



Updating Anker Methodology Living Wage Estimates: Methodological Issues and Guidelines

by

**Kabeer Dawani, Asad Sayeed, Richard
Anker and Martha Anker**

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1. Introduction

The Global Living Wage Coalition (GLWC), comprised of several standard setting organizations, in partnership with ISEAL Alliance and Richard and Martha Anker, has adopted the Anker methodology (Anker and Anker, 2017) for estimating living wages. The GLWC has also been responsible for estimating living wages for more than 30 locations across the globe. A key feature of the Anker methodology, as it is known, is that it estimates the remuneration needed for a basic but decent standard of living for a particular location and point in time. This means that “it is necessary for a living wage to be updated for inflation over time so that it retains its purchasing power and remains sufficient to support a basic but decent living standard” (Anker and Anker 2017, 339). It recommends that living wage estimates are updated every year to account for inflation and any changes in laws as regards income tax and mandatory deductions from pay (ibid).¹

It is necessary to update both the net and gross living wage. The gross living wage is of key importance to employers because this is how much money they would need to pay out each month if they paid their workers a living wage. It is thus important to take into account income taxes and mandatory deductions from pay. Payroll deductions are common and often substantial (e.g. social security taxes and provident fund are 9.34% in Ecuador, 10.88% in Mexico, 10.5% in Vietnam and 8% in Sri Lanka); in addition, income taxes can sometimes be substantial even at relatively low rates of pay. In Malawi, for example, the gap to a living wage is large in part because the marginal income tax rate is 30% on income above MKL 35,000 per month (approximately USD 47 as of December 2018). In Ethiopia, the gross living wage fell slightly between July 2015 and July 2016 due to a change in tax laws – despite approximately 6 % inflation.

The present guidelines explain how to update Anker methodology living wage benchmarks to future years, and are an extension of recommendations in Chapter 20 of Anker and Anker (2017). These guidelines highlight potential methodological issues one could face in updating living wage benchmarks, and suggest solutions. To test out these guidelines and to make them easier to understand, we updated Anker methodology living wage benchmark estimates for four countries of varied contexts – namely Brazil, India, Pakistan, and South Africa – and we draw on these updates to provide examples of how to update living wage and living expenses benchmark estimates. These four living wage update reports are appended in Annex 1 and 4.

Please note that these guidelines focus to a large extent on the first time that living wage and living expenses benchmarks for a particular location are updated. It is expected that updates for future years will be easier and quicker, because many of the issues pertaining to a specific

¹ Please note that Anker and Anker (2017) recommend updating a living wage benchmark every 5-10 years for advances in living standards as a consequence of economic development. This report does not cover that aspect.

context (such as inflation data availability and choices of a CPI series) will have been resolved in the first update.

1.1 Including Family Living Expense Benchmarks in Living Wage Updates

In the Anker methodology, the process of estimating a living wage begins by first estimating the living expenses for a decent but basic standard of living for a reference size family. The family living expenses benchmark estimate is then used to arrive at the net living wage by dividing expenses by the typical number of full-time workers per couple.

However, the living expenses estimate, in addition to being used to estimate a living wage benchmark for a worker, can also be used to arrive at a living income. Living income, as defined by the Living Income Community of Practice, is “the net annual income required for a household in a particular place to afford a decent standard of living for all members of that household”.² As is evident from this definition, both the Anker living wage and living income share the standard of living that is benchmarked for a family.

Accordingly, during the process of updating a living wage, we also update family living expenses. The idea is that by updating the family living expenses annually, those stakeholders interested in estimating a living income can utilize the updated living expenses estimate. This estimate can be updated using the same inflation rate used to update the living wage update, and so does not require additional work. Note that mandatory payroll deductions and income taxes are not relevant for updating living expenses.

1.2 Templates for Update Reports and Documentation of Sources

This paper, in addition to providing guidelines for updating living wage benchmarks, also provides templates for (i) an update report (Annex 1), and (ii) documenting sources of information for inflation, tax rules and rates, mandatory deductions from payroll, and exchange rates (Annex 2). It is important to use the template to ensure consistency and transparency across countries and years. Moreover, by documenting sources of information in detail, this also facilitates updating living wage and living expense estimates in subsequent years, because which data to use would already have been decided on.

1.3 Technical Expertise Required for Updating Benchmarks

The process to update living wage and living expenses requires some technical expertise. This means that updates should be done by researchers who are familiar with the Anker methodology, and who have facility using and interpreting inflation data. Ideally, the researcher is also familiar with the country context.

² <https://www.living-income.com/the-concept>

2. How to Update Living Wage and Living Expenses Benchmarks

Updating an Anker methodology living wage benchmark requires collecting information from several different sources. This section outlines in a step-by-step manner which information needs to be collected and how to use this information to update a living wage benchmark.

2.1 Information from Original Living Wage Report

The first step to updating a living wage benchmark is to read the living wage report to understand the context of the living wage benchmark. Researchers should pay particular attention to how income taxes, payroll taxes, and other mandatory deductions from pay are assessed.

The next step is to extract the following information from the original living wage report:

- Living expenses for a decent but basic standard of living for a reference size family
- Net living wage
- Income taxes and other mandatory payroll deductions (amounts, tax rules and rates, and sources when provided)
- Gross living wage (this should be the sum of the net living wage plus applicable income taxes and mandatory payroll deductions)

Most recent GLWC living wage reports follow a standardized outline, and include a summary table and a key assumptions table towards the end of the report. Therefore, most of the required information from a living wage report can quickly be obtained from these tables. However, it is also necessary to carefully read the section of a living wage report concerned with taxes and deductions from pay and the estimation of gross living wage which explains in detail how payroll taxes and income taxes are assessed. For example, whether in kind benefits and which cash bonuses and forms of remuneration are subject to tax.

It is important to pay particular attention to sections of a living wage report which (i) describe the context for which the living wage was estimated (such as whether it was for urban or rural areas, or for a particular city or province, etc.) and, (ii) indicate income taxes, mandatory deductions from pay, and data sources for these. For example, for Pakistan (Sayeed and Dawani 2017), the living wage was estimated separately for urban and rural Sialkot in Punjab Province. There was no income tax due on a living wage and the only mandatory deduction from pay was for old-age benefits for urban Sialkot. No information was provided on data sources in the Pakistan living wage report for either inflation or mandatory deductions, so there was nothing of note there.

2.2 Inflation Data

The net living wage in an original living wage report is increased by the amount of inflation between the study month and the same month in each subsequent year – using the year-on-year

inflation rate (for the study month³). Use of annual year-on-year inflation rates implicitly takes seasonality in prices into account (ILO 2004) and for this reason it is the preferred approach for updating a living wage every year.⁴

We outline below which inflation index and series to use, likely sources for these data, and the documentation procedure to use for a living wage update report.

2.2.1 Inflation Index to Use: Consumer Price Index (CPI)

It is recommended to use the inflation data produced and reported by a country's national statistical office or ministry. Choosing an inflation index is, however, not always straightforward, because countries often report multiple indexes every month. The Pakistan Bureau of Statistics, for example, publishes the Consumer Price Index (CPI) and the Sensitive Price Index (SPI) every month.

In line with recommendations in Anker and Anker (2017), we recommended that CPI be used for all updates. CPI is almost unanimously accepted as the standard measure for inflation by stakeholders in a country (such as firms, unions, workers, government, NGOs, and civil society) as well as by international buyers, companies and organizations across the globe. Using CPI to update a living wage benchmark, will, therefore, be accepted by stakeholders and others. Since the CPI is a global standard, it also enables us to have a uniform update process across countries.

2.2.2 Where to find CPI data: National statistical office website usually

As mentioned above, the CPI is usually published by government (usually by the national statistical office). They have the reach, credibility and resources to carry out the needed price surveys. This was the case for all four of the countries where we have updated the GLWC living wage estimate. Therefore, we recommend using CPI data from a country's national statistical office or ministry website or publications. For example, the government department responsible for publishing CPI in South Africa is 'Statistics South Africa', and they publish CPI data on their website: www.statssa.co.za.

2.2.3 Type of CPI Series to Use

It is safe to say that almost all countries report a CPI every month in order to determine inflation – but there may be several different types of CPI series published, at different levels of geographic or administrative disaggregation, or for specific types of workers. In India, for instance, besides the national CPI, the Ministry of Statistics and Programme Implementation also publishes separate CPI for each state and for rural and urban areas. Furthermore, the Ministry of Labour and Employment, Government of India publishes a CPI for Industrial Workers. In South

³ The study month is the month that the data was collected and living wage estimated for.

⁴ For a particular conference, workshop, trade show, collective bargaining negotiation, or some other event, the living wage benchmark estimate may need to be updated to a particular non-study month. In such a case, the year-on-year inflation rate to the study month cannot be used. In this situation, it may or may not be reasonable to use reported CPI index inflation values, depending on the extent to which there is seasonal variation in inflation. Our recommended approach to account for this situation is discussed and outlined in Annex 3.

Africa, the government statistical office reports the CPI by income decile. It is common for countries to report separate national, rural and urban CPI.

It is necessary to decide which of the available potential CPI options to use. The principle we recommend to use is the CPI that is the most representative for workers and the area for which the living wage benchmark was estimated. In general, the greater the disaggregation of the CPI, the better it will reflect the actual inflation workers face – but this guidance must be balanced against the possibility that a city-specific or region-specific CPI might not be sufficiently robust to use. To understand and determine which CPI is the most representative, information from at least the following three sources should be gathered:

(a) **Geographic area of the original living wage study and the type of workers covered.** This, as was pointed out in Section 2.1, is indicated in the original country living wage report.

(b) **Types of geographic areas covered by the CPI price survey.** This information is usually available in the methodology documents for the CPI published by the agency responsible for reporting CPI index data.

(c) **Number of markets covered in a geographic area and stability of CPI values for geographic area compared to CPI values for larger area including for country.** CPI values for a specific geographic area could be relatively unstable, possibly due to a fairly small number of markets covered when collecting price data. Such CPI series should not be used despite their attraction of being location-specific. This requires an expert's judgement.

2.2.4 Examples

These three sets of information, then, can be used to guide which CPI series to use for a living wage update. We illustrate how to choose a CPI series by using the examples of India, Pakistan, and Ethiopia and (a), (b) and (c) information categories noted above.

India example

(a) The original living wage benchmark for India was for the garment and textile sector in Tiruppur City in Tamil Nadu State (Barge et al. 2018). This is a city in southern India with around 444,444 inhabitants in 2011.

(b) The Government of India's Ministry of Statistics and Programme Implementation collects monthly price data from 1,181 village markets for rural prices and 1,114 markets distributed over 310 towns for urban prices.⁵ These prices are used to compute the rural,

⁵ The detailed sampling methodology is published in a 2015 report titled "Consumer Price Index: Changes in the Revised Series" and is available on the Ministry of Statistics and Programme Implementation's website and at the following link: http://164.100.34.62:8080/PDFFile/CPI-Changes_in_the_Revised_Series.pdf.

urban and combined Consumer Price Index (CPI) each month for each state in India and for the country as a whole, using 2012 as the base year. There are a sufficient number of markets for these price data to be representative for those areas.

In addition, the federal government's Ministry of Labour and Employment reports a CPI for Industrial Workers (CPI-IW) and collects price data from 78 "industrially important centres across the country".⁶ Within Tamil Nadu – our state of interest – these centers are: Chennai, Coimbatore, Coonoor, Madurai, Salem, and Tiruchirappally. All of these urban centers are bigger than Tiruppur City in terms of population, except for Coonoor, which is much smaller. It is therefore difficult to compare any of them with Tiruppur due to the differences in size. This we feel makes CPI-IW inappropriate for Tiruppur.

Having ruled CPI-IW out, we therefore decided to use the urban CPI for Tamil Nadu, as we feel that is the most relevant for workers in Tiruppur City.

Pakistan example

(a) The living wage benchmark for Pakistan was estimated for Sialkot (urban and rural areas separately). Sialkot is a city in Punjab, Pakistan with a population of around 592,000 in 2017.

(b) The Pakistan Bureau of Statistics surveys 76 markets in 40 urban centers across Pakistan; however, of these, only one is in Sialkot. This is too small a sample to use to estimate inflation for urban Sialkot. Moreover, there is no separate price survey for rural areas or for the province. Therefore, there was no option but to use the national CPI to update the living wage benchmark estimates for urban and rural Sialkot.

Ethiopia example

(a) The living wage benchmark for Ethiopia was estimated for Ziway, a small town with a population of around 44,000 in 2007 approximately 167 kilometers from Addis Ababa. The original living wage study was done in 2015.

(b) and (c) The Ethiopia National Statistical Agency publishes CPI for 11 regional states as well as for the country as a whole.⁷ Price data comes from a retail market survey of 119 'purposively selected' urban market places around the country. This means that prices are for urban areas only and there are not many markets surveyed in each regional state. For this reason, it is not surprising that regional state CPI inflation rates vary considerably compared to the national average inflation rate. For example, while the year-on-year inflation rate for December 2016 for Ethiopia was 6.7%, it was 1.9%

⁶ "Consumer Price Index Numbers for Industrial Workers – Annual Report 2016". Ministry of Labour and Employment, Government of India. It is available at:

http://www.labourbureaunew.gov.in/UserContent/CPI_IW_AR_2016.pdf?pr_id=uSUuM1lby%2b4%3d.

⁷ <http://www.csa.gov.et/price-indices/consumer-price-index/category/349-cpi-2018#>

for Oromia (regional state in which Ziway is located), 0.8% for Addis Abba, 9.4% for Amhara, and 10.0% for Afar. In contrast, regional differences in the year-on-year inflation rate for May 2018 were quite different as the inflation rate for Oromia (13.0%) was close to the 13.7% national average whereas the inflation rate for Afar and Addis Abba were lower at 11.1% and 11.7% respectively. Therefore, we decided to use national inflation rate data rather than inflation rate data for the Oromia regional state.

2.3 Documenting Sources

When carrying out a living wage update, it is important to document the available information on the various types of price indexes available, their levels of disaggregation and representativeness, and various other details (such as the base year they use) along with their sources. This is important for transparency and credibility of the living wage update. This is also important as it will enable future living wage updates in subsequent years to be streamlined and done quicker and more easily. Annex 2 provides a suggested template for recording technical details on available inflation rate data, best CPI series to use for living wage updates, information on mandatory deductions from pay, and exchange rates to use to convert to USD. In general, the more detail the documentation of a living wage update, the easier it will be to carry out successive annual living wage updates.

3. Increasing Net Living Wage and Living Expenses by Inflation

Once the most appropriate inflation series and rate has been identified, living expenses and net living wage can now be updated/increased each year using the following formula (after one has identified (i) the net living wage from the original country report (time t here) and (ii) the inflation index to use, and therefore the following year-on-year inflation rate has been determined). For simplicity we only refer to net living wage in the formula, but the same applies to living expenses for a decent standard of living for a reference size family.

$$\begin{aligned} & \textit{Updated net living wage in time } t + 12 \textit{ months} \\ & = \textit{Net living wage in time } t \times (1 + \textit{inflation rate in time } t + 12 \textit{ months}) \end{aligned}$$

where time t = study month and study year

Although we suggest that the net living wage be updated each year by year-on-year inflation rates, it is also possible to update the net living wage for several years at a time or for a number of months other than 12 months (provided you have taken seasonality into account as discussed in Annex 3) as follows:

$$\begin{aligned} & \textit{Updated net living wage in time } t + n \textit{ months} \\ & = \textit{Net living wage in time } t \times (1 + \textit{inflation rate in time } t + n \textit{ months}) \end{aligned}$$

where time $t = \text{study month and study year}$

We demonstrate how this should be done using the example of Brazil. The net living wage in the coffee producing region of Southern and Southwestern Minas Gerais State in Brazil was R\$1,267 in July 2015 (Barbosa et al. 2016). To update this living wage we used national INPC data reported by the Brazilian Institute of Geography and Statistics (IBGE).⁸ Discussion and explanation of available inflation rate series and data for Brazil is provided in Annex 1. A simple calculation determines the percentage increase in the INPC index between the two time periods. The inflation rate between July 2015 and July 2018 was 15.87%.

We can now plug the values in columns (1) and (4) into our formula:

$$\text{Net living wage in July 2018} = 1,267 \times \left(1 + \frac{15.87}{100}\right) = 1,468$$

Solving this equation yields the result in column (5) for the net living wage updated to July 2018, and this is R\$ 1,468.

Table 1: Updating net living wage in Brazil from July 2015 to July 2018 (in Brazilian Real)

Net living wage in July 2015 (study month and year) (1)	INPC – July 2015 (2)	INPC – July 2018 (3)	Inflation rate between July 2015 and July 2018 (4)	Net living wage in July 2018 (5)
1,267	4,475.17	5,185.48	15.87%	1,468

4. Potential Issue: Anomalies in Inflation in Particular Months⁹

When updating a living wage or living expense benchmark for inflation, the inflation rate may be anomalous in a particular month due to exogenous shocks in prices for some commodities in the sample basket of goods and services used to calculate CPI. This might occur due to a natural disaster that negatively affects the supply of a crop and so leads to a sharp increase in prices for a month or so before prices go back to equilibrium. Another example of this is petroleum prices,

⁸ The inflation data are available on the IBGE’s website and can be accessed here:

https://ww2.ibge.gov.br/english/estatistica/indicadores/precos/inpc_ipca/defaultseriesHist.shtm

⁹ When updating the living wage benchmark to a non-study month – for instance, from June 2017 to March 2018 – one must look out for another potential issue, which is of seasonality. We explain how to address this in a separate note in Annex 3.

which can be quite volatile from month to month. Unlike seasonality, this issue is sometimes seen in year-on-year inflation rates, and it is therefore important to account for this when necessary when updating a net living wage.

Our suggested way of dealing with an anomalous month as regards inflation would be to average annual year-on-year inflation rate for the study month with year-on-year inflation rates for month before and after the anomalous month, so that the increase in inflation over this period is averaged out. For example, when updating a living wage from February 2017 to February 2018, if the inflation rate for February 2018 is abnormally high compared to the inflation rates for January and March 2018 (i.e. the months before and after February 2018), we suggest taking the average of year-on-year inflation rates for January 2018, February 2018, and March 2018 in this example so that the anomalous month (February 2018) would not greatly affect the updated living wage.

To illustrate, if the year-on-year inflation rates for January 2018, February 2018, and March 2018 were 3%, 5% and 3.5% respectively, we would use the average of these three rates to update the living wage. This works out to 3.83%.

5. Taxes and Mandatory Deductions

In addition to inflation, which affects the purchasing power of a worker's wage, income taxes and other mandatory payroll deductions (such as social security taxes and union dues) reduce take home pay and therefore affect the gross living wage. For this reason, it is necessary to assess what income taxes and mandatory payroll deductions are applicable for workers earning a living wage. This means that it is necessary to determine whether there have been any changes in the tax laws and regulations since the original living wage was estimated. Tax rates, tax brackets, exemption from tax, tax deductions, and other obligatory deductions can change and so one cannot simply increase the gross living wage by inflation without accounting for these taxes.

Thus, when reading the original country living wage report (Section 2.1), it is vital to pay close attention to the applicable taxes and mandatory payroll deductions at that time. This includes details on the rules and regulations as regards exemptions from tax, tax deductions, and tax rate schedules. It is important to note and document this information provided in the original living wage report. A template for recording this information is provided in table 2, table 3 and table 4 below.¹⁰

Table 2 provides a format to document the mandatory payroll deductions that were applicable for (i) the original country report study date and (ii) the date of the update. Please note that there are two columns for each type of deduction: fixed amount and percentage. Table 2 needs to be filled

¹⁰ These tables also form part of the technical annex to a living wage update report that is used to document the update process, as mentioned in Section 2.3 and provided in Annex 2.

out with this in mind because sometimes a deduction is a fixed amount and sometimes it is a percentage of the wage. Table 3 should be used to document which types of remuneration are subject to each tax or deduction for both the original study date and the update month and year. Similarly, table 4 should be used to document information on income tax rates and which tax bracket the living wage falls under.

Table 2: Mandatory deductions applicable from original country report and date of most recent update

Mandatory deductions (adjust following list as needed)	FROM ORIGINAL REPORT _____ month ____ year			FOR DATE OF UPDATE _____ month _____ year		
	Applicable? (Yes or no)	Fixed Amount	%	Applicable? (Yes or no)	Fixed Amount	%
Social security						
National health insurance						
Unemployment insurance						
Provident fund or pension (if not optional)						
Union dues (if <u>not</u> optional)						
Other mandatory deduction from pay (specify _____)						
Other relevant information						

Table 3: Types of remuneration subject to income tax and payroll deduction

Types of remuneration subject to income tax and payroll deductions (adjust following list as needed)	_____ month _____ year						
	Is this type of income subject to tax (increase list as needed)? YES or NO						
	Every cell must be filled in [Use NA = when this form of remuneration does not exist; Use NI = when no information or not known]						
	Social Security	Health Ins	Unemployment Insurance	Provident fund or pension	Union dues	Other deductions	Income tax
Base pay							
Production bonus							
Attendance bonus							
In kind benefits							
Cash allowances							
13 th month							
Holiday bonuses							
Other types of pay (specify _____)							
Other relevant information about payroll deductions							

Table 4A: Income tax rates, credits, and allowances in _____ month and _____ year (original study month and year)

Tax bracket	% tax rate and/or explanation for no income tax liability
Tax credits and allowances (adjust following as needed)	Amount and indicate if a credit or deduction
Dependents	
Personal	
Other (specify _____)	
Other relevant information	

Table 4B: Income tax rates, credits, and allowances in _____ month and _____ year (month and year of update)

Tax bracket	% tax rate and/or explanation for no income tax liability
Tax credits and allowances (adjust following as needed)	Amount and indicate if a credit or deduction
Dependents	
Personal	

Other (specify _____)	
Other relevant information	

Moreover, it is important to look at the laws for income tax and payroll deductions as each country uses a different base for their calculations. For instance, from the examples below, we can note that Brazil uses the gross pay as the basis for the social security deductions while in Pakistan the EOBI (old age benefits insurance) deduction is based on the minimum wage.

Brazil example

The original country report for Brazil indicated that there was a social security deduction of 8% (percentage deduction) from gross pay and a deduction for union dues of R\$ 17.93 per annum (fixed amount). There were no income tax liabilities on the living wage in July 2015. Total deductions, therefore, were R\$147 (Barbosa et al. 2016).

In July 2018, which is when we updated the living wage benchmark, the social security rate remained at 8% and again no income tax was due on the increased living wage. However, the mandatory deduction for union dues in 2015 was no longer mandatory in the 2017 Labor Reform Law (Law N^o 13.467 of July 13, 2017), and therefore this was excluded in 2018 from the calculations for the total for income tax and mandatory deductions. Hence, total mandatory deductions in 2018 for a living wage for Brazil worked out to R\$128.

Pakistan example

In Pakistan, the deduction for Employees Old-Age Benefits Insurance (EOBI) in urban Sialkot had been revised upwards since the original study (from Rs.80 to Rs.130, as it is 1% of minimum wage) and therefore this new value had to be taken into account. In rural Sialkot, however, there remained no applicable taxes or other mandatory deductions.

6. How to Calculate Taxes Due on a Net Living Wage

Calculating the amount of taxes due on a net living wage is not always straightforward. Most tax instructions are written to help people calculate taxes owed on their gross wages. This is not the same as calculating how much of a gross wage is needed in order to have a take home pay equal to the net living wage.

As there are many different tax laws and regulations in the world, it is important to spend some time to understand exactly how taxes are calculated in a particular country. There are too many

different tax laws for us to address each and every situation in this section. However, this section addresses the two most common situations that we have found. The first situation is one in which there is a fixed tax rate on all earnings. The second situation is when there are marginal tax rates that depend on earnings.

Step 1: Collect and document relevant information about tax laws in study location

The first step is to carefully collect and review relevant information on mandatory payroll deductions and income taxes that are paid by workers – including tax rates for each type of tax. It is important to determine and document the types of earnings that are taxed. For example, are in kind benefits taxed? How about vacation pay – is it taxed? What about bonuses such as the 13th month bonuses? Countries have different rules about taxing different forms of pay.

It is also important to find out about laws and rules regarding tax deductions – since countries vary greatly in the types of tax deductions they allow. Note that since some of the earlier living wage reports do not provide tax rules and laws in the required detail, researchers doing an update report will sometimes need to find this information through web searches and contacts with certifying organizations.

Note that payroll deductions and income taxes are amounts that are taken out of workers' gross pay. They do not include amounts that are paid directly to the government by companies (companies often directly pay a portion of social security tax to the government – this is not included in gross pay and so is not relevant here).

Step 2: Determine net taxable living wage income and net non-taxable living wage income for workers who earn a living wage

The second step is to determine which parts of remuneration are taxable. In kind benefits are often not taxed. In addition, in some countries, certain bonuses such as a 13th month bonus or paid vacation are not subject to tax. All non-taxable income should be subtracted from the net living wage to determine the NET TAXABLE Living Wage (LW) INCOME for workers earning a living wage.

Step 3: Calculating gross living wage

In this section, we present two different formulas for calculating the gross living wage using information on net taxable remuneration for workers earning a living wage and non-taxable remuneration. Case 1 deals with a situation where the tax rate does not depend on income. Case 2 deals with a situation where there are marginal tax rates that depend on income.

Case 1: Formula for calculating taxes when there is one tax rate

In this case, the net living wage and tax rate are known and the following have already been calculated: NET TAXABLE LW INCOME and NET NON-TAXABLE LW INCOME. Formula 1 allows you to calculate the gross living wage when there is a fixed tax rate (and not progressive tax rates that change with income).

1. Add up all tax rates to get TOTAL TAX RATE

Note that there are often several different payroll taxes and mandatory deductions such as for social security, health insurance, unemployment insurance, and union dues. When they are all expressed as rates, it is necessary to add up all of the tax rates to get a total tax rate.

2. Calculate NET PERCENT

$$\text{NET PERCENT} = 100\% - \text{TOTAL TAX RATE}$$

3. Calculate GROSS LW using formula 1 below:

$$\text{GROSS LW} = (\text{NET TAXABLE LW INCOME} / \text{NET PERCENT}) + \text{NET NON-TAXABLE LW INCOME}$$

Example of calculation for Case 1

There are two mandatory deductions for country X. There is a 10% deduction for social security and 1% deduction for union dues. The net living wage is 1,100. However, 100 is in the form of a free lunch which is not taxable. The gross living wage is calculated as follows:

1. NET TAXABLE LW INCOME = 1,000 (i.e. 1,100-100)
2. TOTAL TAX RATE = 11.0% (i.e. 10% + 1.0%)
3. NET PERCENT = 89% (i.e. 1.0 - 11%)
4. GROSS LW = 1,223.594 (i.e. 1,000/89% + 100)

Cross-Check: Taxes = 11% of gross taxable LW = 1,123.594 x 11% = 123.595

Case 2: Formula for calculating taxes when there are marginal tax rates

As above, the net living wage is known and the net taxable remuneration for a living wage and net non-taxable remuneration for a living wage have already been calculated. There are different tax rates for different levels of income. An example of a tax rate schedule is shown in table 5 below.

Table 5: Tax rate schedule example

Lower threshold of tax bracket	Upper threshold of tax bracket	Marginal tax rate (R) for income between lower and upper threshold	Tax on income below the lower threshold
0	I1	R1	0
I1	I2	R2	R1xI1
I2	I3	R3	R1xI1 +R2xI2
I3	I4	R4	R1xI1 +R2xI2 + R3xI3
I4	unlimited	R5	R1xI1 +R2xI2 + R3xI3 + R4xI4

Steps in calculating the taxes are as follows:

1. Select the most likely tax bracket and so marginal tax rate for the GROSS LW.
 Note that marginal tax rate is called RM in formula 2 below.
 The lower bracket threshold of the selected marginal rate is called ThM in formula 2 below.
2. Calculate the amount of tax on income below the marginal tax bracket from the last column of the tax table. This is referred to as Tax1 in formula 2 below.
3. Use formula 2 below:

$$\text{Gross LW} = (\text{NET TAXABLE LW INCOME} + \text{Tax1} - \text{RM} \times \text{ThM}) / (1 - \text{RM})$$
4. Check that Gross taxable LW calculated in the formula 2 above falls into the tax bracket selected. If it does not fall into the selected tax bracket, then change the tax bracket accordingly and redo the calculation. Note that this can happen when taxable LW income is close to the upper threshold of a marginal rate.¹¹

¹¹ Note that taxes are applied to the taxable part of the gross living wage – and sometimes it is difficult to predict which marginal rate will apply when taxes are added to net income. This is sometimes only known through trial and error.

Example 1 of calculation for Case 2

Country Y has no taxes for income up to 35,000 LCU, 15% tax rate for income between 35,000 and 40,000 LCU, 20% tax rate on income between 40,000 and 50,000 LCU, and a 30% tax rate on income over 50,000 LCU. The net living wage is 42,000 LCU which includes a free lunch, which is worth 1,000 LCU and is not taxable.

1. NET TAXABLE INCOME = 41,000 (i.e. 42,000 – 1,000)
2. Assume that the Gross LW is between 40,000 and 50,000 LCU. Therefore, the marginal tax rate (RM) would be 20% and the lower threshold ThM would be 40,000 LCU
3. Tax1 equals the tax on 40,000 LCU which is 750 LCU (i.e. 0 x 35,000 + 15% x 5,000)
4. Gross LW = ((NET TAXABLE LW INCOME + Tax1 – RM x ThM)/(1-RM)) + NET NON-TAXABLE LW INCOME
5. Gross LW = 43,187.5 = (i.e. 41,000 + 750 - 20% x 40,000)/(80%) + 1,000
6. The Gross taxable LW is 42,187.5 which is in the 20% tax bracket

Cross-Check: Taxes = 15% of 5,000 LCU + 20% of 2,187.5 LCU (i.e. 20% of 42,187.5 – 40,000) = 750 + 437.5 = 1,187.5

$$\text{NET LW} = \text{GROSS LW} - \text{Taxes} = 43187.5 - 1,187.5 = 42,000$$

Example 2 of calculation for case 2

Suppose the tax rates are as in the above example, but the net LW is 49,000 LCU including 1,000 for a non-taxable free lunch.

1. NET TAXABLE INCOME = 48,000 (i.e. 49,000 – 1000)
2. Assume that the Gross LW is above 50,000 LCU. And therefore, the marginal tax rate (RM) would be 20% and the lower threshold ThM would be 40,000 LCU
3. Tax1 equals the tax on 50,000 LCU which is 2,750 LCU (i.e. 0 x 35,000 + 15% x 5,000 + 20% x 10,000)
4. Gross LW = ((NET TAXABLE LW INCOME + Tax1 – RM x ThM)/(1-RM)) + NET NON-TAXABLE LW INCOME
5. Gross LW = 52,071.43 = (i.e. (48,000 + 2750 - 30% x 40,000)/(70%)) + 1,000

Cross-Check: Taxes = 621.43 (i.e. 30% of 52,071.43-50,000) + 2,000
(i.e. 20% of 40,000) + 750 (i.e. 15% of 5,000) = 321.43 + 2,000 + 750
= 3071.43

NET LW = GROSS LW – Taxes = 52,071.43 – 3071.43
= 49.000

7. Calculating Gross Living Wage

Having calculated the updated inflation-adjusted net living wage and the applicable income tax and mandatory payroll deductions, it is now possible to calculate the gross living wage as follows:

$$\begin{aligned} & \text{Gross living wage in time } t + x \text{ months} \\ &= (\text{Net living wage in time } t + x \text{ months}) \\ &+ (\text{income taxes and mandatory deductions in time } t + x \text{ months}) \end{aligned}$$

where time t = study month and study year

Continuing with the example of Brazil from Sections 3 and 5, we calculate the gross living wage for the coffee growing region in Southern and Southwestern Minas Gerais State using the above formula. The gross living wage updated to July 2018 works out to R\$1,596 (see table 6 in the next section).

8. Converting Living Wage and Living Expenses Estimates to US Dollars for Cross-national Comparison

For cross-national comparison and context for international stakeholders, it is also important to provide the equivalent US Dollar (USD) amounts for living wage estimates. The original living wage country reports already have this, and we recommend using the same USD values from the original study for the original study date in the living wage update report (see table below for Brazil).

To convert the updated living wage estimates in local currency to USD, we recommend using the International Monetary Fund’s (IMF) archive of exchange rates.¹² This is a good source to use because it covers a large number of countries and provides several data points for each month. In case, IMF data are not reported for the desired period, we recommend using www.xe.com. We recommend using an average exchange rate over the month to which the estimate is updated. If the exchange rate is volatile from month to month, this should be noted in the update report, and in this situation, we recommend using the average exchange rate over the three-month period that brackets the month of the update (i.e. month before, update month, month after). Table 6 below indicates the living wage benchmark for Southern and Southwestern Minas Gerais, Brazil in local currency and in USD using the IMF’s database for July 2018. This is our recommended format for presenting the updated living wage estimate also. The update report for Brazil, which this table forms a part of, is attached as Annex 1. This example also serves as a template table for living wage update reports.

Table 6: Living wage for coffee growing region in Southern and Southwestern Minas Gerais, Brazil in original study and latest update (in Brazilian Real and US Dollars)

	July 2015	July 2018
Living Expenses for a Decent Standard of Living Per Month	R\$2,534 (\$685)	R\$2,936 (\$769)
Net Living Wage Per Month	R\$1,267 (\$342)	R\$1,468 (\$384)
Income Taxes & Mandatory Payroll Deductions per Month on Living Wage	R\$147 (\$40)	R\$128 (\$33)
Gross Living Wage	R\$1,414 (\$382)	R\$1,596 (\$417)

¹² This is available at the IMF’s website under the heading “Representative Exchange Rates for Selected Currencies”, and can be accessed at the following link: https://www.imf.org/external/np/fin/data/param_rms_mth.aspx.

	July 2015	July 2018
Exchange Rate	3.7	3.82
Source of Exchange Rate	Original Country Report	IMF's Archive for July 2018 ¹³

9. Conclusions

Living wage benchmarks estimated using the Anker methodology indicate how much workers need to earn to be able to afford a basic but decent living standard. Since living wages and living expenses are estimated for a particular point in time, they need to be updated every year for inflation and changes in income taxes and mandatory payroll deductions to make sure that the original living wage and living expenses maintain their purchasing power. Indeed, unless a living wage is updated for inflation, it will not continue to be sufficient to support a basic but decent standard of living for workers and their families.

This paper provides guidelines on how to update Anker methodology living wages and living expense estimates annually, as well as templates for reporting each update and documenting information sources.¹⁴ These guidelines and templates will enable updates to be carried out and reported systematically and consistently for all locations in which living wage studies are done, thus enabling the GLWC to maintain the timeliness of living wage estimates from year to year.

The guidelines highlight important methodological issues and provide recommendations on how to address them. Section 2 discusses how to identify and select an appropriate CPI series to use to update living wage and living expense estimates. Sections 3 and 4 discuss how to update net living wage and living expenses for inflation. Sections 5 and 6 describe how to determine the amount of income taxes and mandatory payroll deductions which would need to be paid on a living wage. Section 7 discusses how to update a net living wage to a gross living wage by taking into consideration income taxes and mandatory payroll deductions. Finally, section 8 provides recommendations on how to convert updated living wage and living expense estimates to US dollars to improve cross-national comparison. Throughout this paper, examples drawn from four new living wage and living expense updates (for Brazil, India, Pakistan, and South Africa) are used to explain and illustrate issues.

¹³ https://www.imf.org/external/np/fin/data/rms_mth.aspx?SelectDate=2018-07-31&reportType=REP

¹⁴ Most readers will also be interested to read the accompanying paper – “Carrying Out Living Wage and Living Expense Updates on a Large Scale Annually: Costs, Issues, Sustainability, and Recommendations” - which discusses and makes recommendations on technical, organizational, funding, and institutional issues on how to do living wage and living expense updates in a sustainable way for the many present and future GLWC living wage studies.

These guidelines are accompanied by four annexes. Annex 1 provides a template for a living wage and living expenses update report using Brazil to illustrate how to use this template. This template is expected to be used by researchers when they do a future update. In this way, future update reports will be uniform, comprehensive, and informative. Annex 2 provides a template for the technical annex which is expected to accompany an update report. Information recorded in this technical annex will help ensure that future updates and update reports are relatively easy to do, because the data sources and data series to use would already have been decided on. Annex 3 discusses seasonality in inflation and when to make an adjustment for seasonality in prices when living wage and living expenses need to be updated to a non-study month. Finally, Annex 4 provides update reports for India, Pakistan, and South Africa.

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Annex 1: Template for Living Wage Update Report

Part I – Outline of an update report with a short description of each section

1. Background

This section provides a short introduction to the update report, including the context of the original study and why there needs to be an update.

2. Living wage and living expenses for reference size family in original country report – **insert date of original report here**

This section indicates estimates in the original report for the net and gross living wages and for family living expenses.

3. Inflation rate used for update

This section describes available information and data series on inflation and the CPI data series selected for the update with reasoning, as well as any notes on the inflation series to be used.

4. Recent level of inflation

This section describes the level and trend in inflation.

5. Mandatory payroll deductions and income taxes on a living wage

This section indicates mandatory payroll deduction and income taxes that would need to be paid on a living wage according to the original country report. It also describes any changes in laws regarding mandatory payroll deductions and income taxes since the original report as amounts for the update.

6. Updated living wages and family living expenses for **date of update**

This section indicates the net and gross living wages and family living expenses for the original study as well as update values (Table 1).

Table 1: Living wage for **location or study for original study year and latest update (in local currency units (LCU) and US Dollars)**

Currency	Original study date		Date of update	
	LCU	USD	LCU	USD
Living Expenses for Reference Family Per Month				
Net Living Wage Per Month				
Income Taxes and Payroll Deductions Per Month on Living Wage				
Gross Living Wage Per Month				
Exchange Rate to USD				
Source of Exchange Rate	Original report		Source of exchange rate for update	

Part II – Example of an update report for Minas Geras, Brazil updated to July 2018 from July 2015 study

The following update report for Brazil for 2018 is provided as an example. When a new living wage update report is done, the same template and format should be used. For the most part, **only parts highlighted in red would need to be changed.**

Living Wage and Living Expenses for Southern and Southwestern Minas Gerais, Brazil – Updated to July 2018

1. Background

This report updates the living wage and living expenses for **the coffee producing region of Southern and Southwestern Minas Gerais State in Brazil.**

The net living wage and living expenses are updated to the study month of the most recent calendar year – **July 2018** – to take into account the amount of inflation since the original **July 2015** living wage study. Without accounting for inflation, the net living wage estimated in **2015** would not be sufficient for workers to have a basic but decent standard of living in **2018** because the purchasing power of the living wage would have decreased compared to what it was in **2015**. Similarly, living expenses for a reference family are also updated to **July 2018** to account for inflation.

The gross living wage is updated to **July 2018** by taking into consideration in addition income taxes and mandatory deductions from pay that workers would need to pay on the updated **2018** living wage. This is done using **July 2018** laws.

2. Living wage and living expenses for reference size family in original country report in July 2015

The original living wage country report estimated the net living wage as **R\$1,267 in July 2015**. This was the required take-home pay for workers for decency in **July 2015**. The gross living wage, which also takes into account income taxes and mandatory deductions from pay **for social security and union dues**, was estimated as **R\$1,414 in July 2015**. The living expenses for a basic but decent standard of living for a reference family in the original country report was estimated as **R\$2,534 in July 2015**.

3. Inflation Rate Used for Update

The Brazilian Institute of Geography and Statistics (IBGE) is the government body responsible for computing and reporting price indexes in Brazil. It reports two main consumer price indexes: (1) IPCA, for broader consumption, and (2) the INPC, which is a restricted price index applicable for most workers.

IPCA covers families with monthly incomes ranging from one to forty minimum wages, and is typically used to update balance sheets and financial statements of companies.

INPC covers families with monthly incomes ranging from one to five minimum wages, and is the most widely used indicator for wage agreements and negotiations.

This report uses the INPC to update the living wage as it is more representative for workers. INPC is estimated for ten metropolitan areas in Brazil, and their weighted average is used to arrive at the national INPC value. There are no separate values for states or for rural/urban areas, and because none of the ten metropolitan areas are representative of Southern and Southwestern Minas Gerais, we use the INPC national average to update the living wage for Minas Gerais.

4. Recent Level of Inflation

Although Brazil had high rates of inflation in 2015 and 2016, there has been a steady decline in year-on-year inflation rates from August 2016 onwards. In more recent years (2017 and 2018), the level of inflation has been moderate to low. Between July 2017 and July 2018, it was 3.61%. Inflation between July 2015 (original living wage study date) and July 2018 is 15.87%. This is the inflation rate used for this update.

5. Mandatory Payroll Deductions and Income Taxes on a Living Wage

There continues to be an 8% social security tax on earnings just as in 2015. Just as in 2015, there is no income tax due on a living wage. Union dues, which were mandatory in 2015, are no longer mandatory since the 2017 Labor Reform Law (Law N° 13.467 of July 13, 2017). This social security tax is taken into consideration in estimating mandatory deductions and gross living wage for July 2018.

6. Updated Living Wages and Family Living Expenses for **July 2018**

The updated net living wage, or take-home pay, for **July 2018 is R\$1,468 per month**. The gross living wage, which also takes into account income taxes and mandatory payroll deductions, is **R\$1,596 per month for July 2018**. Table 1 provides details of the original and the updated living wages and family living expenses.

Table 1: Living wages and living expenses for coffee growing region in Southern and Southwestern Minas Gerais, Brazil for original study year and latest update (in Brazilian Real and US Dollars)

	July 2015 (original study date)		July 2018	
	Brazilian Real	USD	Brazilian Real	USD
Currency	Brazilian Real	USD	Brazilian Real	USD
Living Expenses for Reference Family Per Month	R\$2,534	\$685	R\$2,936	\$769
Net Living Wage Per Month	R\$1,267	\$342	R\$1,468	\$384
Income Taxes and Payroll Deductions Per Month on Living Wage	R\$147	\$40	R\$128	\$33
Gross Living Wage Per Month	R\$1,414	\$382	R\$1,596	\$417
Exchange Rate to USD	3.70		3.82	
Source of Exchange Rate	Original Report		IMF's Archive for July 2018¹	

¹ https://www.imf.org/external/np/fin/data/rms_mth.aspx?SelectDate=2018-07-31&reportType=REP

Annex 2: Template for Technical Annex to a Living Wage Update Report

This annex provides a template format to use to record technical details of a living wage update report. This detail makes it easier to carry out subsequent update reports in future years.

- Date (month and year) of Original Report: _____
- Date (month and year) of Latest Previous Update: _____
- Date (month and year) of Current Update: _____

Available Inflation Rate Data

1. Indicate which agency(ies) collect data for Consumer Price Index(es), and briefly describe the methodology of the index

2. Indicate the base year of the index _____
3. Describe where the prices data are collected (e.g. in Pakistan from 76 markets in 40 urban areas)

Provide web links for all sources used _____

4. Indicate type(s) of inflation rate data available – such as monthly, year-on-year, seasonally _____ adjusted

5. Indicate breakdowns available for inflation rates (or CPI) – such as whether the CPI is disaggregated by rural and urban areas, by province/state, for major cities, by income quintile, etc. Provide web links for each type available _____

Inflation Rate Decided to Use for Update

1. Indicate which inflation rate series was used for current update. Indicate web page links when relevant

2. Provide brief reasoning for why this inflation rate series was used and why this is better than the other possible options

Tables to document data – To be filled in with as much detail as possible

Table 1: Living expenses for reference family and net living wage over time

	Original study date: _____	Update 1 date: _____	Update 2 date _____	Update 3 date _____	Update 4 date _____
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	Original study date: ____	Update 1 date: _____	Update 2 date _____	Update 3 date _____	Update 4 date _____
Living expenses for reference family = original study family living expenses x (row 4 value)					
Net living wage = original Net LW x (row 4 value)					
Amount of inflation (%) from previous update					
Total inflation since study (This is row 4)					

Table 2: Net and Gross living wages over time

	Original study date _____	Update 1 date ____	Update 2 date _____	Update 3 date _____	Update 4 date _____
Net living wage (from table 1) (1)					
Total mandatory payroll deductions and income tax (2)					

Gross living wage (net living wage plus (3) = (1) + (2)					
--	--	--	--	--	--

Mandatory Deductions from Pay

Indicate any changes over time _____

List sources of information and web links wherever possible _____

Table 3: Mandatory deductions applicable from original country report and updated report

Mandatory deductions	ORIGINAL REPORT in _____ month and year			UPDATE OF UPDATE in _____ month and year		
	Applicable? (Yes or no)	Fixed Amount?	%	Applicable? (Yes or no)	Fixed Amount?	%
Social security						
National health insurance						
Unemployment insurance						

Provident fund or pension (if not optional)						
Union dues (if not optional)						
Other mandatory deduction from pay (specify)						

Remuneration Subject to Payroll Deduction and/or Income Tax

Table 4A: Types of remuneration subject to income tax and/or payroll deduction: Original study date

Types of remuneration subject to income tax or payroll deductions (adjust list as needed)	_____ study month and _____ study year						
	Is this type of income subject to tax? YES or NO						
	Every cell must be filled in [indicate NA = when this form of remuneration does not exist; NI = when no information or not known]						
	Social Security	Health Ins	Unemployment Insurance	Provident fund or Pension	Union dues (when mandatory)	Other deductions Specify _____	Income tax
Base pay							
Production bonus							
Attendance bonus							
In kind benefits							
Cash allowances							
13 th month							

Holiday bonuses							
Other types of pay – specify							

Table 4B: Types of remuneration subject to income tax and/or payroll deduction: Update date

Types of remuneration subject to income tax or payroll deductions (adjust list as needed)	_____ update month and _____ update year						
	Is this type of income subject to tax? YES or NO						
	Every cell must be filled in [indicate NA = when this form of remuneration does not exist; NI = when no information or not known]						
	Social Security	Health Ins	Unemployment Insurance	Provident fund or Pension	Union dues (when mandatory)	Other deductions Specify _____	Income tax
Base pay							
Production bonus							
Attendance bonus							
In kind benefits							
Cash allowances							
13 th month							
Holiday bonuses							
Other types of pay – specify							

Table 5A: Income tax rates, tax allowances, and tax credits in study month and year

Tax brackets	% tax rate and/or explanation when no income tax liability
Tax credits and allowances/deductions (adjust list as needed)	Amount and indicate if a credit or deduction
Dependents	
Personal	
Other (specify)	

Table 5B: Income tax rates, tax allowances, and tax credits in update month and year

Tax brackets	% tax rate and/or explanation when no income tax liability
Tax credits and allowances (adjust list as needed)	Amount and indicate if a credit or deduction
Dependents	
Personal	
Other (specify)	

Exchange Rate Used to Covert Local Currency to USD

Source used _____

Why this source was used _____

Table 6: Exchange rates of Local Currency (____) to US Dollar used

	Original study date _____	Update 1 date _____	Update 2 date _____	Update 3 date _____	Update 4 date _____
Exchange rate					

Annex 3: Note on Seasonality in Inflation and When to Make an Adjustment for Seasonality in Prices When Updating a Living Wage to a Non-study Month

1. Background

Seasonal variation in inflation rates poses a potential problem when updating a living wage to a specific month during the year when seasonally adjusted inflation rate data are unavailable (which is common for developing countries). Use of annual year-on-year inflation rates implicitly takes seasonality in prices into account (ILO 2004) and for this reason it is the preferred approach for updating a living wage every year. However, when updating the living wage to a specific non-living wage study month – for example, from August 2016 to March 2017 – seasonal variation in prices may result in over- or under-estimating the living wage unless an adjustment is made. This note provides guidance on how to approach the issue of seasonality in prices.

2. Types of Seasonal Variation

There are two types of seasonality that may show up in price data used to calculate Consumer Price Indices (CPI) and inflation rates: (i) the basket of goods and services used to estimate inflation includes some commodities that are only available in certain periods of the year, and (ii) fluctuations in prices in particular months for certain goods and services, which typically recur every year (ILO 2004). An example of the former is fruits and vegetables which are only available in a specific season. An example of the latter is an increase in energy prices in the winter (or summer as the case may be) every year because of increases in demand in that season.

Variation in prices from both types of seasonality could potentially affect inflation rates for particular seasons and months. The first type is dealt with at the stage of computing CPI by government agencies and the methodology they employ accounts for this. Typically, the sample basket of goods and services for which prices are collected substitutes for those goods that are only available in particular seasons with similar goods and services. This is what the statistical bureaus do in India, Pakistan and South Africa, and it appears to be standard practice. The CPI

computed from the resultant price data would then not have fluctuations in inflation for this reason in particular seasons that recur every year. We, therefore, do not think that it is necessary to account for this when updating living wages each year.

However, it is possible that the basket of goods and services for which prices are collected to estimate inflation rates by national statistical offices may always have variations in prices in particular seasons, and it is necessary to account for this.

3. Identifying seasonality in inflation data

The second type of seasonal variation, as identified above, generally recurs every year at a similar time of the year. Identifying this variation can be done by plotting month-on-month inflation rates over time – ideally using data for at least for five years in order to identify and make sure that there is a recurring seasonal pattern – for example, a sharp increase or decrease – in particular month(s) over multiple years.¹ Seasonality in prices should appear in the form of “regularly spaced peaks and troughs which have a consistent direction and approximately the same magnitude every period/year” (Nwogu, Iwueze, and Nlebedim 2016, 384).

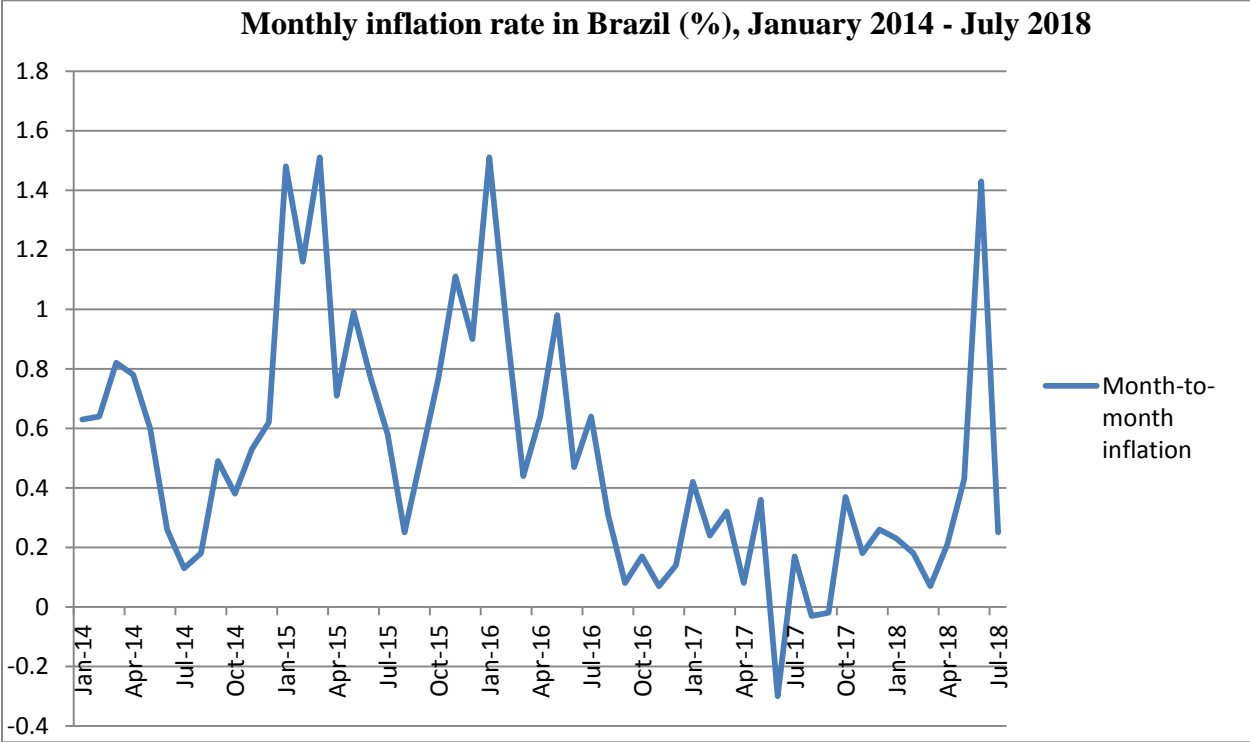
In the absence of a simple statistical test to identify seasonality in price data, the process of identifying this variation through graphical representation is necessarily somewhat subjective, especially given that each country’s context is different. None-the-less in this paper, we provide a guide to aid the process of identifying when seasonal variation is an issue and so needs to be accounted for.

1.1. Example 1: Brazil

Plotting the national month-to-month inflation rates for Brazil (Figure 1) from January 2014 to the most recent available data, July 2018, we see that while there is significant volatility in month-to-month inflation over this period, there is no discernible pattern for the same month(s) in different years. There appears to generally be a downward trend in prices from January to April each year, but given that the size of the downward shift in month to month inflation is inconsistent (e.g. large in 2014 and small in 2018), we do not think that this can necessarily be attributed to a consistent and regular seasonal effect. Moreover, in 2015, the decrease in the inflation rate in the beginning of the year is over a much shorter time period before increasing. In addition, it is important to note that the size of month-to-month inflation rates is rather small with a range only from -0.3% to 1.5%. Given that seasonal pattern of inflation rates is inconsistent each year and small in amplitude, we do not feel that it is not necessary to make any seasonal adjustment for Brazil.

¹ It is better to examine aggregate inflation rates rather than looking for seasonality in individual goods or services (e.g. only at bananas, tomatoes, mangos, etc.), because, as Bryan and Cecchetti (1995) show, large variation in individual goods disappears or becomes much smaller when aggregated and index variation is examined.

Figure 1: Month-to-month national inflation rate for Brazil (%), January 2014 - July 2018

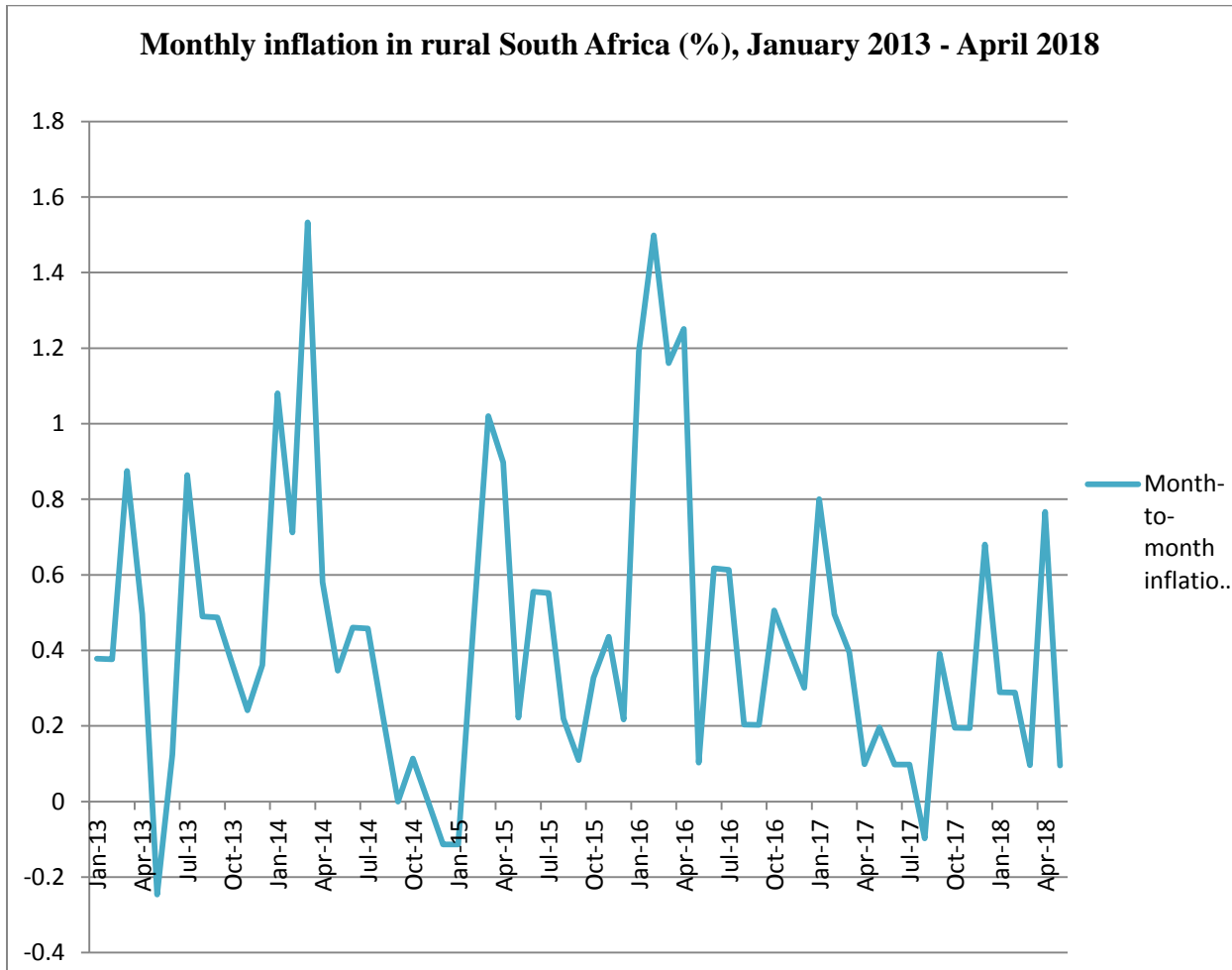


Source: Authors’ calculations based on CPI data from the Brazil Institute of Geography and Statistics (IBGE).

1.2. Example 2: Rural South Africa

Similar to Brazil, monthly inflation for rural South Africa from January 2013 to May 2018 also varies – but also without any consistent or strong seasonal pattern apparent (Figure 2). While the inflation rate appears to fall in size every April and May, this pattern does not occur in 2017 when inflation increases in these two months, pointing to something besides seasonal variation at play.

Figure 2: Month-to-month inflation rate for rural South Africa, January 2013 - April 2018

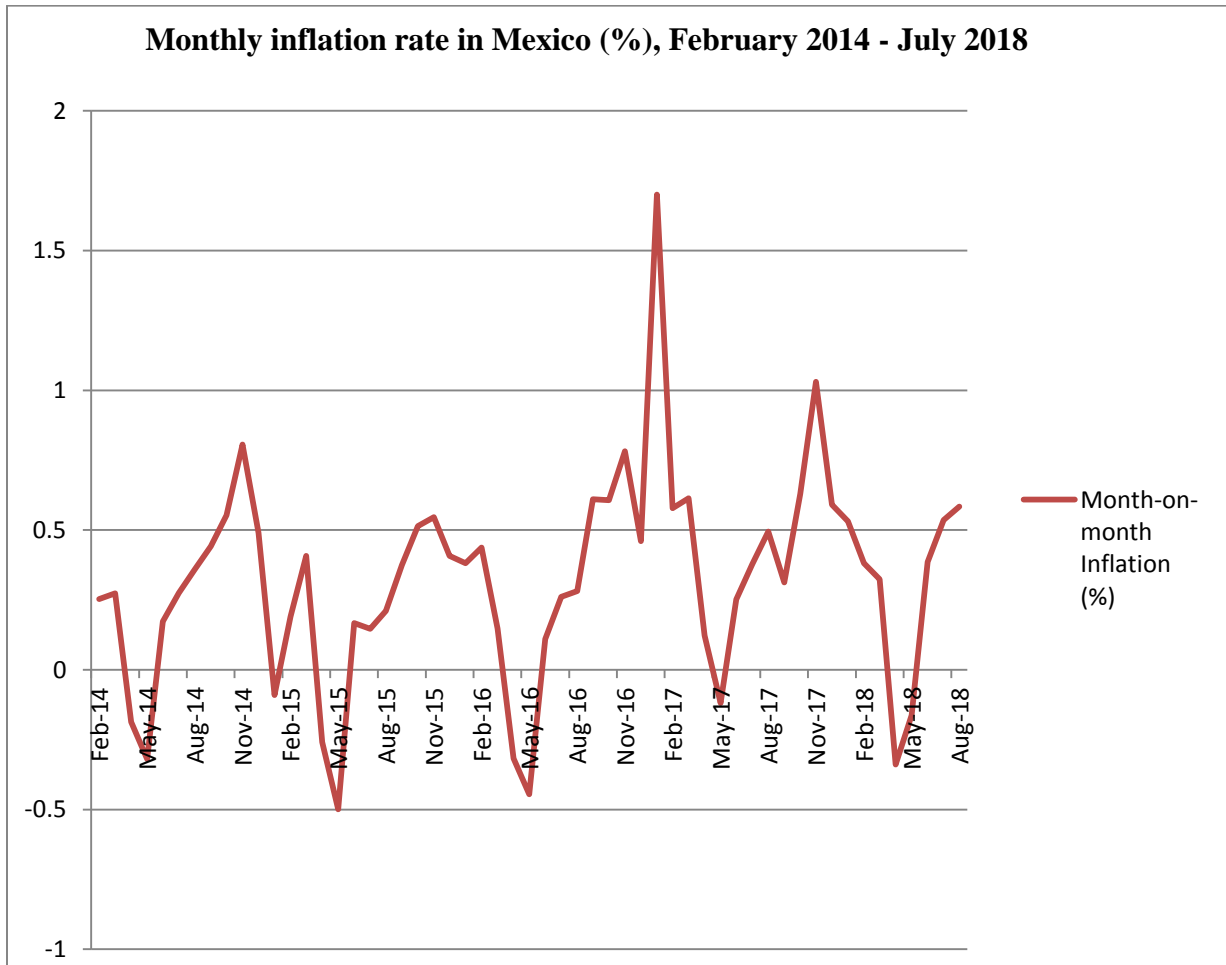


Source: Authors' calculations based on CPI data from Statistics South Africa.

1.3. Example 3: Mexico

In contrast to Brazil and South Africa, monthly inflation rate for Tapachula, Chiapas, Mexico (Figure 3) from February 2014 to August 2018 has a clear pattern. The month-to-month inflation rate declines every year from February to March and increases every year from May to October. It is important to note in this example that the magnitude of the decreases and increases in monthly inflation are similar each year, even if the precise values differ each year. Although the magnitude in monthly inflation rates is fairly small, only ranging from -0.5% to 1.7%, we recommend adjusting for seasonality (as outlined below in Section 2.2) when updating the living wage for Mexico to a non-study month.

Figure 3: Month-to-month inflation rate for Mexico (Tapachula, Chiapas), February 2014 - July 2018

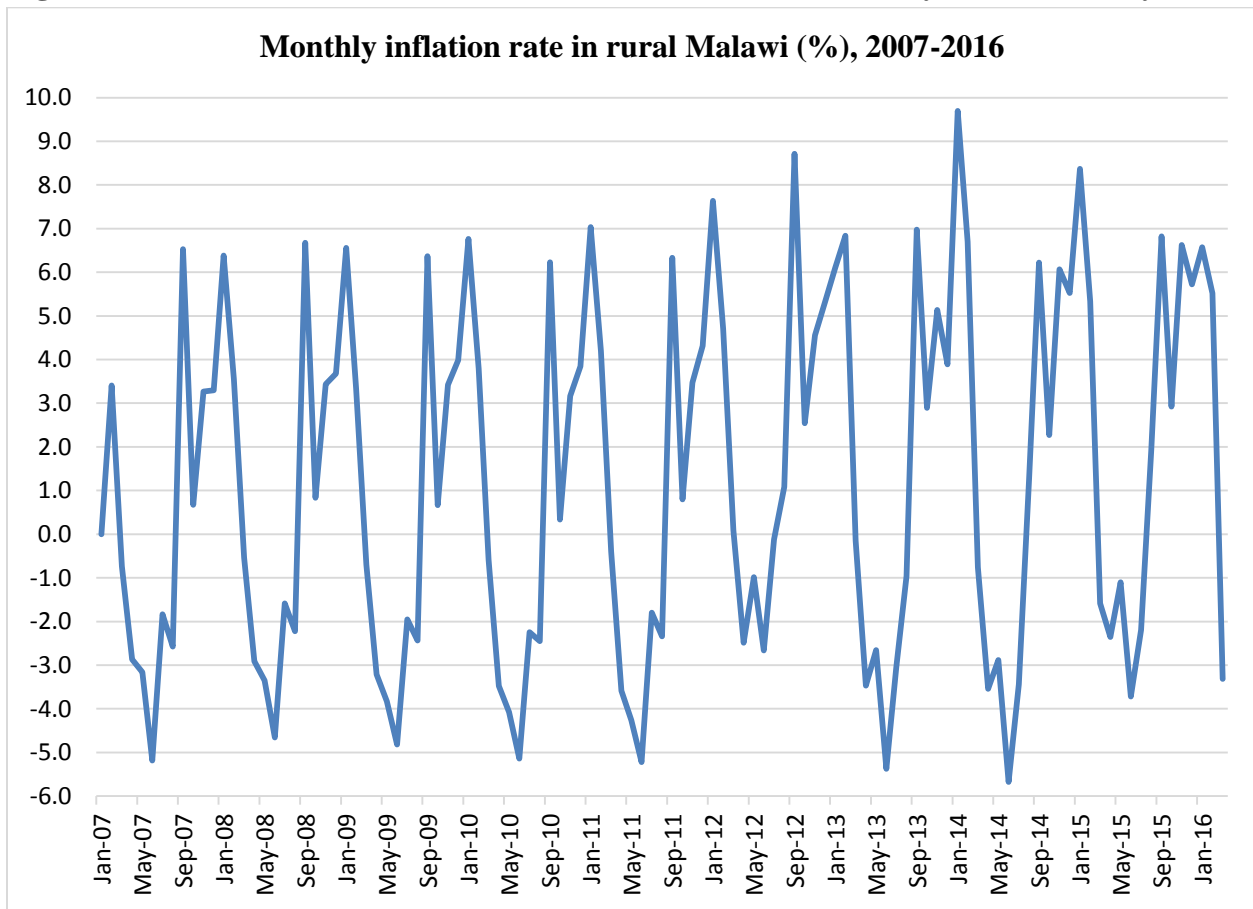


Source: Authors’ calculations based on CPI data from the Mexican National Institute of Statistics and Geography (INEGI).

1.4. Example 4: Malawi

Rural Malawi is a case where seasonality is prominent in monthly inflation data. As is evident in Figure 4, there is an extreme seasonal pattern in month-to-month inflation which consistently repeats every year; prices fall sharply every April-June and rise sharply every September-January. The monthly variation is also very high, ranging from -5.7% to 9.7%. We therefore recommend accounting for seasonality – through the method outlined in Section 2.2 – when updating the living wage for rural Malawi to a non-study month. This would smooth out inflation during the year, and so would not give a false impression for the first half of the year when inflation is typically extremely negative in rural Malawi, or for the second half of the year when inflation is typically extremely high in rural Malawi.

Figure 4: Month-to-month inflation rate for rural Malawi, February 2007 – January 2016



Source: Calculations by Anker, Anker, and Chiwaula (2017) based on data from Malawi National Statistical Office.

2. Conclusions based on above examples from Brazil, South Africa, Mexico, and Malawi

2.1. Lessons learned

As pointed out above, identifying seasonality in inflation is subjective to some degree, but a few things can nevertheless be learned from the preceding examples in order to reduce this subjectivity. First, it is important to look at monthly inflation data over several years (ideally at least five years) in order to make sure that patterns observed for one or two years are not anomalies. Second, it is necessary to examine monthly inflation rates for patterns in the same month(s) each year over this extended period. There may be some patterns that do not repeat each year and even if they do repeat every year, there may be differences in scale each year. Therefore, it is important when identifying seasonal variation to also determine the typical scale or magnitude of the increase or decrease each year. This is because, as seasonality is a form of systematic variation, the magnitude should also be reasonably regular (Nwogu, Iwueze, and Nlebedim 2016).

2.2. What to do when there is seasonality in inflation

Once seasonality in inflation is identified, it is best to “change the focus from short-term month-to-month price indices and instead focus on making year-over-year price comparisons for each month of the year” as these implicitly adjust for seasonality (ILO 2004, 340). Thus, for instance, when updating from August 2016 to March 2017 – a period of 8 months - for a country with high seasonal variation in inflation, we would use the average year-on-year inflation rate for January 2017 - March 2017, and multiply this by 8/12 and increase the living wage by the resulting percentage.

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Annex 4: Additional Living Wage Update Reports

This section includes update reports for three other countries, in addition to Brazil (see Annex 1), for which Anker Methodology Living Wage Benchmarks were updated. These include India, Pakistan, and South Africa.

1. Living Wage for Tiruppur City, Tamil Nadu, India – Updated to April 2018¹

1. Background

This report updates the living wage for Tiruppur City in Tamil Nadu, India with focus on the garment and textile industry. The living wage is updated to April 2018, to account for inflation since the original living wage study in August 2016. April is the month when wages increase for workers who fall under the four-year wage agreement between the unions and the Tiruppur Export Association (TEA).

Without accounting for inflation, the living wage estimated in 2016 would not be sufficient for workers to have a basic but decent standard of living in 2018 because the purchasing power of the living wage would have decreased with respect to current prices.

2. Living Wage in Original Country Report – August 2016

The net living wage – that is, the take home pay for workers – for Tiruppur in the original study was ₹11,918 per month in August 2016. The gross living wage – that is, the pay required to ensure sufficient take home pay for decency – which takes into account mandatory deductions for provident fund and health insurance benefits - was ₹13,725 per month in August 2016.

3. Inflation Rate Used for Update

¹ This living wage benchmark report for Tiruppur City, India was done before the template in Annex 1 was finalized. In addition, this update report was done for a particular event, which is why it was updated to a non-study month. For these reasons, it does not exactly follow the template provided in the present report, nor does it include an update for family living expenses. The Tiruppur update report is available on the GLWC website at <https://www.globallivingwage.org/wp-content/uploads/2018/05/Tiruppur-India-LW-Update-2018-1.pdf>.

The Government of India publishes the CPI (consumer price index) for each state in India for rural and urban areas separately as well as for the state as a whole.² Since Tiruppur is an urban town, we use the general CPI data for urban Tamil Nadu to update the living wage as this is the most relevant data for workers in Tiruppur.³

4. Recent Level of Inflation

There has been moderate inflation in urban Tamil Nadu since the original study in August 2016. The annual inflation rate between August 2016 and August 2017 was 5.07%, with no major variation in inflation between months or seasons. Further, the inflation rate between August 2016 and April 2018 was 6.84%. These are the inflation rates used to update the living wage for Tiruppur City to April 2018.⁴

5. Updating Living Wages to April 2018

The updated net living wage, or take-home pay, for April 2018 is ₹12,733 per month. ESIC and provident fund mandatory payroll deductions were 1.75% and 12% respectively for a total of ₹1,874. Therefore, the updated gross living wage for April 2018 is ₹14,670.

Table 1: Living wage for Tiruppur City in original study and latest update (in Indian Rupees)

	August 2016 (original study date)	April 2018
Net Living Wage Per Month	Rs 11,918	Rs 12,733
Taxes and Mandatory Deductions Per Month on Living Wage	Rs 1,807	Rs 1,937
Gross Living Wage Per Month	Rs 13,725	Rs 14,670

² The Government of India's Ministry of Statistics and Programme Implementation collects monthly price data from 1181 village markets for rural prices and 1114 markets distributed over 310 towns for urban prices. These prices are then used to compute the rural, urban and combined Consumer Price Index (CPI) each month for each state in India and for the country as a whole, using 2012 as the base year. In addition, the Ministry also publishes the CPI for each major expenditure group and sub-group from the basket of goods and services in the price sample (such as health, housing, food, and then within food, cereals, meat and fish, vegetables, and so on).

³ The Government of India's Ministry of Labour and Employment also publishes the Consumer Price Index for Industrial Workers. We do not use this because their sample of industrial centers does not include Tiruppur City, nor are the centers included in Tamil Nadu comparable to Tiruppur. The CPI for urban Tamil Nadu is therefore more representative of the changes in prices in Tiruppur City than is the CPI for Industrial Workers.

⁴ As of writing, the Ministry of Statistics and Programme Implementation had only published provisional CPI data for April 2018. Accordingly, we also provide a provisional update using an inflation rate of 6.84% between August 2016 and April 2018.

Living Wage for Urban and Rural Sialkot, Pakistan – Updated to December 2017

1. Background

This report updates the living wage for the soccer ball manufacturing industry in urban and rural Sialkot in Pakistan.

The net living wage is updated to the study month of the most recent calendar year – December 2017 – to take into account the amount of inflation since the original December 2015 living wage study. Without accounting for inflation, the net living wage estimated in 2015 would not be sufficient for workers to have a basic but decent standard of living in 2017 because the purchasing power of the living wage would have decreased compared to what it was in 2015. Similarly, the living expenses for a reference family are also updated to December 2017 to account for inflation.

The gross living wage is updated to December 2017 by also taking into consideration income taxes and mandatory deductions from pay that workers would need to pay on the updated 2017 living wage. This is done using 2017 laws.

2. Living Wage and Living Expenses for a Reference Size Family in Original Country Report in December 2015

Urban Sialkot

The original living wage country report estimated the net living wage as Rs. 19,960 in December 2015. This was the required take-home pay for workers for decency in December 2015. The gross living wage, which also takes into account income taxes and mandatory deductions from pay for pension, was estimated as Rs. 20,040 in December 2015. The living expenses for a basic but decent standard of living for a reference family in the original country report was estimated as Rs. 30,900 in December 2015.

Rural Sialkot

The original living wage country report estimated the net living wage as Rs. 16,993 in December 2015. This was the required take-home pay for workers for decency in December 2015. The gross living wage, which also takes into account income taxes and mandatory deductions from pay was estimated as Rs. 16,993 in December 2015. The net and gross living wage estimates were the same as there were no applicable income taxes and mandatory deductions. The living expenses for a basic but decent standard of living for a reference family in the original country report was estimated as Rs. 27,987 in December 2015.

3. Inflation Rate Used for Update

The Government of Pakistan's Bureau of Statistics (PBS) collects monthly prices for a fixed basket of goods and services from 40 urban centers in Pakistan, with a varying number of markets in each urban center based on their population. Prices are collected from a total of 76 markets within these 40 urban centers. PBS uses these price statistics to compute the Consumer Price Index (CPI) for each month, using 2007-08 as the base year. They report the year-on-year and month-on-month percentage of inflation for each month. PBS also reports general inflation rates as well as food and non-food inflation rates.

Since inflation rates are only available for urban areas, it is necessary to use these data for rural areas as well. And it is necessary to use national inflation data for Sialkot because, of the 76 urban markets surveyed nationally, the PBS includes only one market in Sialkot. This is too small a sample to use to estimate inflation for Sialkot. Therefore, in this report, the national year-on-year inflation rate is used for both urban and rural Sialkot.

4. Recent Level of Inflation

Pakistan has experienced moderate inflation in recent years. Between December 2015 and December 2016, the inflation rate was 3.7%, while the inflation rate between December 2016 and December 2017 was slightly higher at 4.6%. The total amount of inflation between December 2015 and December 2017 was 8.47%.

5. Mandatory payroll deductions and income taxes on a living wage

Urban Sialkot

The mandatory deduction for pension, called the Employees Old-Age Benefits Insurance (EOBI), has been increased from the original country report to Rs. 130. There is no other applicable income tax or mandatory payroll deduction. This deduction for EOBI is taken into consideration in estimating mandatory deductions and gross living wage for December 2017.

Rural Sialkot

There continue to be no applicable income taxes or mandatory payroll deductions.

6. Updated Living Wages and Family Living Expenses for December 2017

Urban Sialkot

The updated net living wage, or take-home pay, for December 2017 is Rs. 21,651 per month. The gross living wage, which takes into account income taxes and mandatory payroll deductions, is Rs. 21,781 per month for December 2017. When updated for inflation, the living expenses for a reference family are Rs. 33,517 in December 2017.

Rural Sialkot

The updated net living wage, or take-home pay, for December 2017 is Rs. 18,432 per month. The gross living wage, which takes into account income taxes and mandatory payroll deductions, is also Rs. 18,432 for December 2017. When updated for inflation, the living expenses for a reference family are Rs. 30,358 in December 2017.

Table 1 provides details of the original and the updated living wages and family living expenses for both Urban and Rural Sialkot.

Table 1: Living wage and living expenses for soccer ball manufacturing industry in Sialkot, Pakistan in original study year and latest update (in Pakistani Rupees and US Dollars)

	Urban Sialkot			Rural Sialkot		
	December 2015	December 2016	December 2017	December 2015	December 2016	December 2017
Living Expenses for Reference Family Per Month	Rs 30,900 (\$296)	Rs 32,043 (\$306)	Rs 33,517 (\$307)	Rs 27,987 (\$268)	Rs29,023 (\$277)	Rs 30,358 (\$278)
Net Living Wage Per Month	Rs 19,960 (\$191)	Rs 20,699 (\$198)	Rs 21,651 (\$199)	Rs 16,993 (\$163)	Rs 17,622 (\$168)	Rs 18,432 (\$169)
Income Taxes and Payroll Deductions Per Month on Living Wage	Rs 80 (\$0.8)	Rs 130 (\$1.2)	Rs 130 (\$1.2)	0	0	0
Gross Living Wage Per Month	Rs 20,040 (\$192)	Rs 20,829 (\$199)	Rs 21,781 (\$200)	Rs 16,993 (\$163)	Rs 17,622 (\$168)	Rs 18,432 (\$169)
Exchange Rate to USD	104.3	104.8	109.1	104.3	104.8	109.1
Source of Exchange Rate	Original Report	IMF's Archive for December 2017 ¹		Original Report	IMF's Archive for December 2017	

¹ https://www.imf.org/external/np/fin/data/rms_mth.aspx?SelectDate=2017-12-31&reportType=REP

Living Wage for Rural Western Cape Province, South Africa – Updated to May 2018

1. Background

This report updates the living wage for the wine grape growing region of Western Cape Province, South Africa.

The net living wage is updated to the study month of the most recent calendar year – May 2018 – to take into account the amount of inflation since the original May 2013 living wage study. Without accounting for inflation, the net living wage estimated in 2013 would not be sufficient for workers to have a basic but decent standard of living in 2018 because the purchasing power of the living wage would have decreased compared to what it was in 2013. Similarly, the living expenses for a reference family are also updated to May 2018 to account for inflation.

The gross living wage is updated to May 2018 by also taking into consideration income taxes and mandatory deductions from pay that workers would need to pay on the updated 2018 living wage. This is done using May 2018 laws.

2. Living Wage and Living Expenses for a Reference Size Family in Original Country Report in May 2013¹

The original living wage country report estimated the net living wage as R3,122 in May 2013. This was the required take-home pay for workers for decency in May 2013. The gross living wage, which also takes into account income taxes and mandatory deductions from pay for an unemployment insurance fund, was estimated as R3,154 in May 2013. The living expenses for a basic but decent standard of living for a reference family in the original country report was estimated as R5,122 in May 2013.

3. Inflation Rate Used for Update

Statistics South Africa, a government department, reports several consumer price indices for South Africa at different levels of aggregation. These include the following: a national CPI (consumer price index); an urban CPI; a rural CPI; and a CPI for each province, including Western Cape Province. In addition, the national CPI and urban CPI are also reported by household expenditure deciles. The base year for all the indices is 2016.

¹ It should be noted that the South Africa report is the first living wage report undertaken for the GLWC and it did not include the now typical summary table and wage ladder. Despite this, this update is not impeded by the lack of summary table and wage ladder. It is easy to calculate the gross living wage from the net living wage, since all forms of remuneration are subject to the unemployment insurance tax.

In this report, we use the rural CPI for updating the living wage, as the prices collected are believed to be more representative of the prices that workers pay in rural Western Cape Province than the other CPI indexes which are greatly influenced by prices in urban areas, where approximately 65% of the population of South Africa live², and where prices would be significantly different from prices in rural areas.³ The level of urbanization for Western Cape Province is even higher (69%).⁴ Hence, we use the rural CPI to update the living wage for rural Western Cape Province.

4. Recent Level of Inflation

In recent months, inflation in rural South Africa has been low to moderate. The year-on-year inflation rate for May 2018 was 3.13%. Since March 2017, when the year-on-year inflation rate was 6.04%, inflation has declined and remained stable in the 3-4% range. Further, inflation between May 2013, when the original study was conducted, and May 2018 is 29.9%. This is the inflation rate used in this report.

5. Mandatory payroll deductions and income taxes on a living wage

A mandatory payroll deduction of 1% for an unemployment insurance fund (payable on total earnings including in-kind benefits and the 13th month bonus) remained unchanged in May 2018. There are no additional income taxes or deductions applicable.

6. Updated Family Living Expenses and Living Wages to May 2018

The updated net living wage, or take-home pay, for May 2018 is R4,056 per month. The gross living wage, which takes into account income taxes and mandatory payroll deductions, is R4,097 per month for May 2018. When updated for inflation, the living expenses for a reference family is R6,653 in May 2018. Table 1 provides details of the original and the updated family living expenses and living wages.

² The World Bank estimated that 65% of the South African population lived in urban areas in 2015.

³ World Development Indicators, The World Bank. Accessed on 23rd July 2018:
<<https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?locations=ZA>>

⁴ Piet van Zyl (2017), "Trends in Western Cape Urbanisation: Challenges and Opportunities for Development Industry?" Presentation by Environmental Affairs and Development Planning, Western Cape Government, South Africa. Available at: <http://www.wcpdf.co.za/2017_conference/3%20-%20PietvanZyl.pdf>

Table 1: Living wage and living expenses for wine grape growing region in rural Western Cape Province, South Africa in original study year and latest update (in South African Rand and US Dollars)

	May 2013	May 2018
Living Expenses for Reference Family Per Month	R 5,122 (\$530)	R 6653 (\$532)
Net Living Wage Per Month	R 3,122 (\$323)	R 4,056 (\$325)
Income Taxes and Payroll Deductions Per Month on Living Wage	R 32 ⁵ (\$3)	R 41 (\$3)
Gross Living Wage Per Month	R 3,154 (\$326)	R 4,097 (\$328)
Exchange Rate to USD	9.66	12.50
Source of Exchange Rate	Original Report	IMF's Archive for May 2018

⁵ The only mandatory deduction for the workers is a 1% deduction for an unemployment insurance fund. This has not changed since the original report (source of tax information is finance consultant Theo Burrows in email to Zachary Kairie, Fairtrade Africa, July 2, 2018). Further, as per the South African Revenue Service, there is no income tax applicable to the income threshold that this living wage falls into. Accessed on 20th July 2018: <<http://www.sars.gov.za/Tax-Rates/Income-Tax/Pages/Rates%20of%20Tax%20for%20Individuals.aspx>>