# Economic Impact of COVID-19 On Bangladesh: Agenda for Immediate Action and Planning for the Future

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# Agenda for Immediate Action and Planning for the Future

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**<u>Abstract</u>**

This paper uses a Social Accounting Matrix for Bangladesh for the year 2017 to understand the impacts of COVID-19 on the economy. In addition it addresses counterfactual questions regarding various scenarios to assist both endangered sectors and vulnerable population by using both a SAM-based model and HIES, LFS and other satellite accounts data. Both short rn and medium run scenarios as well as pertinent financing aspects are discussed

The government of Bangladesh has taken some bold and timely steps for countering the negative impact of 'global pandemic' from COVID-19 on Bangladesh economy.[1]Like many other countries, Bangladesh recognizes the need to address effectively the severe consequences of COVID-19 with curtailed economic activities manifested in factory closures, sudden loss of employment and income with significant reduction in national output. Cancellation of export orders, declining remittance inflows, and depressed demand for domestically produced goods and services have already had an adverse impact. The services sector which includes trade, transport and communication, hotels & restaurants, banking and finance, education, etc. as in other countries, has predictably shrunk in capacity utilization. The recent IMF projections (World Economic Outlook Apr 2020) depict overall economic growth in 2020 at 2% but paint an optimistic picture of robust economic recovery in 2021 with GDP growth at 9.5%. The conclusion of our research and analysis at the PRI is that in order to achieve a 5 per cent GDP growth rate in fiscal year FY20 and 6% in FY21, based on the 2017 Social Accounting Matrix (SAM) for Bangladesh and the computation of multipliers discussed below, the country will need a further stimulus package. It is also necessary to optimize allocation by identifying the most affected sectors and their relative importance in terms of value added, employment including female employment, income generation and other aspects of gender inclusivity as well as inclusivity in general. I should point out that only a fraction of the tables that we have prepared are displayed below. But even this may be overwhelming to a busy policymaker. We trust that we have given enough quantitative information to guide the flow of expenditures sector wise and to high priority subnational regions. More information, if needed, can be readily provided.

The government has taken many significant steps already. My aim is to provide further specificity by using the detailed data in 2017 SAM (Social Accounting Matrix) and related reliable satellite accounts. I am also able to offer some modest forecasting capability to address some salient issues in the next 3 months period and (more modestly) some realistic basis for planning for the future beyond this crucial initial period.

The government plan of action admits that the economic impact is yet to be quantified but the negative shock is predictably severe. The fiscal package (better called a "relief package" rather than "stimulus package") includes a fairly generous quantum of financial support to various groups of the vulnerable population. The

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[1] In addition to the budgetary matters discussed in this paper, it should also be mentioned that administration mobilized civilians ---particularly students--- and the army and did rapid biometric digital survey. It also issued identification cards to the refugees who number more than a million. The distribution of basic amenities has been organised on family basis keeping in mind the family structure, that is how many members, how many children or adults etc. are to be provided for. They are now being given fortnightly living assistance. The govt. has a data base of 5 million extreme poor, elderly, widow etc. who are to receive different kinds of support. If they can add--- with assistance from competent expert help from the civil society--- 1.5 million vulnerable people (the "new poor") and do biometric survey quickly issuing them accurate biometric cards that will open path to proper   distribution. Through such quick targeting which should err on the side of inclusion---not exclusion--- the "new poor" can receive their required rice, dal, cooking oil etc. from distribution centers at the ward or union level. The army along with civil administration and local people can do the survey rapidly. The difficulty in distribution and problems of corruption can be overcome to a great extent by this process involving ordinary local people and civil society volunteers. Bangladesh has food self-sufficiency and that is a great achievement. I have discussed the details in my earlier report to IFPRI which is based on comprehensive national and regional data. How to ensure distributive justice for food is important. Here biometric survey is important and the Rohingya survey of 1 million has shown that Bangladesh has the capacity to do this with dispatch. We should also note the fact that the govt. has been successful in sending laborers to harvest in the *Haor* areas, known as the rice bowl of Bangladesh. I am grateful to Mr. Mofidul Hoque, director and one of the key founders of *Muktijuddho Jadughor* and his colleagues for providing me with much needed local on-ground information.

purpose of this note is to help direct the strategic allocation of this support to the affected population and geographical areas on the basis of some preliminary data analysis and economic modeling using both sectoral data and *the economy wide consistent multi-sectoral* data captured by the detailed 2017 Social Accounting Matrix (SAM-2017). SAM-2017 is a square table consisting of equal numbers of rows and columns. The detailed description is given in annex 4. Suffice it to mention here that SAM-2017 is the most up-to-date consistent data set with enough ( about 100) productive activities and commodities, labor and capital categories and household groups to enable us to carry out exercises that even many developed countries cannot achieve at the moment because of lack of such consistent data sets disaggregated for recent years.

The results are preliminary but so far the best quantitative estimates available for an economy wide impact analysis that can give the GoB implementing bodies some guidance through relatively more specific recommendations.

For optimal decision making it is necessary to think in terms of distinct but overlapping decision and implementation phases. In order to keep the different time frames of analysis distinct., we propose to deal with three different time scales:

1. The immediate crisis with a time horizon of from now to three months into the future—the main problem will be to contain the infection and prevent widespread hunger and shortages along with giving incentives for the private sector to follow an optimal restorative path.
2. From 3 months into the future covering 12 months of fiscal year FY2021. Here the main task will be to identify the key strategic sectors and restore production, domestic consumption and exports.
3. Beyond FY2020. Here we need to be forward looking and consistent with Vision 2041 and $8^{th}$ FYP, design the best growth path with distributional equity.

In this document we deal with the first two time-frames together giving immediate practical priority to the first 3-months action agenda. After the economy and society get out of the immediate crisis and the economy returns to a stable but realistic growth path within the next 18 months, key strategic decisions regarding the third time frame will need to be made. PRI team is working on various issues related to this phase. We hope that we will be ready with the long-term plan before the time to make those strategic decisions come.

## 1. The immediate crisis with a time horizon of 3-6 months

### 1.1 Public Health Issues and Aid: identifying the hotspots and prioritizing directing aid to the appropriate places[2]

Unlike India, to the best of my knowledge, we have not estimated a SIR (Susceptibility-Infections-Recovery) or SEIR(Susceptibility-Exposure-Infection-Recovery) model to derive the optimal lockdown periods either with continuous or with several carefully sequenced lockdowns. In the absence of such work, the updated information from IEDCR and their updated maps are the best guides to the ordering of priority to be given to the various affected Upazillas and Thanas.

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[2] See annex 6 for a summary description of the standard epidemiological models---SIR and SEIR models--- and a road map of what needs to be done for optimal targeting of population during a pandemic such as the present one.

From the best available information a two-tiered budgetary approach seems appropriate. Since the epidemiological diffusion situation is an evolving one. aid going towards buying PPE and other equipment and for adequate testing should be given to the presently affected areas first while a reserve fund should be maintained for future affected areas or for those areas where there will be an intensification of the infection, sickness and mortalities. The amount and proportions should be up to the discretion of expert advisor group of public health professionals and including social scientists who have studied public health issues in Bangladesh.

### 1.2 Economic Impact Issues and Countervailing Policies for the first 3 to 12 months:

**1.2.1** : The most immediate issue is to prevent starvation and hunger. Both cash transfers and aid-in-kind to the affected groups will be necessary. From the poverty data we have the government claims to have identified 100 spatial sites. From the SAM-2017, we find that the poor areas in the North such as Kurigram and Dinajpur, central districts such as Dhaka and Narayanganj, and the southern areas such as Bandarban and Naikhongchhori will experience the most acute food shortages. Quick identification of the poor families and effective delivery of food aid in particular will be the key required actions. Undoubtedly, there will be some leakage. Working with reliable government officials, volunteers and local people who have a reputation for being reliable will be crucial.[3]

The is not adequate to support the workers and families who will need at least BDT 3000 per month for the next 3 to months. Both the BD LFS and the SAM-2017 indicate that about 80 to 85 percent of workers are in the informal sector. However, the steps the government has taken are a good start. Let us discuss these steps with our comments and recommendations based on existing evidence.

**We know from the Bangladesh government documents that the government has taken the following steps:**

a) Free food distribution;

b) Sale of rice under Open Market Sale (OMS) program with a highly subsidized price (Taka 10 per kg);

c) Cash transfer to the targeted vulnerable population;

d) Expansion of allowance programs (Old Age Allowance and Allowance for Widow/husband Deserted Women) to all eligible persons (100 percent) of the 100 most poverty stricken Upazilas of the country;

e) Expedite construction of house for the homeless people.

These are reasonable steps. From the SAM-based multipliers we have derived, it is possible to confirm that all of these measures will have immediate and longer term impacts if implemented immediately with some degree of effectiveness. The objective should be to minimize leakage and deliver aid to the targeted groups immediately. As the earlier PRI policy brief by Mansur, Razzaque and Khondker (2020) suggest, emphasis should be given to "…the government-to-person (G2P)

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[3] Dr. S. Akhtar Mahmood, formerly with the World Bank Group, has suggested some strategic ideas for monitoring implementation progress and assessing impact of the support programs. These will help ensure the effectiveness of the programs. See his article in the Dhaka Tribune, https://www.dhakatribune.com/opinion/op-ed/2020/04/19/what-gets-measured-gets-done-2

cash transfer programme [to be] implemented through the existing digital financial system (DFS) infrastructure, upholding the social distancing rules, with the beneficiaries receiving their allowances in their mobile financial system (MFS) accounts."

They advocate such a program covering 12 million households Their estimate of monthly allowance required is the same as mine stated earlier. The SAM-based calculations direct and indirect effects of injection of funds into the top 10 value added sectors in Bangladesh economy on the eight different household groups which include both rural and urban households at various levels of income and classified according to other related socio-economic criteria, are given below in table 1:

**Table 1: Multipliers for eight different household groups for the top 10 value added sectors**

| | Retail Trade | Land Transport | Other Services | Building | Wholesale Trade | Paddy Cultivation | Public Administration & Defense | RMG-Woven | RMG-Knitting | Miscellaneous Industry |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sectoral VA** | 1,512,540 | 1,404,807 | 1,322,765 | 1,037,226 | 927,041 | 831,226 | 784,407 | 660,534 | 636,446 | 440,973 |
| **Rank of % GTVA** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **% GTVA** | 8.09% | 7.51% | 7.07% | 5.55% | 4.96% | 4.45% | 4.19% | 3.53% | 3.40% | 2.36% |
| **Small Farmer** | 0.232 | 0.224 | 0.274 | 0.187 | 0.24 | 0.182 | 0.254 | 0.212 | 0.199 | 0.183 |
| **Medium Farmer** | 0.166 | 0.161 | 0.193 | 0.135 | 0.172 | 0.135 | 0.18 | 0.153 | 0.143 | 0.132 |
| **Large Farmer** | 0.148 | 0.155 | 0.133 | 0.135 | 0.151 | 0.169 | 0.137 | 0.148 | 0.133 | 0.13 |
| **Non-Farm SE** | 0.199 | 0.207 | 0.187 | 0.18 | 0.204 | 0.218 | 0.189 | 0.197 | 0.178 | 0.174 |
| **Non-Farm WE** | 0.42 | 0.404 | 0.498 | 0.337 | 0.435 | 0.328 | 0.46 | 0.384 | 0.36 | 0.331 |
| **Day Labour** | 0.179 | 0.173 | 0.212 | 0.144 | 0.186 | 0.141 | 0.196 | 0.164 | 0.154 | 0.142 |
| **Salaried** | 0.218 | 0.214 | 0.243 | 0.181 | 0.225 | 0.188 | 0.23 | 0.203 | 0.189 | 0.177 |
| **Self-Empl.** | 0.203 | 0.212 | 0.188 | 0.185 | 0.208 | 0.226 | 0.191 | 0.202 | 0.182 | 0.178 |

Source: author's calculation for 2017 SAM
2017 SAM was kindly made available to the author by Prof. B.H.Khondker, Director, PRI

Scrutinizing Table 1, we can see that in addition to the RMG sector which most commentators have focused on so far, there are other sectors that also contribute significantly in terms of total value added going to the various households including the poor households. Of course, it should be kept in mind that the SAM separates out knitting from the RMG sector; but these two sectors should be counted together to gage the importance of the entire "RMG" sector. [4]If we follow the first row of the table which gives the sectoral value added for the top 10 sectors as a percentage of GDP, we can see that other sectors such as Retail Trade, Land Transport, Other Services, Building, Wholesale Trade and Paddy Cultivation are also large sectors and some are quite important in generating employment and incomes especially for impoverished households such as small farmers and day laborers.

There are other steps the government has taken all of which need to be channeled efficiently. There are issues regarding financing efficiently these and other expenditures that do not necessarily require austerity. My own approach to public finance in difficult times discussed in the context of Global Financial Crises (Khan 2004b; 2011, forthcoming 2020) prefigures what Krugman (2013)

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[4] I am grateful to Dr. Zaidi Sattar for pointing out that we should take Knitting into account in assessing the importance of RMG sector

and others have suggested more recently. In times of crisis such as the present one, out-of-the box anti-austerity financing is the needed call of the hour.[5]

Here are tables representing the impact on employment that would result from a 1 crore taka injection in the top 10 value added sectors. The results have been differentiated by location, gender and skill level for closer analysis.

**Table 2: Employment outcomes in Skilled and Unskilled Sector for 1 crore taka injection**

| | Retail Trade | Land Transport | Other Services | Building | Wholesale Trade | Paddy Cultivation | Public Administration and Defense | RMG-Woven | RMG-Knitting | Miscellaneous Industry |
|---|---|---|---|---|---|---|---|---|---|---|
| Rank % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| %GTVA | 8.09% | 7.51% | 7.07% | 5.55% | 4.96% | 4.45% | 4.19% | 3.53% | 3.40% | 2.36% |
| No. of Extra Unskilled Labour | 483.36 | 607.62 | 1444.73 | 557.06 | 641.22 | 621.84 | 365.83 | 491.0 | 473.43 | 131.55 |
| No. of Extra Skilled Labour | 242.69 | 640.36 | 89.36 | 152.27 | 154.68 | 328.13 | 161.86 | 212.1 | 194.60 | 64.07 |

Source: Author's Calculation from Employment 2019 Matrix

**Table 3: Rural Employment outcomes for 1 crore taka injection differentiated by gender and skill level**

| | Retail Trade | Land Transport | Other Services | Building | Wholesale Trade | Paddy Cultivation | Public Administration and Defense | RMG-Woven | RMG-Knitting | Miscellaneous Industry |
|---|---|---|---|---|---|---|---|---|---|---|
| Rank % | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| %GTVA | 8.09% | 7.51% | 7.07% | 5.55% | 4.96% | 4.45% | 4.19% | 3.53% | 3.40% | 2.36% |
| No. of Extra Unskilled Labour | 320.06 | 406.38 | 724.42 | 382.66 | 412.34 | 577.05 | 182.92 | 122.75 | 231.30 | 69.82 |
| No. of Extra Skilled Labour | 98.48 | 210.23 | 40.08 | 57.24 | 50.65 | 284.83 | 80.93 | 106.07 | 39.80 | 9.64 |
| No. of Extra LS Rural Male | 292.44 | 395.83 | 348.79 | 362.70 | 386.69 | 517.83 | 142.28 | 61.37 | 151.11 | 59.86 |
| No. of Extra HS Rural Male | 96.68 | 210.23 | 25.15 | 49.81 | 47.91 | 277.79 | 71.56 | 106.07 | 39.80 | 9.64 |
| No. of Extra LS Rural Female | 27.62 | 10.54 | 375.63 | 19.96 | 25.65 | 59.22 | 40.63 | 61.37 | 80.18 | 9.96 |
| No. of Extra HS Rural Female | 1.80 | 0.00 | 14.93 | 7.43 | 2.74 | 7.03 | 9.37 | 0.00 | 0.00 | 0.00 |

Source: Author's Calculation from Employment 2019 Matrix
Notation: LS = low skilled, HS = high skilled

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**Table 4: Urban Employment outcomes for 1 crore taka injection differentiated by gender and skill level**

| | Retail Trade | Land Transport | Other Services | Building | Wholesale Trade | Paddy Cultivation | Public Administration and Defense | RMG-Woven | RMG-Knitting | Miscellaneous Industry |
|---|---|---|---|---|---|---|---|---|---|---|
| **Rank %** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| **%GTVA** | 8.09% | 7.51% | 7.07% | 5.55% | 4.96% | 4.45% | 4.19% | 3.53% | 3.40% | 2.36% |
| **No. of Extra Unskilled Labour** | 163.30 | 201.25 | 720.31 | 174.40 | 228.89 | 44.79 | 182.92 | 368.25 | 242.13 | 61.73 |
| **No. of Extra Skilled Labour** | 144.21 | 430.13 | 49.28 | 95.04 | 104.03 | 43.31 | 80.93 | 106.07 | 154.80 | 54.43 |
| **No. of Extra LS Urban Male** | 147.75 | 195.68 | 210.10 | 165.75 | 209.66 | 38.65 | 142.28 | 122.75 | 115.80 | 55.06 |
| **No. of Extra HS Urban Male** | 135.45 | 373.20 | 32.13 | 94.46 | 99.54 | 40.22 | 71.56 | 106.07 | 152.59 | 50.86 |
| **No. of Extra LS Urban Female** | 15.54 | 5.57 | 510.22 | 8.65 | 19.23 | 6.14 | 40.63 | 245.50 | 126.33 | 6.67 |
| **No. of Extra HS Urban Female** | 8.76 | 56.93 | 17.15 | 0.58 | 4.49 | 3.09 | 9.37 | 0.00 | 2.21 | 3.57 |

Source: Author's Calculation from Employment 2019 Matrix
Notation: LS = low skilled, HS = high skilled

We now look at the poverty data in Bangladesh with a finer spatial differentiation by looking at the HIES 2016 data closely from poverty analysis perspective. It should be underlined that we have many more than the top 30 subnational regions shown in Annex 4. In fact, we have ranked several hundred subnational regions that can be made available if needed.

If we look at the top 5 areas with deep poverty under each of the categories below certain regions claim our attention. These are Kurigram and Dinajpur in the Northwest, Bandarban and Naikhongchhori in the Southeast, Kishoreganj in the central area and Magura in the Sothwest. In addition, areas like Dhaka and Narayanganj have been identified as hotspots of COVID-19 infection and deserve special attention. The strategy suggested by this is that for rapid action, priority lists will not be difficult if we look at detailed regional lists like those presented below which are subsets from larger lists that are also available and can be provided upon request..

The Annex 4 lists 4.1 to 4.20 have been compiled by looking at subnational units within Bangladesh. These lists present both aggregate poverty in various subnational units in terms of total nos. and through differentiation by gender etc. We have chosen to present top 30 areas in annex 4 terms of headcount ratios. These are given in annex 4 for allocating aid to the poorer subnational entities by ranking them from the poorest to the less poor by location. The differentiation according to gender should also help guide aid when gender is a critical category for priority in aid allocation. Instead of dictating our own values to the policy makers we leave it to them to allocate aid using the information in this paper and their own value and practical policy judgements. But the positive information and ranking should be helpful in this decision-making process. For example, if moderate poverty is the issue being addressed, then Annex List 4.3 shows the top thirty priority areas of concern in Bangladesh. Likewise, Annex List 4.2 shows the top thirty regions of concern in Bangladesh when female poverty is of concern. We also see that there are considerable regional overlaps in different Annex 4 lists as well. Along with our tables of SAM multipliers, these subnational regional poverty lists with ranking according to the extent of poverty should help focus policy debate clearly and one hopes will make it easier to reach optimality given the value

judgements of the policymakers which ideally should reflect a value consensus among those who are the most affected.[6]Below we select only the 5 most affected areas from each list in Annex 4 for illustrative purposes. The policymaker will have at her disposal several hundred ranked areas under each list which we can provide if needed.

**For Example,**

**List of Ranking of Poverty Level, distributed by location (district level) and gender**
**List 1. Highest 5 Upper Poverty Limit (Male)**
(1) KURIGRAM - 71.07; (2) BANDARBAN - 63.7 ;(3) DINAJPUR- 63.2; (4) MAGURA - 56.48;
(5) KISHOREGONJ - 53.64
**List 2. Highest 5 Upper Poverty Limit (Female)**
(1) KURIGRAM- 70.97; (2) DINAJPUR- 65.47; (3) BANDARBAN- 62.79; (4) MAGURA - 56.83;
(5) KHAGRACHHARI- 54.37
**List 3. Highest 5 Upper Poverty Limit (National)**
(1) KURIGRAM- 71.02; (2) DINAJPUR- 64.335; (3) BANDARBAN- 63.245; (4) MAGURA- 56.655;
(5) KISHOREGONJ -53.57
**List 4. Highest 5 Lower Poverty Limit (Male)**
(1) KURIGRAM- 53.88; (2) BANDARBAN- 50.64; (3) DINAJPUR- 43.65; (4) MAGURA- 37.05;
(5) JAMALPUR-35.46
**List 5. Highest 5 Lower Poverty Limit (Female)**
(1) KURIGRAM- 54.24; (2) BANDARBAN- 49.98; (3) DINAJPUR- 46.51; (4) MAGURA- 38.27;
(5) JAMALPUR-34.94
**List 6. Highest 5 Lower Poverty Limit (National)**
(1) KURIGRAM- 54.06; (2) BANDARBAN- 50.31; (3) DINAJPUR- 45.08; (4) MAGURA- 37.66;
(5) JAMALPUR-35.2
**List 7. Highest 5 Upper Poverty Limit (Rural)**
(1) KURIGRAM- 74.1; (2) BANDARBAN- 67.4; (3) DINAJPUR- 66.2; (4) MAGURA- 62.2;
(5) KHAGRACHHARI -61.1
**List 8. Highest 5 Upper Poverty Limit (Urban)**
(1) KISHOREGONJ - 66.7; (2) JAMALPUR - 63.2; (3) PATUAKHALI - 61.0; (4) KURIGRAM - 56.1;
(5) DINAJPUR -54.4
**List 9. Highest 5 Lower Poverty Limit (Rural)**
(1) KURIGRAM- 57.4; (2) BANDARBAN- 53.3; (3) DINAJPUR- 46.9; (4) MAGURA- 43.4;
(5) KHAGRACHHARI -39.6
**List 10. Highest 5 Lower Poverty Limit (Rural**
(1) BANDARBAN - 42.6; (2) KISHOREGONJ - 38.4; (3) KURIGRAM - 38.3; (4) ) JAMALPUR - 36.3;
(5) PATUAKHALI -36.1

**List of Ranking of Poverty Level, distributed by location (thana/upazilla level) and gender**
**List 11. Highest 5 Upper Poverty Limit (Male)**
(1) NAIKHONGCHHARI- 91.57; (2) ALIKADAM- 89.39; (3) KAHAROLE - 88.24; (4) CHILMARI - 85.14;
(5) CHAR RAJIBPUR - 84.03
**List 12. Highest 5 Upper Poverty Limit (Female)**
(1) NAIKHONGCHHARI- 91.04; (2) ALIKADAM- 86.87; (3) KAHAROLE - 84.62; (4) CHAR RAJIBPUR - 84;
(5) BOCHAGANJ - 82.61
**List 13. Highest 5 Upper Poverty Limit (National)**
(1) NAIKHONGCHHARI- 91.305; (2) ALIKADAM- 88.13; (3) KAHAROLE - 86.43; (4) CHAR RAJIBPUR -
84.015; (5) CHILMARI - 81.81
**List 14. Highest 5 Lower Poverty Limit (Male)**
(1) NAIKHONGCHHARI- 85.89; (2) ALIKADAM- 74.66; (3) CHAR RAJIBPUR- 74.06; (4) CHILMARI -73.05;
(5) KAHAROLE-70.59
**List 15. Highest 5 Lower Poverty Limit (Female)**
(1) NAIKHONGCHHARI- 87.46; (2) ALIKADAM- 73.18; (3) CHAR RAJIBPUR- 69.17; (4) KULIAR CHAR -
67.05; (5) KAHAROLE- 66.67

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6 This can be justified by applying Rawlsian difference principle leading to the maximin rule, i.e. benefit the least advantaged during any distribution of resources.

**List 16. Highest 5 Lower Poverty Limit (National**
(1) NAIKHONGCHHARI- 86.675; (2) ALIKADAM- 73.92; (3) CHAR RAJIBPUR- 71.615; (4) KAHAROLE- 68.63; (5) CHILMARI- 67.74
**List 17. Highest 5 Upper Poverty Limit (Rural)**
(1) MATLAB DAKSHIN- 93.5; (2) CHAR RAJIBPUR- 90.3; (3) BURICHANG- 87.8; (4) JAGANNATHPUR- 86.3; (5) ALFADANGA - 85.5
**List 18. Highest 5 Upper Poverty Limit (Urban)**
(1) HOMNA- 97.4; (2) GHIOR- 96.1; (3) BURICHANG - 92.7; (4) AKHAURA- 91.0; (5) KAHAROLE - 88.8
**List 19. Highest 5 Lower Poverty Limit (Rural)**
(1) MATLAB DAKSHIN-88.8; (2) CHAR RAJIBPUR- 85.4; (3) ALFADANGA- 77.1; (4) BURICHANG-72.2; (5) JAGANNATHPUR- 68.5
**List 20. Highest 5 Lower Poverty Limit (Rural)**
(1) GHIOR- 86.4; (2) KAHAROLE- 84.1; (3) BURICHANG- 76.5; (4) GODAGARI- 73.7; (5) AKHAURA- 70.8

**1.22 Salary support to export oriented manufacturing industry workers** under which government has already provided BDT 50 billion from budget resource to Bangladesh Bank for creating a fund. The fund will be provided to export-oriented businesses through commercial banks as interest-free loan so that factories can pay salary of their employees. The banks will only charge 2 percent of the loan disbursed amount as their operating commission;

**Here several observations are in order:**

**1.1** There are non-export sectors such as construction and transportation sectors shown in table 1 and others in the subsequent tables in the text and in the annexes that make a large contribution to GDP and employment. In fact, through the input-output table and SAM we can identify and derive a larger list of sectors which should receive government support. The employment distribution data collected by Prof. B.H. Khondker and his team as we show later, can be particularly helpful here. The initial allocation of BDT 50 billion will need to be augmented.

We now separate out the unskilled and skilled workers situation for the top 10 sectors in our attempt to look closely at the component of household income coming from labor. Here we can see that RMG is the sector that comes out on top from this angle. But Knitting, Misc. Industry, Transport Equipment, Basic Metal Manufacturing, Rice Milling etc. are also significant. Thus the package for increasing aggregate demand through aid to various sectors will need to include these sectors as strategic also.

**Table 5: Multipliers for top 10 VA in manufacturing sector for skilled and unskilled labor**

| Commodity | Sectoral Value Added | Rank of % of GTVA | % of GTVA | Multiplier for Skilled Labour | Multiplier for Unskilled Labuor |
|---|---|---|---|---|---|
| **RMG-Woven** | 660,533.60 | **1** | 3.53% | **0.532** | **0.485** |
| **RMG-Knitting** | 636,446.40 | **2** | 3.40% | **0.513** | **0.444** |
| **Miscellaneous Industry** | 440,972.83 | **3** | 2.36% | **0.533** | **0.509** |
| **Transport Equipment** | 360,572.50 | **4** | 1.93% | **0.436** | **0.424** |
| **Basic Metal M** | 143,214.39 | **5** | 0.77% | **0.429** | **0.448** |
| **Rice Milling** | 107,977.75 | **6** | 0.58% | **0.496** | **0.425** |
| **Other Processed Food** | 104,579.98 | **7** | 0.56% | **0.462** | **0.423** |

| Commodity | Sectoral Value Added | Rank | % | | |
|---|---|---|---|---|---|
| Cloth Milling | 76,041.41 | 8 | 0.41% | 0.45 | 0.432 |
| Tanning and Finishing | 48,489.09 | 9 | 0.26% | 0.55 | 0.461 |
| Sweetener Industry | 40,924.74 | 10 | 0.22% | 0.55 | 0.571 |

Source: author's calculation from Bangladesh SAM 2017

We now turn to table 6 which gives a picture of employment in the top 10 sectors by looking at unskilled and skilled labor situation separately.

**Table 6: Employment in Top 10 VA in manufacturing sector for skilled and unskilled labor**

| Commodity | Sectoral Value Added | Rank of % of GTVA | % of GTVA | Rank Lab. Unsk/GTVA | Lab. Unsk./GTVA Percent | Rank Lab. Sk./GTVA | Lab. Sk./GTVA Percent | Rank Cap./GTVA | Cap./GTVA Percent | Rank Lab. Unsk/VA | Lab. Unsk./VA Percent | Rank Lab. Sk./VA | Lab. Sk./VA Percent | Rank Cap./VA | Cap./VA Percent |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RMG-Woven | 660,533.60 | 1 | 3.53% | 6 | 1.35% | 6 | 0.87% | 6 | 1.31% | 6 | 38.31% | 13 | 24.70% | 24 | 36.99% |
| RMG-Knitting | 636,446.40 | 2 | 3.40% | 7 | 1.24% | 5 | 0.89% | 7 | 1.27% | 11 | 36.53% | 11 | 26.22% | 23 | 37.25% |
| Miscellaneous Industry | 440,972.83 | 3 | 2.36% | 9 | 0.74% | 11 | 0.52% | 10 | 1.10% | 17 | 31.26% | 15 | 22.15% | 19 | 46.59% |
| Transport Equipment | 360,572.50 | 4 | 1.93% | 12 | 0.44% | 14 | 0.31% | 8 | 1.18% | 25 | 22.71% | 23 | 16.09% | 4 | 61.20% |
| Basic Metal M | 143,214.39 | 5 | 0.77% | 19 | 0.22% | 19 | 0.16% | 21 | 0.39% | 19 | 28.68% | 17 | 20.33% | 15 | 50.99% |
| Rice Milling | 107,977.75 | 6 | 0.58% | 21 | 0.21% | 25 | 0.10% | 26 | 0.27% | 12 | 36.13% | 22 | 17.05% | 18 | 46.82% |
| Other Processed Food | 104,579.98 | 7 | 0.56% | 29 | 0.14% | 24 | 0.11% | 25 | 0.31% | 22 | 24.43% | 19 | 19.64% | 10 | 55.93% |
| Cloth Milling | 76,041.41 | 8 | 0.41% | 23 | 0.17% | 21 | 0.12% | 32 | 0.12% | 4 | 42.73% | 8 | 28.73% | 29 | 28.55% |
| Tanning and Finishing | 48,489.09 | 9 | 0.26% | 31 | 0.12% | 33 | 0.02% | 31 | 0.12% | 3 | 44.79% | 28 | 8.82% | 20 | 46.39% |
| Sweetener Industry | 40,924.74 | 10 | 0.22% | 32 | 0.11% | 28 | 0.07% | 33 | 0.04% | 2 | 50.33% | 7 | 33.10% | 32 | 16.58% |

Source: author's calculation from Bangladesh SAM 2017

Clearly the RMG sector is important; but it ranks number 6 unskilled and skilled labor categories relative to the others in the top 10 category. Knitting and Cloth Milling along with RMG can be target sectors that can help workers significantly. If we look closely at the location, skills and gender of workers more closely as in the following table, this conclusion gains further support.

**Table 7: 10 Highest employment areas in manufacturing sector for skilled and unskilled labor, classified according to gender and location (in millions)**

| Commodity | Sectoral Value Added | % of GTVA | M.R LS Lab. | M.R MS Lab. | M.R HS Lab. | W.R LS Lab. | W.R MS Lab. | W.R HS Lab. | M.U LS Lab. | M.U MS Lab | M.U HS Lab. | W.U LS Lab. | W.U MS Lab. | W.U HS Lab. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RMG-Woven | 660,533.60 | 3.53% | 0.02 | 0.01 | 0.00 | 0.02 | 0.02 | 0.0 | 0.04 | 0.09 | 0.01 | 0.08 | 0.06 | 0.00 |
| RMG-Knitting | 636,446.40 | 3.40% | 0.06 | 0.13 | 0.00 | 0.03 | 0.03 | 0.00 | 0.05 | 0.08 | 0.01 | 0.05 | 0.04 | 0.00 |
| Miscellaneous Industry | 440,972.83 | 2.36% | 0.08 | 0.09 | 0.00 | 0.01 | 0.01 | 0.00 | 0.08 | 0.09 | 0.01 | 0.01 | 0.01 | 0.00 |
| Transport Equipments | 360,572.50 | 1.93% | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 |
| Furniture Industry | 206,330.48 | 1.10% | 0.34 | 0.14 | 0.01 | 0.02 | 0.02 | 0.00 | 0.14 | 0.09 | 0.01 | 0.01 | 0.01 | 0.00 |
| Basic Metal M | 143,214.39 | 0.77% | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 |
| Rice Milling | 107,977.75 | 0.58% | 0.07 | 0.04 | 0.00 | 0.03 | 0.00 | 0.00 | 0.01 | 0.01 | 0.00 | 0.01 | 0.00 | 0.00 |
| Cloth Milling | 76,041.41 | 0.41% | 0.05 | 0.03 | 0.00 | 0.17 | 0.05 | 0.00 | 0.02 | 0.02 | 0.00 | 0.04 | 0.03 | 0.00 |
| Yarn | 32,589.17 | 0.17% | 0.05 | 0.05 | 0.00 | 0.03 | 0.02 | 0.00 | 0.03 | 0.02 | 0.01 | 0.02 | 0.01 | 0.00 |

Source: author's calculation from Bangladesh SAM 2017
Notation: M = Men, W=Women, R=Rural, U=Urban, LS=Low Skilled, MS=Medium Skilled, HS= High Skilled
Thus, M.R LS Lab. = Men Rural Low Skilled Labour

We need to consider relief loan proposals along with the data above to get a more complete picture of the relief package. The government has also proposed judiciously a low rate of interest for loans to affected sectors However, the interest rate proposed—though low ---may still prove to be onerous. Some provision for loan forgiveness if there is evidence of good faith effort so that moral hazard and adverse selection problems can be minimized may be necessary also.

2. **Working Capital for affected industries and service sector** has been announced under which a total of BDT 300 billion loan will be provided by commercial banks to affected businesses with annual interest rate of 9 percent. Out of this, the businesses will pay interest of 4.5 percent and rest 4.5 percent will be paid by government from its budgetary resources as interest subsidy.

Again, even 4,5 percent may be burdensome for some businesses. A flexible case-by-case approach may be optimal even for addressing the issue from purely efficiency perspective.

3. **Working Capital for Small and Medium Industries (including Cottage Industries)** has been announced under which a total of BDT 200 billion loan will be provided by commercial banks to affected businesses with annual interest rate of 9 percent. Out of this, the businesses will pay interest of 4 percent and rest 5 percent will be paid by government from its budgetary resources as interest subsidy.

   Again, the same observation as under point 2 above applies here.

4. **Export Development Fund (EDF) size increased and interest rate reduced.** The size of EDF will be increased from 3.5 billion USD to 5.0 billion USD to facilitate the import of raw materials under the Back-to-back Letter of Credit. The existing interest rate of EDF (LIBOR plus 1.5 percent sum total 2.73%) has been reduced to 2 percent (fixed).

**The interest rate here may be reasonable. But from our SAM-based calculations, the size of the fund may need to be increased by at least 50 per cent.**

5. **A new Pre-Shipment Credit Refinance Scheme will be launched** by Bangladesh Bank with a total fund size of BDT 50 billion. Interest rate of this credit facility will be 7.0 percent.

**Here the size of the fund will need to be increased and the interest rate reduced.**

6. **Special Honorarium:** Government doctors, nurses and medical workers who are directly engaged in treating COVID-19 patients will be listed and given special honorarium.

This is a good idea. Together with transfers to other workers and needy people, this should help to raise the effective demand. The following table derived from our model can help guide the quantitative targets to be set by the government. Clearly, the skilled professionals and the economy will benefit from injections given the relatively higher multiplier value here. But the unskilled health and insurance service workers will need a reasonably higher package to meet their immediate needs over the next three to twelve months period.

**Table 8: Multipliers for skilled workers in health and related service sectors**

|  | Health Service | Insurance Service |
|---|---|---|
| **Labour Unskilled** | 0.316 | 0.38 |
| **Labour Skilled** | 0.597 | 0.654 |

Source: author's calculation from Bangladesh SAM 2017

7. **Health Insurance and Life Insurance:** Doctors, nurses, health workers , administrative officials, members of law enforcing agencies, army personnel and other staff of the republic who are directly engaged and if any of them become infected in discharging their duties, they will be given health insurance from 5 to 10 lac taka, depending on his/her rank as health insurance and life insurance coverage will be given 5 times of that amount.

Whether the amount proposed is adequate will need to be determined on the basis of costs and needs. **Here also from the SAM-based analysis, the lower income households will need more of a safety net than the higher income households.**

8. **Expansion of Allowance Programs**: Programs under social protection like Old Age Allowance and Allowance for Widow/husband Deserted Women will be expanded to cover all eligible person (100 percent) of the 100 most poverty stricken Upazilas of the country. For this 815 crore taka will be allocated.

Going back to our table 1 in particular and the tables that follow from the household income and expenditure data (2016) which are very detailed and the SAM- 2017, it appears that 815 crore taka will not be adequate for this purpose. **Based on the information from HIES 2016 and SAM-based modeling, my recommendation is to increase this support by at least 50 percent and monitor the situation closely to see if further assistance in the poorest Upazillas will be needed.**

Clearly, a government sponsored program is necessary since the private sector even in a wealthy country like the USA has proved unwilling and/or unable to undertake this task in the health care sector. From the SAM- based analysis, I estimate that the amount will need to be augmented by at least 60 per cent.

9. **Construction of houses for the homeless people:** On the birth centenary of the Father of the Nation, construction of houses for homeless people will be expedited In current fiscal, 630 crore taka allocated and next fiscal 1500 core taka will be allocated.

This will be a good start. It will also help jumpstart the construction sector which I have already identified through SAM-2017 as a key strategic sector in addition to the RMG and other export-oriented sectors.

**Table 9: Multipliers for skilled and unskilled workers in construction and related sectors from SAM-based calculations**

|  | **Building** | **Agriculture Construction** | **Other Construction** | **Kutcha House** |
|---|---|---|---|---|
| **Labour Unskilled** | 0.501 | 0.401 | 0.456 | 0.516 |
| **Labour Skilled** | 0.389 | 0.328 | 0.364 | 0.405 |

Source: author's calculation from Bangladesh SAM 2017

**Procurement**: To ensure fair price to the farmers, Food Ministry will increase procurement by two lac ton more.

This will be a good move. The storage facilities have been increased since 2008; but care must be taken to ensure that the rice will not spoil and be available for meeting the demands of the needy groups.

**Table 10: Multipliers for paddy and related Agricultural sectors for skilled and unskilled labor and for rural household groups**

| | Paddy Cultivation | Wheat Cultivation | Other Grain Cultivation | Jute Cultivation | Sugarcane Cultivation | Potato Cultivation | Vegetable Cultivation | Pulses Cultivation | Oilseed Cultivation | Fruit Cultivation | Cotton Cultivation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Labour Unskilled** | 0.479 | 0.142 | 0.425 | 0.516 | 0.434 | 0.448 | 0.419 | 0.163 | 0.346 | 0.323 | 0.001 |
| **Labour Skilled** | 0.361 | 0.12 | 0.355 | 0.338 | 0.336 | 0.402 | 0.402 | 0.148 | 0.272 | 0.331 | 0.001 |
| **Small Farmer** | 0.182 | 0.057 | 0.169 | 0.187 | 0.17 | 0.183 | 0.174 | 0.068 | 0.134 | 0.145 | 0.001 |
| **Medium Farmer** | 0.135 | 0.042 | 0.125 | 0.139 | 0.127 | 0.134 | 0.126 | 0.051 | 0.099 | 0.109 | 0 |
| **Large Farmer** | 0.169 | 0.051 | 0.157 | 0.183 | 0.173 | 0.159 | 0.135 | 0.067 | 0.125 | 0.157 | 0.001 |
| **Non-Farm SE** | 0.218 | 0.066 | 0.203 | 0.235 | 0.222 | 0.207 | 0.178 | 0.086 | 0.162 | 0.2 | 0.001 |
| **Non-Farm WE** | 0.328 | 0.102 | 0.305 | 0.336 | 0.305 | 0.33 | 0.314 | 0.122 | 0.242 | 0.261 | 0.001 |
| **Salaried** | 0.141 | 0.044 | 0.131 | 0.144 | 0.131 | 0.141 | 0.134 | 0.053 | 0.104 | 0.112 | 0 |
| **Self-employed** | 0.188 | 0.058 | 0.175 | 0.196 | 0.181 | 0.186 | 0.171 | 0.072 | 0.139 | 0.158 | 0.001 |

Source: author's calculation from Bangladesh SAM 2017

| | Tobacco Cultivation | Tea Cultivation | Spice Cultivation | Flower Cultivation | Other Crop Cultivation | Livestock Rearing | Poultry Rearing | Shrimp Farming | Inland Fishing | Marine Fishing |
|---|---|---|---|---|---|---|---|---|---|---|
| **Labour Unskilled** | 0.43 | 0.433 | 0.43 | 0.398 | 0.075 | 0.491 | 0.464 | 0.446 | 0.446 | 0.449 |
| **Labour Skilled** | 0.365 | 0.345 | 0.368 | 0.401 | 0.064 | 0.45 | 0.374 | 0.486 | 0.514 | 0.482 |
| **Small Farmer** | 0.173 | 0.172 | 0.171 | 0.175 | 0.031 | 0.2 | 0.18 | 0.199 | 0.202 | 0.197 |
| **Medium Farmer** | 0.128 | 0.129 | 0.126 | 0.13 | 0.023 | 0.146 | 0.132 | 0.146 | 0.146 | 0.143 |
| **Large Farmer** | 0.165 | 0.178 | 0.147 | 0.169 | 0.03 | 0.162 | 0.155 | 0.166 | 0.15 | 0.151 |
| **Non-Farm SE** | 0.213 | 0.228 | 0.192 | 0.217 | 0.039 | 0.212 | 0.202 | 0.217 | 0.198 | 0.199 |
| **Non-Farm WE** | 0.312 | 0.309 | 0.309 | 0.314 | 0.055 | 0.362 | 0.325 | 0.359 | 0.365 | 0.355 |
| **Salaried** | 0.134 | 0.133 | 0.132 | 0.135 | 0.024 | 0.155 | 0.139 | 0.154 | 0.156 | 0.152 |
| **Self-employed** | 0.181 | 0.184 | 0.173 | 0.183 | 0.032 | 0.199 | 0.182 | 0.2 | 0.197 | 0.193 |

Source: author's calculation from Bangladesh SAM 2017

10. **Farm Mechanization**: Taka 100 crore has been allocated to Agriculture Ministry for mechanization of harvesting and another 100 crore taka will be allocated.

Consistent with our SAM-based multipliers for the paddy and other crops sectors, this scheme will help in the period beyond the first three months but may not have much impact now. For future planning, the amount will need to be increased. But this should be determined by a careful assessment of needs in the future.

11. **Agriculture Subsidy**: Taka 150 crore will be allocated for distribution of seed and sapling to the affected farmers. Besides, 9000 crore taka will be allocated as fertilizer subsidy in the next year and subsidy for irrigation will be continued.

**This may be adequate for now but should be revisited for planning beyond the crisis. My own field work done for IFPRI several years ago indicates that the needs of small farmers**

**should be addressed better. The 2017 SAM-based household analysis also supports this conclusion and recommendation.**

12. **Agriculture Refinance Scheme**: Bangladesh Bank will establish a new refinance scheme to supply working capital in agriculture sector. Interest rate for the farmers will be 4%. Small and medium farmers, flower and fruit growers, fishery, dairy and poultry farm owners at rural areas will be the beneficiaries of this fund.

**From our SAM-based analysis in the agricultural sectors and my earlier field work-based research for IFPRI, particularly for the North ern Bangladesh this should be an urgent priority. Again, the interest rate will need to be graduated according to needs and incomes of the farmers. For poor farmers the 4 % rate compounded may actually be quite burdensome.**

This is a good scheme and should help small farmers if implemented efficiently and equitably. Again, the SAM-based multipliers show roughly an effect between 2.5 and 3 times if effective demand can be increased so that the capacity utilization can also be increased realistically.

We acknowledge that the Government of Bangladesh has credibly announced a Work Plan with four major strategic programs to be implemented in immediate, short-term and long-term span. The four major strategies the government has adopted in this regard are as follows:

a. **Increased public expenditure** with a target to create job. Foreign tour and luxury expenditures will be discouraged. As the public debt to GDP ratio is very low (34 percent), increased public expenditure will not put pressure on macroeconomic stability and will not hamper the overall sustainability of the government debt;

**Table 11 : SAM-based Multipliers for top 30 VA sectors for output, skilled and unskilled labor & 8 HH groups**

|  | Retail Trade | Land Transport | Other Services | Building | Wholesale Trade | Paddy Cultivation | Public Administration and Defense | RMG-Woven | RMG-Knitting | Miscellaneous Industry |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sectoral VA** | 1,512,540.44 | 1,404,807.99 | 1,322,765.44 | 1,037,226.00 | 927,040.91 | 831,225.63 | 784,407.00 | 660,533.60 | 636,446.40 | 440,972.83 |
| **Rank %** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** |
| **%GT VA** | 8.09% | 7.51% | 7.07% | 5.55% | 4.96% | 4.45% | 4.19% | 3.53% | 3.40% | 2.36% |
| **Labour Unskilled** | 0.458 | 0.609 | 0.937 | 0.501 | 0.587 | 0.479 | 0.414 | 0.531 | 0.512 | 0.448 |
| **Labour Skilled** | 0.664 | 0.46 | 0.42 | 0.389 | 0.574 | 0.361 | 0.831 | 0.484 | 0.444 | 0.428 |
| **Small Farmer** | 0.232 | 0.224 | 0.274 | 0.187 | 0.24 | 0.182 | 0.254 | 0.212 | 0.199 | 0.183 |
| **Medium Farmer** | 0.166 | 0.161 | 0.193 | 0.135 | 0.172 | 0.135 | 0.18 | 0.153 | 0.143 | 0.132 |
| **Large Farmer** | 0.148 | 0.155 | 0.133 | 0.135 | 0.151 | 0.169 | 0.137 | 0.148 | 0.133 | 0.13 |
| **Non-Farm SE** | 0.199 | 0.207 | 0.187 | 0.18 | 0.204 | 0.218 | 0.189 | 0.197 | 0.178 | 0.174 |
| **Non-Farm WE** | 0.42 | 0.404 | 0.498 | 0.337 | 0.435 | 0.328 | 0.46 | 0.384 | 0.36 | 0.331 |
| **Salaried** | 0.179 | 0.173 | 0.212 | 0.144 | 0.186 | 0.141 | 0.196 | 0.164 | 0.154 | 0.142 |
| **Self-employed** | 0.218 | 0.214 | 0.243 | 0.181 | 0.225 | 0.188 | 0.23 | 0.203 | 0.189 | 0.177 |

Source: author's calculation from Bangladesh SAM 2017

| | Inland Fishing | Transport Equipments | Entertainment | Other Construction | Professional Service | Forestry | Communication | Furniture Industry | Livestock Rearing | Poultry Rearing |
|---|---|---|---|---|---|---|---|---|---|---|
| Sectoral VA | 362,140.88 | 360,572.50 | 321,319.07 | 295,372.00 | 257,055.26 | 256,676.38 | 234,409.79 | 206,330.48 | 192,884.90 | 167,377.03 |
| Rank % | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| %GTVA | 1.94% | 1.93% | 1.72% | 1.58% | 1.37% | 1.37% | 1.25% | 1.10% | 1.03% | 0.90% |
| Labour Unskilled | 0.446 | 0.343 | 0.421 | 0.456 | 0.353 | 0.437 | 0.297 | 0.493 | 0.491 | 0.464 |
| Labour Skilled | 0.514 | 0.334 | 0.65 | 0.364 | 0.747 | 0.398 | 0.474 | 0.436 | 0.45 | 0.374 |
| Small Farmer | 0.202 | 0.144 | 0.225 | 0.175 | 0.225 | 0.182 | 0.164 | 0.198 | 0.2 | 0.18 |
| Medium Farmer | 0.146 | 0.105 | 0.162 | 0.128 | 0.16 | 0.135 | 0.12 | 0.145 | 0.146 | 0.132 |
| Large Farmer | 0.15 | 0.115 | 0.161 | 0.143 | 0.126 | 0.172 | 0.131 | 0.164 | 0.162 | 0.155 |
| Non-Farm SE | 0.198 | 0.15 | 0.214 | 0.187 | 0.173 | 0.222 | 0.172 | 0.214 | 0.212 | 0.202 |
| Non-Farm WE | 0.365 | 0.26 | 0.406 | 0.315 | 0.408 | 0.327 | 0.296 | 0.358 | 0.362 | 0.325 |
| Salaried | 0.156 | 0.111 | 0.174 | 0.135 | 0.174 | 0.14 | 0.127 | 0.153 | 0.155 | 0.139 |
| Self-employed | 0.197 | 0.143 | 0.217 | 0.174 | 0.205 | 0.189 | 0.163 | 0.198 | 0.199 | 0.182 |

Source: author's calculation from Bangladesh SAM 2017

| | Shrimp Farming | Basic Metal M | Hotel and Restaurant | Kutcha House | Water Transport | Rice Milling | Other Processed Food | Other Transport | Marine Fishing | Tourism |
|---|---|---|---|---|---|---|---|---|---|---|
| Sectoral VA | 149,067.42 | 143,214.39 | 115,909.07 | 112,096.00 | 111,136.99 | 107,977.75 | 104,579.98 | 91,927.73 | 85,061.38 | 77,272.72 |
| Rank % | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| %GTVA | 0.80% | 0.77% | 0.62% | 0.60% | 0.59% | 0.58% | 0.56% | 0.49% | 0.45% | 0.41% |
| Labour Unskilled | 0.486 | 0.384 | 0.548 | 0.516 | 0.142 | 0.493 | 0.427 | 0.404 | 0.449 | 0.554 |
| Labour Skilled | 1.047 | 0.401 | 0.458 | 0.405 | 0.131 | 0.422 | 0.391 | 0.173 | 0.482 | 0.464 |
| Small Farmer | 0.146 | 0.166 | 0.21 | 0.196 | 0.058 | 0.195 | 0.172 | 0.212 | 0.197 | 0.213 |
| Medium Farmer | 0.166 | 0.12 | 0.151 | 0.143 | 0.043 | 0.143 | 0.124 | 0.146 | 0.143 | 0.153 |
| Large Farmer | 0.217 | 0.125 | 0.146 | 0.158 | 0.048 | 0.16 | 0.125 | 0.146 | 0.151 | 0.146 |
| Non-Farm SE | 0.359 | 0.166 | 0.195 | 0.207 | 0.063 | 0.21 | 0.166 | 0.194 | 0.199 | 0.196 |
| Non-Farm WE | 0.154 | 0.299 | 0.38 | 0.354 | 0.105 | 0.352 | 0.31 | 0.366 | 0.355 | 0.384 |
| Salaried | 0.2 | 0.128 | 0.162 | 0.151 | 0.045 | 0.151 | 0.133 | 0.157 | 0.152 | 0.164 |
| Self-employed | 0.224 | 0.162 | 0.201 | 0.195 | 0.058 | 0.195 | 0.166 | 0.196 | 0.193 | 0.203 |

Source: author's calculation from Bangladesh SAM 2017

b.   **Introducing fiscal stimulus package** to retain workers in the manufacturing sector, to maintain competitiveness of the enterprises especially in the export-oriented manufacturing sector and to revitalize the economic activities and business environment. The major policy interventions in this regard are to provide several credit facilities at low interest rate from the banking system for the businesses;

c.   **Expansion of social safety net programs** to meet the basic needs of people living below poverty line, day labourers and for those who are engaged in the informal sector. The major interventions are: a) Free food distribution, b) Sale of rice under Open Market Sale (OMS) program with a highly subsidized price (Taka 10 per kg), c) Cash transfer to the targeted vulnerable population, d) expansion of allowance programs (Old Age Allowance and Allowance for Widow/husband Deserted Women) to all eligible person (100 percent) of the 100 most poverty stricken Upazilas of the country, and e) Expedite construction of house for the homeless people etc.

d.   **Increase money supply** to maintain liquidity of the economy so that the shock arising out of the pandemic can be absorbed and day to day businesses can be operated smoothly. Bangladesh Bank has already lowered CRR (cash reserve ratio) and Repo rate to increase money supply and it will continue if needed. However, special attention will be given so that inflation does not increase as a result of increased money supply.

While specificity is required within each of the four categories, the government's declared policy support measures in dealing with the economic fallout of COVID-19 certainly deserve appreciation. The support analyzed above includes working capital loan fund for manufacturing and service industries, export promotion fund, pre-shipment credit refinancing , a special fund for export-oriented industries, working capital support for cottage, micro, small and medium enterprises, rice procurement budget, working capital support for farmers, agricultural subsidy, and safety net expansion. However, the upshot of our quantitative estimates based on SAM- 2017, household income and expenditure survey and labor force survey indicates that in addition to allocating aid strategically for maximum countervailing impact, there needs to be a second stimulus package which in addition to the estimates shown by the government in annex 3 should be at least four billion US dollars for anywhere near a five percent growth rate to be achieved in FY 2020-2021. This estimate is based on the SAM-based multiplier of 2.5 and an incremental capital-output ratio of 4.5.[7] Thus an additional quantum of aid package will be needed  for both social safety net protection and achieving a reasonable rate of economic growth after the first two quarters of the COVID-19 external shock.

### Annexes in the next few pages after the references section

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[7] This is slightly less than the estimate given by Prof. Selim Raihan but more than the lower rate of 4.24 that was achieved during an earlier---presumably more efficient investment regime. See his article in the Daily Star: https://www.thedailystar.net/op-ed/economics/bangladesh-needs-new-investment-regime-105907

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## Annex 1: Stimulus Package Declared by the Hon'ble Prime Minister (95,619 crore Taka)

In Crore Taka

| Serial No | Name of the Package | Amount |
|---|---|---|
| 1. | Special Fund for Salary support to export oriented manufacturing industry workers | 5,000 |
| 2. | Working Capital loans provided to affected industries and service sector | 30,000 |
| 3. | Working Capital loans provided to SMEs, cottage industries | 20,000 |
| 4. | Expansion of facility provided through Export Development Fund (EDF) | 12,750 |
| 5. | Pre-Shipment Credit Refinance Scheme | 5,000 |
| 6. | Special Honorarium for doctors, nurses, medical workers | 100 |
| 7 | Health Insurance and life insurance | 750 |
| 8. | Free Food Distribution | 2,503 |
| 9. | OMS at 10 taka/kg | 251 |
| 10 | Cash Transfer to targeted poor people | 760 |
| 11. | Expansion of Allowance Programs | 815 |
| 12. | Construction of home for homeless people | 2,130 |
| 13. | Additional procurement of paddy/rice (2.0 lac ton ) | 860 |
| 14. | Support for farm mechanization | 200 |
| 15. | Subsidy for agriculture | 9,500 |
| 16. | Agriculture Refinance Scheme | 5,000 |
|  |  |  |
|  | **Total** | **95,619** |
|  | **In Billion US Dollar** | **11.249** |
|  | **As % of GDP** | **3.3** |

# Annex 2:

For the ongoing FY 2019-20 and upcoming FY 2020-21, the fiscal requirement is estimated below (based on initial declaration of 72,7500 crore taka stimulus package):

(In Million USD)

| | Item | | FY 2019-20 | FY 2020-21 |
|---|---|---|---|---|
| 1 | Emergency relief operation | | 333.04 | - |
| | Free Food Distribution (0.6 Million MT of Rice and Wheat) | MODMR | 294.11 | - |
| | Special Grant (Cash) | MODMR | 9.41 | - |
| | Subsidy provided to OMS of rice in reduced price | MOFood | 29.52 | - |
| 2 | Healthcare Service | | 230.00 | 300.00 |
| | Support to emergency healthcare services (already allocated) | MoH&FW | 30.00 | - |
| | Additional requirement for emergency health services | MoH&FW | 200.00 | 300.00 |
| 3 | Additional expense for expanding 2 cash transfer programs to 100% eligible beneficiaries of the 100 poverty stricken upajilas | | 26.20 | 104.70 |
| | Old Age Allowance | MoSW | 16.50 | 66.00 |
| | Allowance for Widow/husband Deserted Women | MoSW | 9.70 | 38.70 |
| 4 | Constructing home for homeless people Program | | 74.10 | 176.47 |
| 5 | Salary support to export oriented manufacturing industry workers | BB | 588.23 | - |
| 6 | Interest subsidy of loans provided to industry and service sector | BB | 39.71 | 158.82 |
| 7 | Interest subsidy of loans provided to SMEs | BB | 29.41 | 117.65 |
| 8 | Interest subsidy of loans provided through Export Development Fund (EDF) | BB | 10.00 | 50.00 |
| 9 | Interest subsidy of loans provided through Pre-Shipment Credit Refinance Scheme | BB | 5.00 | 20.00 |
| 10 | Credit facility for self-employment and micro-businesses (proposed) | 2 Public Sector Banks* | - | 100 |
| 11 | Estimated Revenue Loss (2% of GDP) | | 6,780.00 | - |
| | | | | |
| | **Total** | | **8,115.69** | **1,027.64** |

# Annex 3: Major Budget Support Program in Progress:

2019-20 FY

1. From ADB: 500 million $ budget support, negotiation completed (COVID-19)
2. AIIB: 250 million $ in process (COVID-19)
3. World Bank: 250 million $ Jobs Development Policy Credit-2 (Ongoing program but fund disbursement brought forward by reallocating resources from other projects to address COVID-19), work in progress
4. JICA requested for 1.0 billion $ budget support

   2020-21 FY
1. WB: 500 million dollar requested for COVID-19.
2. WB: 250 million$ Jobs DPC-3 budget support regular program not related to COVID-19 .
3. EU Grant 100 million euro may be up loaded
4. DFID requested for additional Support

Emergency health projects ($100 million from WB and $100 million from ADB) is final stage.

BOP support from IMF

   750 million $ BoP support from Rapid Credit Facility (RCF)

## Annex 4: Finer Spatial Categorization of Poverty in Bangladesh

**List of Ranking of Poverty Level, distributed by location (district level) and gender**
**List 4.1. Highest 30 Upper Poverty Limit (Male)**
(1) KURIGRAM - 71.07; (2) BANDARBAN - 63.7 ;(3) DINAJPUR- 63.2; (4) MAGURA - 56.48;
(5) KISHOREGONJ - 53.64; (6) JAMALPUR- 52.96 (7) KHAGRACHHARI - 50.94; (8) GAIBANDHA - 46.63; (9) LALMONIRHAT- 42.27; (10) RANGPUR - 42.22; (11) SHERPUR - 41.31(12) CHAPAI NABABGANJ - 38.79; (13) PATUAKHALI- 37.7; (14) NETRAKONA- 33.23; (15) RAJBARI- 32.85; (16) LAKSHMIPUR- 32.5; (17) NILPHAMARI- 32.49; (18) PIROJPUR- 32.01; (19) PABNA- 31.76 ; (20) CHUADANGA- 31.4; (21) MEHERPUR- 31.4; (22) NAOGAON- 30.87; (23) MANIKGANJ - 30.86; (24) KHULNA- 30.16; (25) SIRAJGANJ- 29.67; (26) CHANDPUR- 29.57; (27) BAGERHAT- 28.91; (28) GOPALGANJ -28.63; (29) BARISAL - 27.84; (30) RANGAMATI - 27.56
**List 4.2. Highest 30 Upper Poverty Limit (Female)**
 (1) KURIGRAM- 70.97; (2) DINAJPUR- 65.47; (3) BANDARBAN- 62.79; (4)MAGURA - 56.83; (5 ) KHAGRACHHARI- 54.37; (6) KISHOREGONJ - 53.5; (7) JAMALPUR- 52.04; (8) GAIBANDHA - 46.62; (9) RANGPUR - 45.35; (10) SHERPUR - 43.39; (11) LALMONIRHAT - 41.65; (12) CHAPAI NABABGANJ- 40.62; (13) PATUAKHALI - 39.25;(14) NETRAKONA - 34.71;(15) RAJBARI- 34.69; (16)- PABNA- 34.22; (17)NAOGAON-33.31;(18) BAGERHAT- 32.99; (19) LAKSHMIPUR-32.53; (20) PIROJPUR-32.48; (21) CHUADANGA- 32.46; (22)NILPHAMARI- 32.08; (23)MEHERPUR- 31.62; (24) KHULNA- 31.5725; (25) SIRAJGANJ- 31.27; (26) MANIKGANJ- 30.49; (27) GOPALGANJ- 30.47; (28) RANGAMATI - 29.51; (29) CHANDPUR- 29.06; (30) BOGRA- 28.73

**List 4.3. Highest 30 Upper Poverty Limit (National)**
(1)KURIGRAM- 71.02; (2)DINAJPUR64.335; (3)BANDARBAN- 63.245; (4)MAGURA- 56.655; (5) KISHOREGONJ-53.57; (6) KHAGRACHHARI- 52.655;(7)JAMALPUR-52.5;(8)GAIBANDHA-46.625;(9)RANGPUR-43.78;(10)SHERPUR-42.35;(11)LALMONIRHAT-41.96;(12)CHAPAI NABABGANJ-39.705;(13)PATUAKHALI-38.475;(14)NETRAKONA-33.97;(15)RAJBARI-33.77;(16)PABNA-32.99;(17)LAKSHMIPUR-32.515;(18)NILPHAMARI-32.285;(19)PIROJPUR-32.245;(20)NAOGAON-32.09;(21)-CHUADANGA-31.93;(22)MEHERPUR-31.51;(23)BAGERHAT-30.95;(24)KHULNA-30.865;(25)MANIKGANJ-30.675;(26)SIRAJGANJ-30.47;(27)GOPALGANJ-29.55;(28)CHANDPUR-29.315;(29)RANGAMATI-28.535;(30)BARISAL-27.475;

**List 4.4. Highest 30 Lower Poverty Limit (Male)**
(1)KURIGRAM-53.88;(2)BANDARBAN-50.64;(3)DINAJPUR-43.65;(4)MAGURA-37.05;(5)JAMALPUR-35.46;(6)KISHOREGONJ-33.69;(7)KHAGRACHHARI-31.82;(8)GAIBANDHA-29.06;(9)RANGPUR-25.62;(10)PATUAKHALI-24.79;(11)SHERPUR-24.67;(12)CHAPAI NABABGANJ-22.99;(13)LALMONIRHAT-22.09;(14)LAKSHMIPUR-20.8;(15)SUNAMGANJ-19.24;(16)PIROJPUR-17.43;(17)NAOGAON-17.29;(18)MANIKGANJ-16.6;(19)RAJBARI-16.49;(20)PABNA-16.12;(21)NETRAKONA-15.54;(22)CHANDPUR-14.83;(23)GOPALGANJ-14.69;(24)BARISAL-14.58;(25)NOAKHALI-14.51;(26)NILPHAMARI-14.46;(27)THAKURGAON-14.21;(28)THAKURGAON-14.21;(29)KHULNA-13.78;(30)BAGERHAT-13.58

**List 4.5. Highest 30 Lower Poverty Limit (Female)**
(1)-KURIGRAM-54.24;(2)-BANDARBAN-49.98;(3)-DINAJPUR-46.51;(4)-MAGURA-38.27;(5)-JAMALPUR-34.94;(6)-KISHOREGONJ-34.51;(7)-KHAGRACHHARI-33.8;(8)-GAIBANDHA-28.64;(9)-RANGPUR-28.31;(10)-SHERPUR-26.7;(11)-PATUAKHALI-26.44;(12)-CHAPAI NABABGANJ-24.55;(13)-LALMONIRHAT-24;(14)-LAKSHMIPUR-20.1;(15)-SUNAMGANJ-19.33;(16)-NAOGAON-18.99;(17)-PIROJPUR-17.85;(18)-PABNA-17.52;(19)-THAKURGAON-16.82;(20)-THAKURGAON-16.82;(21)-GOPALGANJ-16.28;(22)-MANIKGANJ-16.05;(23)-CHANDPUR-15.69;(24)-NETRAKONA-15.58;(25)-RAJBARI-15.56;(26)-PANCHAGARH-15.28;(27)-BAGERHAT-15.08;(28)-BOGRA-14.3;(29)-JHENAIDAH-14.04;(30)-NILPHAMARI-13.98;

**List 4.6. Highest 30 Lower Poverty Limit (National)**
(1)-KURIGRAM-54.06;(2)-BANDARBAN-50.31;(3)-DINAJPUR-45.08;(4)-MAGURA-37.66;(5)-JAMALPUR-35.2;(6)-KISHOREGONJ-34.1;(7)-KHAGRACHHARI-32.81;(8)-GAIBANDHA-28.85;(9)-RANGPUR-26.965;(10)-SHERPUR-25.685;(11)-PATUAKHALI-25.615;(12)-CHAPAI NABABGANJ-23.77;(13)-LALMONIRHAT-23.045;(14)-LAKSHMIPUR-20.45;(15)-SUNAMGANJ-19.285;(16)-NAOGAON-18.14;(17)-PIROJPUR-17.64;(18)-PABNA-16.82;(19)-MANIKGANJ-16.325;(20)-RAJBARI-16.025;(21)-NETRAKONA-15.56;(22)-THAKURGAON-15.515;(23)-THAKURGAON-15.515;(24)-GOPALGANJ-15.485;(25)-CHANDPUR-15.26;(26)-BAGERHAT-14.33;(27)-NILPHAMARI-14.22;(28)-PANCHAGARH-14.21;(29)-KHULNA-13.85;(30)-BARISAL-13.63;

**List 4.7. Highest 30 Upper Poverty Limit (Rural)**
(1)-KURIGRAM-74.18;(2)-BANDARBAN-67.42;(3)-DINAJPUR-66.2;(4)-MAGURA-62.26;(5)-KHAGRACHHARI-61.19;(6)-KISHOREGONJ-50.42;(7)-JAMALPUR-49.97;(8)-GAIBANDHA-47.7;(9)-RANGPUR-44.91;(10)-LALMONIRHAT-44.83;(11)-SHERPUR-44.39;(12)-CHAPAI NABABGANJ-43.24;(13)-PABNA-35.77;(14)-NETRAKONA-35.62;(15)-PATUAKHALI-34.76;(16)-NAOGAON-33.69;(17)-RAJBARI-33.48;(18)-LAKSHMIPUR-33.41;(19)-CHUADANGA-32.96;(20)-MANIKGANJ-32.17;(21)-KHULNA-31.81;(22)-CHANDPUR-31.56;(23)-MEHERPUR-31.07;(24)-BAGERHAT-30.85;(25)-PIROJPUR-30.64;(26)-SIRAJGANJ-30.36;(27)-NILPHAMARI-29.98;(28)-BARISAL-29.62;(29)-GOPALGANJ-29.27;(30)-RANGAMATI-28.71;

**List 4.8. Highest 30 Upper Poverty Limit (Urban)**
(1)-KISHOREGONJ-66.67;(2)-JAMALPUR-63.21;(3)-PATUAKHALI-60.95;(4)-KURIGRAM-56.09;(5)-DINAJPUR-54.42;(6)-BANDARBAN-52.65;(7)-NILPHAMARI-42.29;(8)-BARGUNA-40.26;(9)-PIROJPUR-39.9;(10)-KHAGRACHHARI-39.33;(11)-RANGPUR-38.38;(12)-RAJBARI-35.64;(13)-GAIBANDHA-35.48;(14)-JOYPURHAT-34.39;(15)-MEHERPUR-34.32;(16)-SATKHIRA-32.73;(17)-BAGERHAT-32.17;(18)-GOPALGANJ-31.42;(19)-SUNAMGANJ-31.28;(20)-SHERPUR-31.01;(21)-SIRAJGANJ-30.96;(22)-KHULNA-30.02;(23)-PANCHAGARH-29.84;(24)-CHUADANGA-29.53;(25)-JHENAIDAH-29.37;(26)-JHALOKATI-28.68;(27)-NARAIL-28.63;(28)-RANGAMATI-28.06;(29)-LAKSHMIPUR-27.62;(30)-BOGRA-27.49;

**List 4.9. Highest 30 Lower Poverty Limit (Rural)**
(1)-KURIGRAM-57.4;(2)-BANDARBAN-53.33;(3)-DINAJPUR-46.91;(4)-MAGURA-43.35;(5)-KHAGRACHHARI-39.58;(6)-JAMALPUR-34.94;(7)-KISHOREGONJ-33.09;(8)-GAIBANDHA-29.52;(9)-SHERPUR-28.19;(10)-RANGPUR-26.98;(11)-CHAPAI NABABGANJ-26.09;(12)-LALMONIRHAT-24.72;(13)-PATUAKHALI-23.86;(14)-LAKSHMIPUR-21.1;(15)-SUNAMGANJ-19.87;(16)-NAOGAON-19.12;(17)-MANIKGANJ-17.74;(18)-CHANDPUR-17.22;(19)-PIROJPUR-17.16;(20)-NETRAKONA-17.1;(21)-PABNA-17.1;(22)-RAJBARI-16.67;(23)-THAKURGAON-16.53;(24)-KHULNA-16.23;(25)-BARISAL-15.84;(26)-GOPALGANJ-15.8;(27)-NOAKHALI-15.79;(28)-BAGERHAT-14.21;(29)-CHUADANGA-14.07;(30)-NATORE-14.07;

**List 4.10. Highest 30 Lower Poverty Limit (Rural**
(1)-BANDARBAN-42.62;(2)-KISHOREGONJ-38.38;(3)-KURIGRAM-38.25;(4)-JAMALPUR-36.29;(5)-PATUAKHALI-36.09;(6)-DINAJPUR-35.37;(7)-RANGPUR-26.76;(8)-NILPHAMARI-23.06;(9)-KHAGRACHHARI-22.19;(10)-

GAIBANDHA-21.98;(11)-JOYPURHAT-20.28;(12)-PIROJPUR-19.95;(13)-LAKSHMIPUR-16.83;(14)-PANCHAGARH-16.32;(15)-PABNA-15.98;(16)-COX'S BAZAR-15.54;(17)-BAGERHAT-15.28;(18)-SATKHIRA-15.1;(19)-CHAPAI NABABGANJ-14.65;(20)-SUNAMGANJ-14.38;(21)-BOGRA-14.22;(22)-BARGUNA-13.57;(23)-SIRAJGANJ-13.57;(24)-GOPALGANJ-12.83;(25)-RAJBARI-12.11;(26)-SHERPUR-11.78;(27)-KHULNA-11.75;(28)-JHENAIDAH-11.65;(29)-RANGAMATI-11.04;(30)-LALMONIRHAT-10.67;

## List of Ranking of Poverty Level, distributed by location (thana/upazilla level) and gender

### List 4.11. Highest 30 Upper Poverty Limit (Male)

(1)NAIKHONGCHHARI-91.57;(2)ALIKADAM-89.39;(3)KAHAROLE-88.24;(4)CHILMARI-85.14;(5)CHAR RAJIBPUR-84.03;(6)ULIPUR-81.02;(7)KULIAR CHAR-77.61;(8)BIRAL-76.66;(9)BOCHAGANJ-75.68;DINAJPUR SADAR-73.68;(11)MATIRANGA-73.35;(12)RAUMARI-72.88;(13)FULBARI-72.37;(14)KURIGRAM SADAR-71.78;(15)LAKSHMICHHARI-69.77;(16)SAGHATA-69.47;(17)THANCHI-69.23;(18)NAGESHWARI-68.98;(19)BHURUNGAMARI-68.5;(20)DEWANGANJ-68.14;(21)SHALIKHA-67.55;(22)RUPSA-67.5;(23)MELANDAHA-67.31;(24)HIZLA-67.05;(25)AUSTAGRAM-66.97;(26)HAKIMPUR-66.69;(27)CHIRIRBANDAR-66.01;(28)TARAGANJ-65.19;(29)GAURIPUR-65;(30)KAMARKHANDA-64.71;

### List 4.12. Highest 30 Upper Poverty Limit (Female)

(1)-NAIKHONGCHHARI-91.04;(2)-ALIKADAM-86.87;(3)-KAHAROLE-84.62;(4)-CHAR RAJIBPUR-84;(5)-BOCHAGANJ-82.61;(6)-ULIPUR-80.22;(7)-CHILMARI-78.48;(8)-KULIAR CHAR-77.1;(9)-DINAJPUR SADAR-76.64;(10)-BIRAL-76.52;(11)-THANCHI-75.89;(12)-RAUMARI-75.38;(13)-MATIRANGA-74.31;(14)-NAGESHWARI-73.23;(15)-FULBARI-72.6;(16)-PANCHHARI-71.2;(17)-LAKSHMICHHARI-70.83;(18)-KHANSAMA-70.27;(19)-SHALIKHA-69.83;(20)-RUPSA-69.77;(21)-BHURUNGAMARI-68.99;(22)-TARAGANJ-68.95;(23)-KURIGRAM SADAR-68.71;(24)-DEWANGANJ-67.93;(25)-BIRGANJ-67.76;(26)-MANIKCHHARI-65.98;(27)-DASHMINA-65.7;(28)-HIZLA-65.26;(29)-MELANDAHA-64.92;(30)-CHIRIRBANDAR-64.78;

### List 4.13. Highest 30 Upper Poverty Limit (National)

(1)-NAIKHONGCHHARI-91.305;(2)-ALIKADAM-88.13;(3)-KAHAROLE-86.43;(4)-CHAR RAJIBPUR-84.015;(5)-CHILMARI-81.81;(6)-ULIPUR-80.62;(7)-BOCHAGANJ-79.145;(8)-KULIAR CHAR-77.355;(9)-BIRAL-76.59;(10)-DINAJPUR SADAR-75.16;(11)-RAUMARI-74.13;(12)-MATIRANGA-73.83;(13)-THANCHI-72.56;(14)-FULBARI-72.485;(15)-NAGESHWARI-71.105;(16)-LAKSHMICHHARI-70.3;(17)-KURIGRAM SADAR-70.245;(18)-BHURUNGAMARI-68.745;(19)-SHALIKHA-68.69;(20)-RUPSA-68.635;(21)-DEWANGANJ-68.035;(22)-TARAGANJ-67.07;(23)-SAGHATA-66.475;(24)-PANCHHARI-66.435;(25)-HIZLA-66.155;(26)-MELANDAHA-66.115;(27)-KHANSAMA-65.76;(28)-CHIRIRBANDAR-65.395;(29)-AUSTAGRAM-63.895;(30)-BIRGANJ-63.88;

### List 4.14. Highest 30 Lower Poverty Limit (Male)

(1)-NAIKHONGCHHARI-85.89;(2)-ALIKADAM-74.66;(3)-CHAR RAJIBPUR-74.06;(4)-CHILMARI-73.05;(5)-KAHAROLE-70.59;(6)-KULIAR CHAR-67.62;(7)-AUSTAGRAM-60.55;(8)-ULIPUR-59.58;(9)-KURIGRAM SADAR-56.44;(10)-BHURUNGAMARI-54.33;(11)-RAUMARI-54.24;(12)-DEWANGANJ-53.17;(13)-BIRAL-53.16;(14)-KHANSAMA-52.5;(15)-HIZLA-52.27;(16)-LAMA-52.13;(17)-FULBARI-51.32;(18)-ISLAMPUR-50.81;(19)-FULCHHARI-50.6;(20)-NAGESHWARI-49.95;(21)-CHIRIRBANDAR-49.02;(22)-DINAJPUR SADAR-48.88;(23)-GALACHIPA-48.51;(24)-MATIRANGA-47.88;(25)-PANCHHARI-47.5;(26)-RUPSA-47.5;(27)-NIAMATPUR-46.87;(28)-BOCHAGANJ-45.95;(29)-MADARGANJ-45.72;(30)-MANIKCHHARI-44.44;

### List 4.15. Highest 30 Lower Poverty Limit (Female)

(1)-NAIKHONGCHHARI-87.46;(2)-ALIKADAM-73.18;(3)-CHAR RAJIBPUR-69.17;(4)-KULIAR CHAR-67.05;(5)-KAHAROLE-66.67;(6)-CHILMARI-62.43;(7)-RAUMARI-61.87;(8)-BOCHAGANJ-60.87;(9)-ULIPUR-60.17;(10)-KHANSAMA-56.76;(11)-BHURUNGAMARI-55.81;(12)-KURIGRAM SADAR-55.69;(13)-AUSTAGRAM-55.67;(14)-FULBARI-54.79;(15)-MATIRANGA-53.8;(16)-PANCHHARI-53.6;(17)-BIRAL-53.14;(18)-MANIKCHHARI-52.58;(19)-DEWANGANJ-52.35;(20)-NAGESHWARI-51.22;(21)-DINAJPUR SADAR-50.55;(22)-DASHMINA-50.4;(23)-LAMA-50.21;(24)-RUPSA-48.84;(25)-BIRGANJ-48.68;(26)-FULCHHARI-48.61;(27)-GALACHIPA-48.31;(28)-ITNA-48.31;(29)-HIZLA-47.37;(30)-CHIRIRBANDAR-47.17;

### List 4.16. Highest 30 Lower Poverty Limit (National

(1)-NAIKHONGCHHARI-86.675;(2)-ALIKADAM-73.92;(3)-CHAR RAJIBPUR-71.615;(4)-KAHAROLE-68.63;(5)-CHILMARI-67.74;(6)-KULIAR CHAR-67.335;(7)-ULIPUR-59.875;(8)-AUSTAGRAM-58.11;(9)-RAUMARI-58.055;(10)-KURIGRAM SADAR-56.065;(11)-BHURUNGAMARI-55.07;(12)-KHANSAMA-54.63;(13)-BOCHAGANJ-53.41;(14)-BIRAL-53.15;(15)-FULBARI-53.055;(16)-DEWANGANJ-52.76;(17)-LAMA-51.17;(18)-MATIRANGA-50.84;(19)-NAGESHWARI-50.585;(20)-PANCHHARI-50.55;(21)-HIZLA-49.82;(22)-DINAJPUR SADAR-49.715;(23)-FULCHHARI-49.605;(24)-MANIKCHHARI-48.51;(25)-GALACHIPA-48.41;(26)-RUPSA-48.17;(27)-CHIRIRBANDAR-48.095;(28)-ISLAMPUR-46.605;(29)-NIAMATPUR-46.32;(30)-ITNA-46.315;

### List 4.17. Highest 30 Upper Poverty Limit (Rural)

(1)-MATLAB DAKSHIN-93.45;(2)-CHAR RAJIBPUR-90.28;(3)-BURICHANG-87.78;(4)-JAGANNATHPUR-86.3;(5)-ALFADANGA-85.52;(6)-KAUNIA-83.8;(7)-BHOLA SADAR-82.83;(8)-MADHABPUR-82.66;(9)-PANCHAGARH SADAR-81.25;(10)-SHAJAHANPUR-80.14;(11)-BIRAMPUR-79.52;(12)-KHAN JAHAN ALI-76.35;(13)-MATIRANGA-

74.82;(14)-DEBIGANJ-74.76;(15)-KALIHATI-73;(16)-SERAJDIKHAN-72.91;(17)-DINAJPUR SADAR-72.48;(18)-KERANIGANJ-70.25;(19)-BHEDARGANJ-68.75;(20)-PARSHURAM-68.67;(21)-RAJPARA-68.58;(22)-MUKSUDPUR-68.18;(23)-MATLAB UTTAR-67.26;(24)-PATHARGHATA-66.67;(25)-LAMA-66.55;(26)-NAIKHONGCHHARI-66.53;(27)-GOSAIRHAT-66.12;(28)-KALUKHALI-65.58;(29)-KHALIAJURI-65.57;(30)-CHARGHAT-65.38;

**List 4.18. Highest 30 Upper Poverty Limit (Urban)**
(1)-HOMNA-97.4;(2)-GHIOR-96.12;(3)-BURICHANG-92.65;(4)-AKHAURA-91.01;(5)-KAHAROLE-88.79;(6)-MUJIB NAGAR-86.11;(7)-NABIGANJ-84.29;(8)-HAZARIBAGH-84.15;(9)-MOLLAHAT-82.95;(10)-GODAGARI-81.05;(11)-ATWARI-81;(12)-JALDHAKA-80;(13)-BHANDARIA-78.67;(14)-CHAUHALI-77.14;(15)-CHANDINA-75.9;(16)-CHHAGALNAIYA-75.9;(17)-BABUGANJ-73.75;(18)-KAWKHALI-71.43;(19)-MAGURA SADAR-71.21;(20)-GENDARIA-66.23;(21)-MAULVIBAZAR SADAR-65;(22)-BARISAL SADAR (KOTW..-64.56;(23)-DARUS SALAM-64.52;(24)-BHUAPUR-64.2;(25)-ITNA-64;(26)-FULCHHARI-63.41;(27)-COMILLA SADAR DAKSHIN-61.6;(28)-MUKSUDPUR-61.19;(29)-CHANDGAON-60.76;(30)-FULBARIA-60.76;

**List 4.19. Highest 30 Lower Poverty Limit (Rural)**
(1)-MATLAB DAKSHIN-88.83;(2)-CHAR RAJIBPUR-85.42;(3)-ALFADANGA-77.1;(4)-BURICHANG-72.22;(5)-JAGANNATHPUR-68.49;(6)-KAUNIA-67.6;(7)-PANCHAGARH SADAR-65.63;(8)-MADHABPUR-64.82;(9)-KHAN JAHAN ALI-63.94;(10)-SHAJAHANPUR-60.05;(11)-MUKSUDPUR-59.09;(12)-ATWARI-58.25;(13)-BHOLA SADAR-57.08;(14)-BHEDARGANJ-55.08;(15)-MATIRANGA-54.77;(16)-KALUKHALI-54.55;(17)-BIRAMPUR-54.22;(18)-DINAJPUR SADAR-53.02;(19)-DEBIGANJ-52.91;(20)-BRAHMANBARIA SADAR-52.13;(21)-NAIKHONGCHHARI-50.61;(22)-NALCHITY-50.33;(23)-COMILLA ADARSHA SADAR-50.16;(24)-KALIHATI-49.79;(25)-GOSAIRHAT-49.73;(26)-DOUBLE MOORING-49.68;(27)-KUMARKHALI-48.88;(28)-PARSHURAM-48.19;(29)-CHARGHAT-48.08;(30)-KASHIANI-47.7;

**List 4.20. Highest 30 Lower Poverty Limit (Rural)**
(1)-GHIOR-86.41;(2)-KAHAROLE-84.11;(3)-BURICHANG-76.47;(4)-GODAGARI-73.68;(5)-AKHAURA-70.79;(6)-BHANDARIA-70.67;(7)-HOMNA-70.13;(8)-MOLLAHAT-60.23;(9)-NABIGANJ-58.57;(10)-MUJIB NAGAR-56.94;(11)-BABUGANJ-56.25;(12)-HAZARIBAGH-54.88;(13)-CHAUHALI-53.33;(14)-ISHWARDI-51.32;(15)-COMILLA SADAR DAKSHIN-50.4;(16)-DARUS SALAM-50;(17)-CHHAGALNAIYA-46.99;(18)-BARISAL SADAR (KOTW..-45.57;(19)-FULBARIA-45.57;(20)-CHANDINA-44.58;(21)-JAMALPUR SADAR-43.24;(22)-BURHANUDDIN-40.1;(23)-ATWARI-40;(24)-BARGUNA SADAR-40;(25)-JALDHAKA-40;(26)-MIRPUR-39.02;(27)-ASHUGANJ-37.68;(28)-BOGRA SADAR-36;(29)-KAWKHALI-35.71;(30)-ATGHARIA-34.53;

## Annex 5: COVID-19 Model: An Economy Wide Multi Sectoral SAM-based Model Distributional, Employment and Growth impacts of the Countervailing Public Policies to Overcome the Adverse Impacts of COVID-19
**Bangladesh SAM-2017---Brief Description**

The SAM utilized for this paper was constructed for Bangladesh for the year 2017. It is a square table consisting of equal numbers of rows and columns. The total no. of rows/columns is 219 for the purposes of this table. The expenditures of each variable are noted by convention as flows from a column to the various rows intersecting that particular column, whereas the receipts of each variable are noted in the respective rows. By definition, the sum of expenditures for the variables must equal the sum of the receipts of the same variables, thus leading the total expenditures to match the total receipts (appearing in the bottom corner of the table). The SAM Bangladesh table contains four sets of endogenous accounts for our modeling approach, i.e., (1) activities numbered from 1-100; (2) commodities numbered from 101-200; (3) factors which are broken down between 201-203; (4) and households which have been sub-divided through 204-211. The table also includes exogenous accounts including indirect tax (212), duty (213), direct tax (214), government (215), corporation (216), GFCF (217), inventory (218) and rest of the world (219).

### Fixed price modelling in a SAM-based framework

In this section the social accounting matrix is presented as a data-gathering framework as well as an analytical tool for studying the effects of the energy sectors on growth. Appendix 2 presents the methodology for estimating the impact of growth generated by the energy sectors on poverty alleviation. The origins of social accounting can be traced as far back as Gregory King's efforts in 1681, but more recent work stems from the attempts by Richard Stone, Graham Pyatt, Erik Thorbecke, and others.[8] In the methodological framework of this study, the SAM is used for mapping production and distribution at the economy-wide level. In this section, first a general SAM is described. Then it is shown how the method for studying the effect of growth within this framework follows logically from its structure. The model used is a simple version of a class of SAM-based general equilibrium models.[9] It summarizes succinctly the interdependence between productive activities, factor shares, household income distribution, balance of payments, capital accounts, and so on, for the economy as a whole at a point in time. Given the technical conditions of production, the value added is distributed to the factors in a determinate fashion. The value added accrued by the factors is further received by households according to their ownership of assets and the prevailing wage structure. In the matrix form the SAM consists of rows and columns representing receipts and expenditures, respectively. As an accounting constraint receipts                    must                    equal                    expenditures.

As is elaborated further in Khan and Thorbecke (1988, Khan 1999, Khan 2006, Khan 2010), the SAM framework can be used to depict a set of linear relationships in a fixed coefficient model. For deciding the question of determination, the accounts need to be divided into exogenous and endogenous ones. For instance, in the Bangladesh SAM, there are three endogenous accounts. These are factors, households and production activities, leaving the government, capital and the rest of the world accounts as exogenous.[10]

*Table :Simplified schematic social accounting matrix*

| | | | EXPENDITURES | | | | |
|---|---|---|---|---|---|---|---|
| | | | Endogenous accounts | | | Exogenous | Total |
| | | | 1 | 2 | 3 | 4 | 5 |
| | Endogenous accounts | | | | | | |
| RECEIPTS | Factors | 1 | 0 | 0 | $T_{1.3}$ | $x_1$ | $y_1$ |
| | Households | 2 | $T_{2.1}$ | $T_{2.2}$ | 0 | $x_2$ | $y_2$ |
| | Production activities | 3 | 0 | $T_{3.2}$ | $T_{3.3}$ | $x_3$ | $y_3$ |
| | Exogenous accounts | | | | | | |
| | Sum. of other accounts | 4 | $l_1'$ | $l_2'$ | $l_3'$ | $t$ | $y_x$ |
| | Total | 5 | $y_1'$ | $y_2'$ | $y_3'$ | $y_x'$ | |

---

8  For a description of SAM as a data-gathering device, see Pyatt and Thorbecke (1976). Khan (1997) also has a chapter on this alone.

9  In Walrasian general equilibrium models the flexible price vector determines the equilibrium. In a Keynesian (dis)equilibrium model in the short-run the quantities vary while the price vector remains fixed.

10  See Khan and Thorbecke (1988: ch. II) for more theoretical details and empirical examples. The presentations here follow the cited work closely.

*Table : Schematic representation of endogenous and exogenous accounts in a SAM*

<table>
<tr><td rowspan="2"></td><td rowspan="2"></td><td colspan="4">EXPENDITURES</td><td rowspan="2">Totals</td></tr>
<tr><td>Endogenous</td><td>Sum</td><td>Exogenous</td><td>Sum</td></tr>
<tr><td rowspan="2">RECEIPTS</td><td>Endogenous</td><td>$T_{nn}$</td><td>N</td><td>Injections<br>$T_{nx}$</td><td>x</td><td>$y_n$</td></tr>
<tr><td>Exogenous</td><td>Leakages<br>$T_{xn}$</td><td>1</td><td>Residual<br>balances<br>$T_{xx}$</td><td>t</td><td>$y_x$</td></tr>
<tr><td colspan="2">Totals</td><td>$y_n'$</td><td></td><td>$y_x'$</td><td></td><td></td></tr>
</table>

Source:    Author's Schematization

Looking at the table above which represents a SAM, we can see immediately that

$$y = n + x \tag{1}$$

$$y = 1 + t \tag{2}$$

Now if we divide the entries in the matrix $T_{nn}$ by the corresponding total income (that is, $y_n$), we can define a corresponding matrix of average expenditure propensities. Let us call this matrix $A$. We now have:

$$y = n + x = Ay + x \tag{3}$$

$$y = (1 - A)^{-1} x = Mx \tag{4}$$

$M$ has been called the matrix of accounting multipliers by Thorbecke, for these multipliers, when computed, can account for the results (for example, income, consumption, and so on) obtained in the SAM without explaining the process that led to them. Let us now partition the matrix $A$ in the following way (Khan and Thorbecke).

$$A = \begin{bmatrix} 0 & 0 & A_{13} \\ A_{21} & A_{22} & 0 \\ 0 & A_{32} & A_{33} \end{bmatrix} \tag{5}$$

Given the accounts factors, household and the production activities, now we see that the income levels of these accounts (call them $y_1$, $y_2$, $y_3$, respectively) are determined as functions of the exogenous demand of all other accounts. In this respect, what we have is a reduced-form model which can be consistent with a number of structural forms. This is quite satisfactory as far as tracing the effects of a certain injection in the economy is concerned or for prediction purposes when the structural coefficients are more or less unchanged.

One limitation of the accounting multiplier matrix $M$ as derived in equation (4) is that it implies unitary expenditure elasticities (the prevailing average expenditure propensities in $A$ are assumed to apply to any incremental injection). A more realistic alternative is to specify a matrix of marginal expenditure propensities ($C_n$ below) corresponding to the observed income and expenditure elasticities of the different agents, under the assumption that prices remain fixed. The $C_n$ matrix can be partitioned in the same way as the $A$ matrix above. The most important difference between the two partitioned matrices is that $C_{32} \neq A_{32}$. Expressing the changes in income ($dy$) resulting from changes in injections ($dx$), one obtains

$$d y_n = C_n d y_n + d x \tag{6}$$

$$= (I - C_n)^{-1} d x = M_c d x \tag{7}$$

$M_c$ has been called a fixed price multiplier matrix and its advantage is that it allows any nonnegative income and expenditure elasticities to be reflected in $M_c$. In particular, in exploring the macroeconomic effects of exogenous changes in the output of different product-cum-technologies on other macroeconomic variables, it would be very unrealistic to assume that consumers react to any given proportional change in their incomes by increasing expenditures on the different commodities by exactly that same proportion (that is, assuming that the income elasticities of demand of the various socioeconomic household groups for the various commodities were all unity). Since the expenditure (income) elasticity is equal to the ratio of the marginal expenditure propensity ($MEP_i$) to the average expenditure propensity ($AEP_i$) for any given good $i$, it follows that the marginal expenditure propensity can be readily obtained once the expenditure elasticity and the average expenditure propensities are known, that is,

$$y_i = MEP_i / AEP_i \tag{8}$$

$$MEP_i = y_i AEP_i \tag{9}$$

and

$$\sum_i MEP_i = 1 \tag{10}$$

Thus, given the matrix $A_{32}$ of average expenditure propensities, and the corresponding expenditure elasticities of demand, $y_i$ the corresponding marginal expenditure propensities matrix $C_{32}$ could easily be derived.[11]

These multipliers can be further decomposed for more refined causal analysis of direct, indirect and feedback loop causal influence paths and graphs.


**Annex 6**

**Targeting for Optimality within the SIR and SEIR models of epidemic/pandemic diffusion**

The term targeting   denotes in this paper some modifications of the classical SIR model in the manner described below in order to optimize the effects of countervailing policies. The simplest version of the SIR model consists of three differential equations and provides a good first approximation to the dynamics of a range of infections. Several recent papers cited in the references have started incorporating economic trade-offs and conducting optimal policy analysis within this framework .For a country like Bangladesh targeting in formulating proper public policy response needs to take into account the following:


First, demographically, different groups typically have different risks of infection and mortality implying specific health risks and aggregate costs of treatment differentiated for each group..
Furthermore, each group might interact with other groups at  rates that are variable.
This fits the description of what Easley and Kleinberg (2010) call a "network version" ---in this case, a "network version" of the basic SIR model. Such network differentiation among subgroups of Bangladeshi population will necessitate treating different demographic subgroups appropriately giving appropriate consideration to relevant differentiating factors at play within each subgroup.

Secondly, the interactive term in SIR model which renders the relevant differential equation (see below) nonlinear may vary among subgroups.
Finally, the parameters of contact and infection may not necessarily be constants. They may vary because of endogenous behavioral changes of individuals or because community norms vary from one subgroup to another.
The third point may be too difficult to assess in a country like Bangladesh; but the first two points may be addressed in a multi-risk version of the basic SIR model proposed by Acemoglu et. als. (2020)[12]

As a starting point for Bangladesh, we could focus following Acemoglu et. als. on the special case of the MR-SIR model consisting of three groups—young (20-44), middle-aged (45-65) and old (65+). Like them we could also consider initially the lockdown policies, i.e. consider the special case where the only differences in interactions between the three groups come from differential parameters faced by them. To simplify a bit more initially, the simple epidemiological model can be used to analyze what might be called "zone-based social distancing"(ZSD). The ZSD can offer a framework for estimating the efficacy of alternative social distancing measures. For this purpose we can develop a simple SIR epidemic model on a structured network, for which it is possible to  compute the inter-zonal reproduction number that can be used to guide further empirical analysis and decision making.

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[11]  See Khan and Thorbecke (1988, Khan 1999: 2004a, b;2006; 2010) for some examples. See also Pyatt and Round (1979: 861).

[12]  They refer to their version *as the MR-SIR model.*

By doing the above exercise on the basis of rather incomplete and imprecise data for Bangladesh in this area, we can nevertheless derive results that are highly suggestive. Our model suggests that there are advantages of organizing people into zones (i.e., a particular structure of groups) according to demographic characteristics and geographic locations. Therefore, it is possible to arrive at zonal demographic lockdown policies.

The Multi-Risk SIR model can be set in both discrete or continuous time. The latter permits the standard differential equation approach. For the most general scenario, individuals can be partitioned into risk groups $j = 1, \ldots, J$ with Nj initial members. The total population is normalized
to unity so that sum over all groups equals 1.
At any point in time t, individuals in group j can be subdivided into those susceptible (S),
those infected (I), those recovered (R) and those deceased (D), so that:

$$Sj(t) + Ij(t) + Rj(t) + Dj(t) = Nj$$

Agents move from susceptible to infected, then either recover or die.
The states—in temporal order—are
St = Susceptible
It = Infectious
Rt = Resolving
Dt = Dead
Ct = ReCovered

Any susceptible person might fall prey to the disease by coming into contact with
an infectious person. Therefore, the model needs a time-varying contact rate parameter. It varies over time to capture behavioral changes such as social distancing. In the SEIR model four differential equations can be solved with specified initial conditions and parameter values. However, to get the correct statistically defensible estimates of key numbers such as the number infected and the number recovered etc. we need large scale randomized testing and detection. That does not seem to have been the case in Bangladesh, or even in India. Thus, there is a "calibration gap" in the model for such countries. In Bangladesh we need the best estimates we can get and then solve the differential equations to estimate the optimal lockdown, social distancing and zonal compartmentalization along with demographic partitioning.

**While this important work is undertaken, we need nevertheless to find optimal fiscal and monetary targeting in a muti-sectoral and differentiated locational labor and household group basis. This is what we do in the main body of this paper.**