Employment impact infrastructure investments in the Mediterranean Partner Countries

Study Summary Report June 2015

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Executive summary

This study provides in-depth analyses of the employment outcomes of eight EIB-financed investment projects in four different infrastructure sectors: Transport (3 projects); Energy (5); Sanitation (2); and Environment (1) in the countries of Morocco (4), Tunisia (2), Jordan (2) and Egypt (3). It recommends how to better assess and monitor employment outcomes in future investments, and it also puts forward recommendations to the governments of the four countries on how to increase the employment opportunities. The study's four main questions are summarised below with their respective recommendations. This brief summary is elaborated upon in the separate document named Executive Summary, dated March 2015.

Number of direct jobs created:
- Infrastructure work has the potential to generate large number of jobs, but the results suggest that the estimates of the direct employment created through the assessed projects were lower than expected in general.
- The cost of person-year of employment varies considerably between.
- There was limited monitoring and reporting of the projects employment data.

Recommendations:
- There is scope to increase the labour content of the EIB’s lending portfolio and the report provides some examples in construction and maintenance.
- Periodic project reporting on employment would enable EIB to gradually build up its own database of work in MPC and refine its appraisal tools. A common template for employment recording of EIB infrastructure projects is proposed.

Findings on the characteristics of employees:
- The labour category represents about 70% if the total number of employees.
- There is an equal share of skilled and unskilled labour.
- Most employees were men while women usually restricted to administrative work.

Recommendations:
- There is a demand for more skilled labour as the operations go more mechanised; hence there is a need for adequate training and apprenticeship programmes.
- Although infrastructure is a sector dominated by male workers, several opportunities exist to employ educated women in the field of monitoring and evaluation, health and safety, operation of energy plants etc.

The way forward for EIB

- Improve estimation and monitoring of employment in EIB funded infrastructure projects:
  - Gradually establish a dataset of reliable key direct employment indicators specific to MPC.
  - Monitor and record employment figures at project level.
  - Analyse completed projects to update key indicators.
  - Enhance the employment content in the EIB infrastructure portfolio.
  - Considering balancing large scale with lower-cost investments.
  - Apply appropriate technologies based on technical feasibility and economic justifications.
  - Include a cost item in Bill of Quantities to cover costs of apprenticeships during implementation.

Type of jobs:
- There was an equal split between permanent and temporary jobs in construction.
- Labour work is not considered attractive in any of the four countries.
- Health and safety requirements are in place generally.
- Certain infrastructure sectors offer long-term maintenance employment in large numbers.

Recommendations:
- Encourage small-scale contractors to start their own businesses and be awarded specific sections of work, e.g., maintenance of rural roads, sanitation systems.
- Training on health and safety would improve compliance with health and safety requirements and create a work environment that is more attractive to local labour.

How the jobs are filled:
- Only three projects show a significant proportion of youth engaged.
- Labour demand and supply do not match.
- Labourers are hired from the local areas.

Recommendations:
- The vocational and technical training system should graduate sufficient numbers of qualified individuals to meet the growing needs of the sector for skilled labour.
- Structured on-the-job training programmes could be introduced with a certification programme for unskilled and semi-skilled positions to make these types of jobs more attractive and career oriented.
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Abbreviations and acronyms

BoD  Board of Directors
BoP  Balance of Payments
EmpIA  Employment Impact Assessment
EEAA  Egyptian Environmental Affairs Agency
EMP/INVEST  Employment-Intensive Investment Programme of the Employment Department
EU  European Union
EUR  Euro
FDI  Foreign Direct Investment
FEMIP  Facility for Euro-Mediterranean Investment and Partnership
FTE  Full Time Equivalent
GDP  Gross Domestic Product
GW  Giga Watt
HCP  Haut Commissariat au Plan
HRD  Human Resource Development
IFI  International Financing Institutions
ILO  International Labour Organisation
I-O [table]  Input-Output [table]
JD  Jordanian Dinar
LE  Egyptian Pounds
LIM  Labour Intensive Methods
MAD (DH)  Moroccan Dirham
MENA  Middle East and North Africa
MIS  Management and Information System
MPC  Mediterranean Partner Countries
MW  Mega Watt
NES  National Employment Strategy
NPRR-2  2nd National Programme of Rural Roads
OECD  Organisation for Economic Co-operation and Development
ONEE  Office National de l’Electricité et de l’Electrification Rurale
PM  Project Management
PMU  Project Management Unit
PPP  Private-Public Partnership
PST  Tunisian Solar Plan
RR  Ring Road
SAM  Social Accounting Matrix
TND  Tunisian Dinar
UPVC  Poly vinyl chloride (no plasticizers are added)
WSM  Wage Share Method
1. Introduction

Preceding the global economic crisis, most countries covered by the EIB-FEMIP saw solid growth rates and economic reforms that were successful in many sectors. However, this growth did not translate into sufficient job creation. The countries also suffered from the global recession in 2008 and, although there are encouraging signs of economic recovery worldwide, the Global Employment Report 2014 (ILO) finds that these economic improvements will still not be sufficient to absorb the major labour market imbalances that have built up in recent years.

Social unrest has affected the Middle East and North Africa (MENA) region and threatens its long-term prospects for economic and social growth. Economic growth has decelerated sharply in the region, falling to 2.2% in 2013, well below the global average and too low to generate sufficient employment opportunities for the fast-growing population. Many workers find only vulnerable jobs in the informal economy. Furthermore, youth unemployment constitutes another major challenge in MENA countries, remaining the highest in the world (more than twice as high as the global average).

The current study focuses on four developing, oil importing, lower middle-income countries in MENA region: Morocco, Tunisia, Jordan and Egypt. Table 1 summarises their labour market situation, which is further elaborated upon in Annex 1.

<table>
<thead>
<tr>
<th>Labour Market</th>
<th>Morocco</th>
<th>Tunisia</th>
<th>Jordan</th>
<th>Egypt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour Force (age +15)</td>
<td>12 026 239</td>
<td>3 979 518</td>
<td>1 772 636</td>
<td>27 742 106</td>
</tr>
<tr>
<td>LF growth 2010-2013 cumul. (%)</td>
<td>5.7</td>
<td>4.7</td>
<td>6.8</td>
<td>6.7</td>
</tr>
<tr>
<td>Employment to population ratio (%)</td>
<td>46</td>
<td>41</td>
<td>36</td>
<td>43</td>
</tr>
<tr>
<td>Unemployment rate (%)</td>
<td>9.2</td>
<td>13.3</td>
<td>12.6</td>
<td>12.7</td>
</tr>
<tr>
<td>Unemp rate (M 15-24) (%)</td>
<td>19.0</td>
<td>32.0</td>
<td>28.0</td>
<td>25.8</td>
</tr>
<tr>
<td>Unemp rate (F 15-24) (%)</td>
<td>16.9</td>
<td>29.3</td>
<td>55.9</td>
<td>71.1</td>
</tr>
<tr>
<td>Vulnerable employment, total (%) (1)</td>
<td>51</td>
<td>29</td>
<td>10</td>
<td>29</td>
</tr>
<tr>
<td>Vulnerable emp (M) (%)</td>
<td>NA</td>
<td>31</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>Vulnerable emp (F) (%)</td>
<td>NA</td>
<td>21</td>
<td>2</td>
<td>46</td>
</tr>
</tbody>
</table>

Legend: LF – Labour force, M-Men, F-Female, NA – Not available

In this context, the EIB and the ILO undertook this joint study with an overall objective to provide the EIB and its partner countries with a set of practical recommendations on how to optimize, within existing constraints, employment impacts in infrastructure projects, in terms of both quantity and quality of jobs created.

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1 Vulnerable employment is defined as unpaid family workers and own-account workers as a percentage of total employment.
The specific objective of the study\(^2\) is to provide an in-depth analysis of the different employment outcomes of EIB-financed investment projects in different key infrastructure sectors in the selected partner countries, and to recommend how better to assess (ex-ante) and monitor employment outcomes in future investments.

The ILO contracted the joint venture of the interdisciplinary research consultants (id:rc) and Al Jidara to undertake eleven case studies between November 2013 and March 2015 in Egypt, Jordan, Morocco and Tunisia. This was complemented by studies done by senior analysts in each country using macro-economic tools in order to obtain a full picture of the labour market outcomes of selected EIB investments in each country.

The study covers four main infrastructure sectors (T- Transport, E- Energy, S- Sanitation and Env - Environment) as shown in Table 2, with four projects in Morocco, three projects in Egypt and two projects each in Tunisia and Jordan.

\[
\begin{array}{|c|c|c|c|c|}
\hline
\text{Project} & \text{T} & \text{E} & \text{S} & \text{Env} & \text{Description} \\
\hline
\text{Morocco} & & & & & \\
2\text{nd National Programme of Rural Roads} & 1 & & & \text{a large scale rural roads project with many sub-projects} \\
\text{Solar Energy in Ouarzazate} & 1 & & & \text{development and construction of a 500 MW power plant} \\
\text{Sanitation in Oujda} & 1 & & & \text{rehabilitation of sewage network, storm water drainage and construction of a treatment plant} \\
\text{Sanitation in Sebou Basin} & 1 & & & \text{construction of infrastructure for collection and treatment in 17 urban centres} \\
\hline
\text{Tunisia} & & & & & \\
\text{Urban Priority Roads V} & 1 & & & \text{12 sub-projects to reduce traffic congestion in urban cities} \\
\text{Power Station in Sousse} & 1 & & & \text{construction and operation of dual-fuel power generation plant} \\
\hline
\text{Jordan} & & & & & \\
\text{Amman ring road} & 1 & & & \text{a 41 km four-lane highway around Amman} \\
\text{Tafila wind farm} & 1 & & & \text{a 117 MW wind farm equipped with 38 turbines} \\
\hline
\text{Egypt} & & & & & \\
\text{Giza North Power Plant} & 1 & & & \text{construction of a 2,250 MW power plant using combined cycle gas turbine technology} \\
\text{Egypt Power Transmission} & 1 & & & \text{construction of 10 transmission lines, one underground cable, 10 substations and 22 transformers} \\
\text{EPAP II} & 1 & & & \text{pollution abatement in various industries in the Alexandria and Greater Cairo Governorates} \\
\hline
\text{Number of projects per sector} & 3 & 5 & 2 & 1 \\
\hline
\end{array}
\]

This report summarises the main findings, conclusions and recommendations of this joint study, drawn from the following reports:

\(^2\) This study forms part of a larger multi-country initiative, which is supported by the ILO Governing Body in the field of employment and investment.
1. Employment Impact Assessment of Infrastructure in three Mediterranean Partner Countries: Final Report - Morocco
2. Macro-economic employment impact of infrastructure investments in Morocco
3. Employment Impact Assessment of Infrastructure in three Mediterranean Partner Countries: Final Report - Tunisia
4. Macro-economic employment impact of infrastructure investments in Tunisia
5. Employment Impact Assessment of Infrastructure in three Mediterranean Partner Countries: Final Report Jordan
6. Macro-economic employment impact of infrastructure investments in Jordan
7. Employment Impact Assessment of Infrastructure in four Mediterranean Partner Countries: Final Report Egypt
8. Macro-economic employment impact of infrastructure investments in Egypt

The country studies describe the case studies, national policies in the sectors, related institutional frameworks, an overview of the labour markets, and the challenges faced in the construction sector in each country before presenting the analyses carried out and their results.

These studies also provided the team with the opportunity to verify the extent to which employment data was monitored, by whom and what needs to be improved to attain a reliable dataset for infrastructure projects in that region.

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2 At the time of compiling the reports from Morocco, Tunisia and Jordan there were only three; hence the title of the reports
2. Approach and methodology

The study was divided into two phases: a detailed analysis of a selected number of representative projects to assess the number of jobs created (direct employment), as well as the quality of employment generated; and simulations using macro-economic models to assess the indirect and induced job creation.

For the first part of the study, the consultants were tasked to answer the following four main questions for each project assessed:

- How many direct jobs are created during construction, operation and maintenance?
- Who gets the jobs?
- What kinds of jobs are created?
- Do the jobs go where they are most needed?

The consultants met the objectives of the study with various methods, including:

- **Structured interviews** with key informants such as ministries, national agencies, project management units, contractors, sub-contractors involved in the projects’ various stages. The team interviewed labourers of on-going projects to better understand the working environment and conditions.

- **Site visits** of ongoing projects supported the assessment of the quality of employment and the progress of work; while for completed projects, it helped the study team visualize the size of the work, and thus to correlate it to the employment statistics gathered through the interviews.

- **Review of documents** included appraisal reports, design reports, site records, and physical and financial progress reports.

This was followed by detailed analyses of the quantitative employment data, the qualitative employment policies and other relevant information gathered.

Once the data was collected, collated and analysed, the second phase was launched involving senior analysts from the four countries. The gathered information was categorised according to the different branches of the economy and plugged into macro-economic models for assessment in order to complete the picture of the employment impact of the analysed interventions.

The study aimed at using a set of compatible existing macro models, which are capable of capturing the following employment aspects:

1) Direct effect on production, income and employment
2) Indirect effect on production, income and employment
3) Induced effect on production, income and employment

**Challenges of the study:**

In Morocco, some stakeholders required specific communication protocols, which caused delays in arranging meetings with project management staff and contractors. The larger contractors were generally not as cooperative as their counterparts in Tunisia and Jordan. There were also delays in selecting a representative sample of sub-projects to review large-
scale projects consisting of numerous similar sub-projects. Some data could not be retrieved, but this did not have a significant impact on the study.

In Jordan, the commencement of the Tafila Wind Farm project was delayed and actual employment data could, therefore, not be retrieved.

In Tunisia, the biggest challenge was to reconcile the data obtained from the contractors for the Sousse Power Station with those derived from the simulations on direct employment using the latest I-O table.

In all four countries, additional efforts were needed to present the project data in a format required to enable simulations (cost breakdown split in imported and locally produced goods and according to the different branches of the economy).

Of the four countries that were included in this assignment, Egypt was the most difficult country in terms of issues faced during the data collection process. This was especially true for the data collection aspects of the assignment, and communication with the relevant contractors.

The following summarises some of the main challenges, so that the ILO and the EIB can take them into consideration for the planning purposes in any future similar assignments:

- While project promoters were very accessible, certain promoters were late in responding to data requests made to them, and in providing the contact information for the contractors of the project lots that were selected for evaluation. It is believed that a more detailed presentation as to the need for them to fully cooperate and push the relevant contractors to provide the data requested would have been very helpful.
- It may be advisable to have EIB invite the main contractors to the initial meetings of such assignments along with the promoters to emphasize the importance of the study.
- A few contractors officially declined to provide any information. While the study team was indirectly able to obtain relatively accurate data for those contractors through a project database, it may be wise in future assignments to get solid commitments from contractors at an early stage.
- Data related to salaries and compensation rates were very difficult to obtain from several contractors. This was attributed to the sensitivity of the data, and, despite assurances from the study team that such data would not be disclosed and would only be used for analyses, there was significant hesitation to share such data. For a number of sub-projects, such data were estimated based on average market rates for the various job categories.
3. Investments in infrastructure

3.1. The infrastructure sector in general

Egypt: Over the last five decades, infrastructure in Egypt has experienced a remarkable improvement. This has undoubtedly supported the relatively strong economic growth performance of the country, as well as contributed to the progress in social and economic well-being of its citizens. Despite this progress, in the last years there has been a slowdown or even a decline in some areas of infrastructure, particularly power generation and transportation. Associated with this decline, capital expenditures in Egypt have been reduced in the last decade, raising concerns that the country may have reached an unsustainably low level of infrastructure investment.

Jordan has a remarkable infrastructure, primarily developed during the past decennia. The country underwent progressive improvement of its transport, power, water, sanitation, and telecommunications infrastructure. The infrastructure sector, both public and private funded, accounted for 5-8.3% of Jordan’s GDP between 1998 and 2012.

Morocco enjoys one of the most highly developed infrastructure sectors in Africa. This sector is a major economic driver and a core component of national commerce, accounting for 13-15% of GDP. It is fuelled primarily by government-led investment initiatives to develop the country’s infrastructure as well as a substantial boom in the residential and commercial real estate market.

Tunisia’s construction industry represents 6.5% of the national GDP and its infrastructure quality ranked favourably in the Global Competitiveness Report 2011/2012, scoring higher than the mean of 142 countries. The growth of the sector (5.6% annually between 2008 and 2012) is supported by the government’s commitment to improving the country’s infrastructure, developing an efficient transport system, protecting Tunisian cities against floods, and increasing development in electricity grids and natural gas pipelines as well as private investments.

This report analyses projects in the transportation sector in Jordan, Morocco and Tunisia; projects in the four countries (including Egypt) in the energy sector; projects in water and sanitation in Morocco; and the environmental sector in Egypt.

3.2. Transport sector in Jordan, Morocco and Tunisia

In Jordan, the transport sector, with its network of some 7,200 km of roads, is a very important sector of the economy. It serves the national economy essentially along the corridor Aqaba-Amman; it also plays an important role on a regional level to transport goods and passengers to and from the neighbouring countries (Syria, Iraq, Saudi Arabia, Egypt and potentially Israel and Palestine). The Government has taken several key steps in recent years, such as updating pavement design standards etc. and is currently developing a new strategy for the next 20 years.

One of the priorities of the Government of Morocco in its 2020 Rural Development Strategy is to improve the living conditions of the rural population by increasing their...
access to basic infrastructure and social services, including reducing the imbalance between provinces. There are also plans to modernize the country’s railway system.

Upgrading infrastructure in Tunisia is a key pillar of the 11th Economic and Social Development Strategy 2012-2016 with a goal of expanding the country’s motorway network. Regional and local roads also received their share of the funding including enhanced road maintenance. This strategy emphasises inclusive and balanced development in Tunisia and calls for investment in infrastructure in the hinterland as part of “an integrated development programme”.

3.3. Energy sector in Egypt, Jordan, Morocco, and Tunisia

Egypt has significant primary energy resources, both in traditional fossil fuels (especially oil and gas) and in renewable energy. Egypt’s proven oil reserves stand at 3.7 billion barrels and natural gas reserves are estimated at 67 trillion cubic feet (Tcf) with yet-to-find reserves by 2040 at 90 Tcf. Natural gas is likely to be a key growth engine of Egypt’s energy sector. Hydropower is the third major energy resource in use, but most of the Nile’s hydropower potential, about 85 %, has already been exploited to generate about 13 TWh of electricity per annum. Egypt also has limited coal reserves estimated at about 27 million tonnes (Mt). Egypt’s solar thermal electricity generating potential has been estimated at 73,656 terawatt-hours (TWh)/year. Some of the world’s best wind power resources are in Egypt, especially in the areas of the Gulf of Suez where at least 7,200 MW could be potentially developed by 2022, with further 1,000 MW that could be developed on the west and east banks of the Nile.

In Jordan, over 98% of the Jordanian population has access to electricity, and the demand for it has been growing at a rate of 10% in recent years due to a strong growth of the economy and the population. Its portfolio is dominated by conventional fossil-fuel-fired power plants burning natural gas and fuel oil, but the government has made it a national priority to implement energy efficiency measures and seeks to diversify the electricity generation mix by using energy sources such as domestic oil shale, nuclear power, and local renewable energy technologies largely.

Morocco currently experiences a shortage in domestic energy sources, although its hydroelectric potential is considerable. The government has a well-defined energy strategy for 2009-2020 and aims to increase renewable energy production, and plans expansion of wind, solar and hydroelectric power capacity.

In Tunisia, the sector relies mainly on oil products and natural gas, but water and wind resources are also available and are currently being exploited with an increasing share. Tunisia has a well-developed electricity grid, and is a top-ranking country on the continent in terms of electrification. The combined electrification rate (rural and urban) was approximately 99.5 % in 2012, serving the country’s 10.8 million inhabitants. Although, natural gas is the main fuel for power production, the country has plans to invest in renewable energy through the “Tunisian Solar Plan” (PST) encompassing 40 technology projects in solar power, wind power and energy efficiency.
3.4. Water and sanitation sector in Morocco

By regional standards, Morocco already has good water infrastructure assets, but sanitation in the rural areas has tended to be neglected, as municipalities lack both the financial and technical capacity. Remaining challenges include a low level of wastewater treatment (only 13% of collected wastewater is being treated), lack of house connections in the poorest urban neighbourhoods, and limited sustainability of rural systems (20% of rural systems are estimated not to function). In 2005 a National Sanitation Programme was approved, aimed at treating 60% of collected wastewater and connecting 80% of urban households to sewers by 2020.

3.5. Environmental sector in Egypt

The main environmental problems faced by Egypt are: acute water scarcity, declining water quality, land degradation, increasing pollution and untreated urban and hazardous waste disposal, and poorly protected cultural and natural heritage. In this respect, environmental protection and a balanced use of natural resources must constitute an integral part of the development process. In Egypt, as the available natural resources must support a rapidly increasing population, sound management of such resources, together with a continuous improvement of the protection of the environment are an evident necessity.

The Ministry of State for Environmental Affairs and its executive agency, the Egyptian Environmental Affairs Agency (EEAA), meet this challenge by continuously striving for the integration of the environmental dimension into national policies, plans and lines of action. This is carried out with an immediate focus on the reduction of pollution and the conservation of Egypt's natural resources through effective environmental management.
4. Labour market challenges in infrastructure

Creating jobs in adequate quantity and quality is a top priority for all four countries as persistent unemployment, low labour market participation, and an increasingly marginalized young population is a concern to all. Aware of the daunting challenge, the Government of Jordan prepared a National Employment Strategy (NES) in 2011 while a new NES was launched in Morocco in 2015 with support of the ILO. The interim governments in Tunisia have also reinforced several schemes to address unemployment, particularly targeting educated youth. In Egypt, the National Employment Pact (NEP 2015-2017) aims to make a significant contribution to reducing youth unemployment by promoting fair and decent ‘Blue Collar’ jobs for Egyptian job seekers in employment-intensive areas of the job market.

The following short overview of the current labour markets in the four countries focuses notably on the challenges faced in the infrastructure sector.

In Egypt, the economy witnessed almost a decade of economic growth and prosperity before the global financial and economic crisis, reaching a growth rate of 7.2% in 2007/08.

The impact of the global financial crisis in 2008/09 on Egypt was less significant than in other countries such as the US, EU Member States, or even other Middle Eastern countries such as the UAE. Egypt was mostly affected by inflation due to the openness of the Egyptian economy and its vulnerability to “imported inflation” that resulted from the hike in prices globally due to the crisis. The rise in food and oil prices caused the inflation rates in Egypt to escalate from an average of around 9.5% in 2007 to 14.4% in early 2008, 22% by July 2008, and 25.6% by August 2008. The crisis also had an impact on employment: due to the deteriorating economic situation, the demand for labour grew by only 2.8%, while the supply of labour grew at around 3% every year, resulting in a 0.2% gap between labour demand and supply. Amongst those unemployed, around 92.1% are youth that are seeking employment for the first time. Seeking employment for the first time is hard for males and even harder for females. In fact, only around 75% of new graduate males were able to secure jobs within 5 years after their graduation, while for females, less than 25% of new graduates were able to secure employment within 15 years after their graduation.4

The deteriorating economic situation and the stubbornly high rates of unemployment and poverty fuelled the uprising of January 2011. Today almost 4 years later, rates of unemployment in Egypt are still strikingly high, even higher than in 2010, especially among youth. The uprising and its aftermath affected the Egyptian economy more than the global financial crisis. GDP growth decreased from about 5.1% in 2009/10 to about 1.8% in 2010/11. Total domestic debt rose from 73.6% of GDP in 2009/10 to around 76.2% in 2010/11. Foreign direct investments have fallen greatly by around 70% from USD 6.8 billion in 2009/10 to around USD 2.2 billion in 2010/11, and remained as such since then. Tourism which provides jobs to almost five million workers did not fully recover yet. To resolve the issue of high unemployment Egypt needs to create a GDP growth of around 8

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4 Economic and Social Impact of the Financial and Economic Crisis on Egypt, ILO, 2009
%, however this seems impossible due to the economic downturn experienced since the uprising.

In Jordan, a small economy with few natural resources other than its human capital, employment creation remains a daunting challenge. Unemployment rates, especially among young people, have remained in the double digits over the last decade; labour force participation rates, in particular for women, are among the lowest in the world; and periods of strong growth have not translated into strong job creation for Jordanians. Despite high rates of economic growth, unemployment has remained high in Jordan. The average GDP growth of 6.7% between 2002 and 2008 resulted in a reduction of 3.1% in the unemployment rate (from 15.3% to 12.2%). This relatively weak reduction in unemployment is partially explained by the concentration of Foreign Direct Investment (FDI) in the construction and real estate sector, which created low-skilled jobs for foreign workers. In fact, the economy created 457,000 jobs between the years 2000 and 2008, of which Jordanians took only 28%.

During the past decades, growth of the construction sector in the country has been consistent. However, despite this growth and the marked increase in the number of workers employed by the sector, the percentage of the sector’s employment out of the total employment in Jordan has actually declined between 1980 and 2010, from 9.7% to 6.4%. This decline is mainly related to the dependency on foreign labour, which increased from 224,000 workers in 1980 to 336,000 in 2010 out of a total labour force of 1,660,000. The most important challenges of the construction industry are: the lack of specialised skills in many areas of the business, such as large-scale project development, the lack of semi-skilled workers and the reliance on foreign labour, coupled with sustained migration of highly skilled engineers and professionals to the Gulf countries.

Morocco’s economy benefits from macroeconomic stability and a diversified productive base. From 2000 to 2012, the economy performed steadily with an average GDP growth of 5%, although the growth rate decreased in 2012. The government’s reforms to reduce the deficit, improve economic productivity, and encourage foreign direct investments have helped to catalyse further growth, but Morocco still faces persistent unemployment. However, reform efforts have spurred a downward trend in unemployment, as evidenced by the overall decrease from 13.4% in 2000 to 8.9% in 2011. The economy’s average employment creation from 2000 to 2012 was 139,000 jobs per year (total labour force in 2012 was 11,803,000). Within the infrastructure sector, mainly unskilled Moroccan male workers aged 15 to 44 are employed. They have the second lowest level of education after those workers employed by the agricultural sector (source: Haut Commissariat au Plan (HCP), 2012 and 2014). According to the HCP (2014), employment grew consistently within the sector from 2000 to 2011 due to the boom in the construction industry, with an average of 50,000 jobs created annually during this period. However, in 2012, the economic slowdown began to affect the sector and 21,000 jobs were lost. Those with the least level of qualifications and education were disproportionately affected by sector layoffs. Structurally, the Moroccan construction sector continues to struggle with supply and demand issues concerning its workforce, with a need to rebalance the capacities of the available labour pool with the skill sets required by the employers in the sector.
In Tunisia, before 2011, the economy grew steadily for about a decade with an average GDP growth of 5%. Economic growth was fuelled by FDI and growth of local production, partially associated with liberal market policies that were adopted. After the revolution of 2011, political and social instability took a strong toll on the Tunisian economy and the labour market. GDP declined by 2% in 2011 while the unemployment rate increased from 13% in 2010 to about 19% in 2011. Political uncertainty, associated with longer than expected political transition, is negatively affecting economic growth and employment prospects. Furthermore, political instability across the region and the slowing demand from European markets are making economic recovery extremely hard. Even the recovery of the Tunisian economy in 2012, with GDP growth of 3.6%, is insufficient to respond to the high unemployment rates and the regional and gender-based disparities.

Tunisia has a strong construction industry, which represents about 6.5% of the national GDP. According to the National Association of Builders, the industry employs around one-third of the country’s working population and ranks the fourth largest contributor to the economy after textiles, food, and agriculture.

Based on the outcomes of the National Employment Survey conducted in 2011, construction sector employment increased from 378,000 in 2007 to around 441,700 in 2011, with an annual growth rate of 3.1%. Notwithstanding the huge developments that have taken place in the country, the construction sector is still facing fragmentation and fierce competition. The majority of the sector’s more than 26,000 enterprises employ less than five workers and over 80% are self-employed individuals. In terms of turnover, around 150 firms have an annual turnover of €12 million or more. Significantly, some companies lack proper qualifications, yet, are competing, leading to unrealistically low prices and compromises on quality. However, the recent appearance of large and trans-national projects has created demand for highly specialized construction expertise and management, in a context where skilled capacity is limited.
5. Results of the case studies

The 11 projects studied originate from four sectors: Transport; Energy; Sanitation; and Environment, and cover urban and rural settings. They were implemented using a variety of approaches, both high technology and equipment-based.

The study’s assessment of the Transport sector, which in this study relates to road works in both urban and rural environments (flat, rolling and hilly terrains), includes one project each in Jordan, Morocco and Tunisia:

- The Amman Development Corridor in Jordan includes a section of a 41 km four-lane bypass highway around Amman on its eastern side to remove key transport bottlenecks and to provide access to affordable land for productive investment and urban development purposes.

- The Second National Programme of Rural Roads (NPRR-2) in Morocco seeks to increase the rural population’s access to all-weather roads to 80% by 2015. It consists of over 1,000 sub-projects (117 funded by EIB) totalling 15,000 km to be either of low cost seal standard or all-weather earth and gravel roads.

- The Urban Priority Roads V in Tunisia is composed of 12 sub-projects (5 studied) that aim to reduce traffic congestion in Tunis and other urban cities whereby roads and interchanges are constructed using traditional road construction technology.

The study’s assessment of the Energy sector includes at least one project in each country studied:

- Giza North Power Generation Project in Egypt is an important addition to the capacity of Egypt’s power system to provide electricity and, thus, help sustain economic growth and social development. The project uses natural gas as the principal fuel in Combined Cycle Gas Turbine (CCGT) technology, which is both technically and environmentally among the most-efficient fossil-fuel electricity generation technologies commercially available today at the needed scale. It has an overall generation capacity of 2,250 MW.

- The Egypt Power Transmission Project comprises a multi-component investment programme for transmission infrastructure (10 transmission lines, 1 underground cable, 10 substations and 22 additional transformers) in the Egyptian 220-500 kV transmission network. The investments are expected to contribute to providing a reliable electricity supply for the increasing demand of the country, in part connecting new wind energy generation facilities to the grid and enabling future interconnections to neighbouring country networks (notably to Saudi Arabia and Gaza).

- The Solar Plant in Ouarzazate in Morocco is the first of a series of projects aiming to install 2GW of new solar capacity in Morocco by 2020. This project entails the development and construction of a 500 MW power plant, considering all available solar technologies.

- The Power Station Sousse C in Tunisia involves the construction and operation of dual-fuel (gas as main fuel and gasoil as reserve/emergency) power generation plant. It consists of a single-shaft Combined Cycle Power Turbine unit of 400MW. An
international consortium and 46 different local sub-contractors undertook the construction work.

- The **Tafila Wind Farm in Jordan** entails the development, construction and operation of a 117 MW wind farm equipped with 38 turbines with a unit capacity of 3.075 MW. It will comprise studies, design, construction, commissioning and operation of the wind farm. The project was just starting up at the time of the study; therefore, estimates of the targeted employment data were not available at the time of conducting the assessment.

The study’s assessment of the **Sanitation sector** includes two projects in Morocco:

- The **Sanitation in Oujda Project** concerns the rehabilitation, restructuring and extension of the sewerage network as well as construction of the first treatment plant in the city of Oujda, Morocco, targeting some 450,000 residents.
- The **Sanitation in the Sebou River Basin Project** includes the construction of collection and treatment facilities of wastewater in 17 urban centres, mostly located in the Sebou Basin, Morocco, which extends over an area of 40,000 km². The Sebou basin is inhabited by more than 6 million people, or 20% of the population, and is considered the country’s most polluted basin.

The study’s assessment of the **Environmental sector** includes one project in Egypt:

- The **Egyptian Pollution Abatement Project** aims to demonstrate that market-based financial/technical approaches are effective in reducing industrial pollution in selected hot spot areas in and around the Alexandria and Greater Cairo areas. There are two project components. Component 1 focuses on pollution abatement in major hot spots in the Alexandria and Greater Cairo Governorates and targets the industrial sector at large. The second component entails Technical Assistance (TA) activities aimed at strengthening the capacity of the Egyptian Environmental Affairs Agency (EEAA) and other key stakeholders and provide project management support.

### 5.1. Number of direct job opportunities created by the project

This section provides answers to the question of how many direct jobs are created. It presents the total employment numbers regardless of classification. It is derived as the number of people employed multiplied by the duration of their employment expressed in person-years. The latter is calculated as the sum of the employment durations of staff categories during construction divided by 12 months.

**Finding 1.** Infrastructure work has the potential to generate large number of jobs, but the results suggest that the estimates of direct employment created through the assessed projects were lower than expected in general. Infrastructure works engage large numbers of people, although the generated jobs in the four sectors studied vary, as they are different in nature. The energy sector, for example, applies more sophisticated technology, imported equipment and more educated staff. The projects studied showed that there is also a variation within each sector. The table below shows the results for each sector.
### Table 3 Technology choice and wage proportion of total costs

<table>
<thead>
<tr>
<th>Transport</th>
<th>Energy</th>
<th>Sanitation</th>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>mainly equipment based</td>
<td>high technology requiring</td>
<td>mainly equipment based</td>
<td>mainly high technology requiring</td>
</tr>
<tr>
<td>operation, but potential</td>
<td>specialists in larger numbers</td>
<td>operation, but potential for</td>
<td>special inputs, alternative fuels</td>
</tr>
<tr>
<td>for increase of labour</td>
<td>potential for more engagement of</td>
<td>for increase of labour in</td>
<td>(reuse of waste) have a high</td>
</tr>
<tr>
<td>particularly in rural</td>
<td>women</td>
<td>urban settings</td>
<td>labour component</td>
</tr>
<tr>
<td>areas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 to 21%</td>
<td>3 to 11%</td>
<td>4 to 11%</td>
<td>1 to 19%</td>
</tr>
</tbody>
</table>

As a measure of labour intensity, the study established wage payments\(^5\) in relation to the total cost of the project. The results were lower than expected, indicating the more frequent and extensive use of equipment and machinery in the construction process than the use of labour. Even in the rural roads project, which usually generates higher labour intensities in developing countries, the reported rates were low. This means that even the small and medium-sized contracting companies are using heavy machinery. Low wages, especially for the unskilled labour category, are another contributing factor to the low labour intensity, as analysed using the cost of wages.

- **Roads works**: The level of participation of local contractors in the rural roads Programme in Morocco has grown exponentially from the early stages of PNRR1 implementation (1997-2004), where now small and medium-sized local contractors dominate the implementation profile of such projects. However, these contractors seem fairly mechanised and the labour component was lower than anticipated. For the urban works and motorways in Tunisia and Jordan, large contractors were hired using heavy earthmoving and paving equipment, further contributing to lower rates, although the Amman Ring Road shows a labour component slightly on the high side for such works.

- **Solar and power plant works**: Due to the extensive high technology elements of these two projects, there was a mix of international and local contractors involved. These projects show the lowest labour component with a wage proportion of 3 to 11% \(^5\). The equipment installed and material used, all to a large extent imported, constitute the biggest cost factor. These low figures are consistent with other data derived from similar projects in other countries.

- **Sanitation works**: For sanitation projects national contractors teamed up with international companies for the larger works, especially the treatment plants as they require more expertise. Such contractors, however, used smaller sub-contractors for various components of their projects such as pipe laying and typical civil works. Moreover, storm water pipes were also of bigger dimensions and required equipment for their laying. For the sedimentation ponds, heavy earth moving equipment was used; hence, the labour intensity was low.

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\(^5\) The wage payment includes all employees, which means that the project management and administration are included; hence, the term labour intensity may be somewhat misleading. The labour group’s proportion of the total amount of people employed account for about 70%
• **Environmental works**: In the assessed EPAP II project there was mainly high technology used, requiring specialist inputs. For techniques using alternative fuels, such as reuse of waste, however, there could be a much a higher labour component.

EIB’s evaluation approach is primarily based on assessing the average wage share in percentage multiplied by the total project cost and divided by the average annual labour cost for construction work. The average wage share is generally based on projects developed in Europe whilst the average annual labour cost per person-year is collected from Eurostat in old and new EU member states. This may not reflect the conditions in the MPC as the average wage share per project and the average annual labour costs are fundamentally different in the four MPC studied, as they are all lower middle-income developing oil importing countries. In the last five years, employment has become a more pressing issue for the MPC, and the EIB has increased efforts to provide more accurate estimation of direct employment at appraisal stage.

**Finding 2. The cost of employment varies considerably between projects**

The adjacent table normalised the cost of employment to Full Time Equivalent (FTE) “jobs” to make these costs comparable between projects.

The transport sector represented by road projects, in both urban and rural settings, generated the most jobs per EUR million investment followed by the sanitation sector, according to Table 4 which shows the wage costs in FTE (full – time equivalent). These two sectors should have about the same potential to generate jobs, but it depends on the actual nature of the project and the environment in which it is implemented. For the environmental projects, those involving alternative fuels generate the largest employment potential.

**Finding 3. There was limited monitoring and reporting of employment data of the implemented projects**

Generally, there seems to be very limited monitoring and recording of employment data of the implemented projects. According to the documents sent by EIB, no requirements were specified in the loan agreement for monitoring of employment impact. With the exception of one project in Egypt (Giza North Power Station), and the Sebou Basin sanitation project in Morocco which had technical assistance engaged as part of the loans, little structured reporting including employment data occurred. For some of the smaller rural roads projects some employment figures were not documented at all, but rather based on memory of the contractors’ staff. The Sebou River Basin project is one exception where the project management unit was dedicated to include employment data in their progress reporting. This was done by requiring each contractor to detail the personnel employed on a monthly basis.

The generation project in Egypt was another exception, as it had a comprehensive MIS system for tracking of all resources of the project. The ILO study team believes that this
should be better utilized in terms of monitoring and evaluation of actual employment during the actual implementation, and benchmarking it against pre-construction estimates on employment generation. Each contractor was required to provide daily figures on the resources deployed broken down by category, and by the number of hours.

5.2. Characteristics of employment
This section presents an overview of who gets the jobs and summarises the key indicators of the employees' profiles, including gender split and amount of youth employed. In the study, the employees were categorized into six main groups:

1. **PM&Eng** - Project management and Engineers
2. **Technicians**, incl. staff with an educational requirement such as surveyors, lab technicians
3. **Skilled** labour with a specific profession, such as carpenters, welders, plumbers, etc.
4. **Unskilled** labour, which is all manual labour categories
5. **Security Guards**
6. **Administrative** staff, which includes secretaries, accountants, office staff, and others.

In the table below and in the overall analyses they have been further aggregated into three groups mainly due to educational background, namely: project managers, engineers and technicians; skilled and unskilled labour including guards; and administration personnel.

The table below refers only to work undertaken during construction works. For operation and maintenance, the distribution of employees will change. For example, the Power station Sousse will require more engineers and maintain a high proportion of technicians.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Labour category</th>
<th>Managerial &amp; technical</th>
<th>Workers</th>
<th>Admin.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>PM&amp;Eng</td>
<td>Technician</td>
<td>Skilled</td>
</tr>
<tr>
<td>Trans.</td>
<td>NPRR-2</td>
<td>4</td>
<td>9</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Priority Roads</td>
<td>8</td>
<td>17</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Amman RR</td>
<td>10</td>
<td>19</td>
<td>46</td>
</tr>
<tr>
<td>Energy</td>
<td>Solar Plant</td>
<td>21</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sousse Power Station</td>
<td>4</td>
<td>48</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Giza North Power Station</td>
<td>14</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Power Transmission Project</td>
<td>11</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>Sanit.</td>
<td>Oujda sanitation</td>
<td>2</td>
<td>6</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Sebou River Basin</td>
<td>19</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>Env</td>
<td>EPAP II (alternative fuel)</td>
<td>1</td>
<td>7</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Rounded figures</td>
<td>25</td>
<td>70</td>
<td>5</td>
</tr>
</tbody>
</table>

*The distribution of categories of employees varies a lot per type of environmental abatement project.
Finding 4. The labour category represents about 70% of total number of employees

As seen in the table above, the overall rounded figures show that project management and engineers make up about 10% of the total workforce, which is realistic. Technicians account for about 15%, making the total for this category 25%. The labour component, regrouping skilled, unskilled and guards, is about 70% of the total workforce if all projects are considered. There are variations, but most projects had about 60% of labourers and upwards, to the maximum in Oujda, with its 92% of labourers.

- **Transport:** Two of the projects are traditional equipment-based operations in urban environments, whilst the one in Morocco is situated in the rural areas and relies more on local resources, translating to a high labour component of 82%.

- **Energy:** The two energy projects studied show very different distributions of their categories of personnel employed. Ouarzazate Solar Energy Project has more project managers and engineers than any of the other studied projects, but it also relies heavily on unskilled labour (70%). The Power Station Sousse project operates with a small management and seems to rely on technicians to supervise skilled labour.

- **Sanitation:** These two projects in Morocco show very different distribution of employees. The Sebou River Basin project generates more employment than the sanitation project in Oujda with an estimated wage component of 13 and 4% respectively (see Table 3). The projects are different in character as the work in Oujda is a large scale in one confined area whilst the Sebou River Basin project is located in 17 places having a greater need for project management and engineering. (Note that the table above only provides the distribution of employees and not the number engaged).

- **Environment:** The nature of the EPAP projects varies from wastewater treatment plants to process modification projects, alternative fuels and component rehabilitation projects. Implementation of works was done by international and national contractor plus factories' own labour force. The refuse-derived fuel project at Arab Cement factory has the largest wage component (19%) as well as a high labour component (85%).

Finding 5. An equal share of skilled and unskilled labour

The use of modern construction methods and technology requires labour that is more skilled and their share is generally about the same as the share of the unskilled category, although the Solar Plant in Morocco exceptionally shows a high proportion of unskilled labour of 70% and no skilled labour (from the data that was made available to the study team). This was probably due to the higher input of engineers in the main project who could supervise a larger number of unskilled labour whilst undertaking technical tasks by themselves.
Finding 6. Most employees were men

Women and youth: The high level of youth unemployment in the MENA countries and the fact that the infrastructure sector has traditionally been a male-dominated field, making it difficult for women to get jobs in the sector, motivated the study to gather additional information on these two groups, where it was available.

Most employees were men, with women generally engaged only in administrative work. One exception was the Ouarzazate solar plant project, which employed female engineers. The energy projects assessed showed a greater openness to employing women. The operational phase of these projects also presents opportunities for the employment of women, who are often equally as well educated as their male counterparts. The energy sector is also a more “refined” work environment than, for example, jobs offered in the road or sanitation sector and this may also prove more attractive to women. In addition, the study found that women had taken up jobs such as health and safety inspectors in all sectors, which both sides seemed content with.

An interesting observation was heard in Egypt, regarding female candidates from the local communities preferring not to work for the private contractors, but rather to be employed by the public sector project promoters (i.e. the government agency responsible for the project).

5.3. Types of jobs created

This section answers the third question of what type of jobs are created and is linked to the previous question of who gets the jobs. It elaborates on the levels of education and the type of employment offered.
The adjacent table shows the distribution of permanent and temporary jobs created during construction.

### Table 7: Type of employment (%)

<table>
<thead>
<tr>
<th>Project</th>
<th>Permanent</th>
<th>Temporary</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPRR-2</td>
<td>55%</td>
<td>45%</td>
</tr>
<tr>
<td>Priority Roads</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>Amman RR</td>
<td>65%</td>
<td>35%</td>
</tr>
<tr>
<td>Solar Plant</td>
<td>30%</td>
<td>70%</td>
</tr>
<tr>
<td>Sousse Power Station</td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td>Giza North Power Station</td>
<td>65%</td>
<td>35%</td>
</tr>
<tr>
<td>Power Transmission Project</td>
<td>85%</td>
<td>15%</td>
</tr>
<tr>
<td>Oujda sanitation</td>
<td>31%</td>
<td>69%</td>
</tr>
<tr>
<td>Sebou River Basin</td>
<td>18%</td>
<td>82%</td>
</tr>
<tr>
<td>EPAP II</td>
<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>Rounded average</td>
<td>54%</td>
<td>46%</td>
</tr>
</tbody>
</table>

7 Distinction is made between permanent jobs (people employed during the whole period of construction) and temporary jobs on construction sites. The latter is defined as casual work for a specific task (expressed in work months or workdays), which is just carried out during a specific period of the project (and then converted to a % of FTE corresponding to 12 work months).

The road projects show a high proportion of permanent staff and it is common that contractors have their own supervisory staff and skilled labourers as masons, bar benders etc. The more mechanised the operations are, the higher the need for skilled operators. The energy projects show a high proportion of temporary workers and the same applies to the two sanitation projects assessed. Finally,

**Finding 7. Labour work is not considered attractive**

Labour work is not considered attractive in any of the four countries studied. In Jordan, in particular, a “culture of shame” exists, resulting in very few Jordanians being interested in this type of work. This leads to a large in-flux of Egyptian workers. In Morocco, Tunisia and Egypt, with the exceptions of the highly specialised jobs, all jobs were taken by nationals. In Egypt’s rural areas, work on construction sites is perceived negatively as hard work with long hours compared to their current occupation in agriculture. In urban areas, they are used to work on construction sites and more readily agree with the long working hours.

**Finding 8. Health and safety requirements in place generally**

Health and safety requirements are generally in place, but there were differences between the countries. In Morocco, with the exception of the Ouarzazate project, health and safety officers were seldom hired, as there is a general lack of qualified health and safety supervisors. In Tunisia and Jordan there were stringent requirements stipulated in the contracts, and health and safety officers were hired on most of the projects assessed. In Egypt the occupational safety conditions at the two power projects seemed to be quite advanced. During the field visits to both power projects, all categories of labour were observant of wearing the proper gear, signage was very clear and organized, and everyone seemed aware of the importance of health and safety requirements.
Finding 9. Certain infrastructure sectors offer long-term maintenance employment in larger numbers

Long-term engagements in operation and maintenance:

The adjacent table summarizes the study results on average annual labour requirements for operation and maintenance (O&M) expressed in person-years. In the country reports, estimates are provided for the full life cycle of the project per category of work force where data was available.\(^8\)

Maintenance of roads and sanitation projects can provide long-term employment for local labour, if not continuously but for long periods of the year. Certain projects, especially the rural roads project in Morocco (see Annex 2), thus have the potential to generate a substantial amount of job opportunities. The employment potential in the roads projects is mainly related to maintenance operations, which require more frequent routine, emergency and periodic maintenance for unsealed roads.

Renewable energy projects such as wind-farms and solar plants create less employment opportunities. Wind turbines can run with little need for human supervision. Energy companies employ monitors, either locally or remotely, to observe energy flows and inform technicians of any problems. Much more employment is created when refuse-derived fuels are used as alternative energy, as at the Arab Cement factory in Egypt, which aims to burn 180 000 tons of waste per year. According to the information received from the Egyptian

<table>
<thead>
<tr>
<th>Project</th>
<th>EIB</th>
<th>Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPRR-2</td>
<td>No estimate</td>
<td>1 280 for routine, emergency and periodic for 2880 km rural roads</td>
</tr>
<tr>
<td>Priority Roads</td>
<td>50</td>
<td>21 (maintenance crews only without any sub-contracting)</td>
</tr>
<tr>
<td>Amman RR</td>
<td>No estimate</td>
<td>50 for routine, emergency and periodic for 40 km RR</td>
</tr>
<tr>
<td>Solar Plant</td>
<td>90</td>
<td>25</td>
</tr>
<tr>
<td>Sousse Power Station</td>
<td>90</td>
<td>150</td>
</tr>
<tr>
<td>Giza North Power Station</td>
<td>350</td>
<td>195</td>
</tr>
<tr>
<td>Power Transmission Project</td>
<td>200</td>
<td>160</td>
</tr>
<tr>
<td>Tafila wind farm</td>
<td>No estimate</td>
<td>20 to 30</td>
</tr>
<tr>
<td>Oujda sanitation</td>
<td>No estimate</td>
<td>21 for one large scheme</td>
</tr>
<tr>
<td>Sebou River Basin</td>
<td>No estimate</td>
<td>200 for 17 smaller schemes</td>
</tr>
<tr>
<td>EPAP II</td>
<td>No estimate</td>
<td>5 to 6 per factory</td>
</tr>
</tbody>
</table>

\(^8\) Jobs for operations and maintenance for this study have been converted into FTE (for example permanent people needed to operate a power plant) or total employment generated in operation and maintenance activities (implemented on a periodic basis on a periodic basis) during the project life cycle and then divided by the number of years to arrive at an average number of FTE per year.
Social Fund of Development (SFD), the collection of one ton of municipal waste generates one person-month of employment.

It should be noted that achieving sufficient funding for maintenance of infrastructure facilities can often be problematic, leading in the end to costly rehabilitation projects; this subject, however, goes beyond the scope of this study.

5.4. How the jobs opportunities are filled
This section answers the fourth question, whether the jobs go where they are most needed or not.

- **In Egypt**, labourers are more willing to accept low paying labour positions in the construction industry and it was not a problem to attract them to the jobs on offer.
- **In Jordan**, the building construction sector is mainly dominated by non-Jordanian (mostly Egyptian) unskilled labour. In other construction sectors, such as e.g. roads and utilities, where more technology and machinery are used, the profile is different with Jordanians assuming more of the job opportunities.
- **In Morocco**, the majority of employed personnel were Moroccan with a very few exceptions in the highly specialized components of projects implemented by foreign companies
- **In Tunisia**, the building construction sector is dominated by un-educated labourers, often informally employed by small and micro contractors, whilst jobs created by public-works projects employ higher numbers of educated people, including university or community college graduates.

**Finding 10. Only three projects show a significant proportion of youth engaged**

The youth has suffered during the recession and it is a vulnerable group of the society. Many are also educated in areas where it has been difficult to find jobs (see Morocco report). In the projects assessed, it appears youth had been particularly targeted only in the Second National Rural Roads Programme, the Giza North Power Station, and the Power Transmission Project in Egypt. The Ouarazate solar energy project in Morocco and the EPAP II in Egypt had reached about 25%, which is also a relatively large intake of youth. Some of the projects had no data available and the remaining projects had much lower levels of youth employment.

**Finding 11. Labour demand and supply do not match**

The educational background of the employees is detailed in the respective country reports. The project managers and engineers are well educated and the technicians seem to have appropriate educational backgrounds required. In the labour category, i.e. skilled, unskilled labourers and guards, most employees had a basic schooling background. In the administrative category, there was a fair split between university and college degrees for the more advanced positions while the staff having the lower positions had the comprehensive 10-12 years schooling background.
All four sectors show that there is an imbalance in the supply and demand of labour. Most contractors claim that there is a general lack of skilled labour on the market, especially in specialised job categories, such as bar-benders, electricians, carpenters, masons and technicians. In general, there is a perceived low cultural value of manual labour, especially in the construction sector, which may explain the lack of availability to some extent.

**Finding 12. Labourers are hired from the local areas**

In all projects, hiring labour from areas far from the project’s vicinity remains cumbersome due to the need for housing and transportation for such labour. Nevertheless, to ensure the quality of work and on-time delivery, many contractors prefer to ensure that the main job categories are filled by experienced staff members who have been employed by the contractor before. As a result, the majority of un-skilled and semi-skilled job categories are filled by workers from the project areas while the majority of skilled and specialized job categories are filled by staff residing out of the project area.

In Egypt another explicitly mentioned reason for hiring from the local communities was to eliminate tensions that may arise from bringing in labourers from another area. Whenever there was a need to hire people, the lists of open positions were shared with mayors from the local villages, who were given priority to try to fill those positions from the local residents. As mentioned above, for the skilled labour positions, although some local residents have worked their way up over time, the bulk of such posts are filled by contractors’ permanent staff from outside of the area. This split is further explained by the fact that, given the agricultural background of most local residents, it is hard to find capable highly skilled labourers from the rural areas, especially for projects which are more technology intensive.

In Tunisia, contractors try to recruit labour from disadvantaged governorates and in several cases they have relocated good workers to other projects sites. Nevertheless, contractors remain challenged by the lack of qualified human resources in these governorates, in addition to some negative cultural perceptions to certain job categories, especially those that require intensive physical activity.
6. Results from the macroeconomic employment impact assessments

6.1. Purpose and methodology used for macro EmpIA

The main purpose of the macroeconomic employment impact assessment (EmpIA) is to understand better the importance of selected interventions in infrastructure on various dimensions of employment, in particular indirect and induced effects. It therefore complements the analyses undertaken at the project level.

The study aimed at using a set of compatible existing macro models capable of capturing the following employment aspects:

- Direct effect on production, income and employment
- Indirect effect on production, income and employment
- Induced effect on production, income and employment

The indirect effect refers to the effect of investment in one sector on other productive sectors of the economy, through the production chain. It mainly refers to the backward linkages of the investment sector through the supply chain. The induced effect captures the effect of higher income through employment, which the workers and the households receive. This higher income will “feedback” into the economy, as households consume goods and services produced by the productive sectors. Moreover, tax collection will increase through higher income and consumption, improving the fiscal space for further Government spending and investment. This is presented in Figure 1 below.

Where data was available and reliable, labour market outcomes were disaggregated by gender, age groups, employment status, professional categories, income and education level.

The macroeconomic country studies used a multiplier analysis based on accounting frameworks, in particular the latest available Input-Output (I-O) tables or Social Accounting Matrices (SAM). The I-O model allows employment analysis according to the sectorial categories included in the model. The challenge is to analyse sub-sectors, programmes or even projects for which no data are available. The research tries to overcome this problem by “expanding” I-O tables to include specific project data into the data system thus allowing macro multiplier analysis. Project data on output, inputs in material, equipment, labour, capital, imports, etc. had to be collected to fit with the I-O structure and/or had to be harmonised and balanced with this structure. Even though the I-O tables are available in MPC, the project data needed to be reclassified according to the national accounts classification.
Combined with employment data through an employment module, an I-O model can also capture the employment dimension of investments. An I-O model can then be used to simulate changes in final demand, which could be a rise in investment, higher growth rates in a specific sector, regulation or policy changes, etc. It then describes its impact (disaggregated by direct, indirect and induced effect) on output, income and employment, but also on tax revenues and the Balance of Payments (BoP).

A description of methodologies used and labour market outcomes of the performed simulations are presented in detail in the country reports while the key results are summarised hereafter. The strengths and limitations of closed I-O models are presented in Annex 3.

6.2. Results of simulations for Moroccan projects

In Morocco, impact assessment on employment, income and production has been carried out in three sectors. The analysis has been based on a macroeconomic and inter-sectorial model that is mainly based on time-series of closed I-O tables 2003-2012, which allow the calculation of direct, indirect and induced employment effect over time (“sequential dynamics”). As project data are not part of I-O tables, data were collected on various activities of involved local companies through the supply chains on material and equipment.
used, labour/capital-costs, imports, etc. At a second stage, these data were balanced and harmonized with the existing I-O table.

The final demand generated by the four projects were estimated to have created an additional value added (proxy value for disposable income) of about two thirds on average, about EUR 0.4 billion, with the rest going to the external sector in form of imports, about EUR 0.2 billion. The projects PNRR II and the solar energy project create about 85% of additional income, while the two sanitation projects together would not create more than 15%.

Simulations show a job creation effect (direct, indirect or induced) of over 102,000 FTE jobs, from which 81,000 are direct and indirect, and 21,000 posts induced. This is however less than expected from experience in other cases, due to the capital intensive nature of these projects.

6.3. Results of simulations for Tunisian projects

The impact of the two projects in Tunisia was measured using the most recent Input-Output table of 2011 through four parameters:

1. production/value added generated by contracts awarded to Tunisian enterprises and payment of wages
2. employment generated expressed in full-time equivalent (or person-years)
3. income generated in terms of salaries distributed
4. tax revenues for the Tunisian Treasury resulting from higher earnings and employment

In the above table, Type 1 (T1) employment multiplier equals the sum of direct and indirect employment divided by direct employment while Type 2 (T2) employment multiplier equals the sum of direct, indirect and induced employment divided by direct employment.

The high importance of the indirect effect (high importance of trade) in the solar project (70%) and, to a lesser extent, of the sanitation projects should be stressed. The PNRR II, however, has a remarkably high induced effect (almost 33%), in particular in other sectors, while the effect is not that important for the other projects. The induced effect is the strongest in agriculture, followed by services such as finance and insurance, real estate and trade.

### Table 9 Allocation of direct, indirect and induced employment by project and sector

<table>
<thead>
<tr>
<th></th>
<th>PNRR II Direct</th>
<th>PNRR II Indirect</th>
<th>PNRR II Induced</th>
<th>PNRR II Total</th>
<th>Solar project Direct</th>
<th>Solar project Indirect</th>
<th>Solar project Induced</th>
<th>Solar project Total</th>
<th>Sanitation Oujda Direct</th>
<th>Sanitation Oujda Indirect</th>
<th>Sanitation Oujda Induced</th>
<th>Sanitation Oujda Total</th>
<th>Sanitation Sebou Direct</th>
<th>Sanitation Sebou Indirect</th>
<th>Sanitation Sebou Induced</th>
<th>Sanitation Sebou Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mecan, metal, electrical</td>
<td>22.1%</td>
<td>69.7%</td>
<td>8.2%</td>
<td>2795</td>
<td>23.9%</td>
<td>75.3%</td>
<td>0.8%</td>
<td>6131</td>
<td>23.6%</td>
<td>74.2%</td>
<td>2.3%</td>
<td>488</td>
<td>23.4%</td>
<td>73.5%</td>
<td>2.2%</td>
<td>505</td>
</tr>
<tr>
<td>Other manufacturing</td>
<td>43.4%</td>
<td>48.9%</td>
<td>7.7%</td>
<td>7031</td>
<td>46.3%</td>
<td>52.1%</td>
<td>1.6%</td>
<td>7653</td>
<td>45.1%</td>
<td>50.7%</td>
<td>4.2%</td>
<td>641</td>
<td>44.9%</td>
<td>50.4%</td>
<td>4.7%</td>
<td>787</td>
</tr>
<tr>
<td>Building</td>
<td>63.6%</td>
<td>36.0%</td>
<td>0.4%</td>
<td>13735</td>
<td>63.7%</td>
<td>36.1%</td>
<td>0.3%</td>
<td>4461</td>
<td>63.8%</td>
<td>36.1%</td>
<td>0.1%</td>
<td>2453</td>
<td>63.8%</td>
<td>36.1%</td>
<td>0.1%</td>
<td>3541</td>
</tr>
<tr>
<td>Real estate/bus services</td>
<td>46.8%</td>
<td>20.0%</td>
<td>33.2%</td>
<td>1109</td>
<td>60.2%</td>
<td>25.8%</td>
<td>14.0%</td>
<td>593</td>
<td>58.6%</td>
<td>25.2%</td>
<td>16.2%</td>
<td>111</td>
<td>56.7%</td>
<td>24.6%</td>
<td>18.7%</td>
<td>134</td>
</tr>
<tr>
<td>Trade</td>
<td>0.0%</td>
<td>69.3%</td>
<td>30.7%</td>
<td>11947</td>
<td>0.0%</td>
<td>94.9%</td>
<td>5.1%</td>
<td>16410</td>
<td>0.0%</td>
<td>86.7%</td>
<td>13.3%</td>
<td>1381</td>
<td>0.0%</td>
<td>83.8%</td>
<td>16.2%</td>
<td>1538</td>
</tr>
<tr>
<td>Finance &amp; Insurance</td>
<td>0.0%</td>
<td>61.7%</td>
<td>38.3%</td>
<td>640</td>
<td>0.0%</td>
<td>88.5%</td>
<td>11.5%</td>
<td>487</td>
<td>0.0%</td>
<td>82.4%</td>
<td>17.6%</td>
<td>68</td>
<td>0.0%</td>
<td>81.3%</td>
<td>18.7%</td>
<td>91</td>
</tr>
<tr>
<td>Others</td>
<td>0.0%</td>
<td>9.3%</td>
<td>90.7%</td>
<td>12275</td>
<td>0.0%</td>
<td>38.7%</td>
<td>61.3%</td>
<td>4121</td>
<td>0.0%</td>
<td>22.3%</td>
<td>77.7%</td>
<td>712</td>
<td>0.0%</td>
<td>18.7%</td>
<td>81.3%</td>
<td>929</td>
</tr>
<tr>
<td>Total</td>
<td>26.1%</td>
<td>41.1%</td>
<td>32.8%</td>
<td>49529</td>
<td>20.6%</td>
<td>70.2%</td>
<td>9.2%</td>
<td>39854</td>
<td>34.7%</td>
<td>51.5%</td>
<td>13.8%</td>
<td>5854</td>
<td>37.3%</td>
<td>48.1%</td>
<td>14.6%</td>
<td>7523</td>
</tr>
</tbody>
</table>

| Multiplier T 1    | 2.58            |                  |                |               | 4.41                  |                      |                      | 2.48                  |                      | 2.29                  |                      |                         |
| Multiplier T 2    | 3.83            |                  |                |               | 4.86                  |                      |                      | 2.88                  |                      | 2.68                  |                      |                         |
After consulting promoters, project staff and sector specialists, leakages from the purchase of imported products were estimated at 25% of the total investment budget for the Urban Priority Roads V project and up to 80% for the power station in Sousse. The differences in these values is explained by the fact that, in the road sector, most material is produced locally while for the energy sector (such as a power station) most equipment is imported.

**Table 10 Total impact of the Urban Priority Roads V project**

<table>
<thead>
<tr>
<th>Type of impact</th>
<th>Expenses in millions</th>
<th>Production in millions</th>
<th>Employment in person-years</th>
<th>Revenues (income)</th>
<th>Tax revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TND</td>
<td>Euro</td>
<td>TND</td>
<td>Euro</td>
<td>TND</td>
</tr>
<tr>
<td>Direct</td>
<td>246</td>
<td>113</td>
<td>107</td>
<td>49</td>
<td>5376</td>
</tr>
<tr>
<td>Indirect</td>
<td>136</td>
<td>63</td>
<td>66</td>
<td>30</td>
<td>1821</td>
</tr>
<tr>
<td>Induced</td>
<td>68</td>
<td>31</td>
<td>33</td>
<td>15</td>
<td>1267</td>
</tr>
<tr>
<td>T1 Multiplier</td>
<td>1,55</td>
<td></td>
<td>1,62</td>
<td></td>
<td>1,34</td>
</tr>
<tr>
<td>T2 Multiplier</td>
<td>1,83</td>
<td></td>
<td>1,92</td>
<td></td>
<td>1,57</td>
</tr>
</tbody>
</table>

It is important to note that according to the simulations low-skilled jobs remain dominant in this urban road project (respectively 59%, 45% and 51% of direct, indirect and induced employment), while youth (age up to 29) represents about one third of the workforce in all three categories.

**Table 11 Total impact of the Power Station Project in Sousse**

<table>
<thead>
<tr>
<th>Type of impact</th>
<th>Expenses in millions</th>
<th>Production in millions</th>
<th>Employment in person-years</th>
<th>Revenues (income)</th>
<th>Tax revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TND</td>
<td>Euro</td>
<td>TND</td>
<td>Euro</td>
<td>TND</td>
</tr>
<tr>
<td>Direct</td>
<td>146</td>
<td>67</td>
<td>62</td>
<td>28</td>
<td>2878</td>
</tr>
<tr>
<td>Indirect</td>
<td>77</td>
<td>35</td>
<td>36</td>
<td>16</td>
<td>1009</td>
</tr>
<tr>
<td>Induced</td>
<td>39</td>
<td>18</td>
<td>19</td>
<td>9</td>
<td>735</td>
</tr>
<tr>
<td>T1 Multiplier</td>
<td>1,53</td>
<td></td>
<td>1,35</td>
<td></td>
<td>1,35</td>
</tr>
<tr>
<td>T2 Multiplier</td>
<td>1,80</td>
<td></td>
<td>1,61</td>
<td></td>
<td>1,61</td>
</tr>
</tbody>
</table>

In proportion, jobs with a higher level of education make up 14% of all jobs in the power station project (only 6% in the road project). However, it is important to note that even here low-skilled jobs remain dominant (39%).

From the calculation of multipliers on both projects, (see tables above) it can be seen that the multipliers of production and income are higher than the employment multiplier. The production multiplier is often greater than 2 in many countries, especially in the case of a construction project; here it stands at around 1.90 for the Urban Priority Roads Project and 1.60 for the Sousse Power Station due to leakages mainly from inputs purchased abroad. The employment multiplier is lower, with a total employment effect of around 8,500 person-years for the urban road project and 4,600 person-years for the power station.
6.4. Results of simulations for Jordanian projects

The Jordanian macro study analysed the cost structure, as well as the output, income and employment multipliers, each of them by type I and type II Leontief multiplier. While real data could be used for the Amman Ring Road project, placeholder values were used for the planned Tafila Wind Park, based on a comparable project in another MENA country and local engineers were consulted to determine the best allocation of the sector that are related to this types of projects.

Table 12 Output, Income, and Employment Multipliers type I and type II

| Note: Weighted average is the sum of all sub-sectors weighted by the cost breakdown. |

<table>
<thead>
<tr>
<th>Project</th>
<th>Unit</th>
<th>Amman Ring Road</th>
<th>Tafila Wind Park</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Output</td>
<td>Income</td>
<td>Employment</td>
</tr>
<tr>
<td>Construction</td>
<td>1.39</td>
<td>0.60</td>
<td>2.61</td>
</tr>
<tr>
<td>Construction material</td>
<td>0.51</td>
<td>0.31</td>
<td>0.20</td>
</tr>
<tr>
<td>Fuels</td>
<td>1.15</td>
<td>0.07</td>
<td>1.07</td>
</tr>
<tr>
<td>Electrical machinery &amp; equipment</td>
<td>1.44</td>
<td>0.23</td>
<td>1.85</td>
</tr>
<tr>
<td>Trade, maintenance &amp; repair</td>
<td>1.3</td>
<td>0.06</td>
<td>2.09</td>
</tr>
<tr>
<td>Construction supervision services</td>
<td>1.51</td>
<td>0.03</td>
<td>2.6</td>
</tr>
</tbody>
</table>

The table above shows that both projects have multipliers which are slightly above the economy average (cf. economy average 1.39 for the T1 output multiplier). It also shows the importance of the indirect effect, captured by type 1 multipliers and the induced effect, captured by type 2 multiplier. The output multipliers are lower than in Tunisia due to high import leakages. The highest multipliers are income multipliers, followed by labour and output for the Amman ring road, whereas the projections for the Tafila wind park posit the highest multiplier for employment, followed by income and output.

Table 13 The Employment impact of Increasing sectoral investment


<table>
<thead>
<tr>
<th>Project</th>
<th>Unit</th>
<th>Amman Ring Road</th>
<th>Tafila Wind Park</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Output in mio JD</td>
<td>Income in mio JD</td>
<td>Employment in FTE</td>
</tr>
<tr>
<td>Construction</td>
<td>138.6</td>
<td>40.2</td>
<td>4,547</td>
</tr>
<tr>
<td>Construction Material</td>
<td>119.15</td>
<td>11.83</td>
<td>3,693</td>
</tr>
<tr>
<td>Fuel</td>
<td>16.07</td>
<td>0.19</td>
<td>96</td>
</tr>
<tr>
<td>Electrical &amp; Machinery equipment</td>
<td>53.52</td>
<td>5.15</td>
<td>1,250</td>
</tr>
<tr>
<td>Building and Civil Engineering</td>
<td>0.36</td>
<td>0.08</td>
<td>31</td>
</tr>
<tr>
<td>Trade, maintenance &amp; repair</td>
<td>7.03</td>
<td>1.68</td>
<td>710</td>
</tr>
<tr>
<td>Various Manufacturing Industries</td>
<td>0.36</td>
<td>0.08</td>
<td>31</td>
</tr>
<tr>
<td>Transport</td>
<td>7.03</td>
<td>1.68</td>
<td>710</td>
</tr>
<tr>
<td>Construction supervision services</td>
<td>0.36</td>
<td>0.08</td>
<td>31</td>
</tr>
<tr>
<td>Others Services</td>
<td>7.03</td>
<td>1.68</td>
<td>710</td>
</tr>
<tr>
<td>Total</td>
<td>334.73</td>
<td>59.13</td>
<td>10,327</td>
</tr>
</tbody>
</table>
The table above indicates that the Amman Ring Road project generates income of 59 million JD when investing the total estimated amount of 233 million JD. Therefore, the project creates 10,330 job opportunities that can be distributed as follows: 4,500 jobs in construction closely followed by construction material with almost 3,700 jobs. As also outlined in the findings from Part A, most direct jobs are unskilled and dominated by male non-Jordanian workers. The situation for indirect and induced jobs, however, is a bit more nuanced, creating jobs also for more skilled workers of Jordanian origins.

Regarding the Tafila Wind Project, the study had only one number to work with, the total investment capital of 362.9 million JD. Therefore, by adopting the same methodology and using other countries’ project characteristics, such an investment would generate 41.9 million JD in the economy and 13,130 total FTE job opportunities. The construction material, which represents 44% of the cost of the project, would create about 5,200 jobs, followed by electrical and machinery equipment (over 3,000).

### 6.4. Results of simulation for Egyptian projects

The impact of the three projects in Egypt was measured using the most recent Input-Output table of 2011 through the following two parameters:

1. output/value added generated by contracts awarded to large-scale and medium-sized enterprises
2. employment generated expressed in full-time equivalent (or person-years)

The information used to estimate the impact of the Giza North Power project both on output and employment covered mainly 4 lots (3 designated to the supply and installation and one civil works). Similar to the Giza North Power station project, the Egyptian Power Transmission project was implemented by a number of contractors through several contracts. A sample of three lots was selected, all supply and installation contracts. Finally, for EPAP II, four sub-projects were analysed aiming at supplying and installing equipment to reduce and prevent pollution in selected industries. The results of the simulations are presented in the next table.

<table>
<thead>
<tr>
<th>Project name</th>
<th>Giza North Power Station</th>
<th>Power Transmission Project</th>
<th>EPAP II</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Output in millions LE</td>
<td>Employ. in P-J</td>
<td>Output in millions LE</td>
</tr>
<tr>
<td>Direct</td>
<td>3598</td>
<td>432</td>
<td>6190</td>
</tr>
<tr>
<td>Indirect</td>
<td>7593</td>
<td>911</td>
<td>44601</td>
</tr>
<tr>
<td>Induced</td>
<td>2391</td>
<td>287</td>
<td>11269</td>
</tr>
<tr>
<td>T1 Multiplier</td>
<td>3,11</td>
<td>4,97</td>
<td>2,85</td>
</tr>
<tr>
<td>T2 Multiplier</td>
<td>3,77</td>
<td>5,97</td>
<td>3,37</td>
</tr>
</tbody>
</table>

In general, the impact of the three projects is positive. The indirect impact on output and employment is the largest, indicating large inter-linkages between the different economic sectors in Egypt. Investments considered are mainly concentrated in a capital intensive sector, however, the impact of this sector on other sectors is large and this was the main
driver of the large indirect effect, on both output and employment. Unfortunately, the investments did not create large job opportunities for the youth (16-24) or for females as is illustrated in the next two figures.

Figure 2 Total impact of the Giza North Power Station on employment by gender

Figure 3 Total impact of the Giza North Power Station on employment by age group
6.5. Major Findings

The next table summarizes the direct, indirect and induced employment in percentage of the total employment effect for the different projects in the four countries.

<table>
<thead>
<tr>
<th>Country</th>
<th>Project</th>
<th>Direct</th>
<th>Indirect</th>
<th>Induced</th>
<th>T1</th>
<th>T2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jordan</td>
<td>Amman Ring Road</td>
<td>37%</td>
<td>33%</td>
<td>30%</td>
<td>1.87</td>
<td>2.67</td>
</tr>
<tr>
<td></td>
<td>Tafila Wind Park</td>
<td>41%</td>
<td>36%</td>
<td>23%</td>
<td>1.87</td>
<td>2.42</td>
</tr>
<tr>
<td>Morocco</td>
<td>PNRR II</td>
<td>26%</td>
<td>41%</td>
<td>33%</td>
<td>2.58</td>
<td>3.83</td>
</tr>
<tr>
<td></td>
<td>Solar project</td>
<td>21%</td>
<td>70%</td>
<td>9%</td>
<td>4.41</td>
<td>4.86</td>
</tr>
<tr>
<td></td>
<td>Oujda sanitation</td>
<td>35%</td>
<td>51%</td>
<td>14%</td>
<td>2.48</td>
<td>2.88</td>
</tr>
<tr>
<td></td>
<td>Sebou sanitation</td>
<td>37%</td>
<td>48%</td>
<td>15%</td>
<td>2.29</td>
<td>2.68</td>
</tr>
<tr>
<td>Tunisia</td>
<td>Urban Roads V</td>
<td>63%</td>
<td>21%</td>
<td>15%</td>
<td>1.34</td>
<td>1.57</td>
</tr>
<tr>
<td></td>
<td>Power Station Sousse</td>
<td>62%</td>
<td>22%</td>
<td>16%</td>
<td>1.35</td>
<td>1.61</td>
</tr>
<tr>
<td>Egypt</td>
<td>Giza North Power Station</td>
<td>17%</td>
<td>66%</td>
<td>17%</td>
<td>4.97</td>
<td>5.97</td>
</tr>
<tr>
<td></td>
<td>Power Transmission Project</td>
<td>19%</td>
<td>60%</td>
<td>21%</td>
<td>4.19</td>
<td>5.32</td>
</tr>
<tr>
<td></td>
<td>EPAP II</td>
<td>19%</td>
<td>60%</td>
<td>21%</td>
<td>4.18</td>
<td>5.32</td>
</tr>
</tbody>
</table>

Even though all studies used closed I-O tables and related multipliers, there are slight methodological differences as well as some data differences. Comparison of values should therefore be carried out with caution. Nonetheless, some key indicative conclusions can be drawn:

- Particularly in Egypt and Morocco, the indirect employment effect is considerable and even higher than the direct effect, especially in the energy sector.
- The induced effect is less important but still significant. The difference between T1 and T2 is particularly high in road construction, as there are more unskilled labourers with lower incomes than in the other projects. Unskilled labourers with low incomes tend to have a high propensity to consume goods produced in the local market, leading to relatively higher induced effects.
- The study gives some good indications on multiplier effects in MPC for projects in selected sectors and could be replicated in other oil importing countries in the region with comparable economies. Nevertheless, the small number of projects means the sample is still too limited to draw fully reliable conclusions.
7. **The way forward**

The study has demonstrated the important impact of infrastructure investments. Although the employment generated in general was lower than expected, the infrastructure sector is a major economic driver and a foundational component of creating employment in large numbers. In some cases, it was clear that an increased accuracy in assessing the employment dimension of the EIB’s lending portfolio would be helpful. The study therefore concludes with recommendations on ways forward for the EIB and the Mediterranean partner countries in this respect.

### 7.1. The way forward for EIB

**Recommendation 1: Improve estimation and monitoring of employment in EIB infrastructure project**

Assessing the size of employment impacts from investments in infrastructure is important for governments. In the decision-making they face trade-offs with other investment alternatives in which employment can outweigh other criteria.

In the projects studied, only one had systematic monitoring of employment data. This means that neither the promoter nor the EIB have access to factual employment data, making it difficult to assess more accurately the employment potential of possible forthcoming projects. The reason for this lack of data could be that employment was not such a crucial topic when these projects commenced; a likely reason why employment recording was not integrated in the MIs established for large-scale projects, focussing mainly on physical and financial progress.

Moving forward, as there is a need to have realistic employment targets in the logframe of each MPC project, the following steps are proposed, which could be implemented gradually to improve recording of employment data:

**At appraisal stage - step 1:** Direct employment – gradually establish a dataset of reliable key indicators specific to MPC (as was done for EU member states):

- a. Average labour intensity per infrastructure sector
- b. Average annual wage cost per type of infrastructure sector (deducted from the composition of the labour force on projects and average wage costs per category – professional, technical, skilled and unskilled - which change considerably according to the infrastructure sector)
- c. FTE for EUR 1 million of total investment cost (implementation only to start with, as figures for operation and maintenance require substantial sector experience)

In MPC, the major part of equipment is imported; hence a supplementary option is to split the last indicator in local and foreign cost components.

The results of the current study could serve as a start with the addition of other EIB/IFI projects in MPC where employment was recorded. They also present the opportunity to collaborate with other IFIs or the EU on this important topic.
At implementation stage - step 2: Monitoring and recording of employment figures at project level:

It’s proposed to include in loan agreements and contracts the requirement to record and provide employment data on a regular basis, such as the number of women, men and youth engaged per professional category and the number of workdays paid for. The recording can be integrated in the MIS, nowadays a common tool for such projects.

It is also recommended that employment recording for EIB projects should be standardised as much as possible to attain comparable results over time and across projects. An example is provided in Annex 4 that could be refined in collaboration with EIB staff. The proposed approach and template could also be checked against projects where such approach is already in use, e.g. Giza North Power Plant I and II. In order to introduce this in more EIB projects, it is recommended that:

- Computerised MIS (software available that can be adjusted if needed) - should be user-friendly
- Agreement is made on which core data should be collected (workdays per professional category - age below 30 and above?)
- Projects having a large equipment component should be split in parts produced locally and abroad such as the Solar Plant in Ouarzazate in Morocco

At completion stage - step 3: Analysis of completed projects (long-term)

The main parameters could be updated on a regular basis (every three or five years). This will enable EIB to generate gradually its own set of key employment data for MPC.

At policy level - step 4: Macro-assessment of completed projects for selected infrastructure sectors or sub-sectors to get T1 and T2 employment multipliers in MPC, or use of these multipliers from same type of projects in countries having a similar economic pattern

Steps 1 to 3 are related to the project level, while this final step is reserved to countries where the EIB is asked to contribute to policy discussions.

In countries where the Government and/or EIB are interested in having the complete employment picture of EIB investments, the indirect and induced employment effect should be analysed to enrich policy discussions for different infrastructure sectors. Indirect and induced effects are usually not counted as employment impacts when appraising projects, but are useful when EIB enters into policy discussions with partner countries on which sectors to support.

There are different options for including a more macro view on employment, production and income outcomes into the project analysis, including indirect and induced impact:

- Option A: Replication - Results/technical coefficients found for some selected sectors in some MPC countries will be applied to similar countries and adjusted to the country context. Sensitivity analysis should be undertaken beforehand, as the sample size is very limited. It could be a first step analysis to get a sense of the employment dimension of an EIB intervention, but it is not very accurate by its
nature. It assumes that selected sectors in similar countries work the same way in terms of production and employment. Further analysis following option C (or B) as described below would help to increase the sample size and therefore improve the accuracy of such an analysis.

- **Option B:** The methodologies described in more detail in the country reports can be applied to other EIB projects of different nature producing reliable results. I-O tables and SAMs exist all over the world, with more or less sectorial disaggregation. Physical data on employment can be attached to create employment multipliers. Past Programmes could therefore be evaluated on their effectiveness to create employment and future investment options could be compared on their employment potential. If further sectorial disaggregation is not necessary and employment data are available at the same type of classification, multipliers can be calculated and simulations can be done immediately (within a very short period). In this case, the assumption would be, with all due caution, that the sectorial EIB interventions would follow the national average in terms of production and employment structure.

- **Option C:** In order to obtain results that are more accurate and reliable, especially as EIB projects are quite diverse and are often not really comparable, a breakdown of project expenditure with more precision according to the nomenclature found in I-O tables has to be undertaken. This type of study could be carried out in other regions or extended to other data. Relevant data could be created in a standardised MIS, which would significantly reduce the time for its implementation (3-5 days). The challenge of this type of research is to bring together micro data from projects to a macro model for simulations.

Staff from government departments and research institutes could be trained once macro methods are standardised, or a pool of competent local consultants could be established to undertake such an assignment. The ILO used the latter approach for work in Indonesia, South Africa and Malaysia.

**Recommendation 2: Enhance the employment content in the EIB infrastructure portfolio**

Some options are presented hereafter:

- **Consider balancing infrastructure projects.** Further to the urgent need to increase and maintain infrastructure investments, the appropriateness of the infrastructure investments in meeting the diverse needs of their populations poses a major challenge to MPC. A proper balance has to be established between costly large-scale infrastructure – with well-known huge lead times in preparation, meeting the immediate needs of the few but facilitating high growth potential sectors – with more low-cost local infrastructure serving a larger part of the population.

- **Consider using appropriate technologies where technically feasible and economically justified.** As project preparation is a joint effort of promoters, IFIs and consultants, all parties involved should consider the employment dimension of the proposed action when projects are prepared, prior to their submission to the BoD for approval. Employment optimisation can be achieved particularly for local
infrastructure that can be implemented through national contractors. Some examples of semi-industrialized countries that have been successful in using appropriate technologies are given in Annex 5.

- Include a cost item in BoQ to cover costs of apprenticeships during implementation

### 7.2 The way forward for the countries

The recommendations set out below are in line with labour market reforms specified in National Employment Strategies recently being developed in several MPC and which underline the need to better know the impact of sectoral policies.

**Recommendation 3: Design projects with more emphasis on employment optimisation for funding by IFIs**

This should be in line with the recommendations addressed at the EIB, the same applies to recipient governments. They should attempt to design projects for funding by IFIs with higher local employment content; to monitor infrastructure project employment generation more closely; and to collect better data.

**Recommendation 4: Address skill gaps in infrastructure investment by revisiting the technical and vocational education and training (TVET) approach for the infrastructure sector**

To plan, build, maintain and expand infrastructure, countries need highly skilled professionals, including civil engineers, electrical and mechanical engineers, architects, designers, surveyors and project managers. Equally important for infrastructure investment and maintenance, however, is the availability of well-prepared skilled workers, including construction workers, technicians, machine operators, drivers, and labourers. These occupations form the backbone of a highly productive, quality conscious and sustainable infrastructure industry.

The infrastructure sector is facing significant skills shortages worldwide. In particular, the categories of jobs that proved particularly difficult for employers to fill include engineers, technicians, skilled trade labourers and labourers — all critical to the infrastructure sector. Often, adequate job profiles do not exist and appropriate training programmes are therefore not available.

This is also the case in the four countries of this study. There was an imbalance in the demand and supply of skilled labour; hence, there is a need to ensure that the vocational and technical training system graduates a sufficient numbers of qualified individuals to meet the growing needs of the sector.

This includes updating or developing new curricula through continuous dialogue with employers to align education and training with the infrastructure development needs. Skill-based training should not be pursued on a project level alone but as a sector wide and continuous development activity with effective training financing mechanisms, integration to national qualification frameworks with appropriate accreditation and certification schemes, and links to human resource development (HRD) programmes for both the public and private sector.
Training on health and safety for all job categories should be part of every vocational and technical training programme to improve compliance with requirements, and to help create a work environment that is more attractive to local labour. Vocational and technical training providers may also consider providing specialised programmes to train, qualify and certify health and safety officers.

**Specific country recommendations**

In addition to the general recommendations above, a few key conclusions for individual countries are given below.

Unions and professional associations for construction workers could make the profession more attractive, especially in a country such as Jordan with a low interest in manual labour work. A professional association for construction workers could help lobby to improve the overall work conditions, and make such employment more attractive to Jordanians.

It is undeniable that for maintenance and repair work, Tunisia must appeal to foreign engineers and technicians. One of the priorities is to upgrade vocational training with a new image that breaks the idea that vocational training centres are intended for school dropouts and poorly performing graduates.

It would be helpful to favour the transfer of technologies, like in the case of the power station in Sousse. It is thus important to take advantage of foreign companies, engineers and technicians to develop training on new technologies and new techniques for the local counterparts. The technology spill over is not automatic and needs to be well planned by the government; it needs effective vocational training institutions and an effective cooperation at the work place between foreign companies and local staff.

Packaging of maintenance contracts as ONEE did in Morocco, whereby small maintenance crews are encouraged and given the opportunities to start their own business, is an excellent initiative to engage small and medium size contractors. This is even more so for the maintenance of the rural roads constructed under PNRR1 and PNRR2, where micro-enterprises or local community associations living adjacent to the roads could be employed creating as such employment in the rural areas.

Finally, comprehensive management and information systems like the one developed for the Giza North Power Station in Egypt are very helpful tools for large-scale investment projects, not only to monitor progress on site but also to record employment figures. Each contractor is required to provide daily figures on the resources deployed broken down by category, and by the number of hours. The daily reports are accumulated monthly showing the figures for the particular month, and the cumulative figures from the beginning of the project to date, and broken down by construction lot.
7.3 Outcomes of EIB-ILO workshops held in Rabat and Cairo

A Regional Workshop was held in Rabat, Morocco on 13th and 14th November 2014, with the purpose of bringing together key participants – Government representatives, project stakeholders and national researchers from the four countries involved in the study, IFIs present in Morocco as well as EIB and ILO staff – to share and discuss:

- the methodologies used in the study to assess the direct, indirect and induced employment effects of the EIB infrastructure portfolio in the four countries
- the results of the case studies
- the ways forward for improving project monitoring in terms of employment creation, impact assessments and enhancement of employment outcomes in infrastructure investments.

The discussions and outcomes of the three thematic workgroups which were formed during the workshop are presented hereafter.

**Group 1: “Monitoring employment during project implementation”:**

With regard to the possible benefits of a standardised monitoring system:

- For project promoters, information on employment created would provide additional arguments to attract funding and would be useful for cost-benefit analyses.
- For the EIB and other financiers, such information could improve ex-ante analyses and facilitate dialogue with promoters.
- For decision-makers, this would provide the possibility to compare the effects of projects in different infrastructure sectors.

When defining a system of indicators to measure the direct employment effects of infrastructure projects, the core principle should be simplicity. Contractors should be given an incentive (budget line in contract) to provide the essential data. Key data to collect could include:

- numbers of workdays,
- job category (e.g. managers and engineers; technicians; clerks and sales; administrative; skilled manual workers; unskilled manual workers; other elementary occupation),
- share of female employment,
- share of youth employment (e.g. age 15-24 or age 15-29),
- skill/education level (e.g. 3 categories: less than primary, primary and lower secondary education (ISCED levels 0-2), upper secondary and post-secondary non-tertiary education (ISCED levels 3 and 4), tertiary education (ISCED levels 5-8),
- wage levels.

Overall, the reporting on direct employment should be simple, gradual and regular. From time to time, it could then be complemented by more detailed studies on quality of employment created.
Group 2: “Common method for macro employment impact assessment of infrastructure projects”:

It was concluded that there is a need for such macro assessments, as these improve understanding (and hence facilitate communicate about) the impact of projects or government interventions on the economy and the society as a whole. Specifically, this permits better reconciliation of economic, social (employment) and environmental objectives, thus facilitating selection between alternative options, notably for governments.

The participants agreed that a single family of method (e.g. I-O/SAM) should be chosen, adapted to the country/sector context. As reliable data is key for a successful macro assessment, data collection should be standardised. Moreover, a close cooperation between data collectors and modellers is required.

Group 3: “Mainstreaming and enhancing employment in infrastructure projects”:

It was noted by participants that, even though employment is not the primary objective of infrastructure investments, they can give an important contribution to economic development and job creation. However, there is a need to avoid purely a focus on low-tech manual labour intensive solutions which may restrict uptake of innovative construction techniques in the country concerned – enhancing local employment in higher value added functions is important.

The potential for enhancing employment impact at all stages of the project cycle should be considered. Notably, the impact of different technology alternatives should be estimated at the appraisal and design phase. Furthermore, employment should be one of the criteria of the project preparation and appraisal. This means that mechanisms to enhance employment impact during project preparation should be developed with the help of the promoters. Associated indicators could then be monitored during project implementation. Monitoring and Evaluation processes should be institutionalised and conducted on a regular basis. To facilitate this, a Monitoring and Evaluation guide should be prepared showing details of this process. Another option would be to create a Management Information System (MIS) at the national level, delivering required information and comparing it with the indicators estimated ex ante.

In addition, at the request of the Egyptian authorities, a separate National Workshop was held in Cairo, Egypt, on April 22nd 2015 (as the study in Egypt started one year later than first anticipated). This followed a similar format to the regional workshop, with the notable addition of participants from contractors on the Egyptian projects, and a particular focus on MIS used in Egypt capturing employment indicators.

Two thematic workgroup were formed during the workshop, the discussions and outcomes of which are presented hereafter:

Group 1: “Challenges in capturing direct employment data”:

Regarding the question of what would constitute a suitable standardised set of employment parameters for large-scale infrastructure projects, the group proposed the
following supplementary indicators in addition to those proposed during the Rabat workshop (see previous page):

- Wage data – notably collected as salary ranges, to avoid sensitivity of requesting precise figures
- Productivity per job category or skill/education level – it was noted that the contractors generally have this information, but may not be willing to share it with promoters for commercial reasons.

Participants suggested that a smaller number of parameters could be imposed on smaller contractors, while larger contractors could be required to make more complete reporting.

It was discussed that the collection and monitoring of employment data could be achieved by:

- Conditions in the contract:
  o if requirements were clearly mentioned during bidding, contractors could account for reporting in their tender price and may also be less resistant to provide information, as they would know from the outset that it would be required
  o reporting requirements in EIB contracts should be aligned with the reporting requirements of the government and other IFIs, rather than being imposed unilaterally by the EIB
- Increased use of MIS:
  o a move from manual reporting (Excel/paper) to MIS could facilitate collection
  o participants recommended that all stakeholders should be involved in the design and development of the MIS and noted that champions are important to spearhead the development of MIS
- Providing constructive feedback on data collection, as this could be seen to benefit project promoters and contractors

As in Rabat, it was felt that the reporting requirements could be complemented by further case studies, which would constitute spot-checks to obtain data on qualitative parameters and other quantitative parameters that are not part of the regular reporting.

*Group 2: “Challenges of carrying out macro assessments of employment of large-scale infrastructure projects”:

The workgroup concluded that the I-O model can be very useful, notably because of its worldwide use and the possibility to compare outcomes with other countries. However, disaggregation is needed as well as satellite accounts such as:

1. Sectoral level (for example manufacturing, construction...)
2. Regional accounts

There is also a mismatch between the classification of the national accounts and the classification of the Labour Force (LF) sample survey by the Egyptian CAPMAS. In addition, the I-O table would need to be updated using the economic census of October 2013 (with new technical coefficients). It was proposed that:
1. Ministry of Planning will issue instructions to CAPMAS to adopt ISC for NA and LFSS
2. CAPMAS should be encouraged to develop a SAM
3. Regional I-O tables should be developed
Annex 1 - Basic data on four selected MPC

The analysis of this study focuses on four developing, oil importing, lower middle-income countries, located in the MENA region.


Among selected countries, Egypt is by far the biggest and Jordan the smallest country in terms of surface, population and gross national income. Jordan, however, has the biggest income per capita. All four countries experienced economic growth rates of about 4 to 6%, on average, between 2000 and 2012, but suffered more recently from a decline, where Jordan’s rate dropped by 3.4% whilst Morocco only had a decline of 0.3%. Social unrest has affected the MENA region and threatens its long-term perspective of economic and social development.

All four countries create a significant and similar amount of value added in industry (about 30%), but the service sector is still dominant, particularly in Jordan (80%). While agriculture does not play a role in Jordan, it is still an important sector in Morocco (39% of total employment) and in Egypt (29%) and, to some extent, in Tunisia (16%). Morocco is also the country with the highest level of gross capital formation with 35% in 2012.

### Table 17 Labour market situation in Morocco, Tunisia, Jordan and Egypt

<table>
<thead>
<tr>
<th>Labour Market</th>
<th>Morocco</th>
<th>Tunisia</th>
<th>Jordan</th>
<th>Egypt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour Force (age +15)</td>
<td>12,026</td>
<td>3,979</td>
<td>1,772</td>
<td>27,742</td>
</tr>
<tr>
<td>LF growth 2010-2013 cumul. (%)</td>
<td>5.7</td>
<td>4.7</td>
<td>6.8</td>
<td>6.7</td>
</tr>
<tr>
<td>Employment to population ratio (%)</td>
<td>46</td>
<td>41</td>
<td>36</td>
<td>43</td>
</tr>
<tr>
<td>Unemployment rate (%)</td>
<td>9.2</td>
<td>13.3</td>
<td>12.6</td>
<td>12.7</td>
</tr>
<tr>
<td>Unempt rate (M 15-24) (%)</td>
<td>19.0</td>
<td>32.0</td>
<td>28.0</td>
<td>25.8</td>
</tr>
<tr>
<td>Unemp rate (F 15-24) (%)</td>
<td>16.9</td>
<td>29.3</td>
<td>55.9</td>
<td>71.1</td>
</tr>
<tr>
<td>Vulnerable employment, total (%)</td>
<td>51</td>
<td>29</td>
<td>10</td>
<td>29</td>
</tr>
<tr>
<td>Vulnerable emp (M) (%)</td>
<td>NA</td>
<td>31</td>
<td>11</td>
<td>21</td>
</tr>
<tr>
<td>Vulnerable emp (F) (%)</td>
<td>NA</td>
<td>21</td>
<td>2</td>
<td>46</td>
</tr>
<tr>
<td>Employment in agriculture (%)</td>
<td>39</td>
<td>16</td>
<td>2</td>
<td>29</td>
</tr>
<tr>
<td>Employment in industry (%)</td>
<td>21</td>
<td>34</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>Employment in services (%)</td>
<td>39</td>
<td>50</td>
<td>80</td>
<td>47</td>
</tr>
</tbody>
</table>


Legend: LF – Labour force, M-Men, F-Female, NA – Not available

Note: All figures are shares in percentages of total, beside the first row with labour force figures. Vulnerable employment data for Tunisia are from 2011.
The tables above show that the current growth rate has proven too low to generate sufficient employment opportunities for the fast-growing labour force of about 5% in all four countries and many workers only find vulnerable jobs\(^9\) in the informal economy. A major challenge in the MPC countries is youth unemployment, which remains among the highest in the world more than twice as high as the national average. Young female workers are extremely affected by unemployment in Egypt and Jordan with over 50%.

\(^9\) Vulnerable employment is defined as unpaid family workers and own-account workers as a percentage of total employment.
Annex 2 - An example of estimation of employment generation

Rural road maintenance in Morocco

As in the example of the projects assessed in the study – the second National Rural Roads Programme in Morocco – the following types of maintenance operations are required to secure investments in roads:

- **Routine maintenance**, which includes activities such as erosion control on shoulders and slopes, clearing drains to allow free passage of water, clearing culverts and other waterways, minor repairs to structures, repairing, filling and compacting potholes, grass cutting etc. This type of maintenance is estimated at 13 300 MAD/km/year, which translates to an annual cost of 2% of initial investment.

- **Periodic maintenance**, which includes major repairs to structures, reshaping prior to resurfacing, regraveling, resurfacing of entire sections of road, spot improvement, installation of new culverts etc. This type of maintenance is estimated at 26 600 MAD/km/year, which translates to an annual cost of 20% of initial investment with an input planned every 4 to 7 years.

- **Emergency maintenance**, which covers unforeseen damages to the road network caused by excessive floods or rains such as landslides and the like. This type of maintenance is estimated at 6 650 MAD/km/year. This figure may vary considerably, but annual costs of 1% of initial investment may serve as a guide.
Estimated quantities
The not-yet-classified rural road network completed by the National Rural Roads Programme 1 and 2 at the end of 2013 was about 7,000 km. This network could reach 11,000 km\(^{10}\) at the end of 2015 taking into consideration roads funded under both Programmes and other resources (municipalities and other programmes put in place by the Government of Morocco).

Funding needs
The 2014 budget for routine and emergency maintenance for a network of 7,000 km is about DH 140 million\(^ {11}\). For a network of 11,000 km in 2020 the maintenance costs will reach (at constant prices) DH 732 million\(^ {12}\), including period maintenance necessary by that time.

\(^{10}\) These figures are approximate and have served essentially to estimate funding needs and number of person-years generated.

\(^{11}\) 7,000 km x (13,300 + 6,700) DH = 140,000,000 DH

\(^{12}\) 11,000 km x (13,300 + 6,700 + 46,500) DH = 731,500,000 DH
Implementation approach
The maintenance of rural roads may either be assigned to the Ministry of Equipment (if these rural roads are classified as departmental roads) or be the responsibility of municipalities (Ministry of Interior).

A standard practice for routine and emergency maintenance of rural roads is to sub-contract the work to local petty contractors, community-based organizations or local maintenance crews to undertake work such as clearing of drains and culverts, repairing, filling and compacting potholes, grass cutting and so forth.

Periodic maintenance can also be sub-contracted to small-scale contractors that have been involved in the implementation of rural roads construction programmes.

Estimate of direct employment creation for maintenance of roads built under the Second National Rural Roads Programme
The table on the following page presents the employment potential of these maintenance operations based on the assumptions made above:
<table>
<thead>
<tr>
<th>Type of road</th>
<th>Routine maintenance</th>
<th>Emergency maintenance</th>
<th>Periodic maintenance</th>
<th>Total annual maintenance cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance cost as % of initial investment</td>
<td>2%</td>
<td>1%</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>annually</td>
<td>annually</td>
<td>every five years</td>
<td></td>
</tr>
<tr>
<td>Gravel road (average investment cost in MAD/km)</td>
<td>419,000</td>
<td>8380</td>
<td>4190</td>
<td>16760</td>
</tr>
<tr>
<td>Low-cost sealed road (average inv. Cost in MAD/km)</td>
<td>911,000</td>
<td>18220</td>
<td>9110</td>
<td>36440</td>
</tr>
<tr>
<td>Average if road network is split evenly between gravel and sealed roads</td>
<td>13300</td>
<td>6650</td>
<td>26600</td>
<td>46550</td>
</tr>
<tr>
<td>Labour-intensity per type of maintenance activity</td>
<td>80%</td>
<td>50%</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Wage share per type of maintenance activity</td>
<td>10640</td>
<td>3325</td>
<td>5320</td>
<td>19285</td>
</tr>
<tr>
<td>Average salary per workday based on 2500 MAD per WM for unskilled and 4200 MAD for skilled labour per WM</td>
<td>2840</td>
<td>2840</td>
<td>3350</td>
<td></td>
</tr>
<tr>
<td>Number of workmonths per km per year</td>
<td>3.75</td>
<td>1.17</td>
<td>1.59</td>
<td>6.51</td>
</tr>
<tr>
<td>Annual employment for maintenance EIB network (2290 km)</td>
<td>14897 workmonths</td>
<td>1241 person-years</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Annex 3 – Strengths and limitations of a closed Input-Output model

There is no perfect model: all models are more or less appropriate according both to the purpose of analysis, and also to practical considerations, such as the availability and reliability of data as well as financial and human resources for the implementation of analysis.

The strengths and limitations of a closed Input-Output analysis can be summarized as follows:

The closed I-O model has the following strengths:

- It is a relatively robust model using a limited number of reliable data
- Most countries already have recent I-O tables, meaning there is no need to do it from scratch
- A closed I-O model includes not only the indirect, but also the induced effect
- It allows sectorial decomposition, it shows the interaction between productive activities and therefore allows a production chain analysis
- It shows forward and backward linkages within the national production
- Physical data such as employment in all its detail (gender, age groups, skills, etc.) can be added to the money-metric I-O system and multipliers can be decomposed
- It includes technology choices; share of labour/capital use
- As it is transparent and not too complex, it can be used relatively easily by a large group of actors

On the negative side, the following limitations should be noted:

- The I-O table only describes the production and consumption side of the economy (truncated economic cycle); social transfers and thus distributional effects cannot be analysed.
- The I-O model is based on a series of core assumptions:
  - Idle capacities (supply is without limits)
  - Constant scale economies
  - Production function without substitution between the different inputs
  - Prices are constant and fixed
  - Fixed (technical) coefficients
  - No tax restrictions or non tariff barriers
- An I-O model is an accounting framework, it lacks behaviour, it is not an economic model
- Data refers to one single period
- Reference year is normally not current, thus prediction is limited to the short term
- Linear, simultaneous systems and demand oriented model
- Static model: Multipliers are linear, not dynamic, point in time (risk of out-dated I-O table), meaning that no long term view can be taken
Annex 4 – Monitoring of employment during implementation

- **Why:** The EIB often has not had access to factual employment data about projects undertaken in MPC making it difficult to more accurately assess the employment potential of possible forthcoming projects. There is a need to have realistic baseline targets in the logframe of each project to measure against.

- **What:** Data on the number of women and men engaged in work and the number of workdays per categories of staff defined by the project. The proportion of the young people among the total number of staff. In addition, attempts should be made to estimate the number of jobs created elsewhere (outside the country where the project is implemented) for major equipment parts and materials imported.

- **Where:** MPC

- **When:** During implementation

- **Who:** Contractors, Project Monitoring Units (PMU) or Supervising consultants, Promoter and EIB

- **How:** Projects to compile data on a monthly basis, which means contractors will be required to submit monthly forms to their Supervising consultants and/or Project Monitoring Units, who in turn will collate the data and quarterly submit summaries to the Promoter, who in their turn will submit data on a quarterly/semi-annual or yearly basis (as agreed with EIB) to the EIB.

- **Expected results:** Revisions of employment data for completed projects would enable EIB to refine its assessment tools to be applied for projects in MPC as well as establishing realistic targets on employment creation.

Prerequisites

- Include in loan agreements and contracts the requirement to record and provide employment data, such as the number of women, men and youth engaged and the number of workdays paid for, on a regular basis. In contracts with sub-contracts the main contractor would remain with the overall responsibility of forwarding the project’s captured employment data

- Include obligations for monitoring and supervising consultants to collect and collate such data for submission to the Promoter and subsequently to the EIB.

- Include the employment recording in existing Monitoring and Information Systems (MIS) of the projects

- Design robust forms to be filled in by the contractors and provide guidance

- Provide feedback to the projects and the contractors on a regular basis to engender ownership of the data collection and reporting. Also, consider - what is in it from them?

Template for recording employment data

It is likely that most projects will have the capacity and the opportunity to use Microsoft Excel or any other standard spread sheet software. The data could, of course, also be recorded in a database should it be available and appropriate to use.
The Annex puts forward a sample of a spreadsheet file that could be used to record the data. The file provides guidance on how to use and tailor-make it to suit the needs of each individual project as there is no one-size-fits-all template.

The file consists of several sheets linked together in a system to avoid double entries and thereby minimise the possibility of making data entry mistakes:

**Staff** holds the categories of staff and this sample provides seven categories based on the data collected from country reports. It can be reduced or expanded to suit the needs of the project. This data is then used to speed up the process of selecting staff categories in monthly sheets by having drop-down menus in the other sheets.

**Wage** holds the data on average wage rates for each category listed in Staff. This data could be used to crosscheck that the number of worker-days match the amount paid to staff.

**Month 1,2,..., n:** There are n number of sheets depending on the duration of the project. It can also be organised in physical years of 12 months each. Once the monitoring scheme is established, the sheets ought to be renamed, e.g. Jan 2014, Feb 2014 etc. These sheets are used for monthly recording on the number of people worked and the number of workdays. It splits the information into Permanent and Temporary staff, and it disaggregates the data into gender. It also has a column for the recorder to estimate the proportion of youth (15-25/29 years of age) of the total work force.

**Project/Year:** This is the summary sheet showing the accumulated data of each month.

**Costs:** This sheet holds information concerning the costs of foreign equipment and materials to enable assessments of employment created outside the country. The cost of remunerating the local people engaged on the project shall also be recorded to enable a crosscheck against the employment data.

**Checking:** This sheet checks the number of workdays against what the staff have been paid. Should there be big discrepancies there is a need to double check the figures.

### Table 20 Staff

<table>
<thead>
<tr>
<th>Categories of staff</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Project managers</td>
<td></td>
</tr>
<tr>
<td>Engineers</td>
<td></td>
</tr>
<tr>
<td>Technicians</td>
<td></td>
</tr>
<tr>
<td>Skilled labour</td>
<td></td>
</tr>
<tr>
<td>Unskilled labour</td>
<td></td>
</tr>
<tr>
<td>Safety Guards</td>
<td></td>
</tr>
<tr>
<td>Administration</td>
<td></td>
</tr>
</tbody>
</table>

### Table 19 Wage sheet

<table>
<thead>
<tr>
<th>Currency</th>
<th>Exchange rate to €</th>
<th>Category</th>
<th>Wage/d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Project managers</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Engineers</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Technicians</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Skilled labour</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Unskilled labour</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Safety Guards</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Administration</td>
<td>15</td>
</tr>
</tbody>
</table>
### Table 21 Month 1

Numbers of staff and numbers of workdays created during the month per category of staff

<table>
<thead>
<tr>
<th>Category</th>
<th>Staff</th>
<th>Workdays</th>
<th>Estimate youth (%)</th>
<th>Staff</th>
<th>Workdays</th>
<th>Estimate youth (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
<td></td>
<td>Men</td>
<td>Women</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project managers</td>
<td>11</td>
<td>0</td>
<td>3380</td>
<td>1</td>
<td>1</td>
<td>43</td>
<td>12</td>
</tr>
<tr>
<td>Engineers</td>
<td>18</td>
<td>2</td>
<td>4800</td>
<td>1</td>
<td>1</td>
<td>43</td>
<td>12</td>
</tr>
<tr>
<td>Skilled labour</td>
<td>205</td>
<td>112</td>
<td>3400</td>
<td>1</td>
<td>1</td>
<td>43</td>
<td>12</td>
</tr>
<tr>
<td>Unskilled labour</td>
<td>324</td>
<td>45</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>43</td>
<td>12</td>
</tr>
<tr>
<td>Safety Guards</td>
<td>9</td>
<td>6</td>
<td>3300</td>
<td>1</td>
<td>1</td>
<td>43</td>
<td>12</td>
</tr>
<tr>
<td>Administration</td>
<td>4</td>
<td>28</td>
<td>3200</td>
<td>1</td>
<td>1</td>
<td>43</td>
<td>12</td>
</tr>
</tbody>
</table>

### Table 22 Project (or year)

Average numbers of staff worked and accumulated work-days created during the project/year per category of staff

<table>
<thead>
<tr>
<th>Category</th>
<th>Permanent jobs</th>
<th>Temporary jobs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Staff</td>
<td>Workdays</td>
<td>Estimate youth (%)</td>
</tr>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
<td></td>
</tr>
<tr>
<td>Project managers</td>
<td>5</td>
<td>0</td>
<td>3200</td>
</tr>
<tr>
<td>Engineers</td>
<td>8</td>
<td>0</td>
<td>4800</td>
</tr>
<tr>
<td>Skilled labour</td>
<td>5</td>
<td>1</td>
<td>3400</td>
</tr>
<tr>
<td>Unskilled labour</td>
<td>178</td>
<td>32</td>
<td>15324</td>
</tr>
<tr>
<td>Safety Guards</td>
<td>5</td>
<td>0</td>
<td>3300</td>
</tr>
<tr>
<td>Administration</td>
<td>1</td>
<td>5</td>
<td>3200</td>
</tr>
</tbody>
</table>
Annex 5 - Examples of cost effective labour-based approaches

This annex provides two examples of labour-based construction works applied successfully in many countries.

**Bituminous sealing of low volume roads using labour-based methods**

Sealing of gravel roads can reduce maintenance requirements while at the same time increasing benefits to local economies, and research has shown that it can be economically justified in the long term to seal gravel roads, considering life cycle costs, even at traffic levels significantly less than 100 vehicles per day. Using appropriate design conducive to labour-based work methods can be cost-effective and the technology of cold bituminous seals is now spreading to many countries with scarce funding for maintenance. One such example is from Ethiopia where the Government launched a national initiative in 2011 called the Universal Rural Roads Access Programme to construct over 72,000 km of all-weather access roads over a five-year period. But there are many more examples of successful implementations in countries such as South Africa, Kenya, Tanzania, Indonesia etc. where the labour-based techniques have become the preferred method of sealing low-volume roads, as it creates more employment opportunities than equipment based operations.

Depending on the project objectives and circumstances (e.g. location, availability of labour, equipment and materials), different construction approaches can be used:

- **Conventional equipment based construction methods** using heavy construction plant (graders, dozers, excavators, tippers, water bowsers, heavy vibrating rollers etc.). In this case, labour will only be used where the equipment cannot access the construction sites and for tasks that can only be performed by labour, such as traffic management, supporting activities etc.

- **A mixed approach using heavy equipment** for the roadbed and subgrade formation and labour for the upper pavement layer(s), sealing and drainage works. This approach has been successfully used elsewhere and ensures good progress and a solid foundation for the road and at the same time gives ample opportunities for employment of local labour.

- **Labour based methods for most construction activities** supported by equipment, mainly for haulage and compaction.

The labour intensity is approximately 15-20% of the total costs as the material costs are high.

The ILO is promoting the extensive use of local resources as it optimizes the creation of employment opportunities for the unemployed, creates a conducive environment for wider skills development and encourages the participation of emerging entrepreneurs in the local development process. In this regard, the ILO has widened the application of
labour-based methods and accumulated a wealth of knowledge on the construction and sealing techniques of low volume roads. The following photos have been taken from the publication “Bituminous Sealing of Low Volume Roads using Labour Based Methods”, Training Manual, ILO, June 2013. For more information, see the ILO’s website: www.ilo.org/publns.

Figure 8 Spreading of chippings

Figure 9 Finalising the spread of bitumen

Figure 10 Checking cross fall

Figure 11 Finalised road
Labour-based sanitation projects in poor urban areas in Cairo

The Social Fund of Development of Egypt implemented the Environmental Health Improvement Project in Ell Mataria district in Cairo to rehabilitate the sewerage systems in 30 poor urban areas.

The General Authority of Sanitation and Drainage was responsible for designing schemes, the daily supervision of replacing old sewers, extending the network with new UPVC pipes of various diameters (200 – 300 mm), and connecting it to new households and manholes. The paving of street sections where trenches have been dug was paid by the Governorate.

The photos below are from two sub-projects located in Maini Mater Area and Trolley Area, which were implemented by contractors using mainly skilled and semi-skilled labourers to remove the asphalt road surface and dig trenches with a labour intensity of 28 and 32% respectively of the total contract sums. Semi- and unskilled labourers are paid 20 to 25 LE (Egyptian Pounds) per workday for 8 to 10 hours work.