlook to 2015

FouadMrad, Sari Hanafi, RigasArvanitis;(2013) Scientific Production in the Arab Countries

GCC Petrochemicals & Chemicals Industry; Facts & Figures 2011: Gulf Petroleum and Chemicals Association

Giovanni Battista Dagnino, Giovanna Padula- CoopetitionStrategy;A New Kind of Interim Dynamics for Value Creation- May 2002

Herzer, Dierk (The long run relationship between outward FDI and TFP: Evidence for developing countries proceedings of the German Development Economic Conference) Berlin 2011, No. 41

International Journal of Business and Social Science Vol. 2 No. 20;(November 2011) A Comparison of Inward and Outward Foreign Direct Investment Determinants in Turkey

Jeremy Fischer, Imran Khan, Tulika Khemani, Diane Mak, Rosita Najmi; Jordan Tourism Cluster -Microeconomics of Competitiveness (May 2009)

Journal of Agribusiness in Developing Economies (2013) The Rubber Industry of Thailand: A Review of Past Achievements and Future Prospects

KoenDe Backer, Norihiko Yamano; International and comparative evidence on global value chains; OECD 2012

Malaysian Chamber of Industry; Ch17: Rubber http://www.miti.gov.my/cms/documentstorage/com.tms.cms.document.Document_76736f43-c0a81573-2d952d95-731562fc/Chap%2017.pdf

Mercedes Delgado, Michael E. Porter, Scott Stern(2011) Clusters, Convergence, and Economic Performance

Michael E. Porter, Mark R. Kramer.(2011)Creating Shared Value- How to reinvent Capitalism and unleash a wave of innovation and growth; Harvard Business Review

Murat Kutluksaman, Ipek Mutlu, Jason Saunders, Esra Unluaslan; Turkey's Textiles and Apparel Cluster May (2012)

Nexant (2013)Ammonia and Urea: Strategic Business Analysis 2012/2013 Prospectus;

OECD (2013)Interconnected Economies: Benefitting from Global Value Chains

Potash Corp 2011Industry Overview

Rich Bryden(2012) U.S. Regional Cluster Mapping Institute for Strategy and Competitiveness Harvard Business School (October 2012)

Steven J. Van Kauwenbergh,(2010) World Phosphate Rock Reserves and Resources; IFDC

UN ESCWA Agreement on International Railways in the Arab Mashreq- (April 2002)

United Nations (2010) Integrating Developing Countries' SMEs into Global Value Chains

World Bank Development Indicators and the International Standard Industrial Classification of All Economic Activities (ISIC) Version 3

Yara Fertilizer Industry Handbook; February 2012

Websites

www.unpopulation.org

International Fertilizer Development Center (IFDC) http://www.ifdc.org/

Guide to EU definition of SME Document (1/1/2005)

http://www.sabic.com

http://rubberjournalasia.com/new-strategies-set-to-push-malaysian-rubber-industry/

http://www.ifpinfo.com/Top-MiddleEast-Arabic-3143

http://halalfocus.net/uae-arab-world-needs-over-80-bn-in-agricultural-investment-to-fill-food-gap/

http://www.foodprocessing-technology.com/features/feature129790

http://en.wikipedia.org/wiki/Coopetition

FertilizerWEEK, FERTECON and FMB Fertilizer-Index www.**fertilizer-index**.com/

Annexes

Annex 1: Country Business Profiles for the ESCWA Region

Annex 2: ESCWA Export & Import Data 2012

Annex 3: Fertilizer Producers in the ESCWA Region

Annex 4: Multinational Agro-food Companies