Illustration by MoHFW

Masks for Curbing the Spread of SARS-CoV-2 Coronavirus

A manual on homemade masks

"Masks are effective only when used in combination with frequent hand-cleaning with alcohol-based hand rub or soap and water. If you wear a mask, then you must know how to use it and dispose of it properly."
-**World Health Organization**

Analyses show that if 50% of the population were to wear masks, only 50% of the population would be infected by the virus. **Once 80% of the population wears a mask, the outbreak can be stopped immediately.**

Source: https://pubmed.ncbi.nlm.nih.gov/30229968/

Why Wear a Mask?

COVID-19 virus spreads easily from person to person contact. Virus carrying droplets dry fast enough to form droplet nuclei and remain airborne eventually landing on different surfaces. SARS-CoV-2, the virus that causes COVID-19, has been detected in aerosols for up to three hours and on plastic and stainless steel surfaces for up to three days. (N.Engl J.Med. 2020)

Masks stop the coronavirus from entering the respiratory system through contact with the virus lingering in the air or directly from a person when they sneeze or cough.

Reducing the chances of inhaling the virus by wearing a protective mask that is cleaned thoroughly using a combination of approaches that use Heat, UV light, water, soap and alcohol, will be vital to stopping its spread.

Proposed guide is meant to provide a simple outline of best practices to make, use and reuse masks to enable NGOs and individuals to self-create such masks and accelerate widespread adoption of masks across India. The key criteria for proposed designs are **Ease of Access to Materials, Easy of Making at Home, Ease of Use and Reuse.** **Wearing of masks is recommended for people living in densely populated areas across India.**

COMMON TYPES OF MASKS

DISPOSABLE MASK
(Bought from store—can be used only once)

MAKE AT HOME RE-USABLE MASK*
(Process for making and reusing such masks is defined further in this document)

* There are many variations of homemade masks. This is one of two designs proposed in this manual.

Key Differences between Disposable and Homemade Cotton Masks

PROPERTIES	DISPOSABLE (Surgical) MASK	HOMEMADE (Cotton) MASK
Use	Single use	Multiple use
Effectiveness against Virus Particles	~ 97%	~ 70%
Washing and Cleaning	Should NEVER be washed as it damages filtration and protection ability	Can be reused easily following procedures shown further in this document
Availability	Medical store stocks of such masks are likely to be depleted	Can be easily made at home with available cotton materials
Disposal	Must be disposed after one use in a closed bag with household waste to prevent virus from travel	Can be easily cleaned after use with ingredients available at home

A protective mask can be made with simple **household materials**.

Scientists have tested different household materials for homemade masks. To measure their effectiveness in stopping viruses, they bombarded 0.02 micron particles (5 times smaller than the coronavirus) on to these different materials. They found that **a double layer of 100% cotton cloth is the most effective at capturing small particles,** is breathable and this is also easy to use for making a mask at home.[2]

- A double layer of 100% cotton cloth is about 70% as effective as a surgical mask at capturing small particles (up to five times smaller than coronavirus). [3] [4]
- This material is breathable
- It is easy to find around the house
- These masks can be easily reused

2. https://smartairfilters.com/en/blog/best-materials-make-diy-face-mask-virus/
3. https://www.researchgate.net/publication/258525804_Testing_the_Efficacy_of_Homemade_Masks_Would_They_Protect_in_an_Influenza_Pandemic
4. https://smartairfilters.com/en/blog/best-materials-make-diy-face-mask-virus/

You can easily make a mask at home to protect yourself.

Option 1. Make a Mask using a Sewing Machine

Things you will need:

1. **100% cotton material**

Any used cotton cloth including old cotton vest or t-shirt can be used to make this mask. Remember the colour of the mask does NOT matter. You must ensure that the fabric is washed well in boiling water for 5 minutes and dried well, before you make the mask. Adding salt to this water is recommended.

2. **Four pieces of cloth strips**

3. **Scissors**

4. **Sewing Machine**

Begin with

1.a Cutting Fabric – Cut cloth for the mask at the following sizes as required:
- Adult: 9 inch x 7 inch   • Child: 7 inch x 5 inch

For Adult Size Mask

1.b Cutting Strips – Cut 4 strips for tying and piping from cloth: Two pieces at 1.5"x 5" and Two pieces at 1.5"x 40"
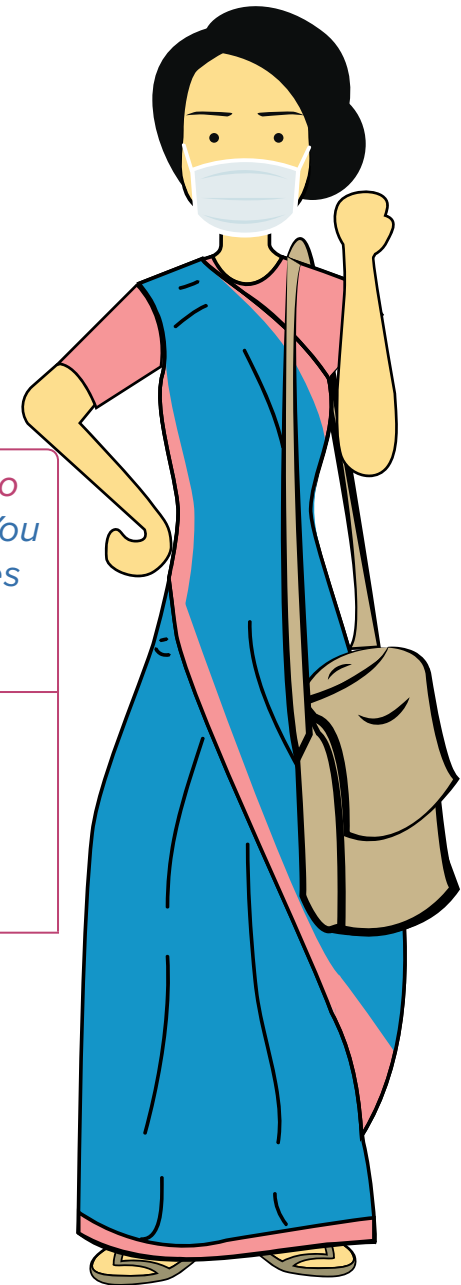
Illustration by MoHFW

Inch= "

0   inch   1   2   3   4   5   6   7

Process demonstrated below is for Adult Size Mask

1.

2.

3.

Take the cut fabric, attach the 1.5x5" strip to be used as piping to the fabric on one end as shown.

4.

5.

6.

Create three downward facing pleats of approximately 1.5" each folding cloth as shown.

7.

8.

9.

Turn the pleated cloth to the other side and repeat steps for pleating on this side as shown above.
Once the pleats have been made, the height of the pleated cloth will be reduced from 9" to 5".
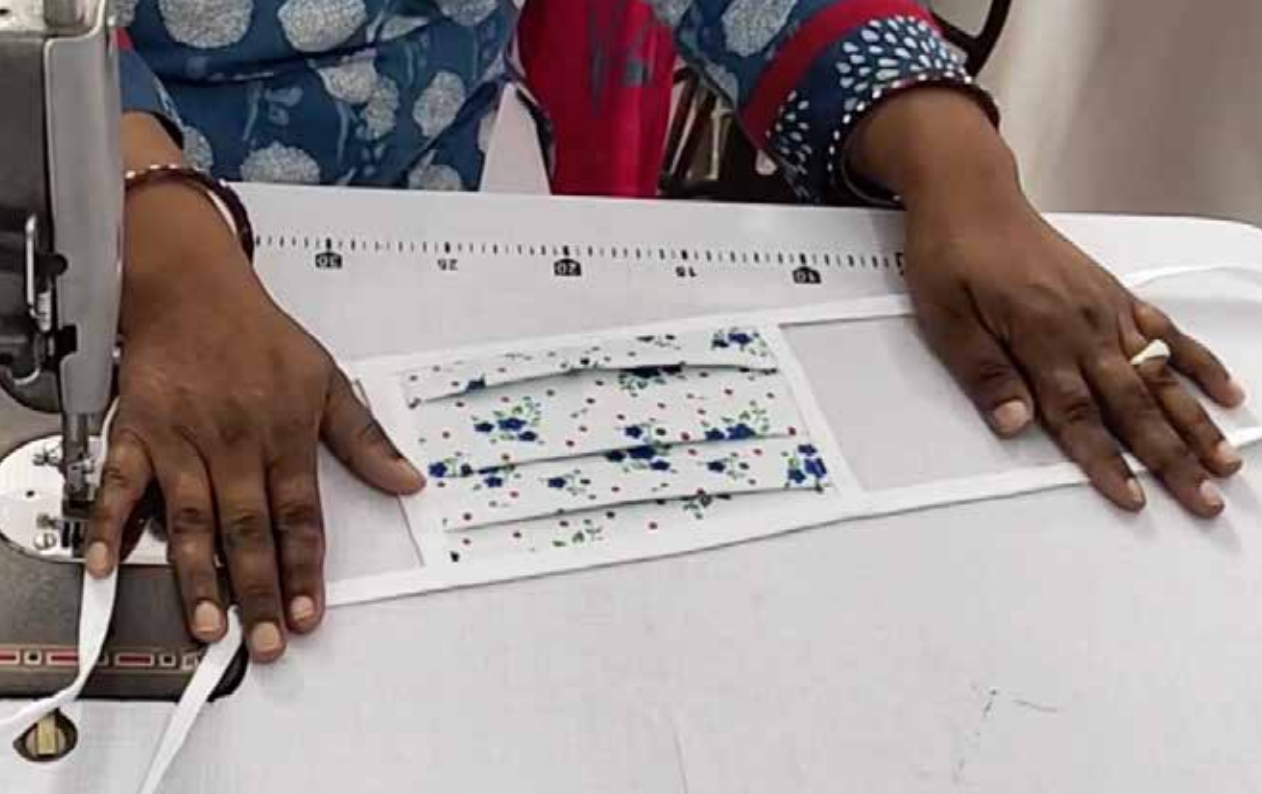
Secure the pleats with piping on both sides as shown above. *Take extra care to keep all pleats facing downward as shown.*

Now begin attaching the long 40" strips used for tying the mask to the top and bottom of mask as shown.
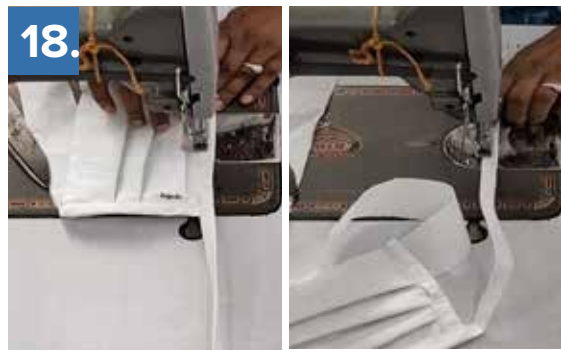
Once again fold both these strips three times and stitch as shown above.

😷 Your mask is now ready

😷 **Ensure that the mask fits around your mouth** and nose and there is no gap between your face and the mask. When wearing the mask, the side facing you should show pleats facing downwards.

😷 **You must never reverse the mask for reuse. Always thoroughly wash mask after every use** following process shown further.

This mask is currently being used by community-health workers of organizations in South Rajasthan including, Amrit Clinic, Arth Hospital, and Shreyas Hospital. Images and process courtsey: Jatan Sansthan, Udaipur

Make sure the mask fits your face well and there are no gaps on the sides...

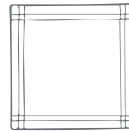Demonstrated by Dr. Gargi Goel, Pediatrician, Rajasthan

Remember to still maintain up to 2 meter distance from others at all times, wash your hands thoroughly when back home and do not touch your face or eyes!

Option 2: Making a mask at home by hand without a sewing machine

Things you will need:

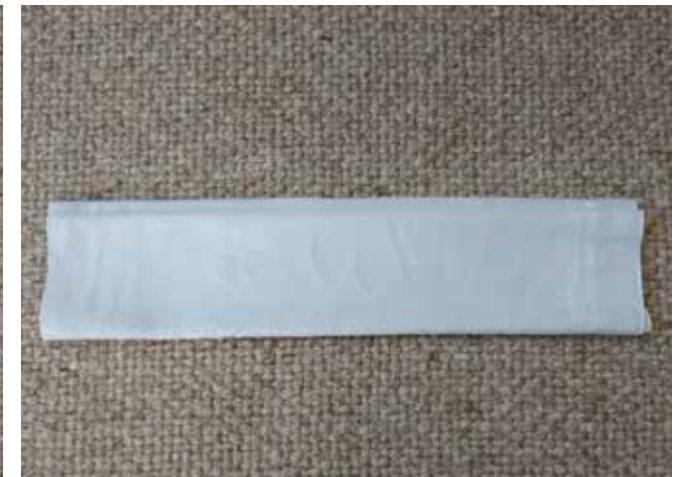| 1.	2.
100% cotton material or a men's cotton handkerchief	**Two rubber bands**

Step 1

Fold the handkerchief from one side to little above the middle of the cloth

Step 2

Now fold over the other edge to go above the first fold

Step 3

Fold this again evenly from the middle as shown

Step 4

Take a rubber band and tie it on left side of the cloth as shown

Step 5

Now tie the other side with another rubber band Ensure that the area in the middle of the two rubber bands is big enough to cover your mouth and nose

Step 6

Take one edge of the cloth on the side of the rubber band and fold over it. Do this for both sides

Step 7

Now take one fold and insert in to the other fold

1. Your mask is now ready

2. Please ensure that the mask fits around your mouth and nose and there is no gap between your face and the mask

3. To wear this mask just warp each rubber band around your ears

4. You must follow all precautions and instructions outlined above when using the mask

IMPORTANT PRECAUTIONS:

Before using the handmade mask remember:

1. Throughly wash and clean the mask (as shown in next page) before putting it on

2. Wash your hands thoroughly before putting on the mask

3. As soon as the mask becomes damp or humid, change it to another one and clean this one.

4. Never reuse a mask after single use without cleaning it.

When removing the mask:

- **Do not touch the front or any other surface of the mask,** remove it only with strings behind
- **For string mask, always untie the string** below and then the string above
- **After removal, immediately clean your hands** with 70% alcohol-based hand sanitizer or with soap and water for 40 seconds
- **Drop it directly into a soap solution or boiling wate**r to which salt has been added

How to Clean and Sanitize your Homemade Mask Everyday

1. Thoroughly wash the mask in soap and warm water and leave it to dry in hot sun for at least 5 hours.
**or**

2. Place the mask in some water in a pressure cooker and pressure boil it for at least 5 minutes. **Dry it completely in the sun.** Adding salt to the water is recommended. **In the absence of pressure cooker, you may boil the cloth mask in hot water for 5 minutes.**
or

3. Apply heat on the mask for up to five minutes (You can use an iron for this)
Caution: Keep switching sides of the mask to avoid creating burn holes in cloth.
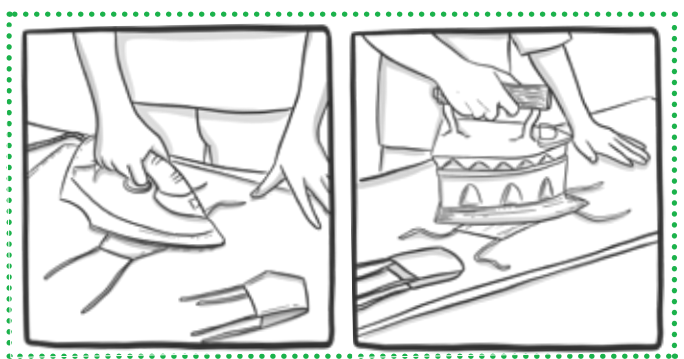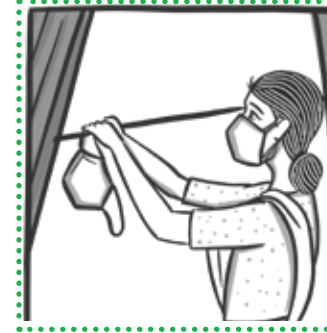
How to Store your Clean Mask

It is recommended that you make two masks so you can wear one, while the other is washed and dried

1.

Take any plastic bag at home

2.

Clean it thoroughly with soap and water

3.

Let it dry well on both sides

4.

Keep your extra clean mask in this clean bag

5.

Keep it sealed well

6.

Now you can rotate your masks for daily use

Issued by the Office of the Principal Scientific Advisor to the Government of India_ March 30, 2020

CAUTION: Masks are NOT a replacement for frequent washing of hands and must be used in addition to washing hands with soap regularly and by disinfecting surfaces. **Masks will only be effective if they are cleaned thoroughly every day.** Disposable masks **will not** provide protection after single use!

Images from public sources

Wearing of masks is recommended for people living in densely populated areas across India.

Design by Vertiver