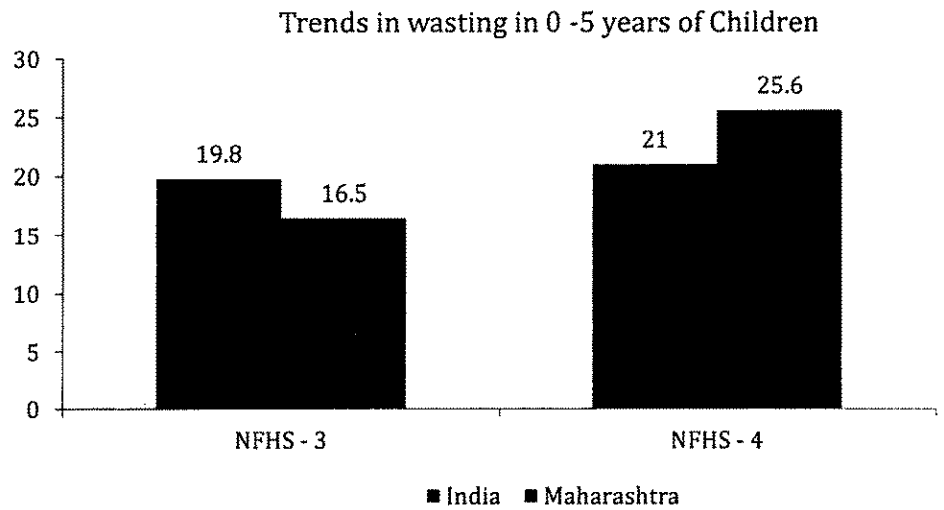
Village Child Development Centre Scheme Maharashtra:

Institutional Directly Supervised Management of Severe Acute Malnutrition

Background

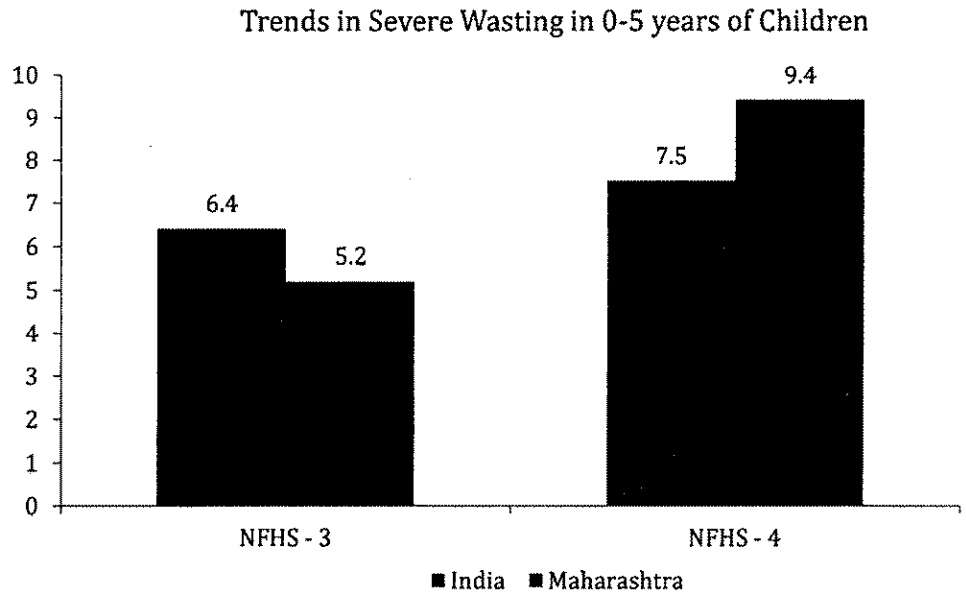
Severe Acute Malnutrition (SAM) affects chances of survival for children, increases their susceptibility to illness, reduces their ability to learn, and makes them less productive in later life. Decreasing child mortality and improving maternal health depend heavily on reducing malnutrition, which is responsible, directly or indirectly, for 35% of deaths among children under five.[1]

Although the median under-five case-fatality rate for SAM typically ranges from 30% to 50%, it can be reduced substantially when physiological and metabolic changes are taken into account.[1] Therefore, SAM Management becomes an integral part of improving child health-related indicators. The following graph shows the wasting and severe wasting data for India and Maharashtra:



Graph 1: Comparison of Wasting from NFHS 3(2005-06) and NFHS 4 (2015-16)

[1] World Health Organisation, 2019,
https://www.who.int/quantifying_ehimpacts/publications/MalnutritionEBD12.pdf
https://www.who.int/nutgrowthdb/jme-2019-key-findings.pdf?ua=1
https://www.who.int/nutrition/publications/moderate_malnutrition/FNBv30n3_suppl_paper2.pdf



Graph 2: Comparison of Severe Wasting from NFHS 3 (2005-06) and NFHS 4 (2015-16)

Analysis of National Family Health Survey (NFHS), NFHS 3 (2005-06) & NFHS 4 (20015-16) for India and Maharashtra indicate a slight increase in the percentage of children who are wasted in India i.e. from 19.8% to 21%. However, a significant increase for Maharashtra i.e. from 16.5% (NFHS 3) to 25.6% (NFHS 4) is observed. Such an increase of 9.1% in severely wasted children compared to the national average increase (of 1.2%) highlights the need for focussed intervention in this area.

A further district wise analysis review reveals that districts such Gadchiroli, Chandrapur, Gondia, Nagpur, Wardha, Yawatmal, Washim, Hingoli, Jalna, Bid, Solapur, Nashik, Dhule, and Nandurbar districts need maximum attention for reducing the percentage of severely wasted children. The following pictorial representations show the district wise mapping of prevalence of wasting and severe wasting in children between 0-5 years:

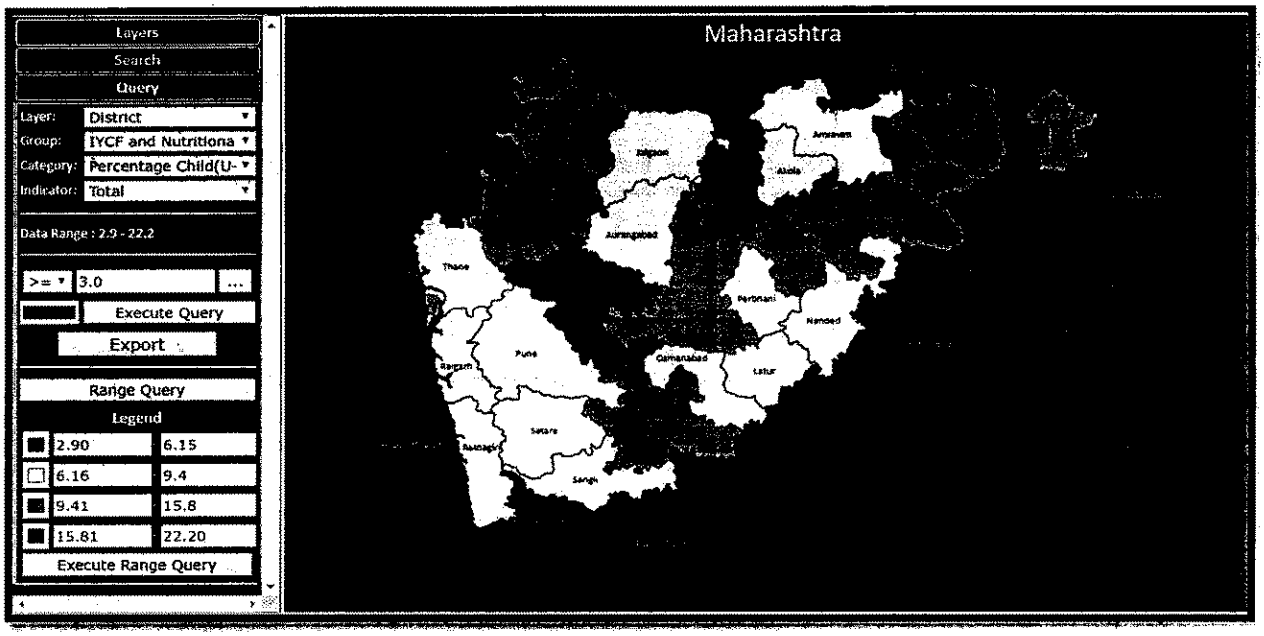


Figure 1: District wise prevalence of severe wasting among children between 0-5 years
source: http://nfhs4.indiagis.org/nfhs4/map/index.jsp

With regard to this challenge, the Government of Maharashtra has timely responded by creating the Village Child Development Center Program which is based on Community-based Management of Acute Malnutrition concept which was launched in the year 2010.

Village Child Development Centre (VCDC) Concept

The state of Maharashtra launched the VCDC scheme in the year 2010 with the aim of addressing the challenge of severe acute wasting. VCDCs are run at the community level through designated anaganwadis which acts as centres for providing facilities with regard to the management of SAM. The services under this framework are only provided for medically uncomplicated SAM children for a period of 8-12 weeks. The diagram ahead explains the three levels of treatment of SAM including VCDC:



Figure 2: Three tier system of SAM Management in Maharashtra

VCDC are institutional platforms which operate on the principle of direct supervision and care for the child with SAM. It must be noted that the two major set of interventions covered in the VCDCs are health and nutrition interventions. The diagram below explains in brief these two interventions:

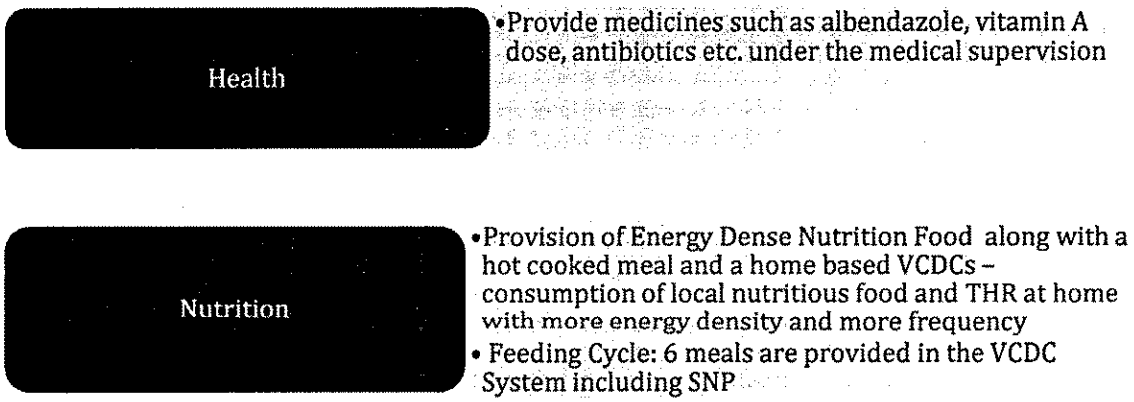


Figure 3: Health and Nutrition Services in VCDC

With regard to the provision of nutrition services, it is important to note that Energy Dense Nutritious Food (micronutrient fortified food) is provide along with the existing supplementary nutrition program of local hot cooked meal and take home ration under the ICDS program. These nutrition interventions are aimed at addressing the energy, protein and micro-nutrient gap in children with SAM.

Components of VCDC

There are five major components of VCDC framework. The diagram below lists the components:

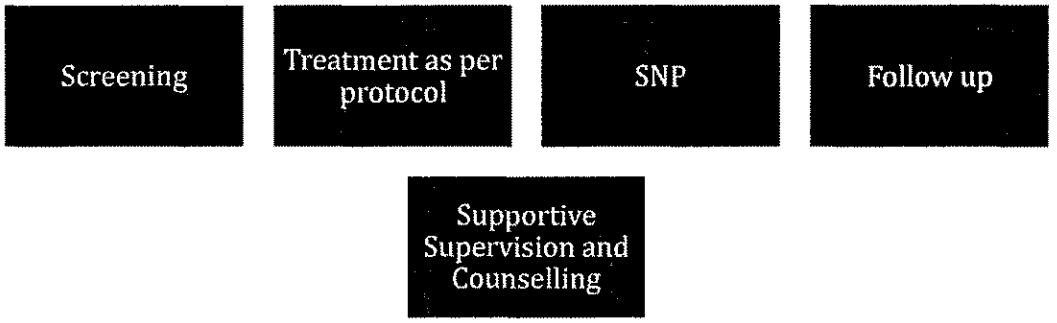


Figure 4: Components of VCDC

A. Screening

According to guidelines for SAM identification, a sub-center level screening of all children (0-6years) by AWW, ANM, and MPW is recommended. This involves mobilization of communities by the Gram Panchayat, ensuring the availability of all Growth Monitoring Devices, the second round for covering reluctant or missed cases, line-listing of identified SAM children. The screening should take 15-20 days and should be repeated every 2 months. Check-up of all identified SAM children to be done by Medical Officers (MO) for appropriate referral.

In the case of medical complications, the child is referred to Nutrition Rehabilitation Centres (NRC) or Children Treatment Centres (CTC). Of total SAM, only a small proportion require admissions to NRC or CTC. SAM children below 6 months of age are directly admitted to NRC. The diagram explains the details:

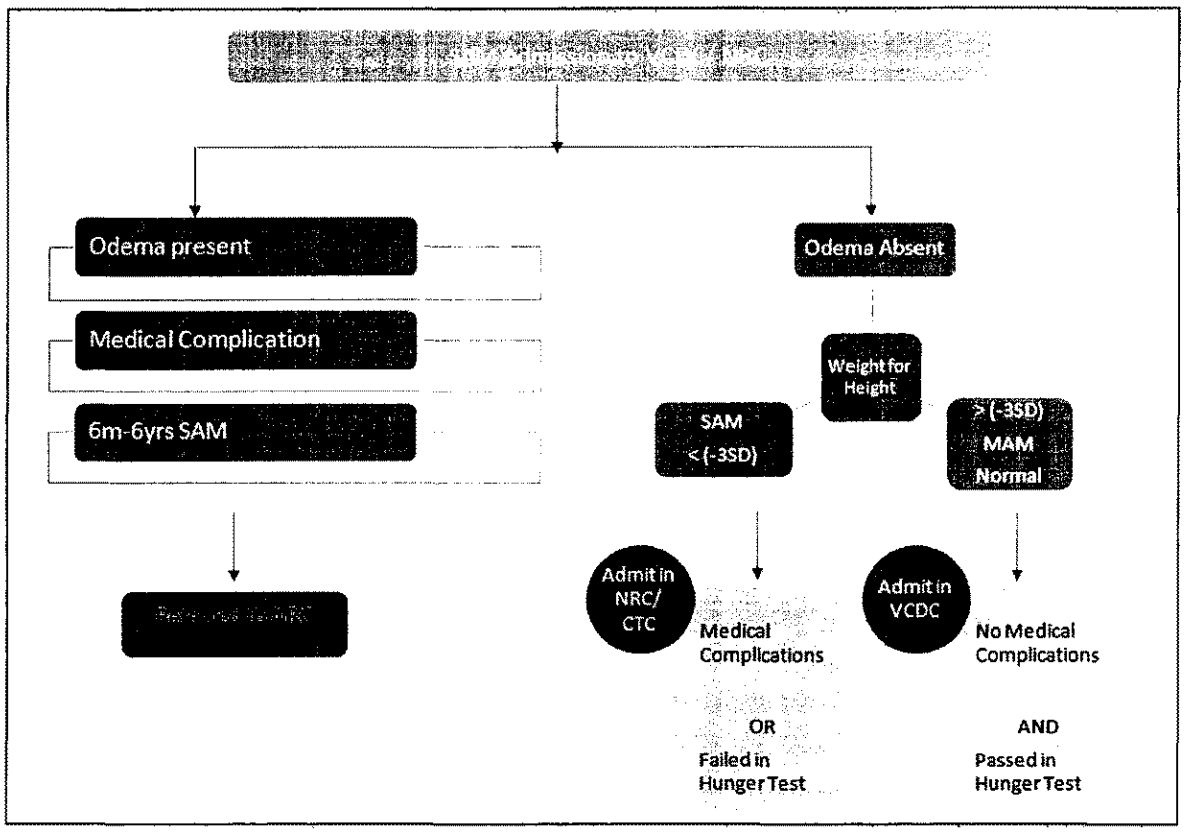


Figure 5: Flow Chart representing SAM Admission to VCDC/ NRC

In the case of no medical conditions, the child undergoes Hunger Test for VCDC admission. The further section explains the details of hunger (appetite testing).

Hunger Testing

Hunger or Appetite Test refers to diagnosis of an infection or a major metabolic abnormality by assessing the appetite of the child. Loss of appetite is a major manifestation of severe metabolic malnutrition.

SAM children (6 months - 6 years) with no medical complications undergo a Hunger Test. This should be done under the supervision of MO/ Health Worker/ Lady Supervisor. The hunger of SAM child is weight-specific and tested as follows:

Table 1: Hunger Testing Criteria

Child's Weight (kg)	Energy Dense Nutritious Food (EDNF)	
	Criteria for Fail	Criteria for Pass
< 4.000	< 1/8th of packet (1 spoon – 10g)	> 1/8th of packet
4 – 6.900	< 1/4th of packet	> 1/4th of packet
7.000 – 9.900	< 1/3th of packet	> 1/3th of packet
10.000 – 14.900	< 1 packet	> 1th packet

Children who pass the hunger test are enrolled in VCDC; those who fail are then enrolled in NRC or CTC.

B. Treatment as per protocol

Under the VCDC framework, treatment protocol consists of health and nutrition interventions

Health Interventions

There are specific health interventions available at the VCDC. These include: (i) antibiotics, (ii) Vitamin A, (iii) albendazole and (iv) immunisation. The details of the same are mentioned in the table ahead.

Table 2: Drugs and Interventions in VCDC

Drugs and Interventions	Dosage and Details	Regime
Amoxicillin Antibiotics	Total volume- 50mg/kg/day	Give three doses per day for 7 days- morning, afternoon, and evening
Vitamin A	No additional dose of Vitamin A required during VCDC. However, routine immunization of Vit A to be continued after VCDC	
Albendazole	1 to 2 year child-200mg (5ml Syrup) 2 to 3 year child-400mg(10ml Syrup) 3 to 6 year child-400mg(10ml Syrup or 1 tablet) * Not applicable to children below 1 year of age	Give one dose after 4 weeks(on 4th meeting)
Immunization	For children who are not immunized due to admission in VCDC, they must be immunized for remaining vaccines after discharge. If village is affected by Rubella then give rubella immunization to child according to guidelines and instructions of heath department.	

Nutrition Interventions

The Government of Maharashtra has implemented two different nutritional related protocols - Amylase Rich Food (ARF) and Energy Dense Rich Food (EDNF) as explained below.

Amylase Rich Food Protocol

Prior to the implementation of the EDNF protocol, the state had implemented the Amylase Rich Food (ARF) protocol. The preparation method can be seen below:

1. Select whole, unbroken grains (i.e. moong, rice, etc)
2. Soak the grain in water until sprouting takes place (around 48 hours).
3. Dry in the sun / roast lightly on low flame.
4. Powder by hand pounding or in an electric grinder.
5. Store in a wide mouthed screw cap bottle.
6. Use this powder to make various recipes according to child's requirement and using guidelines.

Usually prepared food from cereals tends to have a low energy content, which may not meet the daily energy requirements of the child. The addition of ARF lowers the dietary bulk and increases the energy content. Preparation of Amylase Rich Food (ARF) is simple and can be done by AWWs at VCDCs. Certain medicines are provided on the recommendation of a medical officer along with the ARF food. The table below explains the feeding pattern under the ARF protocol.

Table 3: Daily schedule to be followed for children's feeding (age 6 months – 6 years) for 60 days

Sr. No.	Time	Type of food
01.	8:00 am	ARF Recipe at VCDC
02.	10:00 am	AWC Hot Cooked Meal at VCDC
03.	12:00 pm	AWC Hot Cooked Meal at VCDC
04.	2:00 pm	Food prepared by parents at home
05.	4:00 pm	One potato and one banana / one egg and one banana at VCDC
06.	6:00 pm	ARF Recipe at VCDC
07.	8:00 pm	Food prepared by parents at home

ARF Advantages:

ARF is cost-effective and easily prepared as wheat and moong are readily available. It is a low viscosity, yet high energy-rich food. The ARF flour can be used to prepare multiple food items like *Rotis*, porridge, *ladoos*, snacks, etc; in contrast to EDNF, which is restricted to minimal handling before consumption.

ARF Limitations:

1. The preparation is time-consuming; takes 2-3 days.

2. The process involves soaking and drying of grains which depends on weather conditions. Therefore, its preparation in the rainy season (in which there are higher chances of having wasted children) becomes difficult.
3. The preparation is space intensive. Hence, VCDCs which are located in space crunched areas found it difficult to prepare ARF.
4. As ARF is locally prepared, maintaining uniform quality standards is a challenge
5. Since ARF is locally-prepared, the packaging and storage needs to be taken care of by the makers – storage in dry and air-tight containers.

Energy Dense Nutritious Food Protocol

Due to the mentioned limitations of the ARF protocol, it was discontinued in July 2018. Post which, the Government of Maharashtra started the new nutritional related protocol named EDNF. Under this protocol, EDNF is dispensed in the form a unitary packets of semi solid EDNF in paste form. The composition of the EDNF paste is given below:

Table 4: EDNF Composition

Sr. No.	Particulars	Amt per sachet of 92g	Sr. No.	Particulars	Amt per sachet of 92g
1.	Energy	500 Kcal	14.	Vitamin A	840 mcg
2.	Protein	12.5 g	15.	Vitamin D	15 mcg
3.	Lipid	32.86 g	16.	Vitamin E	18.4 mg
4.	Calcium	276 mg	17.	Vitamin C	49 mg
5.	Phosphorous	276 mg	18.	Vitamin B1	0.55 mg
6.	Potassium	1022 mg	19.	Vitamin B2	1.66 mg
7.	Magnesium	84.6 mg	20.	Vitamin B6	0.55 mg
8.	Zinc	12.9 mg	21.	Vitamin B12	1.7 mcg
9.	Copper	1.6 mg	22.	Vitamin K	19.3 mcg
10.	Iron	10.6 mg	23.	Biotin	60 mcg
11.	Iodine	92 mcg	24.	Folic Acid	193 mcg
12.	Selenium	27.6 mcg	25.	Pantothenic Acid	2.85 mg
13.	Sodium	< 267 mg	26.	Niacin	4.88 mg

EDNF Feeding Requirement

The number of packets assigned to the SAM child as per his weight, remains same until he is discharged. The table below explains the feeding requirement under EDNF protocol.

Table 5: Weight-wise Provision of EDNF Packets per day to SAM Children

Weight (kg)	EDNF packet(s) per day	EDNF packets for a week
2.5 - 3.490	1	7
3.5 – 6.990	2	14
7.0 – 9.990	3	21
10.0 – 14.990	3	21

Feeding Timetable:

The feeding of EDNF is done at the VCDC. During VCDC hours, the child is given 2 Hot Cooked Meals and at least 3 servings of EDNF.

Table 6: Daily Schedule for VCDC

Day	Time	Diet for SAM Children
Morning	08:00 am	EDNF
	10:00 am	EDNF
Afternoon	12:00 pm	Hot Cooked Meal in AWC
	02:00 pm	Hot Cooked Meal in AWC/home
	04:00 pm	EDNF
Evening	06:00 pm	EDNF
Night	08:00 pm	Hot Cooked Meal at home

EDNF Advantages:

1. Children with SAM have increased energy-requirement, therefore energy-dense and higher fat content of the diet benefits the children, provided other nutritional requirements are met.
2. Additionally, it is micro-nutrient fortified therefore addresses the nutritional needs of the child.
3. As it is ready-to-eat, it is easier to dispense
4. Uniform quality standards are maintained
5. Since it does not require any human-handling prior to eating, hygiene is maintained. EDNF is pre-packed and easy to store.

Even within the EDNF protocol, there are certain limitations. One of the observed limitation is that child is unable to consume the entire prescribe dosage within a single day. In order to provide a wholesome nutrition to the children with SAM the EDNF protocol is combined with the existing SNP program. The details of the SNP program is ahead:

C. Supplementary Nutrition Programme in addition to EDNF protocol

Under ICDS, SAM children are also provided with the hot cooked meal and THR along with the VCDC nutritional food (EDNF). The beneficiaries are provided with supplementary nutrition as per age-groups; children between 6 months to 3 years are provided with Take Home Ration (THR) and those between 3-6 years are provided with Hot Cooked Meals (*Garam Taaza Aahar*). The provision for SNP are as follows:

Table 6: Day-wise schedules for meals to be provided at Anganwadis

Food Type	Day	Food Name	Composition	Qty per serve (g)	Nutrition Value per Serve		Conforms with ICDS norms	
					Calorie (Kcal)	Protein (gm)	Calorie	Protein
Morning Snacks	Mon Wed Thu Sat	*Murmura Chivda* (Rice Snack)	Rice- 25g Dal- 10g Oil- 10ml Groundnut– 05g	50	245	5.37	Yes	Yes
		Murmura Laddu	Rice- 30g Jaggery- 30g	60	210	2.25		
	Tue, Fri	*Ussal Dal* (Gravy)	Sprouted grams (peas, moong, etc) – 50g Soyabean- 10g Oil- 5ml	70 (after cooking 100g)	295	16.3	Yes (MS+HCM =505.00)	Yes (MS+HCM =18.55)
Hot Cooked Meals (HCM)	Wed Sat	*Khichdi*	Rice- 40g Pulses/ lentils- 10g Soyabean- 5g Oil- 5ml	65 (after cooking 100g)	260	9.28	Yes (MS+HCM =505.00)	Yes (MS+HCM =14.65)
	Mon, Thu	*Lapsi* (Sweet)	Wheat- 20g Jaggery- 20g, Soyabean- 5g, Oil- 5ml	75	332	7.73	Yes (MS+HCM =542.00)	No (MS+HCM = 9.98)

Table 7: Recipes for Take Home Ration for Children between 6 months – 6 years

Sr. No.	Particulars	Recipe -1 Requirement/ beneficiary per day (5 days)	Recipe -2 Requirement/ beneficiary per day (5 days)	Total Quantity (5 days)
1.	Wheat	56g	62g	2.950 kg
2.	*Masoor Dal* Orange Lentil	30g	-	0.750 kg
3.	*Mungdal* (Yellow Lentils)	-	26g	0.650 kg
4.	Chilli Powder	4g	4g	0.200 kg
5.	Turmeric	4g	4g	0.200 kg
6.	Salt (Double Fortified)	8g	8g	0.400 kg
7.	Soyabean Oil (Fortified)	10g	10g	0.500 kg
8.	*Chavli* (Black-eyed peas)	30g	-	0.750 kg
9.	*Matki* (Moth beans)	-	26g	0.650 kg
	Total	142g	140g	7.050 kg

Supplementary honorarium to ICDS Staff

Under the VCDC program, the Anganwadi worker and the helper are provided with honorarium for the running the VCDC. The table ahead provides the supplementary honorarium details.

Table 8: Supplementary honorarium details

Sr. No.	Particulars	Supplementary honorarium per month
1.	Anganwadi Worker	₹ 5
2.	Anganwadi Helper	₹ 5

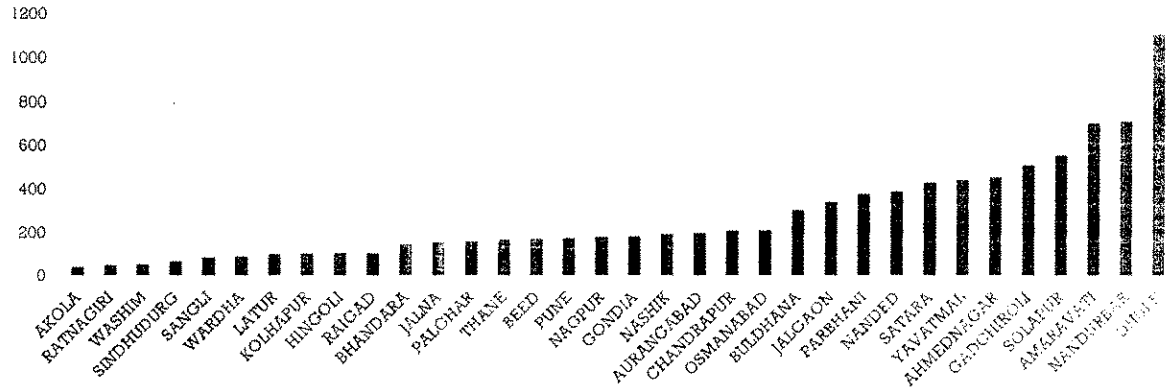
VCDC Distribution and Facilities

Within Maharashtra, there are significant differences in the number of VCDCs across districts. There were 9,336 on-going Village Child Development Centres (VCDCs) in the state; the highest number observed in Dhule (1113), Nandurbar (714) and Amravati (704) and lowest in Akola (41), Ratnagiri (49), Washim (51).

Interestingly, of the total, 12% VCDCs are concentrated in Dhule district and only 8 of 36 districts account for approximately 52% VCDCs Dhule, Nandurbar, Amravati, Solapur, Gadchiroli, Ahmednagar, Yavatmal, Satara.

The graph 1 below represents the distribution of VCDCs across the state:

Graph 3: Distribution of VCDCs across Maharashtra State



Graph 3: Distribution of VCDCs , Source: ICDS Data

The guidelines under this program, also provide for certain facilities be present at the VCDC. The diagram ahead lists these details:



Figure 6: Facilities at the VCDC

D. Follow up

It is essential that regular follow up must be undertaken to check for the improvements in child during the VCDC. A weekly follow up of age, height and weight must be undertaken during the VCDC. A weekly weight gain of more than 5 gram/kg per day amounts to adequate improvement in the child. If there is no expected weight gain after completing VCDC as protocol, then the child must be referred to tertiary care i.e. CTC or NRC. Post the VCDC, on a monthly basis, monitoring of growth parameters must be undertaken. In case a child does not show improvement, then child must be referred medical office or a district hospital.

E. Supportive Supervision and Counselling

Supportive supervision plays a crucial role in the implementation of the VCDC. The lady supervisor and the Child Development Officer must play and active role all stages of the VCDC program. This includes facilitating screening and providing necessary logistics and support to the anganwadi worker for the conduct of VCDC. Counselling of mothers and family members on

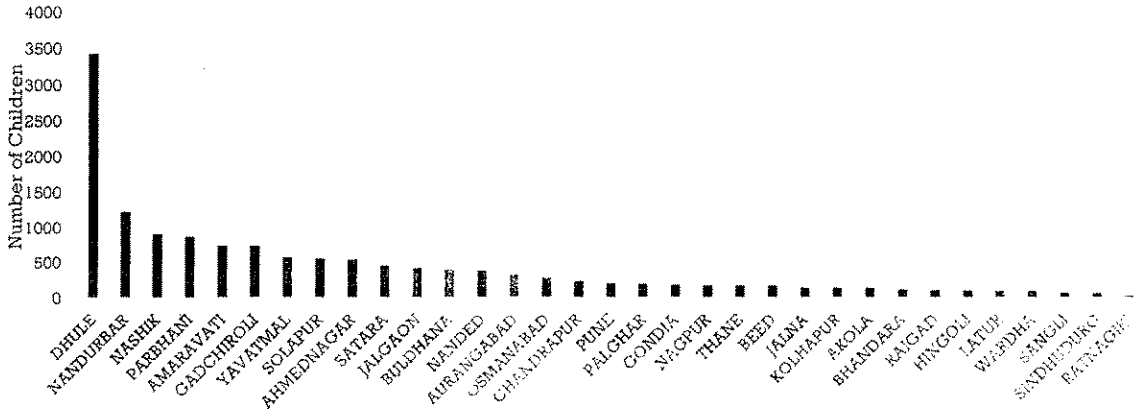
importance of 1000 days in holistic development of children also plays an important role. Growth counselling of the mother of child enrolled in the VCDC can also yield positive results.

Observations from the Implementation VCDC program in Maharashtra:

As of the data of May 2019, within Maharashtra, there were 9,336 on-going Village Child Development Centres (VCDCs) in the state. The total number of children admitted to VCDCs in Maharashtra is 14802. The highest number of children enrolled in VCDCs is in Dhule (3,432), Nandurbar (1,234), Nashik (914), Parbhani (887) and lowest enrolment is seen in Ratnagiri (52), Sindhudhurg (84), Sangli (90).

On average, 2-4 children are enrolled in each VCDC in Nashik, Akola, Dhule. Parbhani and Nandurbar, and only 1 child per VCDC in Bhandara, Washim, Jalna, Nanded, Solapur, Nagpur, Ratnagiri, Beed. The graph below explains the trend:

District-wise Distribution of Children with SAM in VCDC



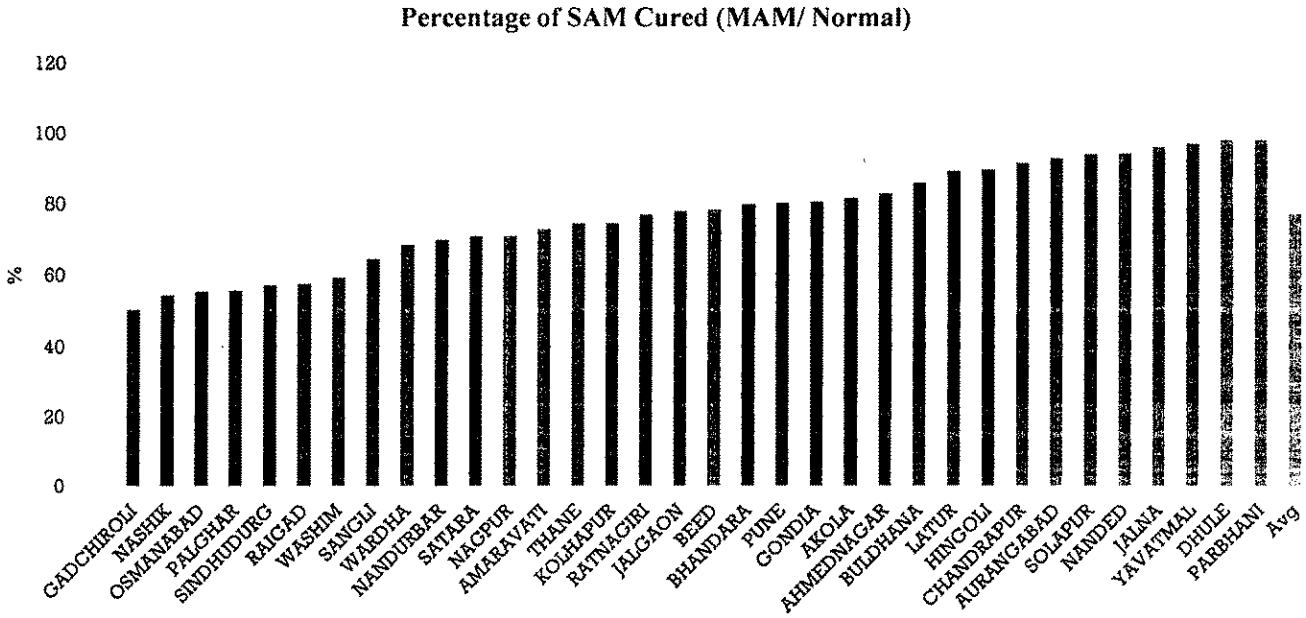
Graph 4: District wise distribution of SAM children in VCDCs
Source: ICDS Data, May 2019

Improvement through VCDC

With respect to the improvement in children admitted to VCDC, Parbhani and Dhule showed the highest percentage of cured[2] children after VCDC admission i.e. 98.42% and 98.34% respectively.

[2] Cured refers to enrolled SAM children with weight-gain as expected within 12 weeks and the positive change maintained for a week. Children with continued weight gain or maintenance of expected weight for a week after discharge are considered as cured.

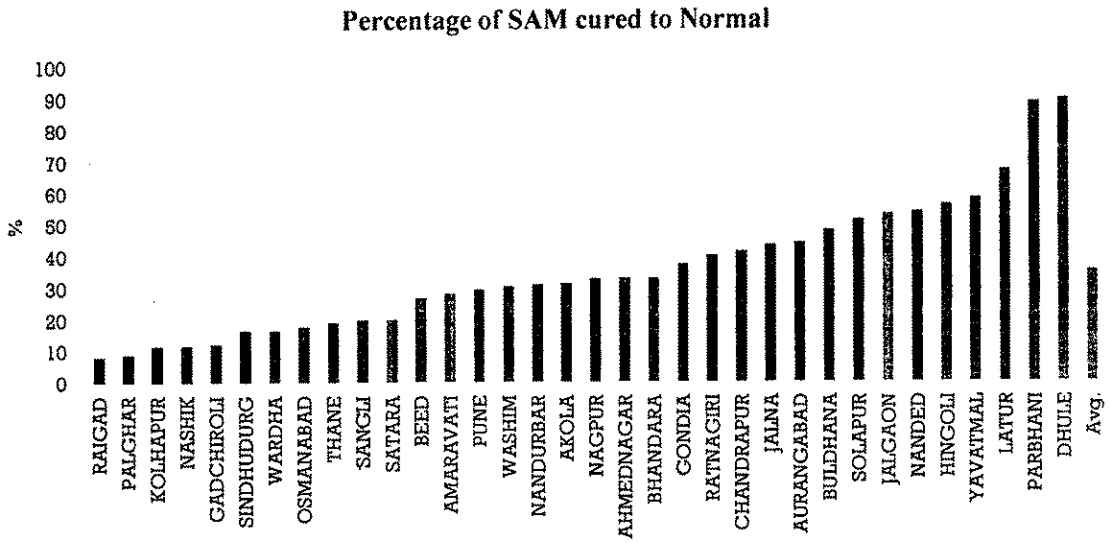
Other well-performing districts are Yavatmal (97.3%), Jalna (96.2%), Nanded (94.44%), Sholapur (94.18%). Lowest success rates are observed in Gadchiroli (50.4%), Nashik (54.38%), Osmanabad (55.41%), Palghar (55.66%), Sindhudurg (57.14%), Raigad (57.5%). All four aspirational districts of Maharashtra, improvement above 50% and Nandurbar showed an improvement of 69.94% of total children enrolled. However, all the aspirational districts' performance is below the state average of 77.17%.



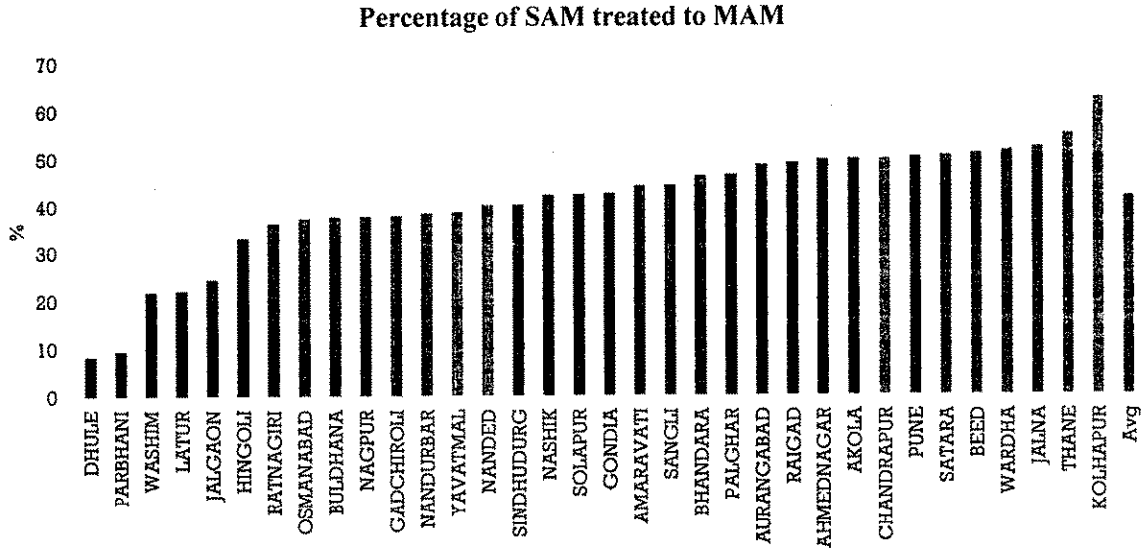
Graph 5: Percentage of SAM Cured (MAM/Normal)
Source: ICDS data, May 2019

A further look at the trend reveals that of all those cured children, 60.07% are cured as normal and 39.93% are cured as MAM. The state's average for a cure rate of SAM to Normal is 35.83%. Well performing VCDCs for curing SAM children to Normal category are concentrated in the following districts – Dhule (90.01%), Parbhani (88.95%) and Latur (67.26%). Graph 6 explains the trend.

The state's average for a cure rate of SAM to MAM is 41.14%. VCDCs with highest curing rates, SAM to MAM category are concentrated in the following districts – Kolhapur (62.75%), Thane (55.32%), Jalna (52.53%) and Wardha (51.85%). Graph 7 explains this trend



Graph 6: Percentage of SAM Children cured to Normal, Source: ICDS Data, May 2019



Graph 7: Percentage of Children cured to Normal, Source: ICDS Data, May 2019

Way Forward

The existing platform of VCDC can be used to implementing a systematic plan for addressing the challenge of SAM in urban area. The concept of the program can be expanded so urban SAM children can also benefit with desired outcomes. Secondly, existing platforms of Community Based Events and Village Health and Sanitation Day under Poshan Abhiyaan can be utilised for improving SAM detection and to deliver important messages to address the issue of SAM. Finally a robust AAA strategy can be adopted to delivery better outcomes on field.