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COMMERCE AND INDUSTRY

# MEASURING CURRICULA

MISMATCH FOR FOOD PROCESSING  
AND TOURISM SECTORS IN BELIZE

*"A LOOK AT THE DEGREE TO WHICH LABOUR  
DEMANDS ARE MET BY EDUCATIONAL INSTITUTIONS."*



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# PART 1

BACKGROUND AND LABOUR MARKETS IN BELIZE

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## SECTION 1

INTRODUCTION AND BACKGROUND LITERATURE

Investigations into the skills mismatch between labor market demand and supply have been approached from various perspectives and theoretical backgrounds over the years. Informed by varying schools of thought, studies have adhered to more traditional approaches, while others have become far more innovative. As ACT (2011)<sup>1</sup> study described, the family of literature into this phenomenon could be broken down into three parent research categories: workforce policy research, industrial/organizational psychology, and economic research.

In the case of workforce policy category of research, ACT (2011) shows that this class of investigative methods could be further divided into two groups: “those that utilize employer surveys to collect data about employer perceptions of skills gaps, and those that impute skills gaps from aggregate labor supply and demand using level of education as a proxy for skill level”.

Within the former category are studies such as Holzer (1997)<sup>2</sup>, Conference Board (1999)<sup>3</sup>, Mahmood (2003)<sup>4</sup> and Pasipamire (2014)<sup>5</sup> that all used employer-based surveys to assess the in-demand skills for the labour force. The latter two studies quantified the level of skill demand via surveys that asked industry professionals to rate the importance of various required skills related to Library and Information Science (LIS) occupation on a nine-point scale. The closer the respondents’ scores were to nine, the more in demand those skills were considered to be. Mahmood and Pasipamire, in turn, employed a Content Analysis methodology to assess the degree to which the skills ranked highly by the industry professionals were provided by academic institutions, thereby, effectively executing a curricula mismatch analysis as opposed to the more conventional skills mismatch examination.

However, it is possible to criticize such approaches based on whether or not it is accurate to assume that the interviewees are adequately knowledgeable of the industry’s needs (ACT 2011, p. 4). A similar critique is applicable to the supply-side aspects that may utilize surveys of employees. The question raised is fairly simple: are current employees or employers adequately able to identify the needed skills in the labour market?

Also within the ambit of workforce policy and economic research is the question as to whether or not the use of aggregate data as proxies for labor supplies and labor demand appropriate. In terms of the former, more traditional methods include the use of education levels as a measure for the skill level available in the market (Peter 2010<sup>6</sup>, Dowling et. al 2010<sup>7</sup>). The demand-side would normally be measured via proxies such as the number of persons employed with said skills or level of education.

This stream of macro-level education-occupation mismatch studies has also, in some instances, employed a more quantitative set of methodologies. These studies utilized a mix of tools such as the ILO’s (2013a<sup>8</sup> and 2013b<sup>9</sup>) Skill-Mismatch Index (SMI) approach as

a means of quantifying the mismatch between skill levels as defined by the International Standard Classification of Education (ISECD-97) and the relevant occupation (Estevão and Tsounta 2011<sup>10</sup>, European Central Bank, ECB 2012<sup>11</sup>, Sparreboom and Tarvid, 2016<sup>12</sup>; Humal 2013<sup>13</sup>). From a more economic research vantage point, these studies’ quantitative approach, in which the SMI (an index of dissimilarity) was employed as an explanatory variable in econometric models, confirmed the positive relationship between education-mismatch and unemployment: that is, the greater the mismatch the higher levels of unemployment expected (Humal 2013). The SMI method was also employed by the Belize Chamber of Commerce and Industry (BCCI) in 2018 (see Appendix).

Nevertheless, the SMI’s limitations have been underscored by its users (see ILO 2013, Humal 2013), as it only analyzes one dimension of the mismatch and does not include a look at that mismatch between the more detailed, job-specific skills supply and skills demand.

The macro-level education-occupation mismatch studies are useful given the functional relationship assumed between structural unemployment and educational levels. Fundamentally, higher levels of educational investments are positively related with higher levels of productivity, lower unemployment rates and the like (Hejke, 1996<sup>14</sup>). These factors are what continue to drive governments to place such emphasis and spending on education.

However, others have questioned such macro-level approaches. Sgobbi and Suleman (2009)<sup>15</sup> raised concerns regarding the applicability of education as a true proxy given the idiosyncratic nature of various industries and even within-industry jobs. In addressing this concern, they differentiated between job-specific skills and general skills (or core skills and supplementary skills). Additionally, fields of work and their related skill demands are not static, and continuously change over time on account of well-known factors such as structural and technological change, as well as the effects of globalization (Sparreboom and Tarvid, 2016, p. 15)<sup>16</sup>.

Notwithstanding Sgobbi and Suleman (2009)’s caveats, it is plausible that the methodology utilized could be said to depend on the objective of the study. Chantani (2010)<sup>17</sup> utilized aggregated education data and overall current and future market trends to determine the skills gap in Aceh, Indonesia, to guide policy-level decisions. Specifically, Chantani’s study did not attempt to inform detailed skills training curriculum; it catered, instead to a strategic skills development policy (p. 2).

To this end, unlike ACT (2011) that categorized research based on methodology, Chantani (2010) distinguished between the sources of the demand: those that are policy-driven, those that are market-driven, and skill demands that are essential for livelihood.

Market-driven skills, as utilized by Chantani (2010, p. 3), were defined as demanded skills stemming from “actual or anticipated business

activities". This, then, suggests that increasing output or forecasted increases in activities within a given sector could be used as a signal for the skills that are or will be demanded. As the name implies, the policy-driven skill demands emanate from government policies that target a specific sector regardless if it is currently viable. Lastly, Chantani's skill demand for livelihood looked more at the skills necessary in rural families and/or communities.

The strengths and weaknesses of each approach have been covered fairly extensively throughout the skills or curricula mismatch literature (Sparreboom and Powell, 2009; Quintini 2011<sup>18</sup>; Johansen and Gatelli 2012<sup>19</sup>; and Wilson et. al. 2013). However, regardless of methodology, the overarching objectives remain the same: to identify the degree to which the skills possessed by members of the labour force is demanded by employers. Until this question is sufficiently answered and the gap narrowed, it is argued that structural unemployment will remain pervasive.

The admonitions underscored by Sgobbi and Suleman (2009) and others (Heijke and Ramaekers, 1998<sup>20</sup>; and Heijke et. al. 2002) regarding the heterogeneity of inter- and intra-industry skills demand cannot be ignored. The realization of the context-specific and job-specific nature of the mix skills demanded must be factored into any analysis, especially at the macroeconomic level. To this end, Mahmood (2003) and Pasipamire (2014)'s use of comparative and Content Analysis to analyze the skills and curricula mismatch within a single sector is informative at the microeconomic level. However, given that the two latter studies utilized employer surveys to validate the skills identified in literature, the time-consuming and costly nature of this method becomes conspicuous when one seeks to look at a group of individual sectors and subsectors.

It is possible, however, to bypass the time-consuming and costly demand-side survey process and build on Mahmood (2003) and Pasipamire (2014)'s approach by using the fairly industry-specific skills identified by the ILO's International Standard Classification of Occupations (ISCO-08) or the country-specific versions that have been created in some jurisdictions. As pointed out by ACT (2011), the survey-associated costs for skills or curricula mismatch analyses could be fairly prohibitive, and the employer-based surveys could be less effective due to the absence of appropriate skill-set benchmarks. The ISCO-08 helps to bypass this problem, as it provides an internationally recognized set of skills for more than 400 occupational areas.

The Mahmood and Pasipamire method was utilized by the Belize Chamber of Commerce and Industry (BCCI, 2017)<sup>21</sup> to identify the curriculum mismatch for two sectors; namely, information and communication technology (ICT) and Agriculture. Unlike other reports such as those that employ the CEDEFOP (2008)'s methodology to anticipate demand and supply, BCCI's mismatch study targeted

sectors that were already identified as being priority sectors by the Belize's National Export Strategy.

This study picks up on BCCI (2017), looking specifically at two other priority sectors: tourism and agro-processing. Unlike BCCI (2017), however, the current work engaged the private sector (demand-side) in validation surveys of the skills identified by the ISCO-08. This, thereby, brings the curricula mismatch analysis closer to the original methodology employed by Mahmood (2003) and Pasipamire (2014).







# PART 1

BACKGROUND AND LABOUR MARKETS IN BELIZE

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## SECTION 2

LABOUR MARKETS IN BELIZE

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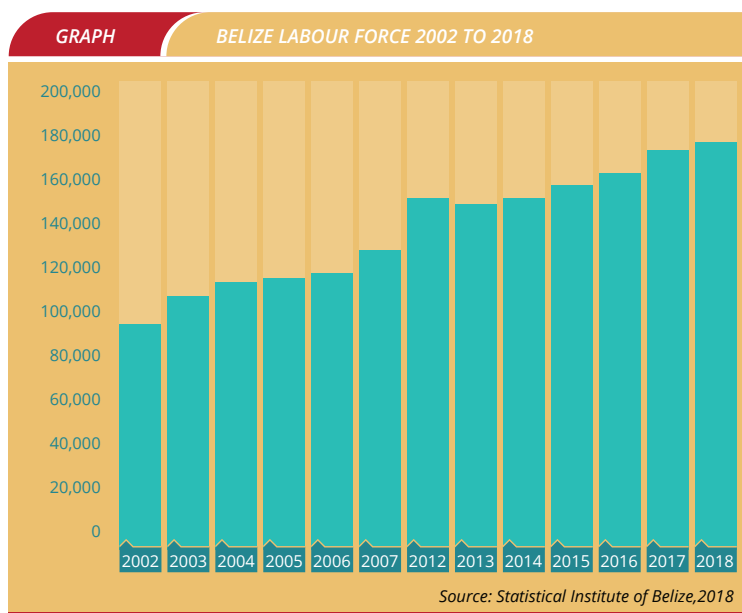
*2.1 | LABOUR FORCE TRENDS*

*2.2 | JOB GROWTH AND 'WAIT UNEMPLOYMENT'?*

*2.3 | SKILL SHORTAGE IN MANUFACTURING SECTOR*

## 2.1 LABOUR FORCE TRENDS

The Labour Force in Belize has grown steadily over the last few years. In 2002, the total labour force according to the Statistical Institute of Belize (SIB) was approximately 94,000. As of April 2018, this figure has increased to more than 172,000 persons, representing an 83% increase over the last seventeen years (2002 to 2018). (This higher rate is also observed for Belize's average annual growth rate)<sup>1</sup>.



This relatively high rate of increase in Belize's labour force serves as a salient development challenge for Belize's labour and employment policies. Fundamentally, as shown in Table 2.1, Belize's Labour Force has outpaced comparator Caribbean Community (CARICOM) member states over the same time span<sup>2</sup>.

Within the same seventeen-year period Barbados only grew by 3.2%, followed by Trinidad and Tobago at 12.9%. Conversely, a few other countries experienced sharp increases, these include Haiti (50.1%), Bahamas (42.8%), and St. Lucia (41.1%) that all have seen increases of more than 40%.

Despite the fact that the Central American region's average for this same period is higher relative to that of CARICOM, Belize's labour force growth appears to have also outstripped even countries such as Honduras (73%), Guatemala (61.1%), and

Nicaragua (51%). This is likely due to a mix of variables, including Belize's traditionally robust population growth rate that has averaged more than 2% for the last six decades, as well as Belize's fairly high youth population.

Regardless of the reason for the near doubling of Belize's labour force in the last 18 years, there is likely to be little disagreement among stakeholders that this pace of growth carries significant labour policy implications. At the very least, it underscores the need for accelerated growth in the number of job opportunities being made available to the labour force. However, speaking from an inclusive growth standpoint, increases in job opportunities are necessary but not sufficient conditions. There is need also to ensure that members of the labour force can access those jobs by possessing the skills actually demanded by employers.

**TABLE 2.1** *GROWTH IN LF IN CARICOM MEMBER STATES BETWEEN 2002 AND 2018*

COUNTRIES	2002	2018	GROWTH BETWEEN 2002 AND 2018
Barbados	147,195	151,958	3.2%
Trinidad and Tobago	597,190	674,347	12.9%
Bahamas	168,364	240,489	42.8%
Jamaica	1,224,385	1,511,825	23.5%
Haiti	3,410,844	5,120,135	50.1%
St. Lucia	71,340	100,641	41.1%
St. Vincent and the Grenadines	50,352	58,956	17.1%
Suriname	169,722	223,863	31.9%
Guyana	269,017	322,973	20.1%
Belize	97,633	177,841	82.2%
<b>REGIONAL AVERAGE</b>			<b>32.5%</b>

**TABLE 2.2** *GROWTH IN LF IN CENTRAL AMERICAN STATES BETWEEN 2002 AND 2018*

COUNTRIES	2002	2018	GROWTH BETWEEN 2002 AND 2018
Honduras	2553211	4421557	73%
Nicaragua	1986641	2994265	51%
Costa Rica	1758312	2322097	32%
Guatemala	4344954	7015993	61%
Mexico	40703848	59153317	45%
El Salvador	2296477	2886457	26%
Panama	1372772	2030929	48%
<b>REGIONAL AVERAGE</b>			<b>48%</b>

<sup>1</sup>

<sup>2</sup> Belize's average annual growth rate is approximately 3.41%. Comparatively, for Barbados, Trinidad and Tobago, Mexico, and Honduras it is 0.18%, 0.68%, 2.1%, and 3.1%, respectively.

BCCI (2019), however, has shown that while access to the primary education is distributed fairly equitably, the same cannot be said for secondary and tertiary level education. Furthermore, even where individuals have been able to access education beyond elementary school, the skills mismatch index (SMI) indicates that there may be a widening gap between skills demand and supply at the macroeconomic level (BCCI, 2018)<sup>3</sup>. Both the former (which speaks to access to higher education) and the latter (managing the quality of education supplied) would be necessary to boost productivity, and Belize's overall economic performance.

Looked at from this perspective, Belize's unemployment rate<sup>4</sup> is something that must be read within the foregoing contexts. That is, it is useful to recall the context of an economy that has a labour force bulge with which the jobs' market has to keep pace.

Essentially, this phenomenon was alluded to by the SIB in their April 2018 Labour Force Survey (LFS):

*"Preliminary findings from the Statistical Institute of Belize's April 2018 Labour Force Survey showed that the country's unemployment rate rose slightly to 9.4 percent from 9 percent in April 2017, despite a net increase of over 5,800 jobs in April 2018. The SIB attributes this marginal growth in the overall unemployment rate to a sharp rise in the level of unemployment in the Cayo and Toledo districts, where data indicates that persons were joining the labour force at a faster pace than that at which jobs were being created.*

*As at April 2018, the number of persons in Belize's labour force was estimated to be 172,086, a net increase of 7,151 persons since last April" (SIB, 2018)<sup>5</sup>.*

## 2.2 JOB GROWTH AND 'WAIT UNEMPLOYMENT'?

At this juncture, however, it is useful to recall that the number of jobs added as referred to by the SIB is the net increase in the number of persons employed over a two-year period. It does not speak directly to the nature or quality of the jobs created, and probably most importantly, it is not an estimate of actual business growth.

For example, when looking at the 5,800 jobs generated between April 2017 and 2018, it is useful to consider whether this statistic indicates the emergence of new businesses, expansion of existing businesses, or work within government projects. As a result, it may also be prudent to examine precisely which of the three principal sectors is most accountable for this net increase. Additionally, for those remaining unemployed, it would also be useful to determine what proportion of this category represents individuals who are engaged in the so-called 'wait unemployment' (see Hyder, 2007<sup>22</sup>; and Herz, 2017<sup>23</sup>).

**TABLE 2.3 EMPLOYMENT INDUSTRIES' JOB INCREASE**

MAIN EMPLOYMENT INDUSTRY	APRIL 2018	APRIL 2017	DIFFERENCE BETWEEN BOTH PERIODS
Primary	27759	337	(921.21)
Secondary	26598	847	2974.52
Services	100841	827	5268.57
DK   NS	752	988	(1483.83)
<b>TOTAL</b>	<b>155950</b>	<b>150112</b>	<b>5838.05</b>

Source: Statistical Institute of Belize Labour Force Survey, 2018

<sup>3</sup> See BCCI 2018, reproduced in the Appendix

<sup>4</sup> Note: At the time of writing the unemployment rate is 9.4%.

<sup>5</sup> See full release at: [http://sib.org.bz/wp-content/uploads/LabourForce\\_2018-04.pdf](http://sib.org.bz/wp-content/uploads/LabourForce_2018-04.pdf)

### Unemployed person's Job Preferences: a case of 'wait unemployment'?

As shown in Table 2.3, the primary sector and unclassified sectors (DK/NS) saw net decreases of more than 2400, a figure that closely rivaled the uptick experienced in the secondary sector. Consequently, the net increase reported by the SIB is principally due to the almost 5,270 jobs added in the Services Sector.

The large increase in the Services Sector should not surprise given that apart from this single industry accounting for almost 70% of Belize's Gross Domestic Product (GDP) in 2018, SIB's LFS presents another often overlooked pattern: that is, the Belizean labour force's ostensible preference for services-sector jobs.

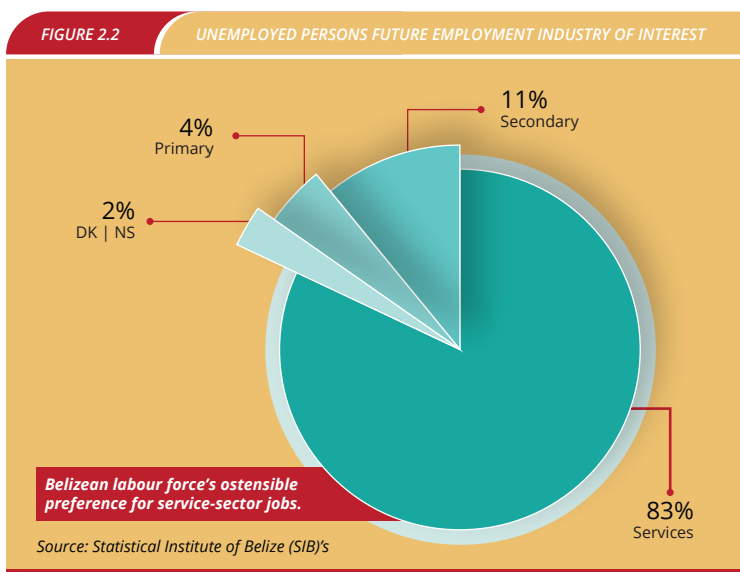


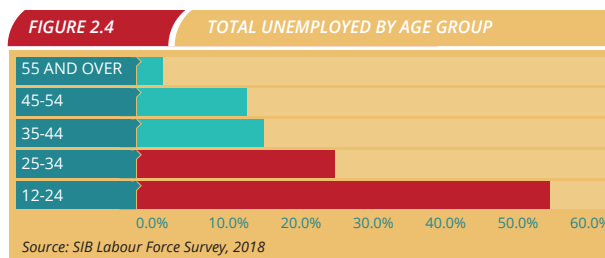
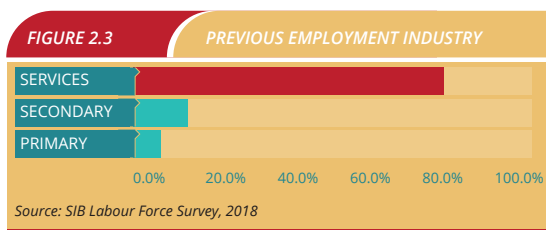
Figure 2.2 demonstrates the results of the responses from the unemployed persons surveyed in the 2018 LFS. When asked about which sector they are interested in working, more than 80% indicated a preference for the Services Sector. Conventionally, conversations in demand- and supply-side labour market gap analyses make the assumption that members of the labour force are without specific preferences beyond wage-related considerations such as the reservation wage<sup>6</sup>. However, there are sufficient anecdotal references to suggest that Belize's labour force has entertained a long-standing cultural predisposition that places a premium on service-sector jobs relative to those in the primary sector; thereby, adding a difficult-to-measure component to the "wait unemployment" phenomenon investigated by the likes of Herz (2017).

Nevertheless, Herz (2017) explained 'wait unemployment' as the tendency of displaced workers, who having already developed a certain set of skills in a particular sector, to "wait and sit through long unemployment spells hoping that their old job reappears." The motivation for this, according to Herz, may be linked to "mobility costs", which was defined as the unemployed person's unwillingness to accept a lower-wage job outside the sector that he had already amassed a certain level of skill.

In Belize's case, the probable existence of 'wait unemployment' may be compounded by the fact that most of the formal educational institutions do not place great emphasis on skills needed in the primary and secondary sectors. For instance, BCCI (2017) found that while the agriculture curriculums in specialized schools are mostly satisfactory in terms of its content, there is a matter of students' access to these programs that must be addressed. This is especially true for students located in the more urban areas.

At the same time, SIB's 2018 statistics show that of the 16,136 persons identified as "unemployed", approximately 70% indicated they had previously been employed. Of the number who had previously been employed, data (see Figure 2.3) shows that roughly 80% were previously working in the Services Sector.

<sup>6</sup> Note: The point here is not to say that the "reservation wage" is irrelevant. However, on its own it cannot fully explain what is being observed. If the "reservation wage" was the principal variable, then the unemployed would accept work in any industry, services or otherwise, that met their wage threshold.



Furthermore, of the total number of unemployed individuals, it cannot be overlooked that the majority (79.9%) are between the ages of 14 and 34. Interestingly, it is shown that 88% indicated that they obtained (or continue to obtain) financial support from a family member (parent, spouse or child). While the aggregated nature of the data makes it difficult to determine which source of financial support is most common, it is not farfetched to infer that if Herz's (2017) 'wait unemployment' scenario is indeed applicable to Belize's situation, and that its existence is likely buttressed by familial support during the period of unemployment.

Nevertheless, with this level of preference for services-sector jobs (see Figure 2.2) that could potentially encourage Herz's "wait unemployment", it would be safe to say that this places a significant amount of strain on Belize's tertiary industry. It is, therefore, necessary to identify the reason for the apparent preference, and ways to lower the aforementioned supply-side "mobility costs" and the demand-side training costs. One conspicuous method is to ensure that the formal education system supplies the requisite skills that, at minimum, reduce the former.

### 2.3 SKILL SHORTAGE IN MANUFACTURING SECTOR

The picture becomes even clearer when the unemployment data is looked at in absolute terms. For 2018, the 4% of respondents who indicated that their future interest is in the primary sector represents only 573 persons out of an unemployed pool of more than 16,000 individuals. In case of manufacturing, this figure is 1753 (11% of total unemployed).

It is natural, then, to ask whether the interest in agriculture is seasonal, especially given the fact that circumstances in the agricultural sector may vary between April and September in a given year. To that end, while Table 2.4 illustrates that there is, on average, more interest in agricultural work during the latter half of the year, the amount of interest averages at about 5%.

**TABLE 2.4** FUTURE INTEREST IN THE AGRICULTURE SECTOR OF APRIL AND SEPTEMBER, 2014-2018

YEAR	APRIL	PERCENTAGE UNEMPLOYED	SEPTEMBER	PERCENTAGE UNEMPLOYED
2014	698	4%	337	2%
2015	785	5%	847	5%
2016	256	2%	827	5%
2017	627	4%	988	6%
2018	573	4%		
<b>AVERAGE</b>	<b>588</b>	<b>4%</b>	<b>750</b>	<b>5%</b>

....there is, on average, more interest in agricultural work during the latter half of the year, the amount of interest averages at about 5%.

Looking at this from a Growth Diagnostic perspective, Martin (2015<sup>24</sup>)'s conclusion that human capital is not likely a binding constraint is supported, especially as it relates to the primary sector. As elucidated by Haunsman, Klingler, and Wagner

(2008)<sup>25</sup>, a constraint could be judged as binding based on whether or not:

- (i) the (shadow) price is high;
- (ii) a movement in the constraint produces significant improvements;
- (iii) agents in the economy are trying to “overcome” or “bypass” the constraint; and
- (iv) agents less intensive in the constraint should be likely be thriving.

### **2.3.1 The Shadow Price**

With the relatively low number of persons expressing interest in the agricultural sector, if indeed there was high demand for workers with this set of skills, the implicit price (wages and return to education) should be high. However, Arcia (2012)—whose findings were reiterated both in Hadley, Alonzo, and Martin (2013)<sup>26</sup> and Martin (2015), found returns to primary and secondary education to be 0.12% and 3.2%, respectively.

Conversely, returns to vocational and tertiary education had returns of 11.3% and 14.6%, respectively. Based on the International Labour Organizations (ILO)'s International Standard Classification of Occupations (ISCO-08), the average job within the agriculture sector appears to demand skills at the primary or at most the secondary level of education. At the same time, the services sector, especially the fast-growing tourism industry, customarily looks for skills at ISCO's level 3 and 4, which are more aligned with post-secondary and tertiary education. Consequently, given the signals of higher implicit price, households have apparently also begun to view the services and manufacturing sectors as being more “worth their while”, while, at the same time, ostensibly relegating the primary sector.

Whether the low implicit price for primary and secondary education (both of which are commonly needed in the agricultural sector) is indicative of the quality of the education, low demand for said set of skills, or a signal that the sectors that need these skills have more than enough available, the forgoing does support Martin (2015, p. 39)'s proposition that if any human-capital constraint exists, it may very much be sector specific. That is, as Martin (2015) had put it: the “rates of return for tertiary and vocational education<sup>7</sup> in Belize are much more in line with other LAC countries and suggest that a shortage of students completing tertiary and vocational education may be a constraint to some sectors and some businesses.”

### **2.3.2 Adaptive Behavior of Economic Agents**

If that is true, then the next task would be to identify the sectors that would most likely be affected by such an undersupply of post-secondary and tertiary-level skills. To answer this, it is useful to look at the adaptive behavior of the private sector actors, which the Growth Diagnostic Methodology suggests would be represented by firms providing above-average amount of trainings as a means to compensate for the workers' lack of skills (see Hausman & Klinger, 2007<sup>27</sup>, and Martin, 2015). Aggregately, however, only 14.4% of Belizean firms surveyed in the World Bank's Enterprise Survey (World Bank, 2010) said that they offered training.

While the macroeconomic view of a relatively low percentage of firms offering training was sufficient to reinforce the earlier position that lack of skills may not be a “binding constraint” across all sectors, the more detailed results of World Bank (2010) is useful as it helps with identifying which sectors may be more sensitive to the human capital constraint.

For instance, the disaggregated result shows that 29.4% of businesses in manufacturing sector provided formal training, while only 10% of firms in the services sector provided training. The former is largely on par with the world average for manufacturers (30.6%), but is below the regional score (48.1%).

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7 Note: Vocational education offered at the ITVETs is classified as post-secondary education.

As it pertains to firms that had identified “inadequately educated workforce as a major constraint”, the World Bank (2010) revealed, yet again, that manufacturers were more likely to consider this variable as a major constraint (40.5%) relative to the regional and world averages of 26.3% and 18.2%, respectively. Conversely, only 24% of the services sector identified this as a major constraint relative to that sector’s regional and world averages of 29.7% and 18.3%, respectively.

CORRUPTION	CRIME	FINANCE	FIRM CHARACTERISTICS	GENDER	INFORMALITY	INFRASTRUCTURE	INNOVATION & TECHNOLOGY	PERFORMANCE	REGULATIONS & TAXES	TRADE	WORKFORCE
VIEW DATA BY FIRM SUBGROUP <b>Business Sector</b>											
INDICATOR								BELIZE	LATAIN AMERICA & CARIBBEAN	ALL COUNTRIES <sup>2</sup>	
Percentage of firms offering formal training								14.4	51.2	33.2	
Manufacturing (All)								29.4	48.1	30.6	
Manufacturing								29.4	...	...	
Services (All)								10.2	51.8	34.1	
Services								10.2	...	...	

The lower levels of “adaptive” behavior by the services sector may indicate that the quality of education provided at the tertiary level is not necessarily a principal concern (at least at present). Therefore, the higher implicit price (and by extension, the higher returns to tertiary education) may be better explained by a robust demand and competition among employers for those skills in the services industry, and less on account of a perceived shortage.

On the other hand, the above-average level of training provided by manufacturers (40.5%)—coupled with the relatively higher returns to vocational skills—provides a strong signal that the secondary sector may be the sector most affected by a low or inefficient supply of adequately trained workers. This observation would carry significant implications for any industrial policy developed by the Government of Belize, which in turn should inform vocational and tertiary level education policy. Additionally, it cannot be overlooked that all stakeholders agree that Belize needs to diversify its export basket beyond primary products by expanding the contribution of value-added goods. The apparent dearth in the requisite skills is, therefore, a salient obstacle that ought not to be ignored.

CORRUPTION	CRIME	FINANCE	FIRM CHARACTERISTICS	GENDER	INFORMALITY	INFRASTRUCTURE	INNOVATION & TECHNOLOGY	PERFORMANCE	REGULATIONS & TAXES	TRADE	WORKFORCE
VIEW DATA BY FIRM SUBGROUP <b>Business Sector</b>											
INDICATOR								BELIZE	LATAIN AMERICA & CARIBBEAN	ALL COUNTRIES <sup>2</sup>	
Percentage of firms identifying labor regulations as a major constraint								19.1	19.1	9.9	
Manufacturing (All)								33.4	19.5	10.7	
Manufacturing								33.4	...	...	
Services (All)								15.1	18.9	9.6	
Services								15.1	...	...	
Percentage of firms identifying inadequately educated workforce as a major constraint								27.6	28.6	18.1	
Manufacturing (All)								40.5	26.3	18.2	
Manufacturing								40.5	...	...	
Services (All)								24.0	29.7	18.3	
Services								24.0	...	...	







# PART 1

BACKGROUND AND LABOUR MARKETS IN BELIZE

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## SECTION 3

HUMAN CAPITAL AND BELIZE'S  
MANUFACTURING SECTOR

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3.1 | ACCESS TO FINANCE CONSTRAINTS: EFFECTS OF CREDIT RATIONING

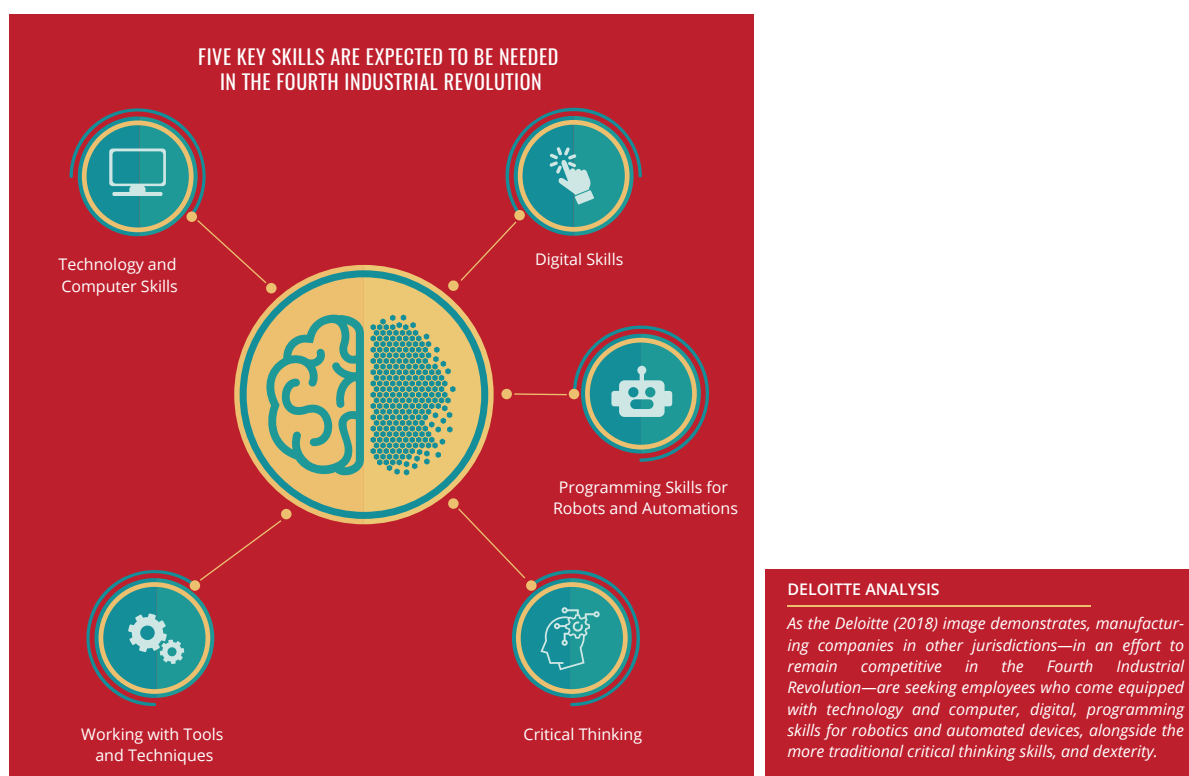
### 3.1 ACCESS TO FINANCE CONSTRAINT: EFFECTS OF CREDIT RATIONING

The foregoing discussion suggests that low levels of human capital are likely a binding constraint to the manufacturing sector. It is also important to recall that the skills needed for this industry are not static, but as a recent study by Deloitte (2018)<sup>28</sup> made evident, as the secondary sector increases in the degree to which technology is utilized, low-skilled rote jobs are being automated, and workers with semi- to high-skills are in greater demand.

As the Deloitte (2018) image demonstrates, manufacturing companies in other jurisdictions—in an effort to remain competitive in the Fourth Industrial Revolution—are seeking employees who come equipped with technology and computer, digital, programming skills for robotics and automated devices, alongside the more traditional critical thinking skills, and dexterity.

However, beyond human capital, it is necessary to also consider other factors underscored by the Growth Diagnostic Framework, several of which have already been discussed, en passant, in previous diagnostics of the Belizean economy (Hausmann and Klinger, 2007; Martin, 2015; and Vasilyev, 2019<sup>29</sup>)

The authors of the Growth Diagnostic “mindbook” had explained that the framework itself is not limited to only macroeconomic growth applications, but could be utilized to diagnose other economic phenomena (Hausmann, Klinger, Wagner, 2008, p. 21). To that end, there is nothing precluding an application of the model to a specific industry; in this instance, Belizean manufacturing sector.



## PART 1 CONCLUSION

Part I of this current study was designed to provide a brief overview of the labour market and macroeconomic landscape within which the Belizean private sector operates. As shown in Section 1 Belize's labour force growth is among the fastest in the Caribbean and Central American region. This variable single-handed places increased urgency and pressure on the need for job growth to keep pace.

At the same time, the foregoing sections also provide some evidence that the Belizean workforce largely prefers the services sector, with more than 80% of unemployed persons indicating interest in this sector. This statistic also makes it difficult to rule out the possibility of Herz (2007) 'wait unemployment' being a significant factor, as experienced workers seek to minimize "mobility costs".

The strong preference for the services sector influenced by high "mobility costs" and relatively higher wages limit the pool of workers applying for manufacturing and agricultural jobs. Ironically, the lack of higher skilled workers entering the secondary sector could stymie its pace of growth, and thereby slow the rate of growth in other jobs. For example, as Deloitte (2018) pointed out for the United States economy, every direct manufacturing job creates "2.5 additional jobs". A similar trend is observable in other jurisdictions such as Indonesia, where the World Bank of Jakarta (2012, p. 5)<sup>30</sup> stated: "Between 1990 and 2009, Indonesia's manufacturing sector growth was associated with an increase in services employment, especially in construction and transport and, to a lesser extent, also trade. This is the result of manufacturing receiving 30 percent of all inputs produced by the Indonesian services sector"

Consequently, if Belize is going to be able to keep pace with the rapid rate of labour force growth, it is in the economy's best interest to steer its financial and human capital towards the secondary sector, while simultaneously ensuring that the services sector workers are also adequately equipped.

As a skills gap report, this study naturally only addresses the aspects associated with the human capital constraint; however, this is not to suggest that other constraints are of less significance. Looking at both the employers' skill demand and learning institutions supply of skills relevant for the Agroproductive and Tourism Sectors, this paper is designed to identify areas of curricula planning that can help reduce the mismatch, and thus boost productivity and profitability, twin outcomes that could also incentivize an increased flow of capital to the manufacturing and tourism sectors.





# PART 2

TOURISM SECTOR  
CURRICULA MISMATCH ANALYSIS

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## SECTION 4

TOURISM SECTOR SKILLS GAP ANALYSIS

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4.1 | *HOTEL MANAGERS*

4.2 | *CLEANING AND HOUSEKEEPING*

4.3 | *DOMESTIC HOUSEKEEPERS*

4.4 | *RESTAURANT WORKERS*

4.5 | *COOKS*

4.6 | *WAITERS*

4.7 | *BARTENDERS*

4.8 | *TOUR GUIDES*

4.9 | *TOURISM SECTOR CONCLUSION*

## TOURISM SECTOR SKILLS GAP ANALYSIS

Part I of this study provided some insights into the larger macroeconomic environment of both the manufacturing and services sectors, with a specific focus on the availability of skilled labour. Using findings from preceding studies, the services sector appears to be less constrained by labour force factors relative to manufacturers. To investigate this matter, this section looks at the supply- and demand-side gaps (or lack thereof) for arguably the largest tertiary sector contributor: the tourism industry.

According to the World Travel and Tourism Council (WTTC, 2018)<sup>31</sup>, direct and indirect contribution of travel and tourism was 15% and 41.3%, respectively, of Belize's Gross Domestic Product (GDP) in 2017. The latter is forecast to increase to 54% of GDP by 2028.

In terms of jobs, the industry directly accounts for 13.4% of total employment. When indirect employment effects are included, this figure climbs to 37.3%. Respectively, these figures are expected to rise to 14.1% and 40.5% of total employment by 2028.

Given the significant role that this sector plays in the Belizean economy, it is useful to examine the degree of the curricula mismatch. The methodology utilized in this study is outlined in Appendix A, however, it is useful at this juncture to remind that the skills/curricula mismatch index is on a scale from zero to one (1). The closer the score, therefore, is to one (1) the wider the gap between the supply- and demand-side variables. The reverse is true.

**TABLE 4.1** FUTURE INTEREST IN THE AGRICULTURE SECTOR OF APRIL AND SEPTEMBER, 2014-2018

SKILLS MISMATCH INDEX	INTERPRETATION
0 - 0.25	No Gap
0.25 - 0.5	Low (narrow) Gap
0.5 - 0.75	Moderately Wide Gap
0.75 - 1	Very Wide Gap

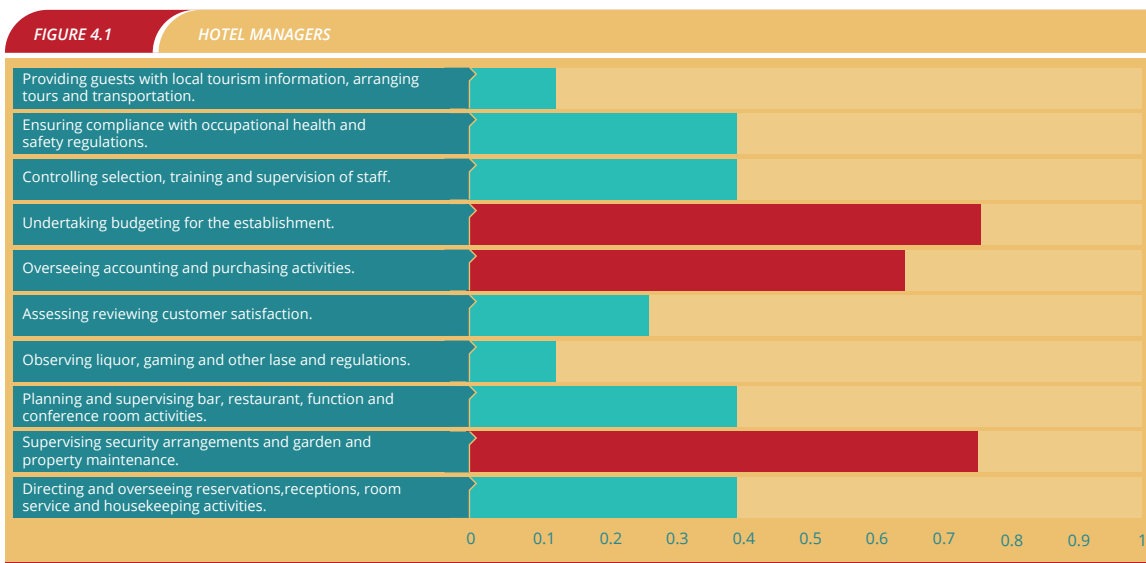
A "low gap" score (between 0.25 and 0.5) indicates that while there is some mismatch, the gap is fairly narrow and easily amended.

Table 4.1 summarizes the index's interpretation, with an aggregate score of less than 0.25 representing "No (significant) Gap", thereby, implying that the skill is adequately supplied by the relevant educational institutions. A "low gap" score (between 0.25 and 0.5) indicates that while there is some mismatch, the gap is fairly narrow and easily amended. However, any index score above 0.5 ranges from moderately wide to severe, with both requiring corrective action in the short to medium-term.

### 4.1 HOTEL MANAGERS

The skills for Hotel Managers were all recognized as being relevant by the private sector respondents (hereafter referred to as "the Validation Survey"), who participated in the validation phase of this study. Said differently, of the skills identified by the ISCO-08, the local respondents indicated that the skills are all relevant to the Belize hotel sector (see Appendix A for description of the Methodology).

Fortunately, as shown in Figure 4.1, for this occupation, most skills are adequately supplied by the surveyed learning institutions. There were only three skills that were inadequately provided. These were "Undertaking budgeting for the establishment"; "Overseeing accounting and purchasing activities"; and "Supervising security arrangements and garden, and property maintenance."



The overall average curricula mismatch index (CMI) score for this specific sub-sector of the tourism industry, however, is only 0.41—placing the gap for this subsector into the “narrow” range. For the most part the core functions of a Hotel Manager are covered by the existing curricula. The weaknesses, as noted above, exist in budgeting and accounting skills being provided, factors that are easily remedied.

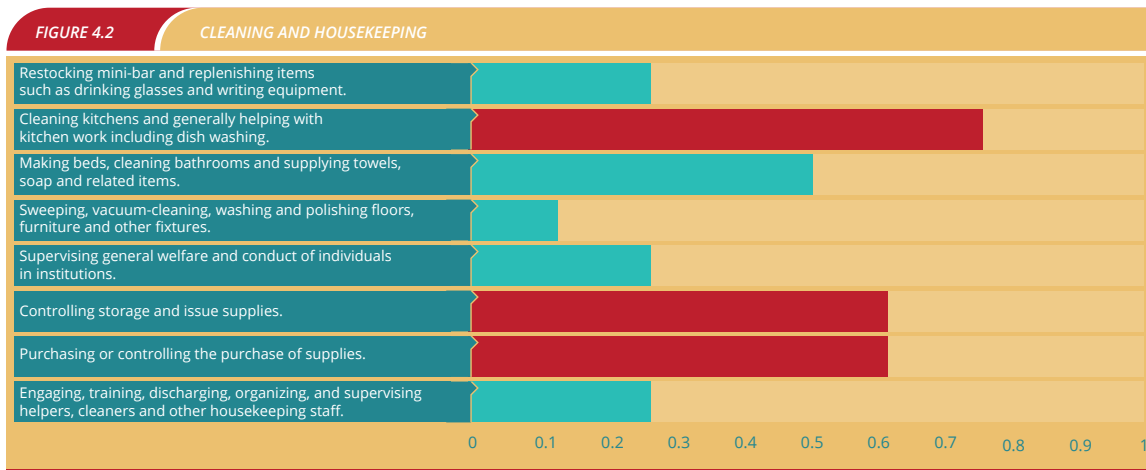
## 4.2 CLEANING AND HOUSEKEEPING

Fairly similar to the cumulative CMI score for Hotel Managers, the CMI score for Cleaning and Housekeeping (0.42) also places it into a “low gap” range. Figure 4.2 shows that the areas with the widest gaps are “cleaning kitchens” and “controlling, storing and issuing supplies”.

It is, of course, easy to assume that these skills—like the accounting skills underscored in section 4.1—are assigned to other categories of employees, and are thus not included in the curricula. This observation does not contradict the Validation Survey which had confirmed that all skills identified for this occupation were of moderate to high relevance to the Belize tourism sector.

It is useful, however, to acknowledge that while the results are aggregated, it is important to recall that individual institutions provide the skills at varying degrees. For example, while tertiary level institutions included in the supply-side survey said that they did not provide any training on “cleaning of kitchens”, the Belize Training and Employment Center (BTEC) and the Institute of Technical and Vocational Educational and Training (ITVET) both indicated that they provided moderate levels of instruction in this area.

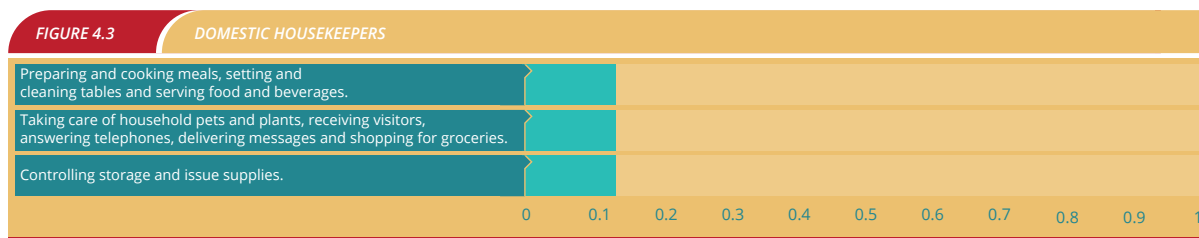
This, however, may not signify the need for the other institutions to adopt these aspects themselves. Instead, it may prove more efficient for the institutes to collaborate and share expertise in this area. For example, it may be convenient to have University of Belize (UB)’s students take specific courses at either BTEC or ITVET to cover those areas. If such an arrangement is made for just this one area, the cumulative CMI score declines to 0.39, narrowing the gap even further. Actually, if this type of resource sharing is expanded to the other two areas at simply a moderate level, the CMI score could decline to 0.33.



### 4.3 DOMESTIC HOUSEKEEPERS

Of the six skills identified by the ISCO-08 as being relevant for this area of work, the employers have only recognized three specific skills as being in demand (see Figure 4.3). The cumulative CMI score for the sub-sector, however, is among the lowest at 0.12, indicating that, as far as the curricula is concerned, there is really “No Gap” in this area.

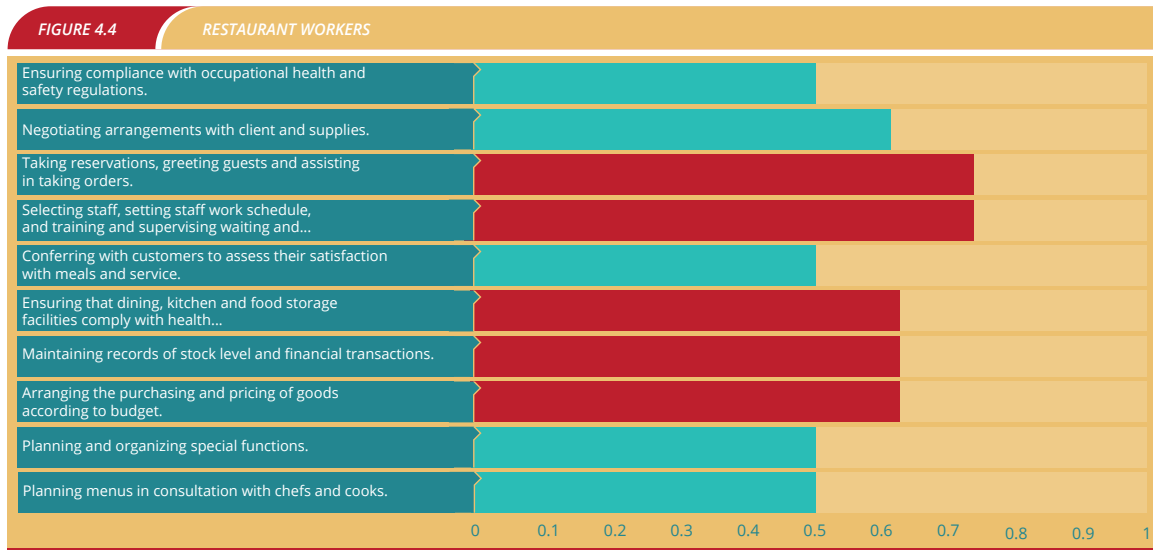
Nonetheless, it is useful to point out that a large part of this narrow gap is due to the fact that The Validation Survey revealed relatively low demand for these skills. Consequently, the narrow mismatch is because both supply and demand are low.



### 4.4 RESTAURANT WORKERS

The Validation Survey identified all skills listed by the ISCO-08 for Restaurant Workers as being “Highly Relevant”. At the same time, however, average CMI score for the collective supply of skills to this sub-sector is fairly wide at 0.60.





If the cumulative score must be taken cautiously, as special attention must be given to the University of Belize (UB)'s tourism syllabus. According to the responses received from UB respondents, if only this institution's supply is included, the CMI would average 0.15, well within the adequate supply range.

If the cumulative CMI is weighted, with heavier weights being given to the University of Belize based on its reach as the national university, it is possible to demonstrate that the cumulative CMI could fall to 0.43. Consequently, this subsector ranges from 0.43 to 0.60, depending on the weights applied to the relevant institutions.

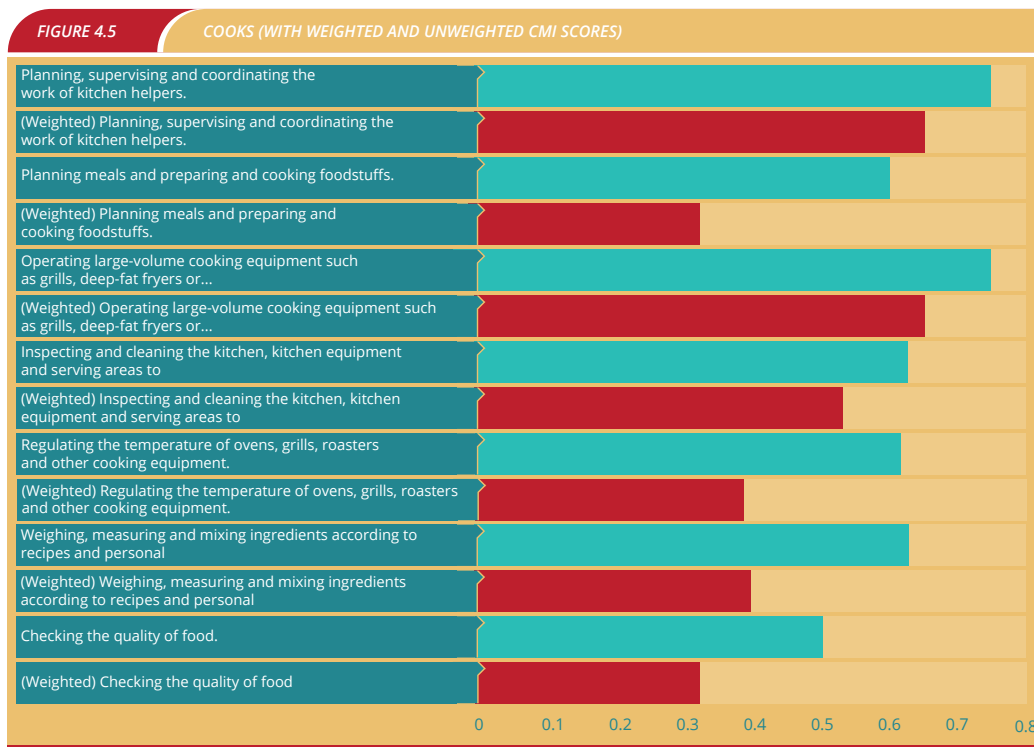
Under either scenario, the results reveal that there is scope for improvements to be made to the curricula for other training institutions. In the instances of constrained resources, a similar case could be made for collaboration and resource sharing as was discussed above.

## 4.5 COOKS

Similar to the situation with Restaurant Workers, the cumulative CMI is 0.63, indicating an overall need to improve access to training in these areas. However, when UB's syllabus is looked at on an individual basis, the score falls to 0.21. Again, when a weighted average is utilized, the cumulative CMI declines to 0.47, placing it within the higher end of the "low gap" range.

Fundamentally, the weighted average result above suggests that there is fairly good coverage by the learning institutions, albeit there is room for improvement. Again, the University of Belize's program has taken the lead in this skill area, and received significantly higher weight considering its status and reach.

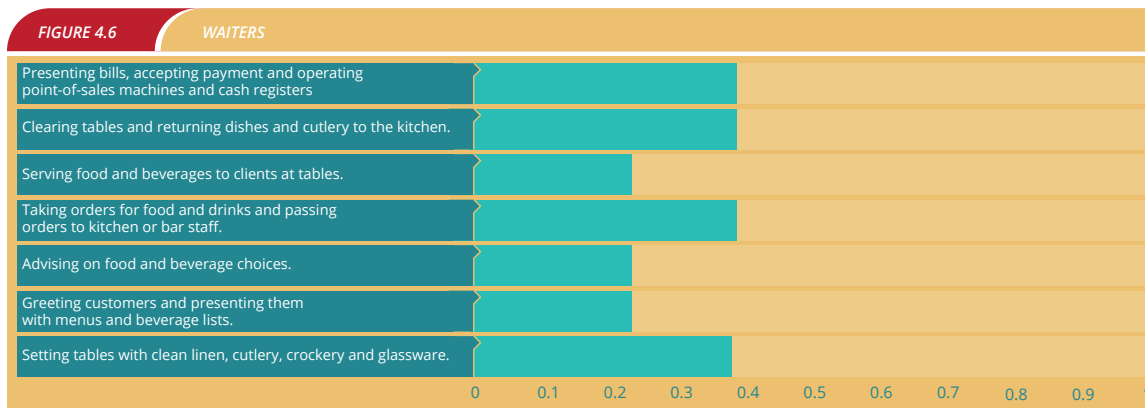
While the weighted cumulative CMI does indicate a "low gap", it nonetheless remains helpful to look at the individual skill areas, as the weights do not remove all skills from the wide to very wide skills gap range. For example, Figure 4.5 shows that certain skill areas, such as "planning and supervising and coordinating the work of kitchen helps", or "operating large-volume cooking equipment" remain above 0.60 (i.e. high gap) even when the weighted CMI is utilized. Therefore, these are aptitudes that are in need of closer attention.



## 4.6 WAITERS

The cumulative CMI for Waiters shows that there is a narrow gap, suggesting that the skills are mostly supplied, despite there being room for improvements. Additionally, the Validation Survey has revealed that Employers recognize all sub-skills as “Highly Relevant”.

In terms of supply, the Belize Training and Employment Center (BTEC) and the Institute for Technical and Vocational Education and Training (ITVET) dominate in this area with individual CMI scores of zero and 0.14, respectively. That is to say, that all the skills demanded by the private sector are supplied adequately by these institutions.



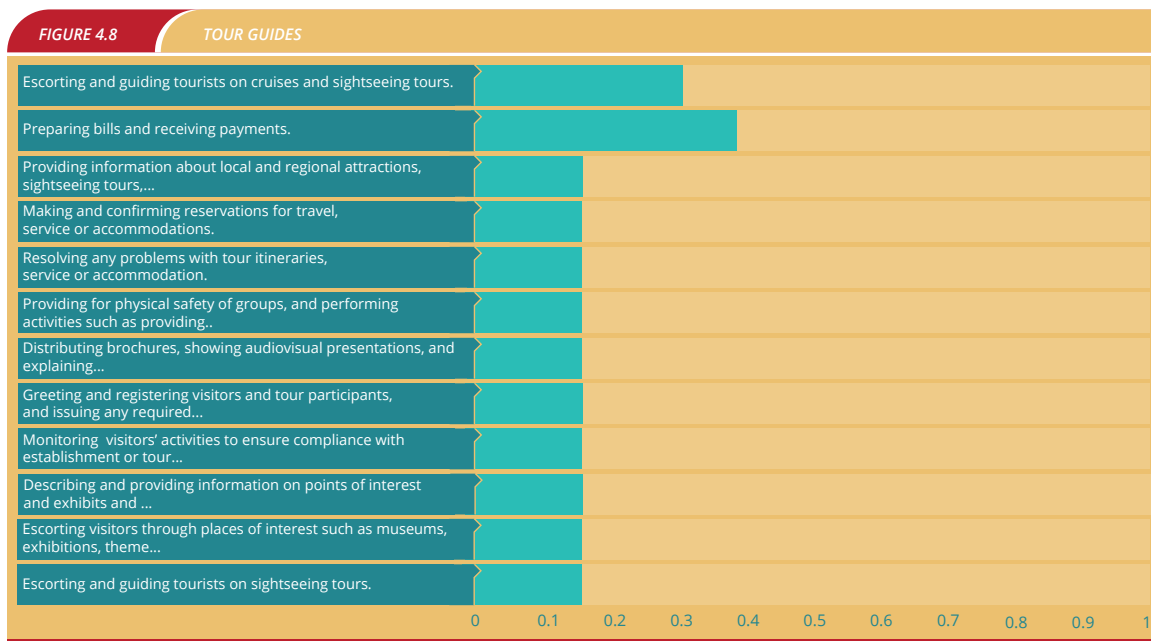
## 4.7 BARTENDERS

With a CMI score of 0.45, the skills demanded by the private sector are provided at moderate level. However, it must be noted that the score improves when only BTEC, ITVET and the University of Belize are included, falling to 0.28.

In this area, as well, it is the BTEC that yielded an individual CMI closest to zero (0.10), followed by ITVET with 0.30. It is essential, however, to consider the fact that BTEC's program is far shorter than the full academic track provided by ITVET; therefore, there is need to look more closely at the quality of the programs at both institutions.

## 4.8 TOUR GUIDES

The cumulative CMI score for the provision of relevant tour guiding skills is 0.16, putting this particular skill area in the "demand met" region. Interestingly, however, the Validation Survey did not yield results above "Semi-Relevant"<sup>8</sup> demand for any of the listed skills, and one skill area was deemed as "Irrelevant" and, therefore, has been removed.



The CMI falls to 0.04 when BTEC, which does not offer any tour-guiding courses, is excluded. As a result, it appears that the moderate demand for tour guiding skills is largely satisfied by the various learning institutions that do have significant reach to the Belizean people. It is also noteworthy that the Belize Tourism Board (BTB) also facilitates trainings for tour guides.

<sup>8</sup> Note: the survey instrument included space for respondents to identify skills that may not have been listed; however, with the exception of UB listing "events planning; organizing; budgeting; marketing; and safety/security protocol", no other skill was identified as relevant.

## 4.9 TOURISM SECTOR CONCLUSION

At this juncture, it is first useful to underscore that the foregoing represents a curricula/syllabi mismatch analysis between the supply- and demand-side for labour in the Tourism sector. Consequently, it does not explicitly take into account other variables such as quality of delivery and soft-skills development. Additionally, it does not distinguish between the programs' design (including duration, or current facilities/resource sharing arrangements). The straightforward question of concern is simply whether or not the skill is made available to Belizeans, thereby, leaving matters of quality assessment for subsequent studies.

When looked at exclusively from the curricula mismatch standpoint, however, the summary CMI for all eight sub-sectors is 0.38, which implies a relatively "narrow gap". In other words, while there is room for improvements, the skills for the tourism sector is moderately satisfying the employers' demand—at least according to what the curricula is designed to offer. If the adjusted results are utilized (i.e. weights and excluded institutions), the score declines by eight basis points to 0.30, which yields the same final interpretation.

Although the results of the CMI accounts for only the tourism sector, being the largest component of the services sector, the relatively narrow gap is consistent with the earlier finding in Part I of this study that showed that a lack of an adequately educated workforce is not necessarily a "binding constraint" for the services sector, for which tourism is a significant contributor.

As Part II above has shown, the likelihood that human capital constraints are not necessarily a "binding constraint" to the services sector—and, by extension, its largest component—is mostly likely due to the number of training options available to workers. While this study treated BTEC, ITVET, and the tertiary-level institutions as having equal weights for the most part, it is important to recall that the University of Belize, and other tertiary-level institution (such St. John's College–Junior College)—which are fairly accessible, do provide a tourism programs.

Additionally, there are several support programs that are supplied by entities such as BTEC. Therefore, even where finance may limit individuals' access to tertiary institutions, they are yet able to attend relatively short-term programs that have a robust success rate.

Lastly, it is useful to recall that the ISCO-08 places services-sector jobs at the higher skill levels (3 and 4), and therefore, there is scope for greater weights to have been given to especially the national university. However, with a few exceptions, this had been avoided. Fundamentally, it is best viewed as having sufficient supply of skills at every level within this sub-sector once it leads to trainees being able to find employment.







# PART 3

AGRO (FOOD) PROCESSING SECTOR

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## SECTION 5

CURRICULA MISMATCH IN AGRO (FOOD) PROCESSING

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5.1 | *SKILLS/ CURRICULA MISMATCH IN AGRO-FOOD PROCESSING SECTOR*

5.2 | -

5.3 | *SKILLS GAP ASSESSMENT FROM ITVETS PRESPECTIVE*

5.4 | *ITVET AND OTHER SOURCES OF ROS-RELATED TRAINING*

5.5 | *AGRO-FOOD PROCESSING CONCLUSION*

5.6 | *RECOMMENDATIONS FOR AGRO-FOOD PROCESSING SECTOR*

The wider agriculture sector contributes approximately 10% to 15% of Belize's Gross Domestic Product, and accounts for more than 80% of the country's merchandise exports on average. When specific products from the agro-food processing industry are isolated from the larger export basket, 2018 figures from the Statistical Institute of Belize (SIB) shows a contribution of approximately \$66 million, which represents about 16% of total merchandise exports (see Table 5.1).

It is this type of statistic, inter alia, that had led to agribusiness being recognized in The National Export Strategy (NES) for Belize 2007-2010 (BELTRAIDE 2006, p. 43<sup>32</sup>)<sup>9</sup> as a priority sector alongside Tourism, Aqua-culture and Fisheries, and Information and Communication Technology. The National Trade Policy<sup>10</sup>, 2019-2030 (NTP)<sup>33</sup> similarly recognizes the significance of the agroproductive sector, despite it being currently described as being part of an “undiversified economy rooted in primary commodities with limited agro-processing”.

**TABLE 5.1 SELECT FOOD EXPORTS FOR 2018**

SELECT COMMODITIES	VALUE OF EXPORT (\$)
Peper Sauce	4,613,192
Orange Squash	813,390
Grapefruit Squash	121,749
Oranges	98,856
Orange Oil	6,756,598
Grapefruit Oil	1,662,703
Red Kidney Beans	9,395,205
Black Beans	4,235,280
Pulp Cells	1,305,516
Animal Feed	15,012,737
Corn Meal	2,098,500
Other Value	19,966,696
<b>TOTAL</b>	<b>\$66,080,424</b>

Nevertheless, the thinking from the NES and the NTP remain valid: the agroproductive sector is a promising priority sector with a great deal of expansion opportunities. For instance, even an at-a-glance look at the diversification potential for non-alcoholic beverages<sup>11</sup> such as fruit juices presents an optimistic picture. For the last five years (2014 to 2018), SIB data shows that Belize exports an average of \$72 million of orange concentrate juices, with the decline in later years being reflective of the recent challenges with the “Citrus Greening” plant disease. As shown in Table 5.1, Belize already has seen some growth in agroprocessing, with goods such as orange oils and pepper sauce. In the case of pepper sauce, this particular product has seen an average growth of about 14% within the last five years. SIB data reports that exports of this product in 2014 were approximately \$2.8 million. Despite some fluctuations, in 2018 this figure climbed to \$4.6 million. A similar point could be made for orange oils which recorded an average growth of more than 30% between 2014 and 2018.

However, the real driving force behind the agroproductive sector is the growing demand for “convenience food” as is generally reflected in variables such as population growth and urbanization trends in developing countries (see Wilkinson and Rocha, 2006<sup>34</sup>)<sup>12</sup>. In Belize's case, and as discussed in the NES and similar documents, the prioritization of this sector is based on, inter alia, factors such as the preferential treatments accessible under various trade agreements to which the country is a beneficiary. These would include agreements such as the Partial Scope Agreement (PSA) with Guatemala, the Economic Partnership Agreement (EPA), the Caribbean Common Market (CARICOM), and even the Caribbean Basin Economic Recovery Act (CBERA).

Nonetheless, to be able to fully realize the full potential of this sector, measures must be taken to ensure that factors that affect productivity levels are adequately addressed. Fundamentally, while physical capital investments (whether as Foreign Direct Investment or domestically sourced) is key to the sector's development, human capital investment is equally (if not even more) important. In terms of addressing the latter matter, this study takes the view that an essential issue that has to be ameliorated is the gap between the skills needed (demanded) by employers and those supplied by the academic/training institutions.

9 See: BELTRAIDE (2006). *National export strategy, 2007-2010*. GoB, Belmopan City. Available at: [http://www.ceintelligence.com/files/documents/NES\\_Belize\\_Final\\_Document,2007-2010.pdf](http://www.ceintelligence.com/files/documents/NES_Belize_Final_Document,2007-2010.pdf)

10 Belize's Ministry of Trade (2019). *National trade policy 2019-2030*. GoB, Belmopan City, Belize. Available at: <https://www.dgft.gov.bz/wp-content/uploads/2019/03/National-Trade-Policy-2019-2030.pdf>

11 Note: referring to Harmonized Standard (HS) Code category of 20.09.0000

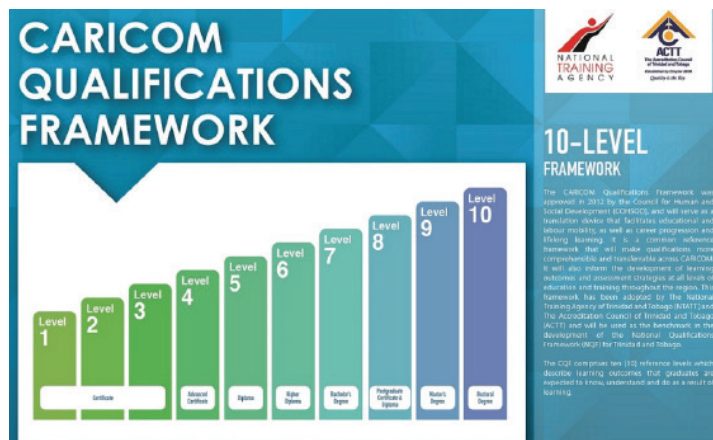
12 Wilkinson, J. and Rocha, R. (2006). *Agri-processing and developing countries*. *Rimisp-Latin American Center for Rural Development*. Available at: <https://openknowledge.worldbank.org/handle/10986/9040>



## 5.1 SKILLS/ CURRICULA MISMATCH IN AGRO- FOOD PROCECESSING SECTOR

In line with the methodology outlined in Appendix A, this study analyzes the gaps that exist between academic/learning institutions' curricula and the skills that are demanded by the private sector. However, unlike the tourism sector, the skills identified are based on the Regional Occupational Standards (ROS) for the Agro-Food Processing (AFP) sector. The ROS is utilized to assess the regional training institutions' delivery of the Caribbean Vocational Qualifications (CVQs).

Given the cross-cutting nature of the skills identified for the AFP sector, the categorization will not follow a job-specific approach as was done for the tourism sector, but rather it is categorized according to the levels of skills (see Figure 5.1). In the case of AFP, the available skill levels are Levels 1 through 3.



Additionally, the results of the Validation Survey indicate that most of the skills listed are demanded by the relevant private sector actors. This result is consistent with both the private sector and public agencies such as the Ministry of Agriculture's Agroprocessing Unit.

Particularly, the Agroprocessing Unit<sup>13</sup> provides an especially valuable set of insights into the demands for various skills as its relationship with industry stakeholders is akin to that executed via BTEC. That is to say, employers and/or producers make requests for specific AFP-related training and support, which are in turn—as much as capacity permits—provided by the Unit via its partnership with other key

government agencies such as the Belize Agricultural Health Authority (BAHA). This close-proximity relationship between the Agroprocessing Unit and industry stakeholders serves as a microcosm of the quintessential arrangement that could exist between academia and the private sector.

On the supply-side, however, it is noteworthy that interviews with officials of the Employment Training and Education Services (ETES) Unit underscored that the formal systems of education—primarily the ITVETs—do not yet provide training to satisfy the AFP-related skills demand. On the contrary, as alluded to earlier, the Ministry of Agriculture's Agroprocessing Unit does provide or coordinate with other agencies (like BAHA) for the provision of such instruction (E. Gentle, personal communication, June 10, 2019).

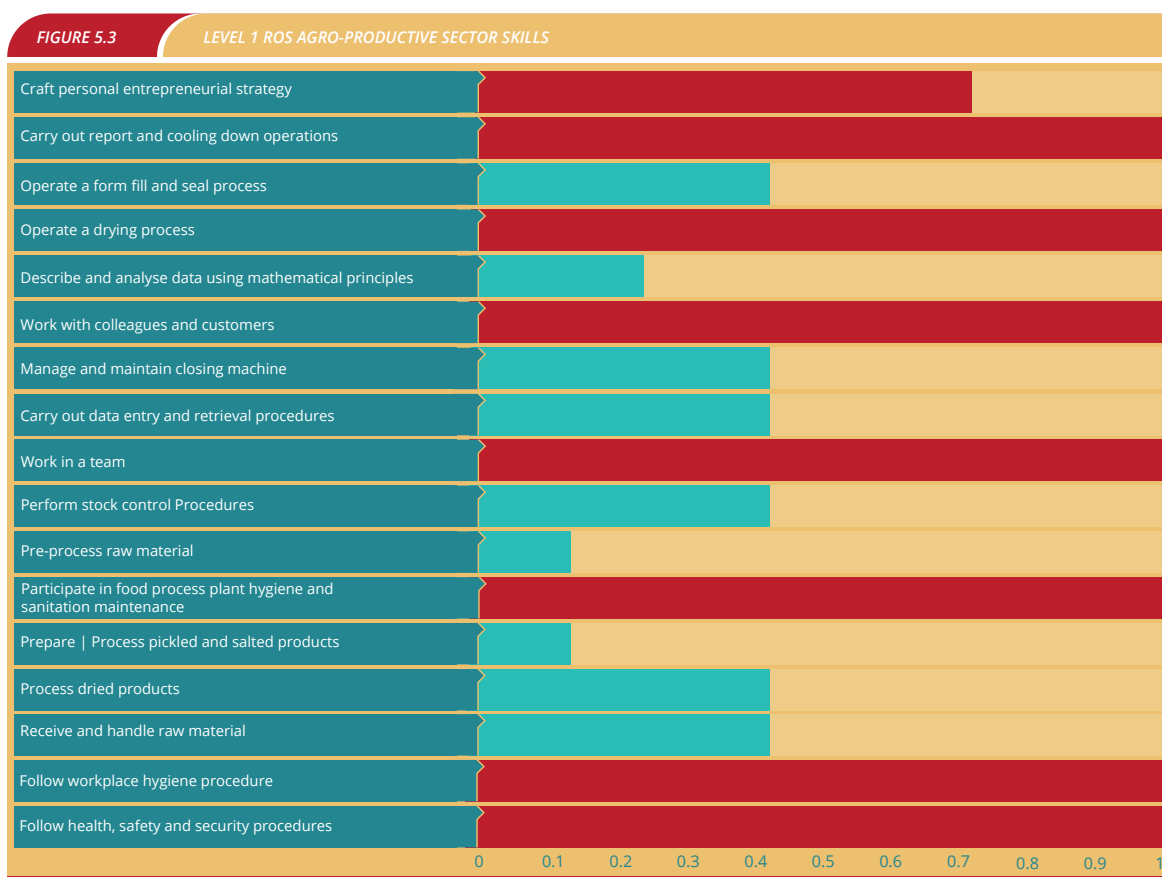
Gentle (2019) indicated that there is, however, a limit of about 15 to 18 individuals who participate in any given product development trainings, which are geared towards helping small-scale suppliers who are actually producing various products. Consequently, it is difficult to treat the Agroprocessing Unit as a substitute for the ITVETs. As a result, either institutions' offerings (or lack thereof) are first looked at separately, before finally being examined as a weighted average of the contributions of both ITVETs and the Agroprocessing Unit. The latter weighted average is justified by the fact that the current study is an analysis that seeks to identify whether the trainings are offered and impacts employment in Belize, and therefore gives less emphasis to the “reach” of the programs.

13 Note: more details on the unit available at: <https://www.agriculture.gov.bz/agroprocessing/>

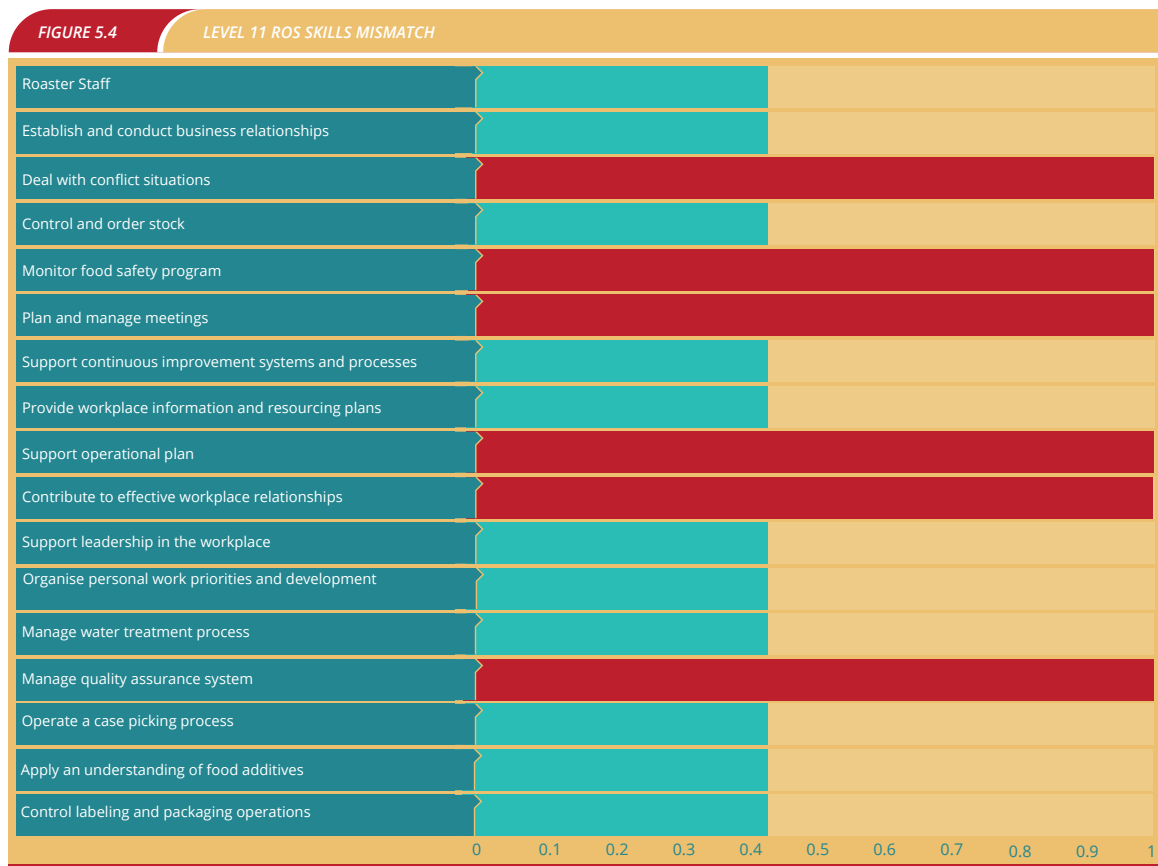
### 5.3 SKILLS GAP ASSESSED FROM ITVETS PERSPECTIVE

As stated earlier, interviews with ETES officials had revealed that the skills associated with Levels 1 through 3 of the ROS are not yet offered at the formal institutions. Consequently, the gap is expectedly wide, with fluctuations below a maximum Cumulative Mismatch Index (CMI) score of one (1) being due to specific skills that have relatively lower demand by the local employers or industry stakeholders.

As a result, the individual CMI scores are useful indicators of the level of demand that exists locally for specific skills and aptitudes. For instance, Figure 5.3 demonstrates that skills such as “following health, safety and security procedures” as well as “following workplace hygiene procedure” are in high demand but are not supplied by the ITVETs; thereby, obtaining the highest CMI score (i.e. CMI of 1.00).



Conversely, skills such as “Operate a form fill and seal process” displayed a moderate gap due to the relatively lower weighted average demand. Similarly, “Pre-process raw materials” is another skill set that Figure 5.3 shows with a lower gap as it had a weighted average demand score of 1.7. Given that the ITVET received a score of one (1) for not supplying this skill the difference between the demand side (1.7) and the supply side (1.0) results in a low CMI score of 0.12, which—in the case of the ITVETs—is more indicative of the skill itself being demanded less by the local private sector. (There is scope, however, to debate whether the assessment should be based on current local needs, or to target the skills that are needed for Belize to remain competitive regionally and internationally).



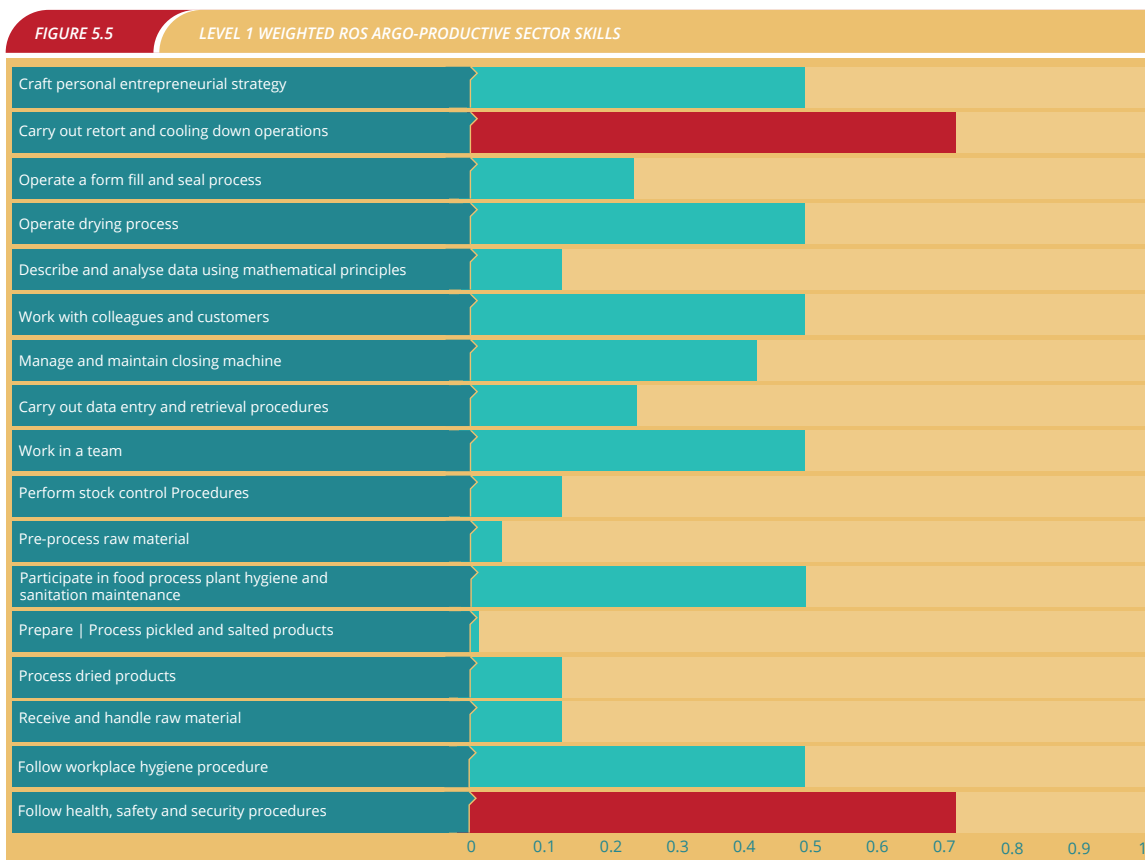
Notwithstanding the “reverse” interpretation applicable to the individual skill areas, the overall CMI score of Level I ROS Skills of 0.63 skills carries the conventional interpretation: there is a significant gap that requires urgent attention.

As is to be expected, the Overall CMI scores for Levels 2 and 3 are even higher at 0.64 and 0.71, respectively. Considering that the higher levels build on the Level 1 courses, this result is not surprising. Most importantly, it communicates that there is an even more robust demand for trainings above Level 1.

Based on the foregoing it is not surprising that the overall CMI score for all three levels combined is 0.64, well within the significant gap range.

## 5.4 ITVET AND OTHER SOURCES OF ROS-RELATED TRAINING

Logically, the ideal condition for trainings associated with the Agro-Food Processing sector would be that they are offered via organizations such as ITVET, which is in the best position to satisfy the CVQs standards. However, given the situation outlined in Section 5.3, there is utility in considering other “unconventional” avenues via which the AFP sector’s skills are supplied. This includes bodies such as the Ministry of Agriculture’s Agroprocessing Unit that offers training, inter alia, in the areas identified by the ROS.



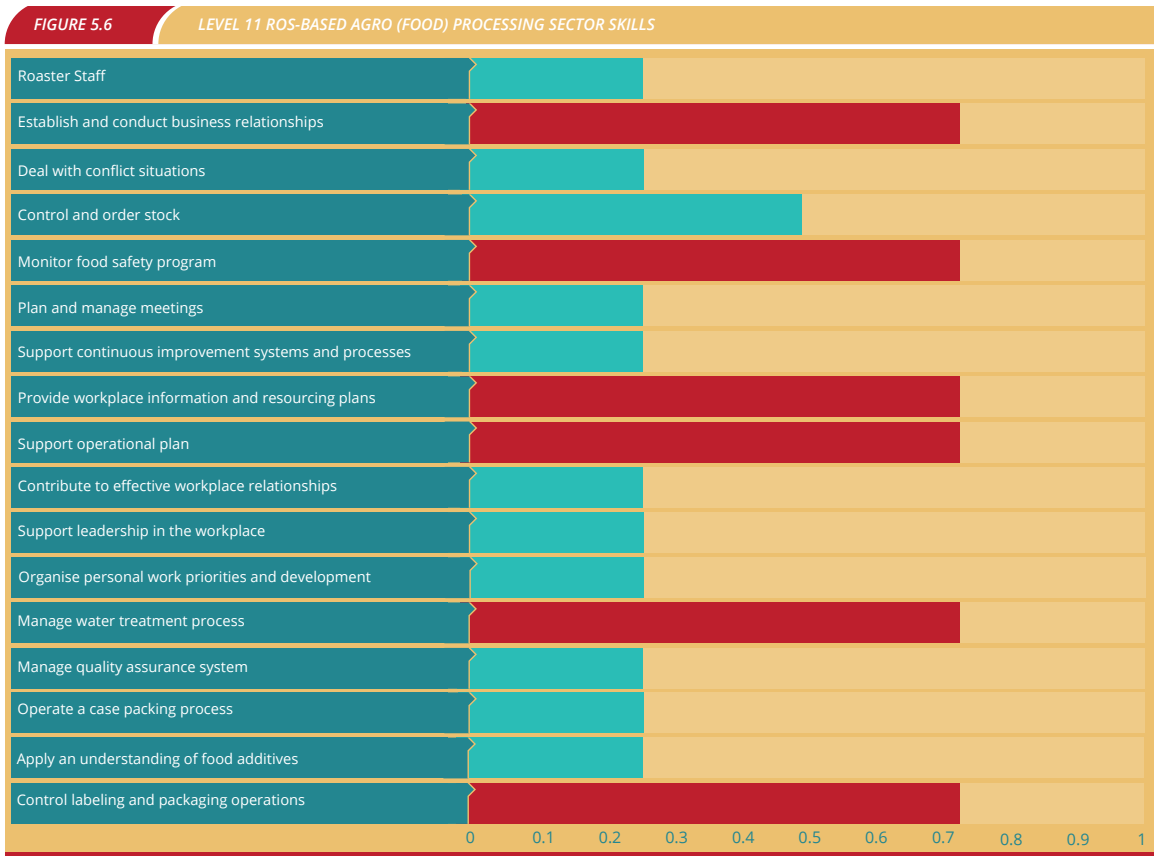
Consequently, this section discusses the CMI scores when the weighted averages of both the supply- and demand-side are employed based on the contributions from the Agroprocessing Unit. In terms of the supply-side weighted averages<sup>14</sup>, it is important to note that the ITVETs were still given the greater weight given their formal mandate as it pertains to the CVQs.

Figure 5.5, therefore, reflects the incorporation of the Agroprocessing Unit's training at ROS Level 1, which now receives a CMI score of 0.34 as opposed to the ITVET-only 0.63 reported in Section 5.3. Of course, there is scope to question if a weight of 30% being given to the unit is exaggerated, considering its relatively small scale, but it is also difficult to ignore the fact of the practical approach employed by the unit that has aided entrepreneurs to actually research, develop, produce and sell their products.

Additionally, the partnership between Agroprocessing Unit and its sister agency the Belize Marketing and Development Corporation (BMDC) has established a unique cooperative brand and company known as Baking Pot Food<sup>15</sup>. This partnership also serves as a type of incubator facility for small-scale agroprocessors. As a result, where the unit falls short of being the nationally recognized body responsible for CVQs, it compensates for by its provision of the incubator service and real business opportunities. Also, it is worth reiterating that an additional focus on this study is whether or not the trainings lead to local employment.

<sup>14</sup> Note: 70% arbitrary weight was given to the ITVETs, with the balance given to the Agroprocessing Unit.

<sup>15</sup> See details at: <http://bmdc.bz/melting-pot-foods/>



Level II skills, as shown in Figure 5.6, also has its fair share of skills that are undersupplied; thereby, leading to a CMI of 0.43. This is, like Level I, still within the moderate-gap zone. Lastly, the skills for Level III yield a CMI of 0.49.

The overall (weighted) CMI score, therefore, is 0.40 for this sector when the Agroprocessing Unit is included in the estimations. Consequently, the overall CMI is clearly within the “moderate” range.

It must be noted that the focus of the APU is on small-scale producers. Larger entities such as the Citrus Products of Belize Limited (CPBL), as explained by one CPBL representative, cannot rely exclusively on the APU’s offerings. The said CPBL representative indicated that they “partially” receive training from the APU, but other needed trainings must be obtained via other private service providers.

There are two salient points to be made at this juncture. First, the contracting of private providers to train personnel is yet another factor that corroborates the discussion from Section 2.3 regarding the Growth Diagnostic’s principles of costly “adaptive behaviors”. That is to say, where there is a genuine “binding constraint”, employers will seek out ways to “get around” it.

Secondly, the APU’s capacity may only be sufficient up to a certain point (as stated earlier, for small-scale producers). These resource and capacity limitations would not be able to completely satisfy the needs of “larger” corporations that are targeting the export market. Combining these factors, it is possible to surmise that at minimum the realities on the ground would best be depicted by a CMI score closer to “moderately high” range (i.e. 0.50 to 0.75).

## 5.5 AGRO-FOOD PROCESSING CONCLUSION

The foregoing section demonstrates that it is possible to obtain two fairly distinct overall CMI scores: when only the formal education institutions are considered there is clearly a significant gap between what is demanded in the labour market and what is supplied. This is depicted by the overall CMI score of 0.64.

At the same time, however, there are institutions such as the Agroprocessing Unit of the Ministry of Agriculture that does provide or otherwise coordinate trainings for small-scale agroprocessors. Moreover, in its partnership with its sister agencies, these initiatives even provide an incubator function. When looked at from this standpoint, it was deemed prudent to include the Ministry's work alongside that of the ITVETs, with the latter receiving greater weight. This approach yielded an overall CMI score of 0.40, which suggests a moderate gap. However, the limited capacity of the APU leads to the inability to completely accept the lower CMI score, with qualitative input suggesting that a moderately wide (0.50 to 0.75) range likely reflects the realities on the ground.

## 5.6 RECOMMENDATIONS FOR AGRO-FROOD PROCESSING SECTORS

The palpable difference between the ITVET-only CMI scores and those that include the efforts of the Ministry of Agriculture presents an opportunity that policymakers could utilize for the benefit of the greater industry. The fact that the Agroprocessing Unit (APU) in collaboration with agencies such as BAHA already supplies training in the relevant areas is a useful indicator that at least some of the skills can be offered with available resources. Given that the ROS has already identified the areas in which the ITVET curricula ought to go, the following recommendations focus on factors that could serve to accelerate the pace of successful adaptation and implementation of the benchmark skills in the local market, so as to narrow the mismatch.

**R1—Inter-Agency Collaboration and Resource Sharing:** As a result of the fact that under the Ministry of Agriculture there is already the APU offering training and support services to agroprocessors, it would be useful for the Ministries of Education, with a leading role for the Employment Training and Education Services (ETES), to collaborate and engage in resource-sharing initiatives with the APU. The goal would be to effectively incorporate the requisite training in at least one of the ITVETs via such intra-agency collaboration, and given the proximity to the APU—located in Central Farm, Cayo District—to the Cayo Center for Employment Training (Cayo CET), it is inherently logical to consider the Cayo CET as the model cite for such partnership, with intentions to expand to other centers located in areas that are known for agricultural and agroprocessing activity.

**R2—Address Accessibility via Improved Public Transportation:** Associated with R1 it is quite likely that trainees and students would have to commute to any such facility that is offering the requisite training. This, however, is likely to be stymied due to a weak public transportation system. The Comprehensive National Transportation Master Plan (CNTMP, 2018)<sup>35</sup> is designed to address these constraints; however, in the short term, temporary solutions such as in-program shuttling service could ameliorate this issue until more long-term solutions are realized.

**R3—Find the 'Right' Fit for Public-Private Partnership Model:** Finding the right formula for a successful public-private partnership (PPP) effort, as evidence from other jurisdictions have shown, is not always as clear cut as one would initially anticipate. For instance, as was pointed out by Dunbar (2013, p. 13)<sup>36</sup>, countries such as India experimented with the National Skills Development Corporation (NSDC), which was 51-49% owned by industry and government, respectively. However, even the NSDC faces question of long-term sustainability, especially as it pertains to access to seed financing as well as other necessary conditions for that level of partnership to thrive.

Conversely, Dunbar (2013) pointed out that where the conditions are not satisfied for that sort of PPP, the private sector can be engaged via its contribution towards the *“development of training programmes and learning materials, providing access to specialized equipment, offering on-the-job training and work experience to students, collaborating on the provision of vocational guidance and information and quality assuring the teaching and assessment of learners in training institutes”* (Dunbar, 2013, p. 13).

The primary selling point of the type of contributions listed by Dunbar (2013) is that they are widely available to businesses regardless of their size or formality status. The principal “resources” are the willingness of both employers and TVET institutions to collaborate, as well as the skills of the employers that are “lent” to TVET training efforts. Possibly the most significant feature of the type of input listed is the fact that these can yield short- to medium-term results, which are more readily measurable, and thereby, can make the benefits of PPP conspicuous to those private sector members who may yet be skeptical as to the benefits of Industry-ITVET cooperation.

**R4—Dual-system Apprenticeship:** It is largely impossible for a study on vocational training to not underscore the need for apprenticeship opportunities. This is the case chiefly due to the palpable success stories in those jurisdictions that have established robust apprenticeships (see ILO, 2012)<sup>37</sup>.

The ILO (2012) had highlighted, inter alia, the utility and high success rates of “Dual system apprenticeships”, in which students receive both “in-company training” and “school-based education”. Probably the factor that should receive specific mention is fact that apprenticeships in many European countries are not viewed as an addendum to the education system, but rather it is part of the formal structure. This thinking is likely buttressed by a society-wide understanding of the productivity-enhancing impacts of vocational training (Mupimpila and Narayana, 2009<sup>38</sup>; Sala and Silva, 2011<sup>39</sup>).

Applying this to Belize, there is clearly need to establish, at minimum, pilot initiatives that could be utilized as archetypes that, upon successful implementation, could be used to demonstrate the benefits of private-sector participation to other employers. Consequently, it is advisable that a Dual-system apprenticeship approach be explored with ‘low-hanging fruit’ sectors where collaboration between the vocational institutions and the private sector can be most easily established.





The image shows a blurred office environment with a desk, chair, and window. A large, semi-transparent red overlay covers the right side of the image, serving as a background for the text.

# PART 4

CONCLUDING REMARKS

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## SECTION 6

OVERVIEWING AND CONCLUDING REMARKS

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The objective of the skills/curricula mismatch series of studies conducted by the Belize Chamber of Commerce and Industry (BCCI), in partnership with the International Labour Organization (ILO), is part of an overarching mission to narrow the “gap” between the labour market’s demand and supply sides. As is true for research of this nature, there is no “one way” to conduct a skills mismatch analyses, as qualitative, quantitative and mixed methods approaches have been shown to have their varying levels of utility. Nevertheless, regardless of methodology, the overarching similarity is that there is generally an assessment of what employers need in terms of workers’ skills, and what is being supplied via the educational institutions.

As shown in BCCI (2018)<sup>40</sup>, using the macroeconomic skills mismatch index (SMI), there is evidence to indicate that there is a mismatch. However, the salient weakness of the SMI is that it is unable to specify precisely where the mismatch exists. Even professionals from the Employment Training and Education Services (ETES) who were interviewed for this study would inform that this is a general limitation of most mismatch research.

The by-sector approach taken in this study is designed to fill that particular void, and build on or support other Belize-centric skills gap or employability studies by focusing predominantly on the specific skill areas that are demanded by the private sector compared to that which is supplied by the educational institutions. It is for this reason that throughout this study the phrase “curricula mismatch” analysis has been used synonymously with “skills mismatch”. This is also reinforced by the view that while informal and on-the-job trainings are valuable in their own right, the formal education system is the recognized as the ideal means to achieve the greatest impact.

Therefore, in order to achieve the desired targeted examination of the institutional skills gap, this study adopted the Content and Comparative Analysis methodology as was employed by earlier research works (Mahmood, 2003, and Pasipamire, 2014). In this way, it was possible to identify the relevant skills sets for each industry, as well as have educational professionals or other key stakeholders who also provide trainings to self evaluate their programs as to the degree to which the relevant skills are supplied by their respective institutions.

Unlike Mahood (2003) and Pasipamire (2014), this current study created what has been dubbed as a Curricula Mismatch Index (CMI) that is used to translate the mismatch observed into an easy-to-read index. That is to say, scores less than 0.25 are considered to be reflective of no real gap; scores between 0.25 and 0.50 are deemed as low-to-moderate; 0.50 to 0.75 is considered as moderately high; and any score 0.75 is indicative of a very wide gap.

The results of this current study—which targeted both the tourism and agro-food productive sectors—revealed that the overall services sector has a low-to-moderate skills gap (with CMI score between 0.30 and 0.38 depending on whether or





not weights are utilized). In terms of agro-food processing, when only formal institutions such as the ITVETs are considered, the CMI score of 0.64 represents a moderately high gap that requires urgent attention. However, when other non-education bodies, such as the Ministry of Agriculture's Agroprocessing Unit are incorporated, it is possible for the score to improve to 0.40; thereby, placing it within the same low-to-moderately wide range as tourism.

Nonetheless, an additional point has to be made regarding the aggregated CMI score for the agro-food productive sector, and that is the fact that the demand-side was subjected to a validation survey in which local employers or relevant stakeholders ranked the degree to which certain skills were needed in Belize currently. It has to be noted that if the Regional Occupational Standards, which itself is based on input from regional and international industry professionals, was taken without local "validation", the gap would have been significantly wider under either scenario. This certainly leads to a separate debate as to whether or not the focus is best placed on current domestic needs, or on what is required for companies to remain regionally and internationally competitive.

The summary results outlined above do corroborate the results of other studies, including the World Bank's Enterprise Survey (2010), in which manufacturers were 1.7 times more likely than their services-sector counterparts to identify the lack of an adequately trained workforce as a "major constraint" to doing business. It is also noteworthy that the World Bank (2010) also found that manufacturers were almost three times as likely to offer formal training as opposed to services-sector employers. Keeping in line with the Growth Diagnostic Framework's thinking, the actions by the manufacturers are consistent with an industry beset by a wide skills gap. Conversely, services-sector employers' lower tendency to both offer formal training as well as identify low skills as a "major constraint" supports the low-to-moderate score.

Of course, the aggregate CMIs do mask the individual skill areas' own scores. For example, when looking at Restaurant workers it is possible to see that an area that requires urgent attention is as it pertains to "taking reservations, greeting guests, and in taking orders." This area, when viewed on its own, received a score of approximately 0.75. Consequently, the disaggregated CMI also provides useful insights, thereby, allowing for policymakers to be able to identify areas that are most in need of attention.

To conclude, it is worth reiterating that this study is best employed in tandem with other research works that have taken a broader vantage point of the skills gap situation in Belize. This targeted effort is to be used as a means to help stakeholders and partners such as ETES and BCCI to be able to speak more precisely to those skills that are currently lacking and how best to bridge the more pressing gaps. As a result, this document is to be treated as only an initial starting point in a much larger conversation and collaborative effort between the relevant parties.



# APPENDIX A

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## SECTION A SKILLS MISMATCH ASSESSMENT METHODOLOGY

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*A.1.1 | NEEDED COMPETENCIES (DEMAND SIDE)*

*A.1.2 | CONTENT ANALYSIS OF CURRICULA (SUPPLY SIDE)*

*A.1.3 | RESULTS OF DEMAND AND SUPPLY SIDE ANALYSES: JUXTAPOSITION*

## SECTION A2 CUSTOMIZATION OF METHODOLOGY IN BCCI-ILO STUDY

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*A.2.1 | CUSTOMIZATION VALIDATION OF DEMAND SIDE NEEDED COMPETENCIES*

*A.2.2 | CONTENT ANALYSIS OF CURRICULA AND PROGRAM OFFERINGS*

*A.2.3 | CURRICULUM MISMATCH INDEX*

# APPENDIX B

## SKILLS MISMATCH INDEX

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*B.1.1 | MACROECONOMIC APPROACH: SKILLS MISMATCH METHODOLOGY*

*B.1.2 | RESULTS: BROAD AND NARROW DEFINITIONS OF LABOUR SUPPLY*

## SKILL MISMATCH ASSESSMENT METHODOLOGY

This study seeks to examine one potential source of the gap: the design and learning outcomes associated with curricula or syllabi of relevant academic institutions. To achieve the above, this report will utilize a qualitative Content Analysis methodology (Elo and Kyngas, 2007) and Comparative method as employed in Mahmood (2003), Pasipamire (2014) and Saeed & Rashidi (2017). In both studies, the curricula mismatch analysis (supply-side) was juxtaposed with the labor market demands and work requirements.

### A.1.1 NEED COMPETENCIES (DEMAND SIDE)

To identify the needed competencies, Mahmood (2003) used a list of 75 competencies that was derived from an extensive review of literature for the occupational field covered in the study<sup>16</sup>. These competencies or skills were further categorized into groups. In Mahmood's study, the 75 skills were further classified into six skill groups, which included a group for management competencies; resource development competencies, and general competencies.

This list of grouped competencies were "validated" via a survey of 70 practitioners and employers who indicated their perceptions on the significance (or lack thereof) of each skill on scale from one (1) to nine (9). A score of one (1) signified that the skill was "not needed" and nine (9) for "most needed" (i.e. in demand).

The scores for all respondents were averaged, and those skills that obtained higher averages were kept in the study. See Figure 1 below.

### A.1.2 CONTENT ANALYSIS OF CURRICULA (SUPPLY-SIDE)

On the supply-side, Mahmood (2003) Pasipamire (2014) utilized Content Analysis to examine the curricula or program offerings of universities that provided Graduate level degrees in the area of interest. Seven universities were utilized by Mahmood, whereby only three schools were included in Pasipamire (2014). Nonetheless, the approaches were similar: The curricula were ranked on a three-point scale, with one (1) representing "No Coverage" by the institution's courses as described by the course outlines, two (2) for "Improper Coverage" and three (3) for "Proper Coverage".

### A.1.3 RESULT OF DEMAND- AND SUPPLY-SIDE ANALYSES: JUXTAPOSITION

The results from both the supply-side curricula Content Analysis and the "validation" survey were compared as shown in Figure 1, which shows the results for one category: "Coverage of Management Competencies".

Figure 1 shows a ten-column table, with the second column listing the fifteen competencies that fall within the broader heading of "management competencies". The third column provided the mean score from the respondents regarding the

<sup>16</sup> Both Mahmood (2003) and Pasipamire (2014) analyzed the curricula mismatch with work requirements for Library and Information Science (LIS) professionals.

level of demand for said skill. The closer the score is to the maximum of nine (9), the more necessary or in demand the skill is considered to be. Consequently, “leadership skills”, for example, receiving a score of 8.09, is highly demanded.

The remaining columns S1 through S7 represented the Content Analyses of the various universities’ level or degree of coverage of the relevant skill. Where a review of a course outline revealed that the program did not cover a particular skill at all, it received a score of one (1) for “No Coverage” (NC), and the opposite is true for PC (Proper Coverage).

Therefore, as shown in Figure 1, the Content Analysis and comparative approaches allow for each relevant and required (in-demand) skills to be analyzed in terms of the degree of curricula (mis)match for each university’s course offerings. For instance, despite “Leadership Skill” receiving a score of 8.09—indicating high demand—the seven universities only provided between Improper Coverage (IC) or no coverage at all (NC).

**FIGURE 1** COVERAGE OF MANAGEMENT COMPETENCIES FROM MAHMOOD (2003)

RANK	COMPETENCY	MEAN	S1	S2	S3	S4	S5	S6	S7
1	Leadership Skill	8.09	NC	IC	IC	IC	NC	NC	NC
2	Defining mission, role and objectives of an academic Library	7.79	NC	IC	IC	PC	PC	NC	IC
3	Public relating to ensure community support (Library friends, fun raising, rapport development with faculty and administrators)	7.77	NC	NC	NC	IC	NC	NC	NC
4-5	Preparing Library budgets and their fiscal management	7.71	IC	IC	IC	IC	IC	IC	IC
4-5	Supervising subordinate staff	7.71	PC	PC	PC	PC	IC	PC	PC
6	Working in teams	7.60	NC	PC	PC	NC	NC	NC	NC
7	Marketing and promotion of library service products	7.47	NC	PC	PC	NC	NC	NC	NC
8	Collecting library use and performance data, conducting statistical analysis, and applying it in planning and decision making	7.43	PC	PC	PC	PC	PC	PC	PC
9	Evaluating library performance qualitatively and quantitatively	7.40	NC	PC	PC	IC	IC	IC	IC
10	Managing libraries by developing appropriate organizational structure, communication patterns, and human resource development	7.34	PC	PC	PC	PC	IC	PC	IC
11	Strategic planning (developing long-range plans and translating them into medium range and operational plans)	7.24	NC	IC	IC	NC	NC	NC	NC
12	Organizing extension activities for academic community like displays, talks, seminars, etc.	7.20	NC	NC	NC	NC	NC	NC	NC
13	Time management	7.19	NC	NC	NC	NC	NC	NC	NC
14	Comprehending the role of knowledge management in libraries	7.06	NC	NC	NC	NC	NC	NC	NC
15	Change management by integrating library resource and service with environmental changes	7.00	NC	NC	NC	NC	NC	NC	NC

**NOTES:**  
S1> - School Number  
NC - No Coverage  
IC - Improper Coverage  
PC - Proper Coverage

## SECTION A2 CUSTOMIZATION OF METHODOLOGY IN BCCI-ILO STUDY

### A.2.1 CUSTOMIZATION VALIDATION OF DEMAND SIDE NEEDED COMPETENCIES

Similar to Mahmood (2003)'s and Pasipamire (2014)'s, Validation Surveys were conducted so as to have employers confirm whether the identified skills were indeed needed in Belize. The validation was based on the occupation-specific skills identified in the International Labour Organization (ILO)'s International Standard Classification of Occupations (ISCO 2008)<sup>17</sup>.

The ISCO's substitutability for the survey-based validation process utilized in the referenced studies is found in the following description of the ISCO (p. 3, 2008):

*The International Standard Classification of Occupations 2008 (ISCO-08) provides a system for classifying and aggregating occupational information obtained by means of statistical censuses and surveys, as well as from administrative records. ...ISCO-08 is a four-level hierarchically structured classification that allows all jobs in the world to be classified into 436 unit groups. These groups form the most detailed level of classification structure and are aggregated into 130 minor groups, 43 sub-major groups and 10 major groups, based on their similarity in terms of the skill level and skill specialization required for jobs (Emphasis Added).*

To this end, the identified skills in the ISCO-08, which are already categorized into Major and subordinate groups, are useful for establishing the baseline for in-demand skills. This pre-classification of the groups is useful for the Content Analysis Methodology, especially since there are no "systematic rules for analyzing data". The primary constant is that Content Analysis demands that the words of the text be classified into significantly smaller "content categories" (Weber 1990<sup>18</sup>, Burnard 1996<sup>19</sup>, Elo & Kyngas 2007). The ISCO's Major Group, Sub-Major Groups and Minor Groups already provide this structure.

### A.2.2 CONTENT ANALYSIS OF CURRICULA AND PROGRAM OFFERINGS

For the "supply-side" component, the program offerings for the relevant subject areas from various institutions will be analyzed by lecturers or department heads that are experienced in the relevant fields and with their own programs' expected learning outcomes. In the event members of the educational institution are not available, the analysis will be executed by independent reviewer(s).

Tourism-related skills are associated with the ISCO-08's Skill Level Three or Four (ISCED-97's levels 3 and 4), which corresponds with tertiary education. Agroprocessing<sup>20</sup>, on the other hand, is associated with secondary and post-secondary training (at Skill Level Two). As a result, emphasis will be given to institutions that provide courses and programs at the relevant skill levels for the respective occupations. The units of analysis (Elo & Kyngas, 2007) are the learning outcomes and the skills and competencies to be derived from completing a program of study.

<sup>17</sup> International Labour Organization (2008). *International Standard Classification of Occupations (ISCO): ISCO-08*. Geneva: ILO.

<sup>18</sup> Weber R.P. (1990) *Qualitative Research: Analysis Types and Software Tools*. Palmer PA, Bristol.

<sup>19</sup> Burnard P. (1996) *Teaching the analysis of textual data: an experiential approach*. *Nurse Education Today* 16, 278-281.

<sup>20</sup> NOTE: This study makes use of the National Training Agency's Regional Occupational Standards that form the basis of the Caricom Vocational Qualifications (CVOs).



### A.2.3 CURRICULA MISMATCH INDEX

Given that the maximum and minimum score possible for both the demand and supply responses is three and one, respectively, it is possible to calculate the Curricula Mismatch Index (CMI) as follows:

$$\text{Cumulative CMI score} = \frac{1}{n} \sum_i^n \frac{(D_i - S_i)2}{(D_m - S_l)2}$$

Where D is the Demand-side score for skill i, and S is the supply-side score for skill i.  $D_m$  is the maximum score possible for the demand-side score, and  $S_l$  is the lowest score possible for the supply side. In this way, the CMI allows for index scores from zero (0) to one (1), with the former representing “No Skills Gap”, and the former indicating maximum “skills gap”. Consequently, the CMI can be interpreted as outlined in Table A.2.3 below.

SKILLS MISMATCH INDEX	INTERPRETATION	COMMENTS
0 - 0.25	No Gap	There is “No Gap” between demand and supply
0.25 - 0.5	Low (narrow) Gap	There is a moderate but manageable Gap
0.5 - 0.75	Moderately Wide Gap	There is a significant gap that requires urgent attention
0.75 - 1	Very Wide Gap	There is a very high gap that indicates that the skill is not supplied at all.

## APPENDIX B: SKILLS MISMATCH INDEX

### SECTION 1 METHODOLOGY

#### B1.1 MACROECONOMICS APPROACH: SKILL MISMATCH METHODOLOGY

The approach adopted in this study is based on that utilized by Estevão and Tsounta (2011), Zimmer (2012) and ECB (2012). Both utilized the Skill Mismatch Index (SMI) as a tool to measure the macroeconomic trends for mismatch by comparing the share of the type of qualifications found in the labour supply (measured either by the working-age population or by the labour force) to the demand for those qualifications (proxied by the number of persons employed with those qualifications).

The formula used to calculate the skill mismatch index is as follows:

$$SMI_{it} = \sum_{j=1}^3 (Supply_{ijt} - Demand_{ijt})^2$$

Where Supply is the percentage of the working-age population that possess education at level j in District i at time t. In other words, the SMI is measured via the sum of the squared differences of the distribution of the skill levels in the labour supply and the said skill levels for labour demand.

The education level j makes references to low-, medium-, and highly-skilled workers that are measured using the Statistical Institute of Belize (SIB)’s data on number of persons in both the supply- and demand-side who possess primary, secondary or tertiary education as the highest level of training achieved.

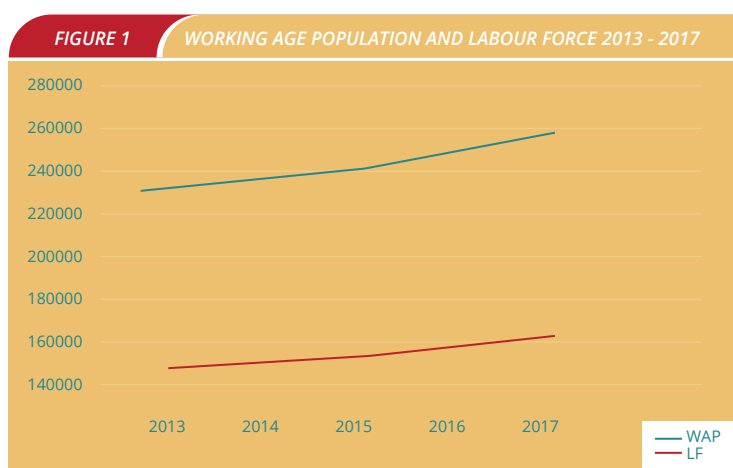
## B1.2 GEOGRAPHICAL MOBILITY

Following the approach utilized by ECB (2012), this study also looks at whether or not there is a mobility problem by comparing the skill distribution at the aggregated country level to the weighted average of the district-level SMIs. The fundamental premise is that if mismatch indices are homogeneous across all six districts in Belize the SMIs should be fairly identical in their structures. However, if there is significant divergence, the weighted index would be higher than the aggregate (unweighted) index. In such an instance a weighted, disaggregated SMI would be indicative of imbalance across districts triggered by an oversupply of skills in one district that is undersupplied in another.

## B1.3 DEFINITIONS OF LABOUR SUPPLY: DATA USAGE

In utilizing the SMI it is important to establish which definition of labour supply is applicable. Literature on this topic has shown that the definition can either be looked at from a “broad” perspective, or a more “narrow” view.

The broad definition—which utilizes the working-age population (see H. Zimmer, 2012)—looks at the entire pool of available workers, including those who would have been classified as discouraged workers. The data currently available for Belize does not allow for the identification of persons who constitute that latter category; therefore, for this study, working-age population retains a lot of meaning as it can speak to the overall health of the labour market.



On average, between 2013 and 2017 the working age population increased at an average of about 6,600 persons per year, while the labour force is about 4050 persons during that time for a 61% New Entrants Labour Force Participation Rate (New LFPR). The New LFPR is only 3 percentage points lower than the standard Labour Force Participation Rate (LFPR) of about 64%.

The labour force, on the other hand, is utilized as the “narrower” definition of the labour supply. However, unlike working-age population, it only includes the number of persons employed and those actively looking for work (unemployed). Discouraged workers, for example, are excluded, and thereby presents the risk of understating the real number of persons that would have otherwise opted for work had the economy been more robust.

The relationship between working-age population and labour force is asymmetrical in nature. Fundamentally, everyone who enters the labour force numbers is simultaneously a part of the former. But not everyone who is newly numbered in the working-age population is equally factored into the labour force, unless said person obtains or actively seeks work.

Interestingly, the labour force may be more susceptible to sharp changes depending on the business cycle. During a recession, it is possible that members of the working-age population who would have otherwise remained outside the labour force would be forced to accept part- or full-time work to compensate for depressed income sources that would have otherwise been sufficient to maintain consumption levels.

For instance, it is noteworthy that the share of new labour force members to new entrants to the working-age population was the highest between 2015 and 2016, with the latter being a recession year. In 2015, new Labour-Force-to-Working-Age Population ratio was 50%, and 2016 it increased by 20 percentage points. Interestingly, as the economy recovered in 2017, the rate decelerated by 5 percentage points<sup>21</sup> (see Column G in Table 1).

**TABLE 1** LABOUR FORCE AND WORKING-AGE POPULATION, 2013-2017

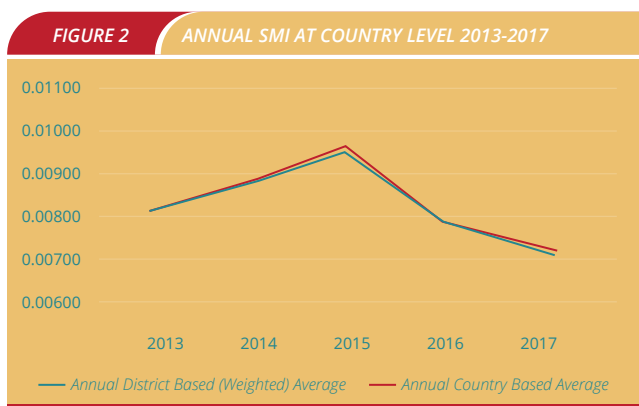
YEARS	WAP	LF	LFP RATE	CHANGE IN WAP	CHANGE IN LF	SHARE OF NEW LF NEW PF
2013	230311	148736	64.58%			
2014	237241	151317	63.78%	6930	2581	37%
2015	242015	153689	63.50%	4774	2372	50%
2016	250488	159648	63.73%	8473	5959	70%
2017	256705	164935	64.25%	6217	5286	85%

It is, therefore, possible to suggest that labour force may correspond more closely to economic cycles, and would serve as an appropriate labour supply proxy when tested against economic growth. However, if the objective is to simply analyze the pool of available workers regardless of their current disposition (i.e. whether as discouraged workers or otherwise), working-age population may be more useful.

Nonetheless, while this study places greater emphasis on the working-age population as the measure for labour supply, in Section 3.2 a comparison is made between the results under both definitions.

## B2 RESULTS: BROAD AND NARROW DEFINITIONS OF LABOUR SUPPLY

### B2.1 BROAD DEFINITION SKILLS MISMATCH: ANNUAL AT COUNTRY LEVEL



The “Broad Definition” Skills Mismatch Index (SMI) at the country level shows that for the last three years (2015 to 2017) there has been an overall decline in the SMI, albeit at a decreasing rate between the latter two years. This suggests that in more recent times the skills gap, on average, has been narrowing.

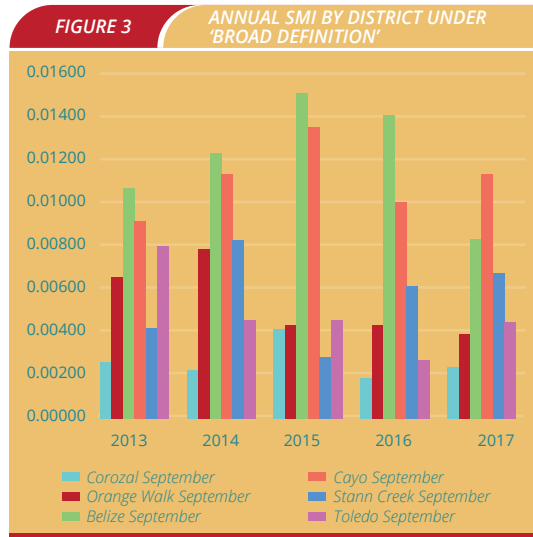
Given the limited data points, it is difficult to say whether Figure 2 is capturing a portion of a larger cyclical trend or is reflecting the results of education policy interventions by public bodies within the ambit of the Ministry of Education and of the Belize Training and Employment Center (BTEC).

Nonetheless, it does indicate that, under the broad definition, the gap between the labour supply and labour demand has been reducing.

This overall trend, however, masks the variations that can be seen at the district levels (see Figure 3). Belize District, for example, has demonstrated the sharpest increases and, subsequent, decreases relative to other districts.

Conversely, the Cayo, Stann Creek and Toledo Districts demonstrated moderate increases within the last two years.

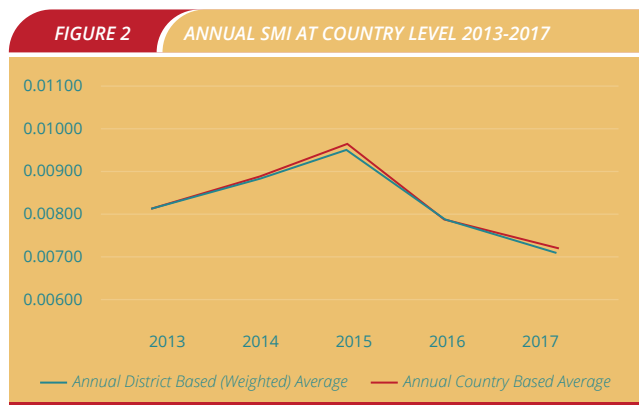
<sup>21</sup> Note: Given the limited data points, it is not possible for this to be treated conclusively as opposed to a mere coincidence.



Orange Walk has remained fairly consistent since 2015, and Corozal shows a fairly small uptick between 2016 and 2017.

In short, the overall downward trend shown in Figure 2 for the last three years for which data is available is largely the result of the sharp decrease by the Belize District. When the weighted average is calculated without the Belize District included (see Figure 4), the downward trend is halted in 2016.

## B2.2 REMOVING THE BELIZE DISTRICT



The difference between the Annual SMI based on the District Averages with and without the Belize District included suggests that greater emphasis has been placed on narrowing the distance between the labour market's supply- and demand-side in the latter.

However, with only the short number of years of available data, it is a bit too soon to make many definitive statements about the state of mismatch. Additionally, one has to also be judicious in the interpretation of these results given that there may be volatility in the survey data.

Nonetheless, looked at from the vantage point of each district, it provides at least a first test as to where additional effort ought to be given so as to ensure that all six districts are able to also see significant narrowing of the distribution between supply and demand of skills.

## B2.3 GEOGRAPHICAL MOBILITY

Now, we have already seen that there appears to be much greater emphasis placed on the reduction of the skills mismatch in the Belize District as compared to the other five districts. Additionally, as was discussed above, the removal of the Belize District data has a profound effect on the national outcome, leading to an overall increase as opposed to a decline.

Nonetheless, it is useful to also ask whether the skill mismatch is due to poor labour pool mobility. A useful way to assess this is look at the difference between the disaggregated, weighted-district-based SMIs and that of the aggregated country-based SMI.

The former is a weighted average of each district's SMI, while the latter is the SMI calculated using the country level (aggregated) information for both the supply- and demand-side.

Ideally, if the distribution of skills and jobs are even throughout each district, it is expected that the structure of both the aggregated and weighted-district-level SMIs would be fairly identical or close to each other. As described in ECB (2012, p. 74):

*"If the type of mismatches is more or less homogeneous across countries, both SMIs will deliver a similar message. But if there is a lack of certain skills in some [districts], compensated by an excess in others, then the [weighted-disaggregated] SMI will be higher than the former".*

As was shown in Figure 2 above, the difference between these indices is minimal, indicating very little divergence between the two. This would imply that the skills mismatch in Belize is more attributable to qualifications as opposed to an issue of labour mobility. However, this included the Belize District.

If the same is repeated, but without the Belize District, the weighted average SMI is shown in Figure 4 to be higher than the aggregated (unweighted) SMI. Following ECB (2012)'s reasoning, then, this would indicate labour mobility issues, which is captured "by the distance between SMIs computed at the [country] and [district] levels."

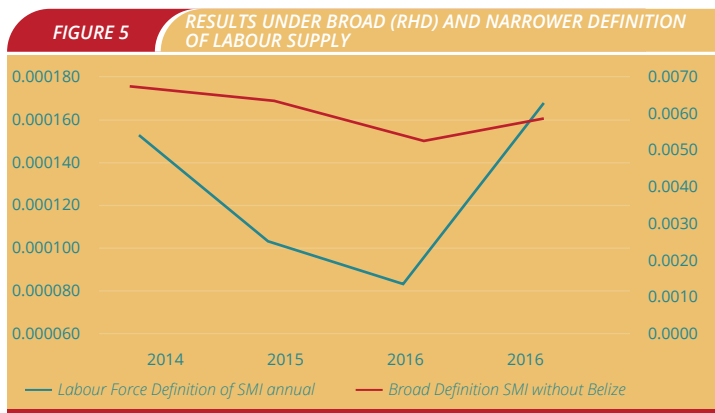
This finding would, then, suggest that appropriate policies to address labour mobility ought to also be prioritized. These include, but not limited to, improving the public transportation systems throughout the country. It is possible to also assume that the Belize District's narrowing SMI is a result of easier access to public transportation to said district and the commercial capital.

## B3 NARROWER DEFINITION OF LABOUR SUPPLY

Thus far, the discussion has revolved around the broader definition of labour supply; however, as was mentioned in Section 2, there are multiple ways to define the same. Consequently, it is deemed prudent to provide a comparison of both definitions when applied to the available data for Belize.

Figure 5 depicts the result of said comparison, with both the "Broad Definition" without the Belize District and the "Narrower" definition. Both methods identify an overall downward trajectory, which was halted in 2016, and reversed in 2017.

However, the decreases and subsequent reversal are sharper and more pronounced in the labour force-based SMI calculations. Nevertheless, as noted earlier, the limited data points make it difficult to come to any definitive conclusions regarding the behavior of the SMI for Belize over the long run.



Interestingly, the “narrower” definition of labour supply demonstrates a widening of the skills mismatch between 2016 and 2017. This is largely due to the large number of persons who joined the labour force in those years. Given the nature of the SMI formula which squares the difference of the skills distribution between the labour force (supply-side) and the number of persons employed (demand-side), the widening gap suggests that while more persons joined the labour force this was not necessarily reflected proportionately in the number of persons hired.

Looked at conjointly with the “broad definition” approach, the fact that working-age population produces a downward slope when Belize is included provides some evidence that a higher number of new hires were in the Belize District—which houses the commercial capital, Belize City (see Table 2).

**TABLE 2** CHANGES IN LABOUR FORCE AND NEW HIRES AS OF APRIL 2017

	LABOUR FORCE	NEW ENTRANCE	EMPLOYED	NEW HIRES	SHARE OF NEW LF ENTRANCE NEW HIRES
<b>BELIZE DISTRICT</b>					
2016	53086		448007		
2017	57871	4785	51589	3582	74%
<b>COROZAL DISTRICT</b>					
2016	19118		18242		
2017	20349	1231	18810	568	46%
<b>ORANGE WALK TOWN</b>					
2016	20610		19131		
2017	21346	736	19556	425	58%
<b>CAYO DISTRICT</b>					
2016	36753		33810		
2017	35678	(1075)	33183	(627)	Decreased
<b>STANN CREEK DISTRICT</b>					
2016	17536		15671		
2017	16874	(662)	14663	(1009)	Decreased
<b>TOLEDO DISTRICT</b>					
2016	12545		12057		
2017	12816	271	12312	255	94%
	<b>NET INCREASE (DECREASE)</b>	<b>5286</b>		<b>3194</b>	<b>60%</b>

Between 2016 and 2017, for example, when the new hires are presented as a ratio of the total new entrants into the labour force, the Belize District demonstrates the second highest rate of 75%. That is to say, of the new entrants into the labour force, two thirds of them are hired.

While Toledo displays a Hires-To- Entrants rate of 94%, the actual quantity is a fraction of the total numbers shown for the Belize District, thereby, it has less of an impact. All other districts’ increases are less than 60%, with two districts (Stann Creek and Cayo Districts) showing reductions in both the demand- and supply-side.

Furthermore, in April 2017, of the 5286 net increase in the labour force, the Belize District alone accounts for more than 90% of this increase (4785 new labour force entrants). Consequently, whether the narrow or broad definition is utilized, the treatment of the Belize District remains a sensitive matter.

## B4 CONCLUDING

The preceding section's results are based on a measurement of skill mismatches based on the highest level of education obtained by those surveyed. Naturally, there are several limitations to this approach, as it does not allow us to look at variables such as the area of study so as to identify whether there is horizontal mismatch; it does not allow us to examine whether there is vertical mismatch; and it certainly cannot take into account skills gained via on-the-job trainings or from experience. Additionally, it is unable to capture much information about the so-called soft skills, which many contemporary employers indicate as high priority.

Those variables and the like are better captured at the micro level by more qualitative methods, including surveys of both employers and employees. To that end, the SMI is a useful tool that should be utilized as complementary to other qualitative approaches.

That having been said, the macro vantage point provided by the skill mismatch index is useful in the sense that it provides policy makers with a tool that serves as a type of signal as to where education policies are successful versus where further interventions may be warranted. Additionally, the SMI—being a composite index—is also usable as an independent variable in other quantitative economic research as was done by Estevão and Tsounta (2011) and ECB (2012).

Speaking more specifically to the SMI itself, both the aggregated and disaggregated-weighted annual indices demonstrate an overall downward trend. However, that downward trend was largely due to the heavy influence of the Belize District which houses the country's commercial capital and the largest concentration of workers in the country.

When the SMI—calculated under the “broad” definition—excludes the Belize district, however, it shows that the other five districts were not as fortunate, with several district-level SMIs demonstrating a widening of the skills gap. The fact that the Belize District's inclusion creates such complete change in trajectory indicates that this district has a higher new-hire-to-new-labour-force-entrants ratio, an assumption that is supported by Table 2.

Given that this study prioritizes the broad definition, the general conclusion is that overall there has been a reduction in the skills mismatch. However, this finding is accompanied by the caveat that this “narrowing” of the gap is mostly the result of the sharp improvements found in the Belize District, which accounts for one-third of Belize's workforce. Therefore, it is also advised that policy makers do not overlook the challenges in the remaining districts, which demonstrate either a constant or widening skills gap.

This study also looked at the aggregated and weighted-disaggregated SMIs as a means to identify whether or not the skill mismatch is due to qualifications or to geographical labour mobility. Under the “broad definition” inclusive of the Belize District, it was found that labour mobility is quite likely not a major concern, because it is fairly easy to travel to the Belize District.

However, by excluding the Belize District, there are indications that labour mobility may be a contributing factor to the skill mismatch in the remaining districts. This corroborates the already identified need to improve Belize's public transportation network (see McNish and Granada, 2013)<sup>41</sup>.

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