# Responding to the pandemic : A case study of West Bengal, India on the role of local MSMEs in supplying PPE kits during COVID-19 outbreak

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**Abstract:**

**Purpose:**The World is going through the most devastating health and economic crisis of our era. The Covid-19 crisis and sudden lockdown in India resulted in an acute shortage of PPE Kits, essentially needed by frontline health workers to fight the very pandemic. When the global supply chain failed, the Department of MSME&T, Government of West Bengal had to initiate a strategy to mobilise its existing MSME units especially those in the Textile Sector to manufacture PPE Kits in order to cater to the burgeoning demand.

**Design/Methodology:**

This paper is a case study which demonstrates how local MSME units of India , through the example of West Bengal in particular, can be empowered and capacitated under government leadership to rise to the occasion of a supply constraint. A literature review of disruption of the global supply chain due to Covid pandemic has been used to map the findings of how hand holding from the Department of MSME&T the MSME enterprises have emerged to organise local MSMEs as suppliers of PPE Kits during the crisis and how they have developed competitive and standard products.

**Findings:**

Important learning from this exercise is that robust local MSMEs are a vital part of any country's economy. Their agility makes them ideal for adapting to new circumstances and given the right kind of support, they can deliver even in the most difficult of times as is evident from this case study.

MSME units of the States could successfully diversify their product line to manufacture PPE kits and now West Bengal has the fastest growing PPE kit manufacturing MSMEs.

Export potential of MSME units increased to a big extent. If the COVID pandemic lasts long, there is a chance of exporting PPE Kits from West Bengal to neighbouring countries like Bangladesh, Srilanka etc. This will further earn revenue for our state MSMEs.

**Research Limitations:** Due to lockdown all the units could not be visited by the researchers and most of the interviews were done over VC.

**Practical implication:** The study has huge practical implications as it saved the Government from dearth of PPE Kits when Government failed to source PPE Kits from outside states.This study demonstrates how local MSME units of an Indian state, West Bengal in particular, can be empowered and coordinated by government leadership, in particular from the department of Micro, Small and Medium enterprise and Textile (MSME&T), Govt of West Bengal, to rise to the occasion. The MSME enterprises have emerged as suppliers of PPE Kits during the crisis and become important players in the PPE market. They have developed competitive and standard products.

**Social Implications:** This can be a role model for other states and the countries to replicate**.**

**Originality / Value:** The article is of 100% originality and based on the primary data received from the practical cases. There is hardly any article published by researchers within the government system

**Introduction:-**

At the end of 2019 a new infectious disease called COVID -19 (Coronavirus Disease 2019) broke out in the Wuhan City of China. The virus strain known as SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus II) attacks the respiratory system (lungs), causes septic shock, may lead to multiple organ failure, and eventually may cause death [1]. Observing its rate of rapid transmission, the World Health Organisation (WHO) declared the disease to be a pandemic on 11th March 2020. Countries including India responded with alacrity and took to varied and extensive measures to curb the effect of this viral pandemic. With no vaccine or cure in the offing, most countries adopted measures of containment, with some initiating the stringent model of a

lockdown followed by testing, contact tracing, and isolation of COVID positive patients as the immediate solution.

India, a developing country with more than 1.37 billion citizens was as a result extremely vulnerable to the contagion effect, with the Prime Minister declaring the pandemic to be akin to a national disaster. The Government of India deemed it fit to announce a sudden and most extensive lock down, touted as presumably the harshest in terms of time of enforcement, scale and scope and duration[1]. On the 23rd of March, 2020, the Government of India declared the lockdown for the entire country. This was in stark comparison to countries such as Italy and Spain, where restrictions were gradual, leaving elbow room for adjustments.

Under this backdrop of pandemic guidelines published by GOI for mandatory use of Personal Protective Equipment (PPE) by the front line workers like Doctors, health workers etc. as the lockdown was sudden and unplanned, it resulted in an acute shortage of supply of PPE due to failing of the global supply chain as well as lack of inventory for national manufacturers. The Government of India announced a nationwide lockdown from 24th March 2020 to restrict the spread of the disease. Due to the sudden announcement of lockdown, organisations, industries and other establishments completely stopped work within a couple of hours.

The different guidelines issued by the government and World Health Organisation (WHO) recommended frequent washing of hands with soap, or use of sanitisers by the general public. Guidelines for front line workers and health professionals included mandatory use of PPE Kit while dealing with Covid-19 patients.

This gave rise to tremendous demand for products like soaps, sanitizers, and PPEs. Shortage of these products in the market was also a result of supply reductions from China, the largest exporter of such goods to India owing to its own rising demand for these products. The government also

[1] https://theprint.in/india/why-india-has-opted-for-a-china-style-lockdown-and-not-like-the-one-in-italy/388137/

restricted international flights including Cargo, which stopped the import of these items from other developed countries like the USA. The production of PPE kits in the domestic market was zero when the pandemic started. Efforts to import PPE Kits from other countries also proved futile as the entire world was dealing with this crisis.

## Literature Review:

The Covid Pandemic has led to a global travesty not only for human lives, but economic activities including manufacturing operations, supply chain and logistics, and several other sectors (Dolgui, Ivanov, and Sokolov 2020[2]; Golan, Jernegan, and Linkov 2020[3]). Covid has exposed the vulnerabilities of many organisations, especially those with a higher degree of dependence on China and the global supply chain for raw materials or finished products. Chamola et al.(2020)[4] studies the implications of it on various sectors including the healthcare industry, one of the most pivotal, in a crisis like situation. Chaudhury (2020) notes the smooth supply of essential commodities such as food and medical instruments required for treatment and control of the pandemic to have suffered disruptions in India due to lockdown restrictions[5]. Krishnan (2020) observes the lock down to have affected even the movement of medical goods. The situation thus serves as a learning lesson for the adoption of a resilient

[2] Dolgui, Alexandre , DmitryIvanov, and BorisSokolov . 2020. "Reconfigurable Supply Chain: The X-Network." *International Journal of Production Research* 58 (13): 4138–4163. [Taylor & Francis Online], [Web of Science ®]

[3] Golan, Maureen S. , Laura H.Jernegan, and IgorLinkov . 2020. "Trends And Applications Of Resilience Analytics In Supply Chain Modeling: Systematic Literature Review In The Context Of The COVID-19 Pandemic." *Environment Systems and Decisions* 40: 222–243. [Crossref]

[4] Chamola, Vinay , VikasHassija, VatsalGupta, and MohsenGuizani . 2020. "A Comprehensive Review of the COVID-19 Pandemic and the Role of IoT, Drones, AI, Blockchain, and 5G in Managing Its Impact." *IEEE Access* 8: 90225–90265. [Crossref], [Web of Science ®], [Google Scholar]

and robust supply chain (Currie et al. 2020[6]; Dolgui, Ivanov, and Sokolov 2020)[7], particularly in the case of health care and essential items.

Future supply chains thus, must start factoring resilience and adaptability to their models of functioning. The idea of seeking out a more diversified supplier base, which is flexible but cost efficient is not without merit. The potential of the MSME sector to overcome the disruptive situation remains untapped, given their ubiquitous involvement in all sectors. This necessitates government policies that are convergent towards building resilient ecosystem with better breadth and depth[8]. In India, enormous needs have been forecasted as per the growing cases, for example, one million ventilators, 500 million testing kits, one million oxygen cylinders, 30 million N95 masks, and 25 million PPE kits (PIB 2020a)[9]. The global shortage of ventilators and PPEs has become a major concern with an increase in infections across the world. Singh et al. (2020)[10] observed how in India, the monopoly of a single government-owned agency led to a bottleneck in the purchasing process for PPE. HLL Lifecare

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[6] Currie, Christine S.m. , John W.Fowler, KathyKotiadis, ThomasMonks, Bhakti StephanOnggo, Duncan A.Robertson, and Antuela A.Tako . 2020. "How Simulation Modelling Can Help Reduce the Impact of COVID-19." *Journal of Simulation* 14 (2): 83–97. [Taylor & Francis Online], [Web of Science ®], [Google Scholar]

[7]Dolgui, Alexandre , DmitryIvanov, and BorisSokolov . 2020. "Reconfigurable Supply Chain: The X-Network." *International Journal of Production Research* 58 (13): 4138–4163. [Taylor & Francis Online], [Web of Science ®], [Google Scholar]

[8] https://timesofindia.indiatimes.com/blogs/agyeya/covid-19-affect-on-micro-small-and-medium-enterprises-msmes/

[9] PIB . 2020b. *Second Advance Estimates of Production of Foodgrains, Oilseeds and Other Commercial Crops for 2019–20* . Department of Agriculture Cooperation and Farmers Welfare, Government of India. February 18. https://pib.gov.in/newsite/PrintRelease.aspx?relid=199401 . [Google Scholar]

[10] Singh et al 2020. https://www.tandfonline.com/doi/full/10.1080/00207543.2020.1792000

Ltd thus had a monopoly to procure PPE Kits and was the sole supplier in the country at that time. This was soon realised to be an unsustainable method.

A remarkable agility among the Indian healthcare supply chain was thus observed , with surprising transformations noticed during the critical time. Singh et al. (2020) observe ventilators, testing kits, and oxygen cylinders to be produced by automobiles manufacturers; PPE, masks, gloves, and hospital furnishing products to be made by textile and fashion industry; sanitisers, cleansers, and oxygen to be provided by chemical factories; and hospitals beds being developed by transforming train bogies.

Such repurposing requires analysing the capability of the current business and suitability of manufacturing elements. including raw material, components, labour, production process and equipment, the production site and its environment.

**Research Methodology**

The empirical context of the lack of available PPE kits and concomitant supply constraints in the state of West Bengal, gave way to a governmental strategem of encouraging local manufacturing units especially in the textile and apparel sector to come forth in having a crisis oriented response. The manner in which these MSME units responded to the existing challenges serves as a case study of how with adequate support such local players can be nurtured and encouraged to act with alacrity during demand-supply crises that usually accompany a socially disruptive event, in this case the Covid pandemic.

The case study method enables a researcher to closely examine the data within a specific context (Zainal 2007)[11]. A case study, as Gerring (2004)[12] argues is best defined as an intensive study of a single unit with an aim to generalize across a larger set of units. In this case we had a limited sample of vendors from the MSME units to participate in the tender and subsequent manufacture of PPE kits in West Bengal. This method is being adopted in this paper, as it would enable to give the readers a holistic view of the series of events that took place. This is a descriptive case study (Yin 1984)[13] where strategies employed by the Department of MSME of the West Bengal government in particular is being explored. It is therefore an attempt to describe what happened in the aftermath of a supply constraint and how MSMEs rose to the occasion under the stewardship of the Department of MSME. The goal therefore in such a methodology is to ‘’describe the data as they occur’’(Zainal 2007)[14].

This case study research provides a framework for understanding the government’s strategy to the shortage of PPE kits and the transformative process that ensued. The vendors selected through the tender process may be treated as our sample selected on the basis of a host of criteria, which is to be discussed in the forthcoming sections.

The research study is both descriptive and inductive. While the following sections elaborate on the process that unfolded, the aim is to also extrapolate patterns so as to provide practical implications and future policy suggestions.

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[11] http://psyking.net/htmlobj-3837/case_study_as_a_research_method.pdf

[12] Gerring, John. (2004). the American Political Science Review Vol. 98, No. 2 (May, 2004), pp.341-354 (14 pages) Published By: American Political Science Association

[13] Yin, R.K., (1984). Case Study Research: Design and Methods. Beverly Hills, Calif: Sage Publications.

[14] http://psyking.net/htmlobj-3837/case_study_as_a_research_method.pdf

The limitations of the case study however relate to the difficulties of arriving at a generalisation given the limited sample. Yin (1994)[15] considered case study methodology to be 'microscopic' because of the limited sampling cases. To Hamel et al. (1993)[16] and Yin (1994)[17], however, parameter establishment and objective setting of the research are far more important in case study method than a big sample size. Our findings derived from the process therefore are suggestive deduced from the strategy adopted by the Department of MSME. While the specificity of the political, administrative and socio-economic context of West Bengal is acknowledged, the possible implications for MSMEs in this state of other states is also conceded to.

**MSMEs in India- With specific reference to the state of West Bengal**

The Micro, small and Medium enterprise sector is one of the most vibrant and dynamic sectors which contributes significantly in the economic as well as social development of the country. It provides second largest employment after agriculture in the country. In one way it is complementary for industrial growth by way of forming ancillary industry for inclusive growth of the large industry. In other way it equally provides employment in the rural areas and thereby maintains a balance of growth throughout the country. As per national sample survey 2015-16, there were 633.88 lakh unincorporated non agricultural MSMEs in the country spreading over a wide range of products and services among which 196.65 lakhs were in the manufacturing

[15] Yin, R., (1994). Case study research: Design and methods (2nd ed.). Beverly Hills, CA: Sage Publishing.

[16] Hamel, J., Dufour, S. and Fortin, D., (1993). Case Study Methods. Newbury Park, CA: Sage Publications

[17] Yin, R., (1994). Case study research: Design and methods (2nd ed.). Beverly Hills, CA: Sage Publishing.

sector(31%). The MSME as a whole provides approx 11.10 crores jobs as per NSS 2015-16. (Annual report, Ministry of MSME 2019-20).

West Bengal ranks second in the country with respect to the number of MSMEs with an estimated number of MSMEs 88.67 lakhs , slightly lower than Uttar Pradesh. And compared to the size of the two states, West Bengal is having the highest density w.r.t. number of enterprises. West Bengal has the highest number of female owned enterprises compared to other states. It has 2901324 nos of female owned enterprises (As per National Sample Survey 73rd round).

West Bengal has 519 MSME clusters , run by Micro enterprises mostly. Out of which a good number are textile and handloom clusters. Thousands of micro enterprises are associated in these handloom and Textile clusters who have experience in manufacturing of both ladies and gents garments.

Department of MSME & Textiles headed by the Principal Secretary to the Government of West Bengal, is a Department under Government of West Bengal which is solely responsible for the development of MSMEs throughout the State. This department has four directorates and five parastatals under it. The four directorates are Directorate of MSME , Directorate of Handloom, Khadi Board and Textile commission. The parastatals under the department are Tantuja, Manjusha, Resham Shilpi and Biswa Bangla Mkt Corporations and Bangashree.

Directorate of Textiles is the nodal office to look after the development of Handloom sector and also Powerloom, Hosiery and Readymade Garment industries in the State, supported by two central marketing organizations (TANTUJA and RESHAM SILPI) and State controlled spinning mills.

The West Bengal State Handloom Weavers Cooperative Society Limited, under the brand name of ‘’Tantuja’’, is primarily associated with the selling of handloom products. Tantuja is one central marketing organization (Apex Society) rendering marketing support to Primary Weavers Cooperative Societies and handloom artisans working outside cooperatives. They also supply products related to disaster management. Apart from these handloom items they sell gauze and bandage to hospitals. They have been working with

the health department of the state for a long time. Tantuja has a turnover of more than Rs.350 crores and works with the entire handloom and textile sector especially textile clusters of the State.

**Demand of PPE Kits: Status of the Country and the State of West Bengal-** Personal Protective Equipment (PPE) are protective gear designed to safeguard the health of close proximity workers by minimizing the exposure to a biological agent like the SARS Cov-2 virus. They are used by frontline workers including the medical fraternity who come in contact with COVID-19 positive patients. Components of PPE are coverall gowns, goggles, mask, gloves, head caps and shoe covers. As per the Public Notice of the GOI under department of Textile, there was no PPE manufacturing unit in our country [2] as of 20.03.2020.

The State of West Bengal with a population of more than 90 million, was vigilant about Covid-19 long before the national lockdown was announced. The State has been publishing daily Covid-19 bulletins since 4th February,2019 [3]. Two hospitals with isolation facilities were set at ID Hospital, Kolkata and North Bengal MCH, Siliguri to begin with. The first Covid-19 positive case was found in the State of West Bengal on 17th March, 2020[4]. By that time 26 hospitals had Isolation facilities to cater to suspected Covid-19 cases (Covid-19 health bulletin dated 17th March, 2020) [3].

As declared by the Government of India, the State of West Bengal government also enforced strict lockdown from 24th March,2020. The health set up of the State geared up for the ensuing crisis. Different hospitals were declared as Covid-19 facilities i.e. facilities supposed to treat Covid-19 patients. Certain private hospitals were also taken over by the State Government for this purpose and designated as Covid-19 facilities. As per the bulletin dated 20th June, 2020, 77 hospitals with 10,340 earmarked beds were designated for treating Covid19 patients out of which 24 were Government facilities and 53 were private facilities which the Government had taken over for Covid-19 treatment [3].

The Health and Family Welfare department (H&FW) started preparations to equip these hospitals to deal with Covid-19 patients. The first step was to provide these health facilities with an adequate number of PPE Kits. A bulk

order for the supply of 5,00,000 PPE Kits was placed with HLL Lifecare Ltd, a Government of India Enterprise. HLL Lifecare Ltd was given a monopoly by the Government of India to procure PPE Kits on its behalf and it was the sole supplier in the country at that time [5]. Like the State Government of West Bengal, many other State Governments placed orders with HLL Lifecare Ltd. Soon it was clear that HLL Lifecare Ltd will be unable to supply at the pace expected by the Government of West Bengal. By 11$^{th}$ April, 2020 HLL could supply only 3000 PPE Kits. The probable reasons for this dismal supply were that HLL Lifecare Ltd procured these PPE Kits through its vendors and the market ecosystem was not developed enough to meet the demand. Lockdown complicated production by severely hampering the transportation of raw material, manpower and finished goods.

It was amply clear that without local manufacturing capability, the shortage of PPE kits could not be alleviated. The State Government then decided to rope in local MSME units into the production of PPE kits. The Government of West Bengal entrusted the department of MSME&T with the sourcing of PPE kits from the MSMEs of the state, and their supply to all the hospitals of West Bengal. The MSME&T department in-turn decided to do this procurement through TANTUJA which was already involved in supplying items like cotton bandages and bed sheets to the health department.

The West Bengal State Handloom Weavers Cooperative Society Limited, under the brand name of ‘’Tantuja’’, is primarily associated with the selling of handloom products. They also supply products related to disaster management. Apart from these handloom items they sell gauze and bandage to hospitals. Three supply orders amounting to 4,00,000 PPE Kits were issued to TANTUJA in late March, 2020 in quick succession.

**Challenges faced by Tantuja and Strategies adopted:**

The supply order of PPE Kits became a challenge for Tantuja. On the one hand there was pressure to supply PPE Kits as the earliest as Covid-19 cases were exponentially rising, and on the other hand there were no readily available suppliers who could deal with this quantity. The first need and effort were to identify the challenges.

a) **Specification:** Tantuja was not aware of the specification at first. Neither vendor knew the specification. Tantuja officers first decided to contact doctors to have their feedback on the PPE Kits.

b) **No prior experience:** Neither Tantuja, nor its vendors had any prior experience of supplying PPE Kits. This gave rise to problems such as making the tender document for this procurement, fixing technical parameters and deciding whether the price was right. Also lack of technical knowhow meant it was difficult to assess who might be the potential MSMEs capable of this supply.

c) **Lack of clarity on part of the buyer** - Health department: The order was new for Tantuja and it had no experience. Similarly, the health department which placed the order was also not very sure what the actual requirements were . Large scale usage of PPE Kits was being done for the first time and Tantuja was supposed to prepare samples, get them approved by the health department and supply accordingly. The onus for all of this research fell upon Tantuja.

d) **Restrictions due to lockdown:** Strict lockdown meant neither potential units, nor their owners could come out freely and participate in the tender process. This new tender meant taking potential bidders on board and lockdown made it difficult. Further, there was fear of Covid-19 all around and bidders needed a lot of convincing.

e) **Supply of Raw material**: As India was not prepared for such a gigantic demand of PPE Kits and they hardly import PPE Kits only for some hospitals and laboratories, no raw material producing farm also developed over years. So, neither bidders, nor Tantuja were confident that the raw material required for the production of PPE Kits could be made locally available. This made it difficult to encourage bidders to participate.

f) **Standardisation and issue of quality control:** PPE Kits to be procured were meant to be supplied to health units. This meant there was no scope for error. Since it was a new and emerging field, there was a lack of standardisation. During the month of March, only two organisations were authorised by the Government of India to verify the quality of the PPE suit. It took time to get the PPE suit certified as none of these were located in West Bengal.

During this entire procurement, different problems were faced by Tantuja, these being:

1. Material related issues: The first coverall supplied by Tantuja was made of plastic (polythene). Though it provided ample protection to the wearer, there was widespread criticism that raincoats in the name of PPE Kit were being supplied. The material was then changed to 60 GSM non-woven polypropylene. The material was comfortable but soon it was realised that it was not permeability proof. Thus three layered centrally laminated 95 GSM polypropylene were introduced in the third tender. This material was fit on all counts but as summer became intense, it became unbearable for health workers to wear this material as even air could not pass through this fabric. The fabric was then changed to 71 GSM. In the first phase the GOI specification only mentioned 95 GSM.
2. Thickness: Thickness of the fabric was changed multiple times. Initially it was one layer 60 GSM non-woven polypropylene. Then it was changed to three layered centrally laminated f 95 GSM non-woven polypropylene. This was thick and uncomfortable to wear for a longer time. During the journey, specification got changed with finer quality and better protective material. These are i) One side laminated and ii) Sandwich laminated (lamination between two layers of finer fabric. Vendors gradually developed themselves to produce sandwich laminated PPE with specification 40/15/40 (95 GSM) and 28/15/21 (71 GSM). These two final quality products meet international standards.
3. Size and comfort: A universal size was being supplied in the beginning but soon it was realised all doctors cannot wear the same size. After multiple iterations, Tantuja started supplying in two sizes, Medium and Large.
4. Quality control: It was extremely difficult for Tantuja to exercise strict quality control measures. The quantities of supply were huge and officials of Tantuja had no prior experience with PPE Kits. Another problem was that only two laboratories in the entire country were initially authorised by the Government of India to test the quality of Coveralls

and none of them were located inside West Bengal. Due to lockdown, it took a long time to get the cover-all tested by them. Despite these difficulties, random sampling was done from all lots received and testing of those samples was done by Tantuja. Visual inspection regarding conformity to size and other specifications were done and some of them were sent to GOI accredited labs at regular intervals. A technical Inspection team was formed and deputed to every factory, where PPE kits manufacturing were going on. Recently, Tantuja has come up with a tender to engage a third party to assist in these inspections.

5. Sealing at the seams: The most critical part in PPE Coverall was sealing at the seams. The tape required for this work was primarily imported from China and the technology for sealing was also not readily available. Sealing of seams also took considerable time. Further different types of tapes were available for sealing and since results from authorised labs were not easily available, it was difficult to decide on the tape and type of sealing (hot or cold). Vendors gradually developed the capability by buying machines required for sealing and started manufacturing standardized suits.

**Strategies adopted**

1. Identifying potential MSMEs and hand holding them: To begin with MSME&T department identified potential MSMEs who could be engaged with PPE Kit manufacturing. These entrepreneurs were called and PPE Kit was shown to them. They were explained what were the parts of PPE Kits and how to manufacture or procure them. The main part of the Kit, PPE was Body Coverall (Dungree) and any MSME involved in apparels/textiles was capable of stitching a dungaree. These entrepreneurs were encouraged to bid in the tender.
2. Helping the vendors network: Vendors were helped to network for the procurement of raw material i.e. fabric for sticking a dungaree. They were also helped with details of suppliers of other items like goggles, gloves, sealing tape importers etc so that they could provide assembled PPE Kits. The available database of MSMEs with the department was

used and they were helped to contact all those who could assist in their supply chain.

3. Helping the vendors with statutory matters: Crisis doubled due to lockdown, which restricted supply of fabrics, hot tape, packaging material as well as new machines to be installed for production of PPE. Department started applications through its online system and issued passes for the workers for these factories, even during lockdown, for easy flow of the PPE Kits. Liaison was done by police and other authorities to ensure these units could work during the lockdown period.
4. Learning from vendors: Since this was a dynamically emerging market, soon vendors started coming up with new ideas for improvement. In consultation with the health department who were the ultimate users of these PPE kits, regular improvements were made in the product. It was immensely helpful to have Textile clusters and ready-made garment clusters in our state. With the long-term experience of manufacture of garments most of the technical difficulties could be overcome during the time.

To begin with, officials of Tantuja studied the tender documents of HLL Lifecare limited, to understand the specifications. It was further discussed with existing vendors of Tantuja if they could diversify in supplying PPE Kit. The following tenders were floated by Tantuja for procurement of PPE Kits:

Outcome of 5 Tenders:-

1. First Tender: This short tender notice was floated on 15th March, 2020 and only 3 participants submitted offers. The kit consisted of 6 items viz. body coverall, shoe cover, head cover, goggles, gloves and three-ply mask. The lowest price received was Rs.583.69/-. The body coverall was initially made from plastic(polythene) but there was intense negative press coverage claiming that raincoats were being supplied in place of PPE Kits. The material of the coverall was subsequently replaced with non-woven polypropylene of 60 GSM.

2. Second tender: The second tender was floated on 07.04.2020. and the tender committee sat with submitting bidders which were 20 in number, and after checking quality, price, and the ability to supply a large quantity of PPE Kits within short span, a total of 9 bidders agreed to supply the kit @ of Rs.750 (L3 as L1 and L2 failed to supply). This was with better quality PPE kits (laminated and hot tape sealed at seams) than the material received vide the first tender. This meant no fluid could permeate from the fabric, moreover seams were sealed so there was no possibility of any fluid penetration from the coverall. The material was also changed to 95 GSM centrally laminated non-woven polypropylene from the 60 GSM used earlier.
3. Third tender: Based on tender notice dated 25.04.2020 the tender was opened on 28.04.2020. It was found that 71 nos. of bidders have submitted their quotation. As the quantity was 3 lakh PPE kits, it was decided to distribute the orders among all technically qualified bidders matching with L1 price which was Rs.343. Material used in this was 71 GSM centrally laminated non-woven polypropylene but coverall was not hot sealed at the seams. This tender was called as hot taping at seams was taking considerable time so it was decided non Covid-19 hospitals may be given Coverall which are not sealed at seams but material used was non permeable.
4. Fourth tender: Based on the experience gathered from the last three tenders and the feedback from the end users, another tender floated on 15$^{th}$ May with a short notice to supply 3 different category PPE kits for 2 lakh pcs. The material used in this was 71 GSM centrally laminated non-woven polypropylene and three categories were hot sealed at the seams, cold sealed at seams (a different type of sealing where a tape is stuck with adhesive on the seams) and without sealing at the seams. A total of 111 submissions were found in all categories. Category I kit was (Rs.375/-), category II (349/-) and category III (Rs.290/-).

**A Brief Profile:**

A filter criterion set at the very outset was that only bidders with minimum manufacturing / supply capacity of 5,000 coverall and shoe cover per day should participate in the tender. Sufficient emphasis was placed on the capacity of bidders to meet the specific technical requirements.

Successful vendors, it is observed, fulfilled certain criteria as a part of technical assessment. These are mentioned as under:

1. Proven capability- This was assessed through the proof of per day capacity of production through self declaration or other relevant documents. This ranged from 2000 per day of coverall of PPE to some as many as 50,000 pieces per day.
2. Proven capability tested against annual turnover-

We have done a survey with the vendors, who have supplied PPE kits successfully to Tantuja. 6 such vendors' profiles with present status are described below.

**Vendor A-**

Fashion Unleash: A unit, Fashion Unleash, based in Kolkata basically manufacturer of ladies wedding dress since 2013 got interested in manufacture of PPE kits after seeing the COVID situation. He collected some initial technical information and submitted samples to Tantuja against the tender. His first two samples got rejected but with continuous intervention and support from the technical team of Tantuja he successfully developed the PPE kits as per the specification and supplied 25000 PPE kits within a span of 35 days. In between the process of supplying to Tantuja he has installed a new hot air sealing machine for best heat sealing and his present capacity is 65000 pcs per month. He is planning to supply to neighbouring states also.

**Vendor B-**

Dynax International, A manufacturer of Jeans, Shirts, Trousers and other gents' garments since 1975, situated in Metiaburuz, Kolkata is another successful supplier. The owner is the Secretary of the Garments

Manufacturers Association. They received a call from the Government on 30th March to come forward for diversification of their product line and to come up with PPE Kit production. Dynax International expressed their happiness over the successful supply of 80000 PPE kits to the Tantuja over a span of 25 days. They also thanked Tantuja in tieing them up with the raw material (PPE Cloth) supplier apart from all technical support extended by Tantuja. Presently their capacity is 1 lakh pc per month and they are supplying to the neighbouring state of Jharkhand.

**Vendor C-**

J C International Ltd. is a leather bag manufacturing unit operating since 1990 in Bantala and Tangra area of Kolkata. They initially thought of importing PPE Kits from China and to supply in India, but due to COVID and irregularity of cargo they had decided to manufacture PPE kits in their in-house facility. Tantaja helped them to source raw cloth from local manufacturers and after submission of 5 samples their 6th sample passed the quality testing. They have already supplied 40000 pcs of PPE kits to Tantuja over a span of 40 days. Present capacity increased to 3000 pc/ day. They have installed 10 nos., of hot air sealing machines for global quality and in the process of export to France and USA.

**Vendor- D:**

Electro Air Pvt Ltd is a Textile farm stretched over different districts of WB. They had experience of supply of School dress, Dress of ICDS and other uniforms. They also have the production and distribution of dairy products under the name Mother Dairy in PPP Mode. With the experience of Textile production, the company approached Tantuja first that they are capable of manufacturing PPE kit as per specification. They were the first company to have received quality certification from CITRA and then by the Ordinance Factory, GOI. In this process they have involved more than 2500 micro tailors stretched over N-24 Parganas, S-24 Parganas, Bardhaman, Nadia etc. They have already supplied 2.5 Lakh PPE kits to the Government and now with the capacity to produce 10-12 thousand PPE kits per day, they are supplying to private hospitals all over the State and country.

**Vendor-E:**

Designer's Export is a reputed company in Kolkata in the Textile Sector and running since 1991. They manufacture kneaded garments for men and women of all ages.. Because of their technical knowledge base, they could immediately start production of PPE Kit. So far, they have supplied 74000 PPE Kits over a span of 40 days against 2 tenders. They have installed 14 nos. of hot tape sealing machines and their present capacity is 1-1.1 lakh pc per month. Presently they are supplying to all Government and private hospitals of the State and also to neighbouring states like Jharkhand, Odisha and Assam. They are on the verge of further augmenting their capacity to send outside India.

**Vendor-F:**

Acme Safety Wares Pvt Ltd is a company dealing with manufacturing of safety goggles, belts, gloves, hot tape, cold tape, safety aprons since last 25 years but in small quantity. During this period, they have given expansion and so far, produced and supplied over 2 lakh pc of PPE Kits within one and half months. Their present capacity is 10000 pc/day. Presently they are also supplying to Maharashtra, Chhattisgarh, Odisha and all private hospitals. They are also supplying AIIMS, IILFS, Columbia Asia and other big hospitals. They are ready to export the PPE kits.

Which businesses entered into PPE

**Sourcing, capacity building and supply:**

At the end of March 2020, when Hindustan Lifecare Ltd. failed to supply 5 lakh pieces of PPE Kits due to prior engagement by other states for supply of PPE kits, on behalf of the Government, Tantuja started to approach different MSMEs to develop them as PPE Kit vendor. Over two months' time the MSMEs of the state came forward and the number of manufacturers of PPE Kits increased dramatically from 3 to 111, showing a very high growth rate. Figure 1 shows the growth in the number of PPE Manufacturing units over a span of 60 days.

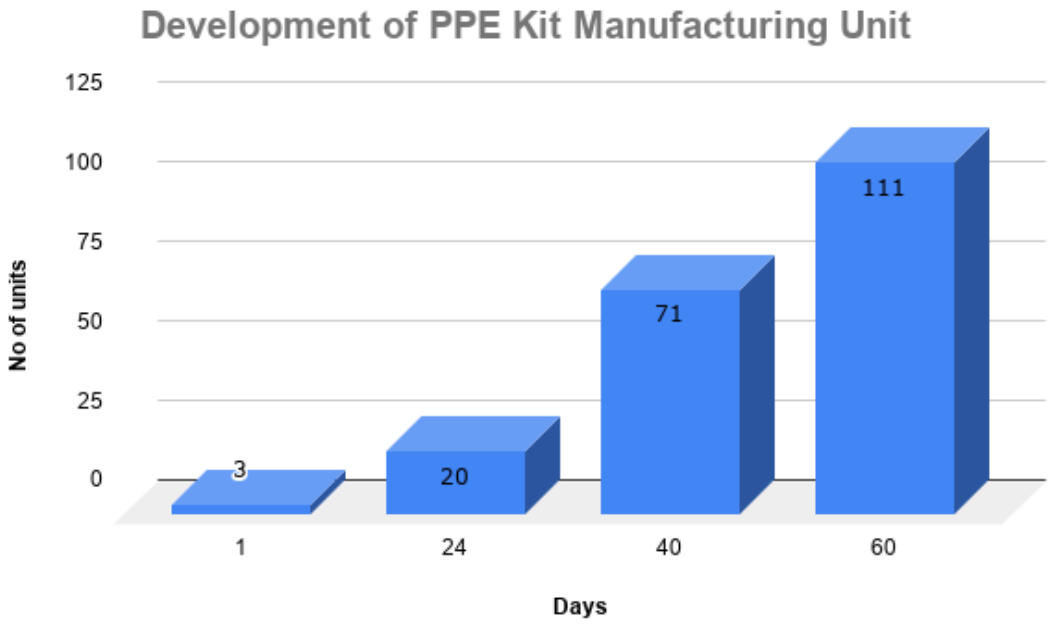


Fig 1: Development of PPE Kit manufacturers in the State

MSMEs are the second highest employment provider in the country, after agriculture. They act as the main modulator for poverty alleviation. It was observed that more than 80 % of these MSMEs were compelled to remain under temporary closure of production due to the absence of workers caused by the countrywide lockdown. Under this grave situation the department motivated some of the units who were in allied businesses, to start the with production of PPE kits. For example, leather wallet manufacturing units and ladies' garments manufacturing units tried and successfully developed the process for manufacturing PPE kits. These have passed the testing and received certificates. The price of the Coverall was initially high, with productivity of the units not higher. Quality of the PPE Kits were also inferior. As the Health department came up with new guidelines for PPE Kits [7] from time to time the technical committee of Tantuja also changed the specification of PPE Kits. But, with huge orders and the rising demand for PPE Kits, the units increased productivity and the price of PPE kits went down over 40% (comparing the value of medium quality PPE Kits in 4$^{th}$ tender) [6]. Figure 2

depicts the result. Data source: e-tendering data at https://wbtenders.gov.in/nicgep/app

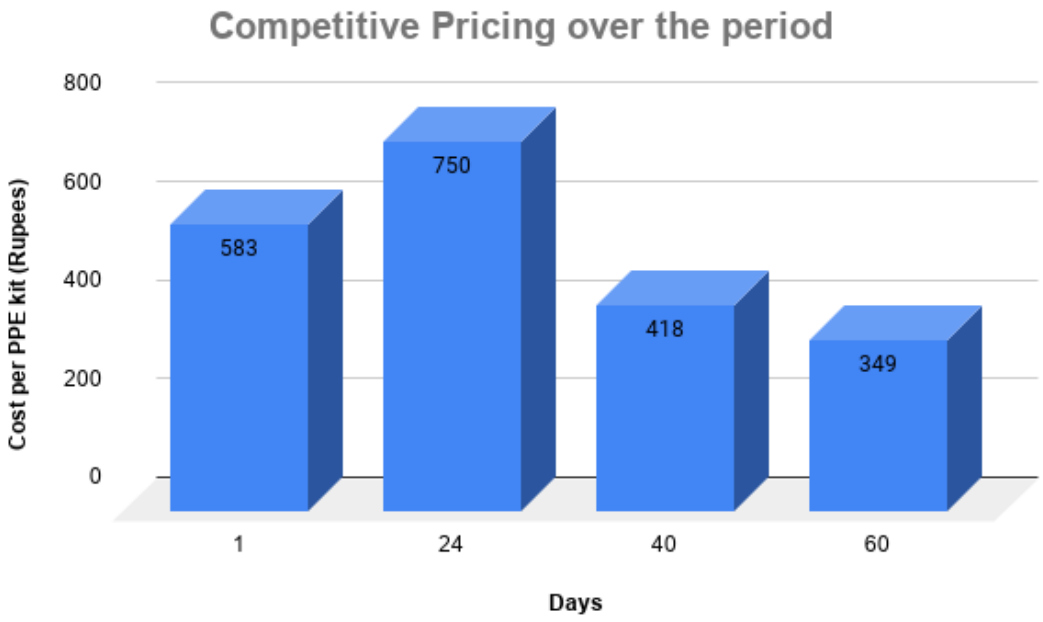


Fig 2. Competitive pricing over the period

The price arrived at by Tantuja is competitive both nationally and internationally and many vendors from West Bengal involved with Tantuja have started supplying to other States.

As most of the industries remain closed except the manufacturing units, producing essential commodities, there was pressure on the enterprises for non-payment of electricity bills, bank dues, workers' salaries despite production and sale being nil. With the intervention of the department, some of these units could start production of diversified products like PPE Kits. For example, one sick unit, which was closed for some time, started the production of goggles and could successfully supply them.

PPE kit production is a labour-intensive job that has helped in generating considerable employment during the lockdown. Items of the PPE Kit like Goggles, gloves, three-ply mask and head cover are sourced from MSMEs of the State. Most of these items are again locally produced resulting in

employment generation. Transportation of the various goods is required. This has employed transport workers who were otherwise not finding work. Within a short span of 2 months, the state government has sourced more than 11 lakh PPE kits from local MSMEs (up to June 2020). The revenue generated for the MSME units supplying PPE Kits to the state is over Rs. 42 Crores in a 60-day span [5]. Fig 3 depicts the revenue accumulation by the units who have successfully supplied the PPE Kits to the state.

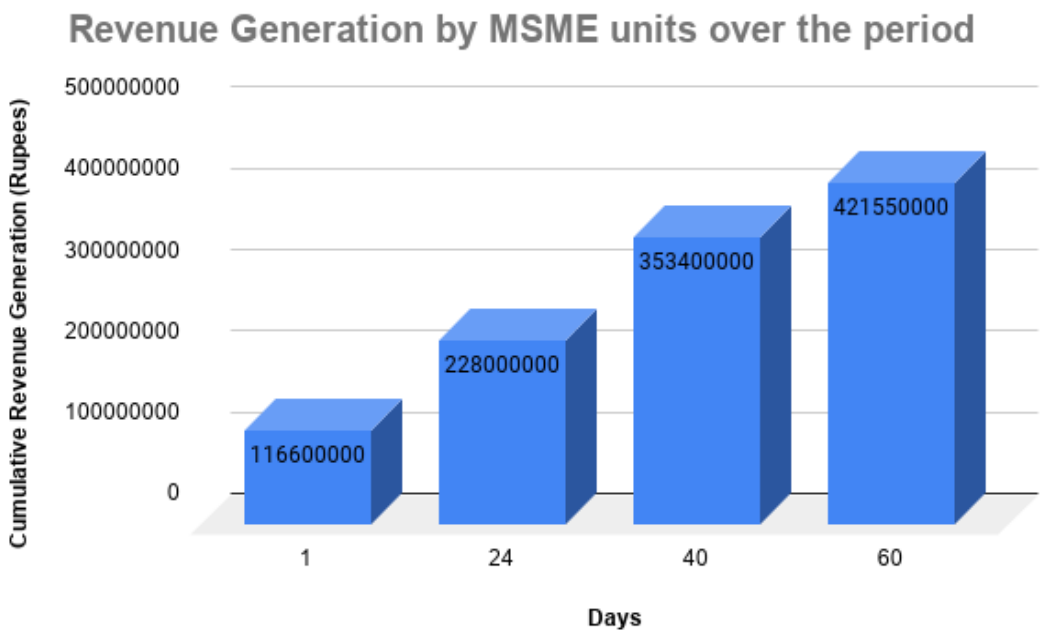


Fig 3. Revenue Generation by MSME units over the period

Findings:-

During the entire period of lockdown and pandemic strike India, it was observed that the country should have a database of some of the disaster managing items like PPE kit, which may be of huge demand at times. It was also felt that the Government should have a prior idea of how a particular category of MSME can slightly change its regular production capacity to manufacture a different item, at time of need. The study has shown a positive side also, that is ,if proper hand holding is given, then MSMEs can be the

lifesaver of the nation when all other supply chains fail and import is restricted due to world wide crises like pandemic. MSMEs have faced some quality related challenges, some raw material availability relating challenges and at start prices was also not competitive due to experiment with different raw material and production processes. But, with the help of the department's inspection, health department's continuous feedback and professional experience of some of the cluster members, the problems could be overcome in time.

**Summary and Conclusion: -**

West Bengal, owing to its high population density, till 20th June 2020 has 12735 confirmed cases amongst which are 5216 active cases, 7001 recoveries, and 518 death records [8]. Further, with the return of migrant workers from all over the country and due to the re-opening, the number of COVID patients spiked in the state. Like the whole country, this state is also approaching a community spread stage. To save its economy, the state is opening different industries and other establishments in a phased manner. Above all, the state has the responsibility to engage migrant workers within the state itself to the fullest extent possible.The State Government needs to build up a database of MSMEs which can manufacture essential commodities by slight modification of their production process. The State Government needs a policy for the re-employment of semiskilled and unskilled workers by setting up more MSME units in both urban and rural areas in the area of these types of essential commodity manufacturing processes. The State should also try to link up local raw material manufacturers with the MSMEs. West Bengal has the fastest growing PPE kit manufacturing MSMEs along with other essential products like sanitiser, poplin cloth washable masks, soaps, detergents etc. As a result, few of these MSME units have started exporting to neighbouring states like Jharkhand and Odisha. There is scope for further development of these units and in future West Bengal MSMEs may become one of the largest producers of PPE Kit in the country. If the COVID pandemic lasts long, there is a chance of exporting PPE Kits from West Bengal to neighbouring countries like Bangladesh, Srilanka etc. This will further earn revenue for our state MSMEs. Another important learning from this exercise is that robust local MSMEs are a vital part of any country’s economy. Their agility makes them ideal for adapting to new circumstances and given the right kind of support, they can deliver even in the most difficult of times as is evident from this case study.

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