SINDH COSTING FOR OPTIMA NUTRITION

October 2019

Contents

Acknowledgments

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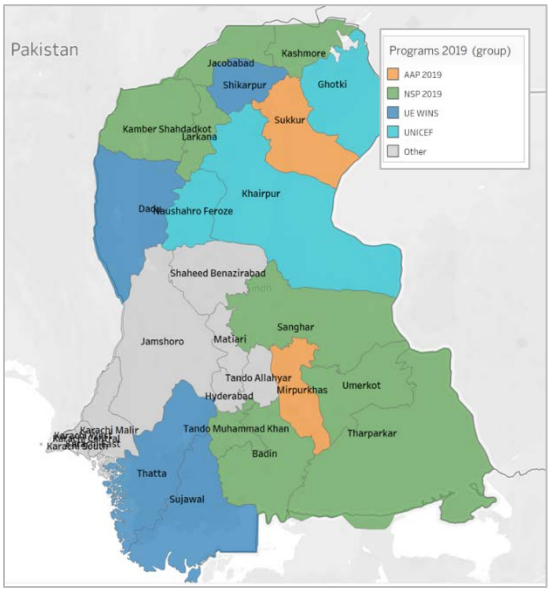
I. OBJECTIVE AND SCOPE OF THE ANALYSIS

1. The scope of the analysis. The objective of this analysis is to estimate unit cost (annual cost per beneficiary) and coverage of the key high-impact, evidence-based nutrition interventions in Sindh, Pakistan, to inform an application of the Optima nutrition tool and conduct allocative efficiency analyses of nutrition investments. The nutrition interventions included in the Optima analysis for Sindh are listed in the table below:

Optima Nutrition Interventions	**Description**
Treatment of SAM	Treatment of Severe Acute Malnutrition (SAM)
IYCF1 (Community)	Infant and Young Child Feeding (IYCF) education programs; Delivered at health facility and community level, and through mass-media campaigns.
IYCF2 (Health Facility)	
IYCF3 (Mass Media)	
IFAS for pregnant women (Community)	90 days Iron and Folic Acid Supplementation (IFAS) for pregnant women implemented at health facility and community level
IFAS for pregnant women (Health Facility)	
Vitamin A supplementation	Delivered mainly through mass campaigns
Micronutrients powders (children)	Provision of micronutrients powders added to children 6-23 months for improving iron status and reducing anaemia
Zinc + ORS for treatment of diarrhoea	Provision of oral zinc tablets and ORS in the treatment of diarrhoea in children 0-59 months of age
Lipid-based nutrition supplements	Implemented at small-scale programme in 2 districts only
Fortification of wheat flour	Fortification of wheat flour with iron/folate, B12 and zinc
Fortification of vegetable oil with vitamin A	Fortification of cooking oil with Vitamin A
Iodine fortification of salt	Provincial salt iodization programme
Water, Sanitation, and Hygiene Interventions (WASH)	Handwashing with soap, Hygienic disposal of children stools, Improved sanitation, Improved water sources
Family planning	Provision of family planning services to women in reproductive age

II. OVERALL APPROACH AND CLASSIFICATION OF COSTS

2. The main source of data used for calculating the unit costs was the Nutrition Support Programme of Sindh (NSP). The NSP is a regional programme for scaling-up high impact nutrition interventions for the period 2015-2019 in 9 districts of Sindh: Badin, Jacoabad, Kambar, Kashmor, Larkana, Sanghar, Tando.M.Khan, Tharparkar, and Umerkot. The NSP is delivered through three main modalities and delivery channels across the province: through the health facilities of the People Primary Health Initiative (PPHI); community level for the uncovered areas (NGOs as implementing partners); and via mass media messages (for IYCF behaviour change communication programmes).



3. Other sources for costing and coverage were the **Accelerated Action Plan (AAP)** for reduction of stunting and malnutrition supported by the Health Department of the Government of Sindh (GoS) in Mirpurkhas and Sukkur; and the nutrition programmes supported by **UNICEF** in Ghotki, Khairpur and Naushero Feroze. Additionally, some interventions coverage information was collected for the European Union funded programme known as **WINS (Women & Children Improved Nutrition in Sindh)** implemented by Save the Children and Action Against Hunger in the districts of Dadu, Shikarpur, Thatta and Sujawal.

4. Where possible**, costs were classified and divided into 'direct costs' and 'programme costs'**. Direct costs are costs for inputs per beneficiaries incurred at the point of delivering the intervention, such as drugs and medical supplies (including transportation and distribution). Programme costs refer to costs that operate across several different service delivery points at a level other than the delivery point of an intervention to beneficiaries, like training, coordination, monitoring and evaluation (staff costs were also included in this category).

5. Average unit costs estimations were constructed from actual financial reports obtained from the NSP for the period 2015 to 2019 for the **treatment of SAM, infant and young child feeding (IYCF) programmes, iron and folic acid supplementation (IFAS) for pregnant women, micronutrients powders for children**. For the other interventions, costing information were obtained from the Health Department, the Planning and Development Department of GoS, and UNICEF.

6. The so-called 'ingredient approach' was adopted for estimating direct costs for the **treatment of SAM, IFAS, and vitamin A supplementation**. For these interventions, programme costs were added as a percentage of direct costs, based on actual financial costs incurred

implementing existing programme, mainly the NSP. For all other interventions, we used the 'programme approach': unit costs were calculated by dividing total programme costs by the number of beneficiaries who benefited from the intervention.

7. Unit costs and coverages information for the **food fortification programme in Sindh** were provided by Nutrition International. **Lipid-based nutrition supplements (LNS)** information were obtained from a WFP-lead stunting prevention operational research project in the districts of Thatta and Sajjawal. **Family planning and Water, Sanitation, and Hygiene Interventions (WASH) interventions** information were provided by the Planning and Development Department of the GoS.

8. **Exchange rate.** Prices were considered in transaction originating currency Pakistani Rupee (PKR) or US Dollar (US$). The currency conversion rate used was 150 PKR to 1 US$.

9. **Baseline coverage data** was assumed for the year 2019. For each intervention, the coverage was calculated through a mapping exercise conducted by key focal points for each stakeholder. Intervention coverage refers to how many people, out of the target population, were receiving the intervention in each district of Sindh in 2019.

III. SUMMARY RESULTS

The table below contains average unit costs and coverage for the interventions included in this analysis for the province of Sindh. District specific cost and coverage information is discussed in the following sections for each specific intervention.

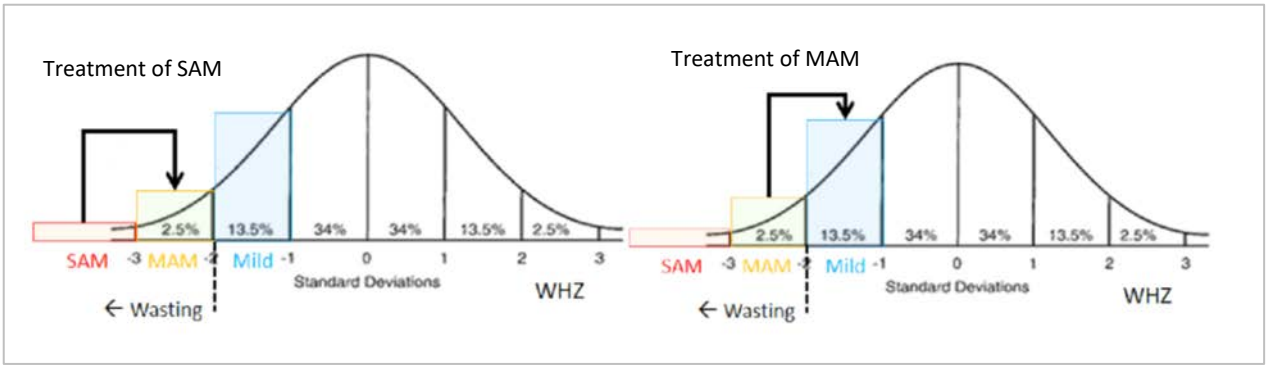
Intervention	**Target Population**	**Unit cost (US$)**	**Baseline coverage (2019)**
Treatment of SAM	Children 6-59 months (UNICEF treats children 6-23 months)	Average for NSP districts: US$ 127 (assumed 15% inpatient @ US$ 58 and 85% outpatient @ US$ 139)	13%
IYCF1 (Community)	Pregnant and lactating women	US$ 1.05	23%
IYCF2 (Health Facility)	Pregnant and lactating women	US$ 0.46	23%
IYCF3 (Mass Media)	Pregnant and lactating women	US$ 0.42	23%
IFAS for pregnant women (Community)	Pregnant women	US$ 1.21	13%
IFAS for pregnant women (Health Facility)	Pregnant women	US$ 0.71	10%
Vitamin A supplementation	Children 6-59 months	US$ 0.14	87%
Micronutrients powders (children)	Children 6-23 months	US$ 1.01	6%
Zinc + ORS for treatment of diarrhoea	Children 0-59 months	US$ 1.01	Not available
Lipid-based nutrition supplements	Children 6-23 months Pregnant and lactating women	US$ 103 (children) US$ 137 (PLW)	44% (only in two piloted districts, Thatta and Sajjawal)
IFA fortification of wheat flour (with iron and folic acid)	General population	US$ 0.17	5%
Cooking oil fortification	General population	US$ 0.06	80%
Iodine fortification of salt	General population	US$ 0.01	100%
WASH: Handwashing	General population	US$ 12	2%
WASH: Hygienic disposal		US$ 0.27	22%
WASH: Improved sanitation		US$ 0.60	34%
WASH: Improved water source		US$ 0.21	22%
Family planning	Women in reproductive age	US$ 0.06	42%

IV. COSTING ASSUMPTIONS PER INTERVENTION

Treatment of Severe Acute Malnutrition (SAM)

10. The treatment of Severe Acute Malnutrition (SAM) is implemented as per WHO/UNICEF's protocols of Community Based Management of Malnutrition (CMAM), through outpatient therapeutic programmes and stabilisation centres, and inpatient care for cases with complications. As June 2019, in the province of Sindh, the treatment of SAM was delivered through the NSP in the 9 districts supported by this programme. UNICEF leads the implementation of this intervention in Ghotki, Khairpur and Naushahro Feroze. The Health department of the GoS, trough the Accelerated Action Plan (AAP) for tackling stunting and malnutrition in the district of Mirpurkhas and Sukkur. The EU WINS programme has also supported the treatment of SAM in Dadu.

11. There is no treatment of Moderate Acute Malnutrition (MAM) currently integrated in Government's approved PC-1. However, WFP is providing support to the NSP for TSFP component (for treatment of MAM Children and Acute Malnourished PLWs) in Umerkot and one sub-district in Tharparker which is being further scale up. This is important to note as, for Optima Nutrition, scaling up treatment of SAM does not directly reduce the prevalence of wasting, since wasting is a combination of SAM and MAM and children recover from SAM to MAM (which is still considered wasting). In the model the treatment of SAM intervention has an option to include management of MAM. If selected, the treatment intervention will also shift children from MAM to mild acute malnutrition (Figure 2). Only the combined action of the treatment of SAM and MAM will reduce the prevalence of wasting in the model.



12. The analysis of unit costs for the treatment of SAM was conducted dividing the intervention between inpatient and outpatient treatment. Children who are diagnosed with SAM and have no medical complications are admitted in Outpatient Therapeutic Programs (OTP) and are managed with Ready to Use Therapeutic Food (RUTF). Those present with complications are first admitted in for inpatient care in a hospital or a stabilization centre where they are managed with F75, then F100 and are then discharged into OTP. In OTP, these children are then managed with RUTF until they attain the recommended weight for height. Other drugs like antibiotics and deworming may be included in management of SAM.

13. Treatment of SAM with medical complications (SAM Inpatient). A child admitted in the inpatient care is first managed with F75 until is fully stabilized. This normally takes 2-3 days. Children who are stable take slightly increased calories and nutrients, are then managed with F100. A child weighing 7kgs and stays in transition for 2 days utilizes a total of 4 sachets of F100 (F-100 therapeutic milk, sachet, 114g for 500ml water). Medication provided in inpatient care may include: Amoxicillin, Gentamycin, Mebendazole, Ceftriaxone, ReSoMal (for rehydration).

14. The estimated cost per average case for the drugs and supplies required for treatment for SAM impatient is around US$ 33 per child (PKR 4,878). This amount includes a 20% mark-up for transportation and distribution costs. It must be said, however, that these estimates are to be considered a broad approximation as direct costs for medication depends on the level of complication affecting the child admitted to the programme.

Management of severe acute malnutrition (SAM) - Inpatient									*Input Currency*	*Display Currency*
Drug/Supply	Percent receiving this aspect of the treatment	Number of units	Times per day	Days per case	Units per case	Unit cost FOB	Cost per average case FOB	Transp + Distrib. (%)	Cost per average case	Cost per average case
						PKR	PKR		PKR	USD
Ready-to-use Therapeutic Food (RUTF)	100	1	1	1	1	45.0000	45.0000	20%	54.00	0.36
F-75 therapeutic milk, CAN, 400g per can	100	0.25625	2	3	1.5375	382.5000	588.0938	20%	705.71	4.70
F-100 therapeutic milk,sachet, CAN, 400g per can 114g for 500ml water	100	0.285	2	2	1.14	442.5000	504.4500	20%	605.34	4.04
Amoxicillin, pdr/oral susp 125mg/5ml/BOT 100ml	100	1	1	1	1	60.0000	60.0000	20%	72.00	0.48
Gentamycin, injection, 40 mg/ml in 2ml vial	100	1	2	7	14	26.1800	366.5200	20%	439.82	2.93
Ceftriaxone, injection, 1g	100	1	1	5	5	500.0000	2,500.0000	20%	3,000.00	20.00
ReSoMal (for rehydration) (42g/satchet/1ltr water)	20	0.025	6	1	0.15	26.8350	0.8051	20%	0.97	0.01
							Total cost per average case		**4,877.84**	**32.52**

15. Treatment of SAM without complications (SAM Outpatient). Children without complications and those discharged from inpatient care are managed with RUTF. Prescription is dependent on weight of the child. A child weighing 7-8.4kgs consumes 3 sachets of RUTF daily. Taking into account an average length of stay to be 60 days, this child will consume a total of 180 sachets to recovery. Children who previously were not in the inpatient are prescribed amoxicillin and one dosage of Albendazole.

16. The estimate average unit cost for the treatment and management of SAM Outpatient is approximately US$ 65 (PKR 9,795). RUTF accounts for the majority of this cost and includes 20% mark-up for transportation and distribution.

Management of severe acute malnutrition (SAM) - Outpatient									*Input Currency*	*Display Currency*
Drug/Supply	Percent receiving this aspect of the treatment	Number of units	Times per day	Days per case	Units per case	Unit cost FOB	Cost per average case FOB	Transp + Distrib. (%)	Cost per average case	Cost per average case
						PKR	PKR		PKR	USD
Amoxicillin, pdr/oral susp 125mg/5ml/BOT 100ml	100	1	1	1	1	60.0	60.0	20%	72.00	0.48
Mebendazole, tablet, 500mg - PAC 100	91	1	1	1	1	3.1	2.8	20%	3.33	0.02
Ready-to-use Therapeutic Food (RUTF)	100	1	3	60	180	45.0	8,100.0	20%	9,720.00	64.80
						Total cost per average case			**9,795.33**	**65.30**

17. Programme costs for the treatment of SAM were computed from actual financial reports obtained from the NSP for the period 2015 to 2019. Programme costs includes direct salaries, training costs, and other allocations of shared programme activities such as personnel not directly implementing the intervention, supervision, monitoring and evaluation, communication, advocacy and general programme management. From the NSP financial reports, the percentage of programme costs over the costs for drug and medical supplies was calculated for each of the nine districts. The average was used to estimate the total unit costs per average case for the treatment of SAM: **US$ 58 (PKR 8,712) for SAM inpatient and US$ 139 (PKR 20,825) for SAM outpatient**.

18. The estimated total unit cost for the treatment of SAM in the province of Sindh was then calculated as an average on the assumption that 15% of the children required inpatient treatment. **Based on these assumptions, the total unit cost per average case of SAM in Sindh is estimated approximately US$ 127 (PKR 19,008).**

	Unit cost (PKR per beneficiary per year)						
	Treatment of SAM (Inpatient)			**Treatment of SAM (Outpatient)**			**Treatment of SAM**
Province/District	Unit cost for drug/medical supplies	% of programme costs	Total unit cost per average case	Unit cost for drug/supply	% of programme costs	Total unit cost per average case	Total unit cost per average case (assumed 15% inpatient and 85% outpatient)
Sindh	**4,878**	**79%**	**8,712**	**9,795**	**113%**	**20,825**	**19,008**
Tahrparkar	4,878	70%	8,292	9,795	73%	16,946	15,648
Umerkot	4,878	77%	8,634	9,795	87%	18,317	16,865
Sanghar	4,878	75%	8,536	9,795	198%	29,190	26,092
Jacobabad	4,878	71%	8,341	9,795	136%	23,117	20,901
Larkana	4,878	101%	9,804	9,795	96%	19,199	17,790
TMK	4,878	75%	8,536	9,795	115%	21,060	19,181
Badin	4,878	68%	8,195	9,795	145%	23,999	21,628
Kambar Shahdadkot	4,878	84%	8,975	9,795	94%	19,003	17,499
Kashmore	4,878	85%	9,024	9,795	70%	16,652	15,508

	Unit cost (US$ per beneficiary per year)						
	Treatment of SAM (Inpatient)			Treatment of SAM (Outpatient)			Treatment of SAM
Province/District	Unit cost for drug/medical supplies	% of programme costs	Total unit cost per average case	Unit cost for drug/supply	% of programme costs	Total unit cost per average case	Total unit cost per average case (assumed 15% inpatient and 85% outpatient)
Sindh	**32.52**	**79%**	**58.08**	**65.30**	**113%**	**138.83**	**126.72**
Tahrparkar	32.52	70%	55.28	65.30	73%	112.97	104.32
Umerkot	32.52	77%	57.56	65.30	87%	122.12	112.43
Sanghar	32.52	75%	56.91	65.30	198%	194.60	173.95
Jacobabad	32.52	71%	55.61	65.30	136%	154.11	139.34
Larkana	32.52	101%	65.36	65.30	96%	127.99	118.60
TMK	32.52	75%	56.91	65.30	115%	140.40	127.88
Badin	32.52	68%	54.63	65.30	145%	159.99	144.19
Kambar Shahdadkot	32.52	84%	59.83	65.30	94%	126.69	116.66
Kashmore	32.52	85%	60.16	65.30	70%	111.01	103.39

19. The baseline coverage for each district was calculated as the percentage of children 6-59 months of age who were treated for SAM in 2019. The average coverage for Sindh was estimated as 13%. For each of the districts were this intervention was delivered in 2019, the relative coverage rates are showed in the table below.

Baseline coverage (2019)		
Programme	**Province/District**	**Treatment of SAM**
	Sindh	**13%**
NSP	Tahrparkar	25%
	Umerkot	18%
	Sanghar	11%
	Jacobabad	10%
	Larkana	7%
	TMK	15%
	Badin	17%
	Kambar Shahdadkot	10%
	Kashmore	13%
UNICEF	Ghotki	28%
	Khairpur	56%
	Naushero Feroze	43%
EU WINS	Dadu	60%
AAP	Mirpurkhas	12%
	Sukkur	21%

Infant and Young Child Feeding programme (IYCF)

20. In Sindh, the promotion of breastfeeding and complementary feeding is provided within the Infant and Young Child Feeding programme (IYCF). The programme was delivered in 15 districts supported by the NSP (9 districts), UNICEF (Ghotki, Khairpur and Naushahro Feroze), AAP (Mirpurkhas and Sukkur) and EU WINS (Dadu). These programmes support the district health and community departments in building the skills of health services providers and communities helping families to learn essential skills and basic knowledge in the nutrition care of young children. Mothers are educated on the benefits of breastfeeding (BF), how to breastfeed, exclusive breast feeding (EBF) for the first six months and continue breastfeeding

for two years and beyond; Complementary feeding counselling and support involves educating mothers on appropriate complementary feeding practices and the appropriate timing of introducing the same.

21. IYCF is delivered through three different modalities and delivery channels across the districts: community level (IYCF1); through health facilities (IYCF2) and via mass media messages (IYCF3). The beneficiaries of IYCF programmes are pregnant and lactating women, mothers, caregivers and peers of children under two years who attend the training and counselling sessions.

22. Unit costs for IYCF programmes were estimated from the financial reports provided by the NSP for the period 2015-2019. Unit costs were calculated by dividing total programme costs by the number of beneficiaries who benefited from the intervention. The average unit costs for delivering IYCF at community level (IYCF1) in Sindh is US$ 1.05 (PKR 158), at health facility level (IYCF2) is US$ 0.46 (PKR 69) and via mass media US$ 0.42 (PKR 63).

	Unit cost (PKR per beneficiary per year)								
	IYCF1 (Community)			**IYCF2 (Health Facility)**			**IYCF3 (Mass Media)**		
Province/District	Total programme costs	# beneficiaries	Total unit cost per average case	Total programme costs	# beneficiaries	Total unit cost per average case	Total programme costs	# beneficiaries	Total unit cost per average case
Sindh	**534,439,711**	**4,456,926**	**158**	**43,981,469**	**2,352,643**	**69**	**283,742,155**	**4,521,378**	**63**
Tahrparkar	64,683,683	1,303,158	50	5,662,727	371,884	15	38,296,429		63
Umerkot	94,835,719	381,575	249	4,928,187	521,214	9	24,912,791		63
Sanghar	91,528,717	850,030	108	5,207,366	713,382	7	47,754,015		63
Jacobabad	79,423,969	575,573	138	4,598,517	55,220	83	23,360,909		63
Larkana	50,795,567	349,950	145	4,867,115	167,457	29	35,388,320		63
TMK	30,278,200	114,142	265	4,245,246	76,103	56	15,721,663		63
Badin	26,561,571	434,694	61	5,213,547	382,553	14	41,891,345		63
Kambar Shahdadkot	23,864,156	143,280	167	4,670,394	50,285	93	31,131,923		63
Kashmore	72,468,129	304,524	238	4,588,370	14,545	315	25,284,760		63

	Unit cost (US$ per beneficiary per year)								
	IYCF1 (Community)			**IYCF2 (Health Facility)**			**IYCF3 (Mass Media)**		
Province/District	Total programme costs	# beneficiaries	Total unit cost per average case	Total programme costs	# beneficiaries	Total unit cost per average case	Total programme costs	# beneficiaries	Total unit cost per average case
Sindh	**3,562,931**	**4,456,926**	**1.05**	**293,210**	**2,352,643**	**0.46**	**1,891,614**	**4,521,378**	**0.42**
Tahrparkar	431,225	1,303,158	0.33	37,752	371,884	0.10	255,310	-	0.42
Umerkot	632,238	381,575	1.66	32,855	521,214	0.06	166,085	-	0.42
Sanghar	610,191	850,030	0.72	34,716	713,382	0.05	318,360	-	0.42
Jacobabad	529,493	575,573	0.92	30,657	55,220	0.56	155,739	-	0.42
Larkana	338,637	349,950	0.97	32,447	167,457	0.19	235,922	-	0.42
TMK	201,855	114,142	1.77	28,302	76,103	0.37	104,811	-	0.42
Badin	177,077	434,694	0.41	34,757	382,553	0.09	279,276	-	0.42
Kambar Shahdadkot	159,094	143,280	1.11	31,136	50,285	0.62	207,546	-	0.42
Kashmore	483,121	304,524	1.59	30,589	14,545	2.10	168,565	-	0.42

23. The baseline coverage for this intervention was estimated as percentage of PLWs who received counselling on IYCF in 2019. The average for Sindh was estimated at around 23%, with the highest coverage rates reported in the districts covered by the NSP.

Baseline coverage (2019)		
Programme	**Province/District**	**IYCF**
	Sindh	**23%**
NSP	Tahrparkar	59%
	Umerkot	62%
	Sanghar	65%
	Jacobabad	25%
	Larkana	47%
	TMK	44%
	Badin	82%
	Kambar Shahdadkot	68%
	Kashmore	82%
UNICEF	Ghotki	6%
	Khairpur	58%
	Naushero Feroze	41%
EU WINS	Dadu	66%
	Shikarpur	0%
	Sujawal District	0%
	Thatta District	0%
AAP	Mirpurkhas	6%
	Sukkur	9%

Iron and folic acid supplementation

24. Pregnant women, especially with limited pre-pregnancy stores, have an increased micronutrient needs among them iron folic acid. Iron deficiency put a mother at risk of death from severe bleeding. It also predisposes the neonate to poor iron stores. The NSP in Sindh supplements with iron and folic acid at health facility level trough the PPHI during the antenatal care visits or during campaigns run by implementing partners.

25. The unit cost per average for the supplies is based on the supplementation of 90 combined Ferrous Salt and Folic Acid tablets per pregnant woman over a period of three months. **The estimated unit cost for the full course of supplementation is US$ 0.28 per beneficiary (PKR 42.69).** This amount includes a 20% mark-up for transportation and distribution costs.

Iron and folic acid supplementation										*Input Currency*	*Display Currency*
Drug/Supply	Percent receiving this aspect of the treatment	Note	Number of units	Times per day	Days per case	Units per case	Unit cost FOB	Cost per average case FOB	Transp + Distrib. (%)	Cost per average case	Cost per average case
							PKR	PKR		PKR	USD
Iron60mg + Folic ac. 400mcg tab / PAC (10x10)	80	3 months suppl.	1	1	90	90	0.494059	35.572248	20%	42.69	0.28
							Total cost per average case			**42.69**	**0.28**

26. Programme costs for IFAS were computed from the NSP financial reports (2015 to 2019) as the percentage of programme costs over the costs for medical supplies for each of the nine districts. **As an average of the nine NSP's districts, the total unit cost per average case of IFAS supplementation is estimated approximately US$ 1.21 (PKR 181) delivered at community level, and US$ 0.71 (PKR 125) if delivered at the health facility level.** The table below shows the breakdown of the calculation by district.

	Unit cost (PKR per beneficiary per year)						Unit cost (US$ per beneficiary per year)					
	IFAS (Community)			IFAS (Health Facility)			IFAS (Community)			IFAS (Health Facility)		
Province/District	Unit cost for supplies	% of programme costs	Total unit cost per average case	Unit cost for supplies	% of programme costs	Total unit cost per average case	Unit cost for supplies	% of programme costs	Total unit cost per average case	Unit cost for supplies	% of programme costs	Total unit cost per average case
Sindh	**43**	**324%**	**181**	**43**	**192%**	**125**	**0.28**	**324%**	**1.21**	**0.28**	**192%**	**0.71**
Tahrparkar	43	148%	106	43	239%	145	0.28	148%	0.70	0.28	239%	0.96
Umerkot	43	225%	139	43	258%	153	0.28	225%	0.93	0.28	258%	1.02
Sanghar	43	122%	95	43	69%	72	0.28	122%	0.63	0.28	69%	0.48
Jacobabad	43	247%	148	43		43	0.28	247%	0.99	0.28		0.28
Larkana	43	215%	135	43	188%	123	0.28	215%	0.90	0.28	188%	0.82
TMK	43	510%	260	43	310%	175	0.28	510%	1.73	0.28	310%	1.17
Badin	43	378%	204	43	138%	102	0.28	378%	1.36	0.28	138%	0.68
Kambar Shahdadkot	43	581%	291	43	144%	104	0.28	581%	1.94	0.28	144%	0.69
Kashmore	43	492%	253	43		43	0.28	492%	1.69	0.28		0.28

27. The proportion of pregnant women who received any iron folic acid as for the mapping exercise undertaken by each programme's focal point is contained in the table below. **The average coverage of IFAS in 2019 for Sindh was estimated 13% delivered at community level and 10% delivered through health facilities.**

Baseline coverage (2019)			
Programme	**Province/District**	**IFAS (Community)**	**IFAS (Health Facility)**
	Sindh	**13%**	**10%**
NSP	Tahrparkar	20%	21%
	Umerkot	14%	27%
	Sanghar	58%	22%
	Jacobabad	20%	21%
	Larkana	50%	14%
	TMK	40%	35%
	Badin	19%	23%
	Kambar Shahdadkot	29%	21%
	Kashmore	22%	6%
UNICEF	Ghotki	20%	0%
	Khairpur	21%	0%
	Naushero Feroze	15%	0%
EU WINS	Dadu	0%	0%
	Shikarpur	0%	0%
	Sujawal District	0%	0%
	Thatta District	0%	0%
AAP	Mirpurkhas	16%	62%
	Sukkur	23%	35%

Vitamin A supplementation

28. The supplementation of vitamin A to children in Sindh is done mainly through mass campaigns alongside other health mobilization events (i.e. polio campaigns). Routine delivery through health facilities is also taking place, especially in urban areas. Children 6-59 months are supplemented with vitamin A capsules bi-annually. At 6 months, children are given 100,000IU capsule and thereafter 200,000IU.

29. **Drugs and supplies required**: Each case per year requires: 1 x vitamin A (100,000 IU) for infants 6-11 months (one dose) and 2 x vitamin A (200,000 IU) for children 12-59 months per year. In this analysis is included the procurement of vitamin A supplies, plus cost for transport and distribution (20%). The cost per bottle (500 capsule) is US$ 10.66 for 200,000IU and US$ 2.53 for 100,000IU. **Therefore, the average unit cost for supplies of the bi-annual supplementation of vitamin A per child is approximately US$ 0.05 (PKR 7.09)**.

Vitamin A Supplementation										*Input Currency*	*Display Currency*
Drug/Supply	Percent receiving this aspect of the treatment	Note	Number of units	Times per day	Days per case	Units per case	Unit cost FOB	Cost per average case FOB	Transp + Distrib. (%)	Cost per average case	Cost per average case
							PKR	PKR		PKR	USD
Vitamin A, caplet, 100,000 IU	10	6-11 Months	1	1	2	2	0.7590	0.1518	20%	0.18	0.00
Vitamin A, caplet, 200,000 IU	90	12-59 Months	1	1	2	2	3.1980	5.7564	20%	6.91	0.05
							Total cost per average case			**7.09**	**0.05**

30. **When adding the estimated percentage of programme costs required to deliver this intervention (+200%), the total unit cost per average case for vitamin A is around US$ 0.14 (PKR 21) per child.**

	Unit cost (PKR per beneficiary per year)			**Unit cost (US$ per beneficiary per year)**		
	Vitamin A Supplementation			**Vitamin A Supplementation**		
Province/District	Unit cost for supplies	% of programme costs	Total unit cost per average case	Unit cost for supplies	% of programme costs	Total unit cost per average case
Sindh	**7.1**	**200%**	**21**	**0.05**	**200%**	**0.14**
Tahrparkar	7.1	200%	21	0.05	200%	0.14
Umerkot	7.1	200%	21	0.05	200%	0.14
Sanghar	7.1	200%	21	0.05	200%	0.14
Jacobabad	7.1	200%	21	0.05	200%	0.14
Larkana	7.1	200%	21	0.05	200%	0.14
TMK	7.1	200%	21	0.05	200%	0.14
Badin	7.1	200%	21	0.05	200%	0.14
Kambar Shahdadkot	7.1	200%	21	0.05	200%	0.14
Kashmore	7.1	200%	21	0.05	200%	0.14

31. The estimated programme coverage for the supplementation of vitamin A in Sindh for 2019 among children 6-59 months is 87%. Almost full coverage level was reported for the majority of districts with the exception of Tahrparkar, Karachi west and Korangi.

Baseline coverage (2019)		
Programme	**Province/District**	**Vitamin A Supplementation**
	Sindh	**87%**
NSP	Tahrparkar	42%
	Umerkot	95%
	Sanghar	95%
	Jacobabad	95%
	Larkana	95%
	TMK	95%
	Badin	95%
	Kambar Shahdadkot	95%
	Kashmore	95%
UNICEF	Ghotki	95%
	Khairpur	95%
	Naushero Feroze	95%
EU WINS	Dadu	95%
	Shikarpur	95%
	Sujawal District	95%
	Thatta District	95%
AAP	Mirpurkhas	95%
	Sukkur	95%
Others	Hyderabad	77%
	Jamshoro	95%
	Karachi Central	78%
	Karachi East	70%
	Karachi South	95%
	Karachi west	43%
	Korangi	41%
	Malir	95%
	Matari	95%
	Shaheed Benazirabad	95%
	Tando Allah Yar	95%

Micronutrients powders (children)

32. Multiple micronutrient powders are powders of various vitamins and minerals (at least iron, vitamin A and zinc) added to or sprinkled on a child's complementary food for improving iron status and reducing anaemia of children 6-23 months of age. The NSP in Sindh is responsible for scaling up this intervention in 9 districts targeting non-SAM children 6-59 months of age.

33. Unit costs include the procurement of micronutrient sachets, training, advocacy and other indirect programme costs. The average unit cost was calculated by dividing total NSP costs by the number of beneficiaries of the intervention. **The estimated average unit cost for delivering the intervention (assumed 55% implemented at community and 45% at health facilities) was around US$ 1.01 (PKR 151) per child.**

	Unit cost (PKR per beneficiary per year)						
	Micronutrients powders (Community)			Micronutrients powders (Health Facility)			Micronutrients powders
Province/District	Total programme costs	# beneficiaries	Total unit cost per average case	Total programme costs	# beneficiaries	Total unit cost per average case	Total unit cost per average case (assumed 55% community and 45% health facilities)
Sindh	**174,901,782**	**2,313,703**	**90**	**110,899,132**	**833,547**	**226**	**151.10**
Tahrparkar	26,531,434	545,515	49	9,292,157	104,414	89	66.80
Umerkot	18,353,764	302,858	61	8,166,419	89,908	91	74.20
Sanghar	28,545,194	474,164	60	35,431,771	261,073	136	94.18
Jacobabad	18,571,793	145,233	128	7,367,028	30,577	241	178.75
Larkana	21,349,284	228,227	94	13,799,575	93,086	148	118.16
TMK	11,098,459	108,224	103	6,068,923	23,633	257	171.96
Badin	22,664,287	248,313	91	12,879,123	193,305	67	80.18
Kambar Shahdadkot	12,244,589	89,773	136	10,298,090	24,477	421	264.34
Kashmore	15,542,978	171,396	91	7,596,046	13,074	581	311.33

	Unit cost (US$ per beneficiary per year)						
	Micronutrients powders (Community)			Micronutrients powders (Health Facility)			Micronutrients powders
Province/District	Total programme costs	# beneficiaries	Total unit cost per average case	Total programme costs	# beneficiaries	Total unit cost per average case	Total unit cost per average case (assumed 55% community and 45% health facilities)
Sindh	**1,166,012**	**2,313,703**	**0.60**	**739,328**	**833,547**	**1.50**	**1.01**
Tahrparkar	176,876	545,515	0.32	61,948	104,414	0.59	0.45
Umerkot	122,358	302,858	0.40	54,443	89,908	0.61	0.49
Sanghar	190,301	474,164	0.40	236,212	261,073	0.90	0.63
Jacobabad	123,812	145,233	0.85	49,114	30,577	1.61	1.19
Larkana	142,329	228,227	0.62	91,997	93,086	0.99	0.79
TMK	73,990	108,224	0.68	40,459	23,633	1.71	1.15
Badin	151,095	248,313	0.61	85,861	193,305	0.44	0.53
Kambar Shahdadkot	81,631	89,773	0.91	68,654	24,477	2.80	1.76
Kashmore	103,620	171,396	0.60	50,640	13,074	3.87	2.08

34. The coverage of micronutrient powders was made available only for those nine districts covered by the NSP. As a consequence**, the calculated average coverage for the province of Sindh is around 6% (or 20% for the nine NSP districts).**

Baseline coverage (2019)		
Programme	**Province/District**	**Micronutrients powders**
	Sindh	**6%**
NSP	Tahrparkar	10%
	Umerkot	10%
	Sanghar	30%
	Jacobabad	16%
	Larkana	26%
	TMK	30%
	Badin	16%
	Kambar Shahdadkot	18%
	Kashmore	20%

Zinc for treatment + oral rehydration solution (ORS)

35. There is a good evidence base for the efficacy of oral zinc tablets in the treatment of diarrhoea in children 0-59 months of age, specifically when used with oral rehydration solution (ORS) and continued breast-feeding. For infants 0-6 months WHO recommends 10 mg zinc for 10-14 days per episode; children older than 6 months 20 mg zinc for 10-14 days per episode. Three sachets of ORS per case is the recommended treatment for those children seeking treatment.

36. The unit cost for this treatment was obtained from the NSP financial reports by dividing total costs by the number of beneficiaries of the intervention. **The estimated average unit cost for the treatment of diarrhoea with zinc and ORS (assumed 85% implemented at community and 15% at health facilities) was around US$ 1.01 (PKR 151) per child.**

	Unit cost (PKR per beneficiary per year)						
	Zinc for treatment + ORS (Community)			**Zinc for treatment + ORS (Health Facility)**			**Zinc for treatment +ORS**
Province/District	Total programme costs	# beneficiaries	Total unit cost per average case	Total programme costs	# beneficiaries	Total unit cost per average case	Total unit cost per average case (assumed 85% community and 15% health facilities)
Sindh	**66,893,691**	**651,896**	**159**	**55,077,777**	**270,953**	**106**	**151.36**
Tahrparkar	10,431,442	143,886	72	6,573,474			61.62
Umerkot	9,525,358	133,562	71	5,925,745			60.62
Sanghar	7,800,792	82,991	94	7,492,682	71,027	105	95.72
Jacobabad	8,182,032	141,636	58	5,364,982	45,324	118	66.86
Larkana	6,563,870	61,573	107	5,852,704			90.61
TMK	5,331,915	13,024	409	4,804,897			347.98
Badin	7,245,429	58,379	124	7,158,442	54,714	131	125.12
Kambar Shahdadkot	6,092,857			6,828,664	99,888	68	10.25
Kashmore	5,719,995	16,845	340	5,076,187			288.63

	Unit cost (US$ per beneficiary per year)						
	Zinc for treatment + ORS (Community)			**Zinc for treatment + ORS (Health Facility)**			**Zinc for treatment + ORS**
Province/District	Total programme costs	# beneficiaries	Total unit cost per average case	Total programme costs	# beneficiaries	Total unit cost per average case	Total unit cost per average case (assumed 85% community and 15% health facilities)
Sindh	**445,958**	**651,896**	**1.06**	**367,185**	**270,953**	**0.71**	**1.01**
Tahrparkar	69,543	143,886	0.48	43,823	-		0.41
Umerkot	63,502	133,562	0.48	39,505	-		0.40
Sanghar	52,005	82,991	0.63	49,951	71,027	0.70	0.64
Jacobabad	54,547	141,636	0.39	35,767	45,324	0.79	0.45
Larkana	43,759	61,573	0.71	39,018	-		0.60
TMK	35,546	13,024	2.73	32,033	-		2.32
Badin	48,303	58,379	0.83	47,723	54,714	0.87	0.83
Kambar Shahdadkot	40,619			45,524	99,888	0.46	0.07
Kashmore	38,133	16,845	2.26	33,841	-		1.92

37. Reported current coverage (2019) levels for the treatment of diarrhoea with zinc and ORS were over 100% for all nine NSP's districts. As these coverages are unrealistic, they should be revised by focal points for future analysis.

Lipid-based nutrition supplements (LNS)

38. A Lipid-based nutrition supplements (LNS) programme in Sindh was supported by WFP, who provided technical assistance to the provincial government to implement a nutrient based stunting prevention operational research project in the district of Thatta and Sajjawal. The model is based on targeting the first 1000 days of life approach and it is aiming to the prevention of acute and chronic malnutrition. It was implemented through primary health care system (PHC) of the government, with the provision of locally produced specialized nutritious products for prevention and behavior change communication, to the target groups (PLW, children 6-23 months) through the Lady Health Workers (LHW) of the PHC. The project was rolled out in 29 Union Councils, selected by Lady Health Workers (LHWs). During the project cycle about 48,891 pregnant and lactating women (PLW) and 59,809 Children (6-23 months) have completed the project cycle covering the first 1,000 days of life.

39. The unit costs (provided by WFP) for this pilot programme were US$ 103 (PKR 15,415) for children and US$ 137 (PKR 20,572) for PLW. This is based on the currency conversation rate used in this analysis: 150 PKR to 1 US$. **Estimated geographical coverage was 44% in the two districts only.**

Monthly Ration for child		Costs (children)				
LNS (Wawa mum) Kg Monthly ration	Quantity for 18 months (Kg)	LNS- Wawamum cost (commodity only per Kg)	LNS Wawamum cost (commodity for 18 months)	Operational cost/child for 18 months (6-23 months)	Unit cost for 18 months for 1 child	
		PKR	PKR	PKR	PKR	USD
1.5	27	338	9,119.07	6,296.50	**15,415.57**	**102.77**

Monthly Ration for PLW		Costs (PLW)				
LNS (Mamta) Kg Monthly ration	Quantity for 15 months (kg)	LNS cost(commodity only per Kg) in PKR	LNS cost(commodity for 15months)	Operational cost/PLW for 15 months	Unit cost for 15 months for 1 PLW	
		PKR	PKR	PKR	PKR	USD
2.25	33.8	365.1	12,321.60	8,250.60	**20,572.20**	**137.15**

Fortification of staples

40. Fortification of staples is a preventive food-based approach to improve micronutrient status of population over time. The fortification is proven to be effective when industrially produced staples are regularly consumed by a large population group in a country. **Nutrition**

International supports food fortification efforts in Sindh working with the provincial government expanding the fortification of wheat flour with iron/folate, B12 and zinc; the fortification of cooking oil with vitamin A; and the provincial salt iodization programme.

41. Unit costs and coverage information for the three food fortification programmes were provided by Nutritional International and are summarised in the table below. **The fortification of wheat flour is the costliest intervention (US$ 0.17 or PKR 25) covering only 5% of the province of Sindh. The fortification of oil with vitamin A has a much broader coverage across the province (80%) and cost US$ 0.06 (PKR 9) per unit. The iodization of salt fully covers the whole province at a cost of US$ 0.01 (PKR 1.3) per beneficiary.**

	Unit cost (PKR per beneficiary per year)			Unit cost (US$ per beneficiary per year)			Baseline coverage (2019)		
Province/District	Iron Folic Acid, B12 and Zinc fortification of wheat flour	Vit. A fortification of oil	Iodine fortification of salt	Iron Folic Acid, B12 and Zinc fortification of wheat flour	Vit. A fortification of oil	Iodine fortification of salt	Iron Folic Acid, B12 and Zinc fortification of wheat flour	Vit. A fortification of oil	Iodine fortification of salt
Sindh	**25.0**	**9.0**	**1.3**	**0.17**	**0.06**	**0.01**	**5%**	**80%**	**100%**
Tahrparkar	25.0	9.0	1.0	0.17	0.06	0.01	5%	80%	100%
Umerkot	25.0	9.0	1.2	0.17	0.06	0.01	5%	80%	100%
Sanghar	25.0	9.0	1.1	0.17	0.06	0.01	5%	80%	100%
Jacobabad	25.0	9.0	0.8	0.17	0.06	0.01	5%	80%	100%
Larkana	25.0	9.0	1.8	0.17	0.06	0.01	5%	80%	100%
TMK	25.0	9.0	1.8	0.17	0.06	0.01	5%	80%	100%
Badin	25.0	9.0	1.3	0.17	0.06	0.01	5%	80%	100%
Kambar Shahdadkot	25.0	9.0	0.6	0.17	0.06	0.00	5%	80%	100%
Kashmore	25.0	9.0	0.6	0.17	0.06	0.00	5%	80%	100%
Ghotki	25.0	9.0	1	0.17	0.06	0.01	5%	80%	100%
Khairpur	25.0	9.0	0.46	0.17	0.06	0.00	5%	80%	100%
Naushero Feroze	25.0	9.0	1.65	0.17	0.06	0.01	5%	80%	100%
Dadu	25.0	9.0	0.75	0.17	0.06	0.00	5%	80%	100%
Shikarpur	25.0	9.0	0.73	0.17	0.06	0.00	5%	80%	100%
Sujawal District	25.0	9.0	1.18	0.17	0.06	0.01	5%	80%	100%
Thatta District	25.0	9.0	0.90	0.17	0.06	0.01	5%	80%	100%
Mirpurkhas	25.0	9.0	2.34	0.17	0.06	0.02	5%	80%	100%
Sukkur	25.0	9.0	1.20	0.17	0.06	0.01	5%	80%	100%
Hyderabad	25.0	9.0	1.12	0.17	0.06	0.01	5%	80%	100%
Jamshoro	25.0	9.0	0.88	0.17	0.06	0.01	5%	80%	100%
Karachi Central	25.0	9.0	1.12	0.17	0.06	0.01	5%	80%	100%
Karachi East	25.0	9.0	1.46	0.17	0.06	0.01	5%	80%	100%
Karachi South	25.0	9.0	2.30	0.17	0.06	0.02	5%	80%	100%
Karachi west	25.0	9.0	1.21	0.17	0.06	0.01	5%	80%	100%
Korangi	25.0	9.0	1.09	0.17	0.06	0.01	5%	80%	100%
Malir	25.0	9.0	2.15	0.17	0.06	0.01	5%	80%	100%
Matari	25.0	9.0	2.66	0.17	0.06	0.02	5%	80%	100%
Shaheed Benazirabad	25.0	9.0	1.84	0.17	0.06	0.01	5%	80%	100%
Tando Allah Yar	25.0	9.0	1.68	0.17	0.06	0.01	5%	80%	100%

Water, Sanitation, and Hygiene Interventions (WASH)

42. Water, Sanitation, and Hygiene (WASH) unit costs and coverage information were provided by the Planning and Development Department of the GoS, based on the budgets for both the AAP and the Saaf Suthro (SSSP) programmes.

43. The unit costs and coverage for each intervention are reported below. **Handwashing is the most expensive of all interventions and it includes the construction of hand wash facility at schools (AAP target 200 schools and SSSP 169). The unit cost for its construction is US$ 12 (PKR 1,787) and has limited coverages across the province (2%).**

	Unit cost (PKR per beneficiary per year)				Unit cost (US$ per beneficiary per year)				Baseline coverage (2019)			
Province/District	Handwashing	Hygienic disposal	Improved sanitation	Improved water source	Handwashing	Hygienic disposal	Improved sanitation	Improved water source	Handwashing	Hygienic disposal	Improved sanitation	Improved water source
Sindh	**1,787**	**40**	**90**	**31**	**11.91**	**0.27**	**0.60**	**0.21**	**2%**	**22%**	**34%**	**22%**
Tahrparkar	1,471	29	23	22	9.81	0.19	0.15	0.15	2%	50%	50%	50%
Umerkot	1,471	39	31	30	9.81	0.26	0.20	0.20	3%	50%	50%	50%
Sanghar	1,471	22	17	17	9.81	0.15	0.11	0.11	1%	50%	50%	50%
Jacobabad	1,471	46	36	35	9.81	0.30	0.24	0.24	3%	50%	50%	50%
Larkana	1,471	27	21	21	9.81	0.18	0.14	0.14	2%	50%	50%	50%
TMK	1,471	72	56	55	9.81	0.48	0.38	0.37	5%	50%	50%	50%
Badin	1,471	29	23	22	9.81	0.19	0.15	0.15	2%	50%	50%	50%
Kambar Shahdadkot	1,471	36	29	28	9.81	0.24	0.19	0.19	2%	50%	50%	50%
Kashmore	1,471	44	35	34	9.81	0.30	0.23	0.23	3%	50%	50%	50%
Ghotki	2,198		125		14.65	-	0.83	-	1%	0%	34%	0%
Khairpur	2,198		88		14.65	-	0.59	-	1%	0%	34%	0%
Naushero Feroze	2,198		156		14.65	-	1.04	-	1%	0%	34%	0%
Dadu	1,471	26	21	20	9.81	0.18	0.14	0.14	2%	50%	50%	50%
Shikarpur	1,471	36	28	28	9.81	0.24	0.19	0.18	2%	50%	50%	50%
Sujawal District	1,471	62	49	48	9.81	0.41	0.32	0.32	4%	50%	50%	50%
Thatta District	1,471	53	42	41	9.81	0.35	0.28	0.27	4%	50%	50%	50%
Mirpurkhas	2,198		136		14.65	-	0.91	-	1%	0%	34%	0%
Sukkur	2,198		127		14.65	-	0.85	-	1%	0%	34%	0%
Hyderabad	2,198		86		14.65	-	0.57	-	1%	0%	34%	0%
Jamshoro	2,198		227		14.65	-	1.51	-	2%	0%	34%	0%
Karachi Central					-	-	-	-	0%	0%	0%	0%
Karachi East					-	-	-	-	0%	0%	0%	0%
Karachi South					-	-	-	-	0%	0%	0%	0%
Karachi west					-	-	-	-	0%	0%	0%	0%
Korangi					-	-	-	-	0%	0%	0%	0%
Malir					-	-	-	-	0%	0%	0%	0%
Matari	2,198		296		14.65	-	1.97	-	2%	0%	34%	0%
Shaheed Benazirabad	2,198		154		14.65	-	1.02	-	1%	0%	34%	0%
Tando Allah Yar	2,198		270		14.65	-	1.80	-	2%	0%	34%	0%

Family planning

44. Family planning unit costs information were provided by the Planning and Development Department of the GoS. The unit cost for family planning was recalculated based on relative distribution of utilization of each individual contraceptive methods. **Therefore, the proportional average unit cost for family planning in Sindh was estimated US$ 0.06 (PKR 8.62).**

	Unit cost (PKR per beneficiary per year)			Unit cost (US$ per beneficiary per year)		
Method	**Distribution**	**Cost**	**Proportional Cost**	**Distribution**	**Cost**	**Proportional Cost**
	A	B	AxB	A	B	AxB
Condom	87%	4.22	3.67	87%	0.03	0.02
Male sterilization	0%	-	-	0%	0.00	-
Female sterilization	0%	-	-	0%	0.00	-
Injectable	4%	71.00	3.05	4%	0.47	0.02
Implant	0%	-	-	0%	0.00	-
Pill	8%	21.24	1.80	8%	0.14	0.01
Withdrawal	0%	-	-	0%	0.00	-
Fertility awareness	0%	-	-	0%	0.00	-
IUD	0%	45.26	0.10	0%	0.30	0.00
	100%		**8.62**	**100%**		**0.06**

45. As a proxy for the coverage of family planning interventions in Sindh for 2019, we used the Contraceptive Prevalence Rate (CPR) for any method of contraceptive in Pakistan from the UNFPA website (https://www.unfpa.org/data/world-population/PK), 42%.

V. ANNEX: METHODOLOGY AND DATA COLLECTION STRATEGY

Methodology and Data Collection Strategy

The purpose of this document is to outline and propose an analytical strategy to collect data and estimate coverage and unit costs of key high-impact, evidence-based nutrition interventions in Pakistan to inform allocative efficiency analysis using Optima nutrition.

Background

Without adequate human capital, countries cannot sustainably improve their economic growth and competitiveness or prepare their workforce for expanding high skill jobs of the future. Compelling scientific and economic evidence shows experiences in the early years have a profound impact on brain development, affecting learning, health, adult productivity and ultimately, the economic competitiveness of nations. Worldwide, 25% of children under age five (156 million) suffer from chronic malnutrition, which means they are stunted (low height for age). The World Bank Group (WBG) estimates that the average country's GDP per capita is 7% lower than it could have been if steps had been taken to prevent stunting among workers when they were children. In Sub-Saharan Africa and South Asia, the difference is even greater (9 to 10%).

In response to the convincing evidence on the benefits of investing in young children, and the growing demand from countries, the WBG is increasing its support to countries to invest in the early years of life. Specifically, the WBG has committed to expanding its investments in the key interventions required to deliver on these priorities through the Investing in the Early Years (IEY) Initiative. The WBG's priorities are threefold: 1) reduce childhood undernutrition, especially stunting; 2) ensure children receive early stimulation and learning; and 3) protect vulnerable children. The WBG is engaging with priority countries to identify opportunities to expand key interventions and consider where it can best provide support through its financial and knowledge services. It is also helping build the evidence base so countries can better appreciate the challenges of early childhood development and identify the most cost-effective opportunities to respond.

One key and persistent question asked by policy makers and nutrition and health program managers which has not been addressed to-date is: what allocation of funding across different interventions would allow us to maximize nutrition and health impact while minimizing costs? Optima nutrition is a mathematical model that uses an integrated analysis of nutrition status, program, and cost data to determine an optimal distribution of investment at different funding levels to better serve the needs of decision-makers and planners. An initial pilot application for Optima nutrition has been developed through a partnership between the World Bank, the Bill and Melinda Gates Foundation, and the Burnett Institute. Currently, the application is focusing on child undernutrition (stunting, wasting, and anemia) and incorporates key nutrition interventions that have shown to impact undernutrition either directly or indirectly through diarrhea incidence and birth outcomes (complementary feeding education, public provision of complementary foods, zinc supplementation, breast feeding promotion, vitamin A supplementation, micronutrient supplementation in pregnancy, balanced energy-protein

supplementation, intermittent preventive malaria therapy in pregnancy, etc). The application allows the user to 1) estimate the impact an intervention scale-up will have on stunting prevalence and child mortality; 2) calculate the cost of scale up under different cost function assumptions; 3) for a given budget, calculate the optimal allocation of resources among the key interventions (that is, identify an allocation that will produce maximum reductions in stunting or/and mortality); 4) for a given budget, calculate the optimal allocation of resources among different geographic areas in a given country; and 5) for a given budget, calculate the optimal allocation of resources among different interventions and geographic areas

Objective

The objective of this analysis is to estimate the coverage and the cost to provide high-impact evidence-based nutrition interventions in Pakistan, to inform an application of an early version of the Optima nutrition tool and conduct allocative efficiency analyses of nutrition investments. The analysis in turn are aimed at informing activities carried out under various initiatives introduced/to be introduced by the Government of Pakistan with support from development partners including the WBG.

For each key nutrition intervention, the following outputs are expected:

a) **Target population**
b) **Intervention coverage**
c) **Intervention unit cost**

Target population

Target population is defined as the population that could possibly receive the nutrition intervention. Examples of target populations include: pregnant women; children aged 6-59 months; etc. Defining the target population is important to calculate the number of beneficiaries requiring the intervention, per year. For most preventive care interventions, the share will be 100% of the total target population. For example, daily and folic acid supplementation will be required for all pregnant women. The target population can be interpreted as the incidence and prevalence of conditions for interventions such as treatment of moderate/severe acute malnutrition (MAM/SAM).

Intervention coverage

The data collection process will include intervention geographical and population coverage, nationally and by region. Intervention coverage refers to how many people, out of the target population, are receiving the intervention.

Intervention unit cost

Unit costs for each intervention will be based on the so-called "**ingredients approach**" and broken down by direct costs (drugs, supplies, transportation, medical personnel, etc.) and program costs (program personnel, technical support, monitoring and evaluation, supervision, advocacy, etc.). Wherever applying the ingredient approach is not practical, unit costs can be estimated using the "**program experience**"

approach, based on the actual financial costs of programs implemented in Pakistan. If no unit costs are available for a given intervention in Pakistan, the mean unit cost for other countries in the region can be used.

Unit costs information will be collected using a customised Excel-based template drawing from the structure and logic of the **Onehealth tool** (OHT)[1]. Costs are classified and divided into 'direct costs' and 'programme costs' (Annex 2). Direct costs are costs for inputs per beneficiaries incurred at the point of delivering the intervention, such as medical drugs and supplies, and medical personnel costs. Programme costs refer to costs that operate across a number of different service delivery points at a level other than the delivery point of an intervention to beneficiaries, like training, coordination, monitoring and evaluation, etc. Activity costs referring to multiple interventions, such as nutrition governance and information systems are shared and allocated equally to each individual intervention.

Scope of the analysis

Most of the key nutrition-specific interventions included in this analysis are also supported by scientific evidence from the Lancet series 2008 and 2013 on Maternal and Child Undernutrition. Some nutrition-sensitive interventions that have proven to be very efficacious in averting stunting and reducing child mortality are also considered: these interventions include family planning and social protection (cash transfer).

The key nutrition interventions includes both nutrition-specific and nutrition-sensitive actions and are grouped into seven separate packages: (i) Infant and Young Child Feeding (IYCF); (ii) Micronutrients supplementation; (iii) Treatment and prevention of acute malnutrition; (iv) Disease prevention and management; (iv) Child care; (v) Family planning; (vi) Social protection. The list of the key nutrition interventions and associated target groups is contained in Annex 1.

Expenditures estimated in this model are **financial costs** of goods and services required to deliver each of the interventions from a supply-side prospective, and do not reflect the full economic and social value of how resources could be used differently, such as opportunity costs of time of beneficiaries seeking and accessing the health services (lost wages, etc.).

Process of undertaking costing exercise

The process is based on the analysis of the country current support to nutrition, relative to national priorities, including the examination of government policies and protocols as we well as other implementing partners programs. The approach uses information gathered from key stakeholders during meetings, workshops, one-to-one interviews and email exchanges.

[1] The OneHealth Tool is a software designed to strengthen health system analysis and costing and to develop financing scenarios at country/regional level. The development of the tool is overseen by the InterAgency Working Group on costing comprised of members from UNFPA, UNICEF, UNDP, UNAIDS, UNWOMEN, WHO and the World Bank.

Key stakeholders include relevant ministries and governmental agencies, UN agencies, donors and int'l NGO implementing nutrition activities. Information collected during the process may include: Key national nutrition policy documents; Programs budgets, expenditures documents, grants applications, etc.; Demographic data by intervention and target groups including; epidemiological data such as prevalence of stunting, wasting, etc,; Baseline intervention coverage data from the most recent Demographic and Health Survey (DHS) or other surveys such as the Multiple Indicator Cluster Surveys (MICS).

The 4 steps process described below support a participatory dialogue within key stakeholders at country level and include tools and templates to be used by designed focal points and by the WB facilitator:

1. **Inception**

1.1. WB facilitator develops the work plan and analytical strategy
1.2. Key stakeholders to:
- Identify and validate the list of key nutrition specific and sensitive interventions
- Take stock of existing data, documentations and concurrent exercises
- Identify focal points for each intervention

1.3. WB facilitator customizes templates based on inputs from key stakeholders

2. **Data collection**

2.1. WB facilitator to:
- Distribute excel-based templates and data collection tools to designated focal points
- Follow-up with key stakeholders and focal points for introduction to templates and tools

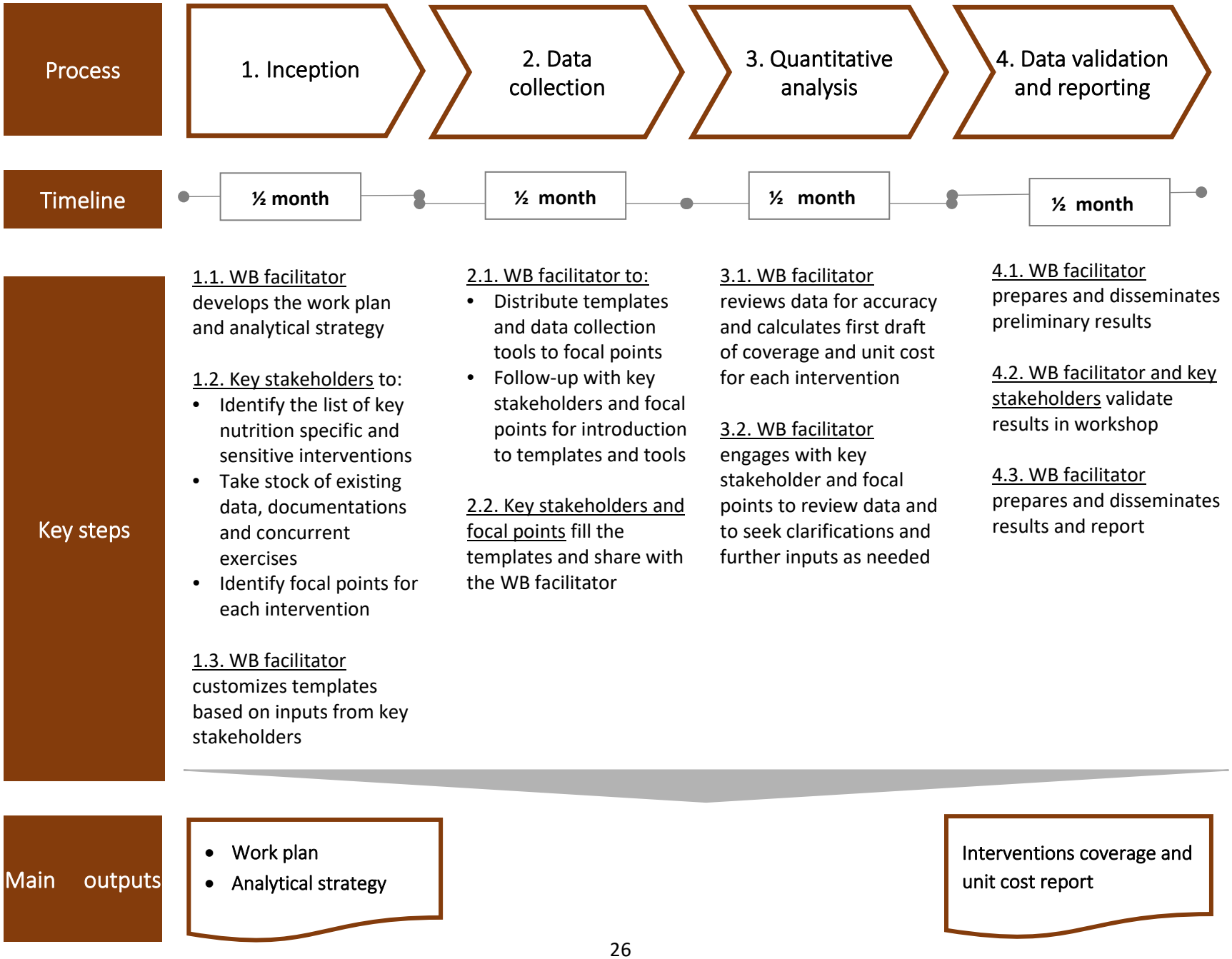
2.2. Key stakeholders and focal points fill the templates and share with the WB facilitator

3. **Quantitative analysis**

3.1. WB facilitator reviews data for accuracy and calculates first draft of coverage and unit cost for each intervention.
3.2. WB facilitator engages with key stakeholder and focal points to review data and to seek clarifications and further inputs as needed

4. **Data validation and reporting**

4.1. WB facilitator prepares and disseminates preliminary results
4.2. WB facilitator and key stakeholders validate results in workshop
4.3. WB facilitator prepares and disseminates results and report


Process
1. Inception
2. Data collection
3. Quantitative analysis
4. Data validation and reporting
Timeline
½ month
½ month
½ month
½ month
Key steps
1.1. WB facilitator develops the work plan and analytical strategy
1.2. Key stakeholders to:
• Identify the list of key nutrition specific and sensitive interventions
• Take stock of existing data, documentations and concurrent exercises
• Identify focal points for each intervention
1.3. WB facilitator customizes templates based on inputs from key stakeholders
2.1. WB facilitator to:
• Distribute templates and data collection tools to focal points
• Follow-up with key stakeholders and focal points for introduction to templates and tools
2.2. Key stakeholders and focal points fill the templates and share with the WB facilitator
3.1. WB facilitator reviews data for accuracy and calculates first draft of coverage and unit cost for each intervention
3.2. WB facilitator engages with key stakeholder and focal points to review data and to seek clarifications and further inputs as needed
4.1. WB facilitator prepares and disseminates preliminary results
4.2. WB facilitator and key stakeholders validate results in workshop
4.3. WB facilitator prepares and disseminates results and report
Main outputs
• Work plan
• Analytical strategy
Interventions coverage and unit cost report

Annex 1: Key nutrition interventions included in the cost analysis

	Intervention	Target population	Description
IYCF	Breastfeeding counselling and support	Pregnant and lactating women	Behaviour change communication on optimal breastfeeding
	Complementary feeding counselling and support	Mothers of children 6-23 months	Behaviour change communication on complementary feeding practices
Micronutrients supplementation	Vitamin A supplementation	Children 6-59 months	Bi-annual supplementation of vitamin A capsules
	Home fortification of food with multiple micronutrient powders	Children 6-23 months	Use of multiple micronutrient powders for home fortification of foods consumed by children 6-23 months
	Iron-folic acid supplementation (PW)	Pregnant women	Four months supplementation of iron-folic acid during pregnancy
Treatment and prevention of acute malnutrition	Management of severe acute malnutrition (SAM)	Children 6-59 months	Severely malnourished children admitted in either inpatient or outpatient therapeutic feeding programs
	Public provision of complementary foods (SNF)	Children 6-23 months	For children living in poverty, provision of a small amount of nutrient-dense complementary food (Supercereal +) for the prevention of moderate malnutrition
Disease prevention and management	ORS+zinc for treatment of diarrhea	Children 6-59 months	Management of mild and moderate diarrhea with oral rehydration solution (ORS) and zinc tablets
	Delayed Cord Clamping	Live births	
Family planning	Promote family planning, including optimized inter-pregnancy intervals	Women of reproductive age (15-49yo)	Community-based Distribution of family planning products (Sayana press)
Social protection	Cash transfers	Targeted households	Disbursement of conditional/unconditional cash to selected vulnerable households

Annex 2: Classification of costs

	Cost category	Example of data included
Direct costs	*Drugs and Medical Supplies*	Albendazole, Folic acid, Vitamin A, etc.
	Medical Personnel	Salaries of health workers pro rated based on time spent delivering the service at health facility level (nurses, midwifes, nutritionists, CHWs, etc.)
Program costs	Programme-Specific Human Resources	Salaries for managers and others programme and support staffs working at national, regional and county level (assumed as 10 percent of programme costs).
	Training	In-service training, training of trainers and development of training material for: MIYCN Training, Iron and Folic Acid Supplementation (IFAS), etc.
	Supervision	National meetings and forums, national staff visiting local staff, county staff visits to health facilities.
	Monitoring and Evaluation	Design of M&E frameworks and systems, national surveys, routine surveillance, data quality audit.
	Equipment	Anthropometric equipment, consumables, stationery.
	Communication, Media & Outreach	Development of communication strategy, mass media campaigns, social outreach activities.
	Advocacy [2]	Advocacy strategies and activities (i.e. develop national nutrition advocacy, communication and social mobilization strategy; advocate workplace support of breastfeeding mothers).
	General Programme Management	Programme support, development and review of country strategies and guidelines, policies, etc.

[2]Advocacy aims primarily to change the behaviour of public leaders or decision-makers.