

User Manual

# NCC Generation Utility for IRS Data



National Remote Sensing Centre

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**Cover Page** : NCC created from Resourcesat-2 L4Mx, DOP : 30Dec2015, Covering part of Indira Gandhi International Airport, New Delhi

## 1. Introduction

Remote sensing satellites view the earth in different spectral bands, viz. near infrared (NIR), red, green, and blue bands. In the absence of a blue channel from IRS-1C/1D onwards, interpreter creates color images using near infrared, red, and green bands in what is known as a false color composite(FCC).

FCC does not look like natural representation of earth system as we view the earth with the naked eye. e.g. Green vegetated areas appear Red in FCC whereas on real world we see it as green. For a trained interpreter, this does not pose any problem. However, for the non-remote sensing professional, this becomes a handicap. To overcome this, there is a requirement to generate natural color composites (NCC) from the given false color composite. This needs the simulation of a blue band and create NCC by combining it with green and red bands.

The NCC S/W module has been developed using the coefficients derived using spectral transformation method to establish a relationship between false color and true color image pairs provided by a sensor with all the four bands. These coefficients seem to work on a large number of images of different seasons, provided similar spectral bands and terrain are used.

With the demand from the users for the Natural Color Conversion software, the software utility is developed at NRSC for users to create NCC at their end by using different sensors data sets from IRS-Resourcesat-1 and Resourcesat-2 Multispectral data.

## 2. Hardware and software requirements:

Desktop computer system with minimum 1 GB RAM and any operating system with preinstalled Java SE JRE 8 (Build 1.8.0\_65 or higher).

### Update Environment Variable Settings:

Add Java Installation directory at the end of 'path' variable inside Environment Variable settings of your system.

### Input and Output requirement:

Input file should be in GeoTiff format and can be individual band files or layer stacked. Software utility can take stacked files with more than 3 band, but while using user should be aware of position of individual band. Output file format will always be in GeoTiff file with same projection parameter as that of input. Input files should contain Infra Red, Red and Green. These individual band file should be co registered.

Select appropriate bits, before proceeding to NCC. It will support any multispectral data. InfraRed band is Band 4, Red is Band 3 and Green is Band 2 in Indian remote Sensing (IRS) satellites. Use following as Bits Per Pixel for IRS data:

### Resourcesat-1

LISS-III and LISS-IV: 8 Bit  
AWiFS: 10 Bit

### Resourcesat-2

LISS-III and LISS-IV: 10 Bit  
AWiFS: 12 Bit

This software utility may also work with any other sensor data provided they meet the above requirement. However its functionality is tested only with NRSC supplied Resourcesat-1 and Resourcesat-2 data.

## 3. Downloading the program

The program and the user manual can be downloaded from the location:  
<http://www.nrsc.gov.in/Data Products services satellite.html>

## 4. Salient Features of software

1. Platform independent JAVA program and does not require any library.
2. Software can take input as individual bands or multiple bands combined as stacked layer.
3. It does not require any installation as program can run by invoking it through double click or through command mode.
4. Software provides option to user to use his own Co-efficient in place of default value provided in the utility. It Offers selection of coefficients in two modes 1. Default Mode and 2. Edit mode.

**Default** Mode: Software uses default coefficients.

**Edit** Mode : User can enter his own coefficients in place of default values. Software uses user entered coefficients to generate NCC.

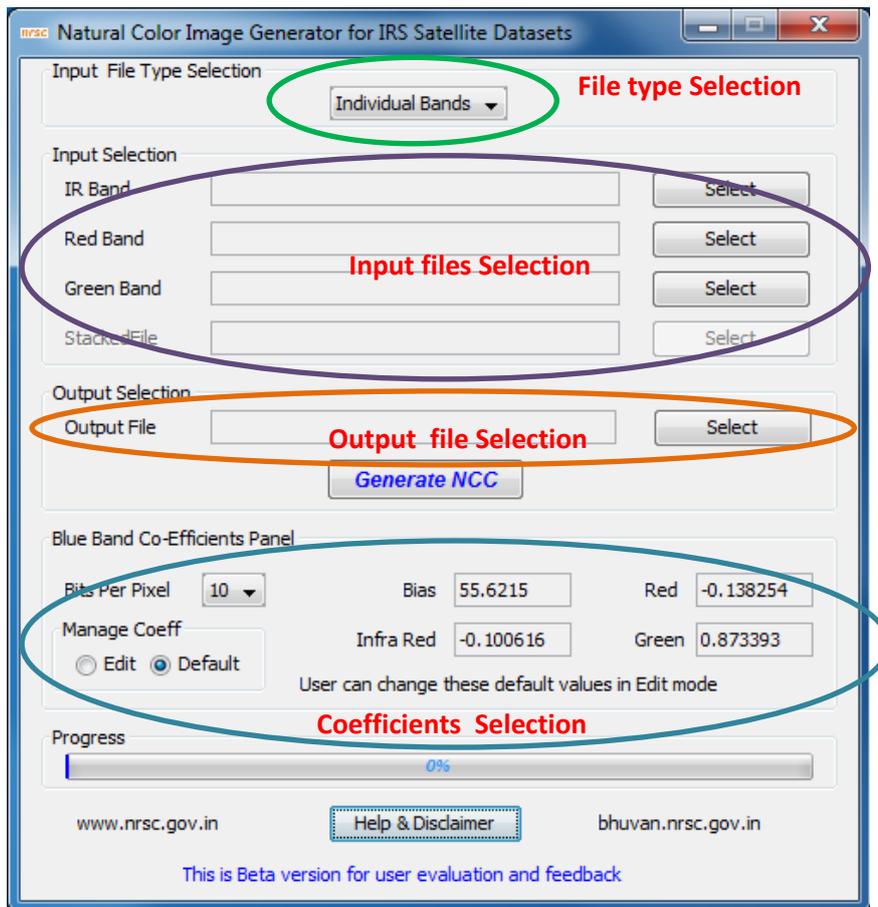
**5. Steps in Running the Program :** Invoke program by double clicking on "*irsncc.jar*" in windows system or type the following command in the terminal window of your operating system "*java -jar irsncc.jar*" the GUI appears

(Give full path of Java command and full path of irsncc.jar incase if above command does not work)

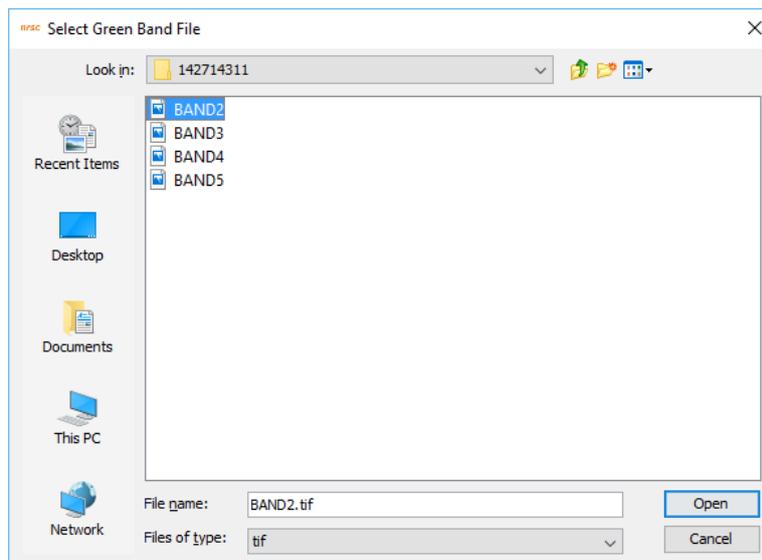
If your system is having more memory try allocating more memory to JVM using *-Xmx* argument in command mode.

(Example: to allocate 4GB of memory: "*java -Xmx4096m -jar irsncc.jar*")

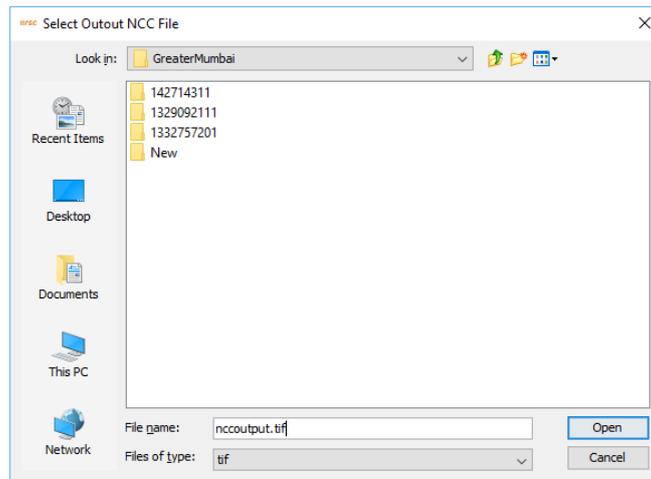
**Download JRE:** Java SE JRE can be downloaded and installed from [Oracle website \(www.oracle.com\)](http://www.oracle.com).



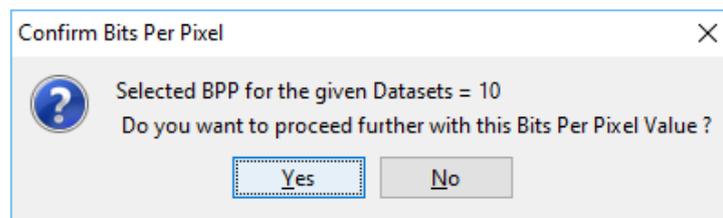
Selection of **“Input File Type Selection”** as Individual bands prompts for entering the locations of the individual bands as shown in the figure below:



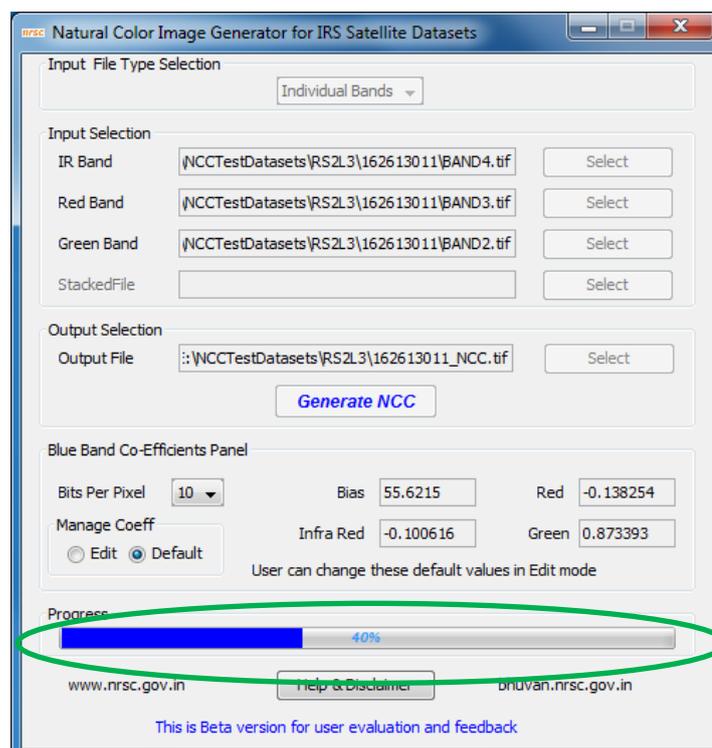
After entering the paths of the individual bands select the name of the output file to be created as shown in the figure below:



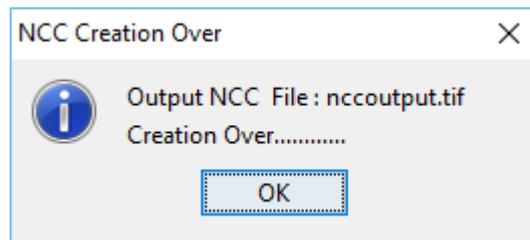
The program prompts you about the number of Bits per pixel selected automatically, which does not required to be changed except for Resourcesat-1 AWIFS data, for which it needs to be changed from 12 to 10. Click **Yes** if the value chosen is correct



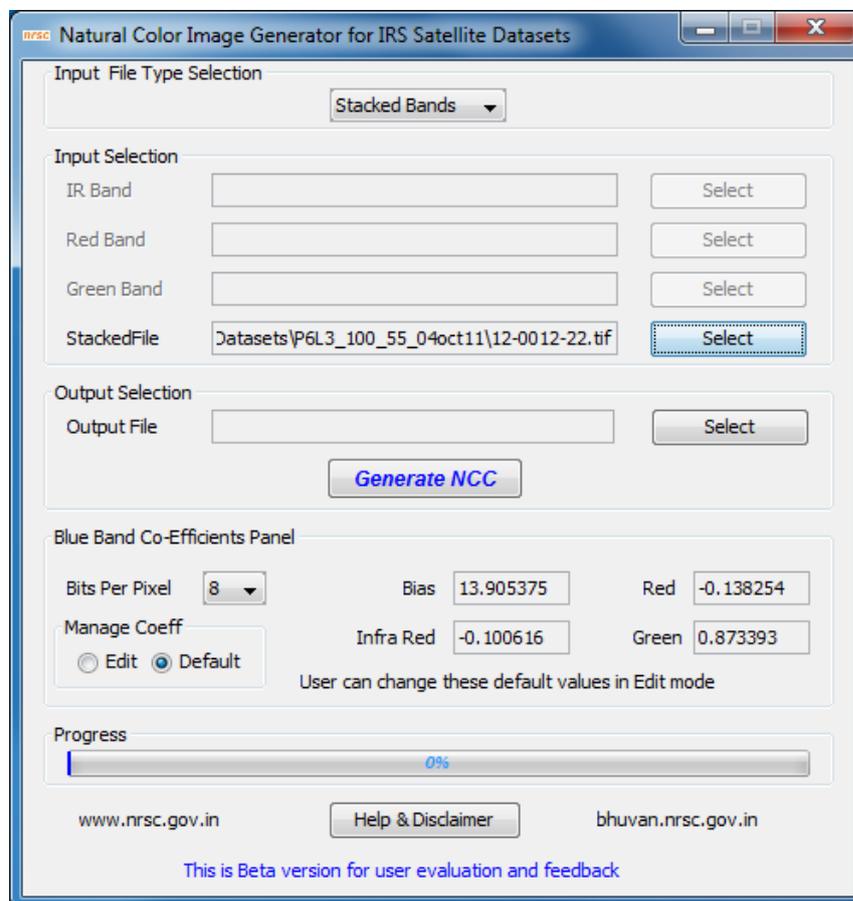
The progress status appears at the bottom of the progress bar as shown below:



After completion of the conversion the completion status is reported as shown in the figure below:

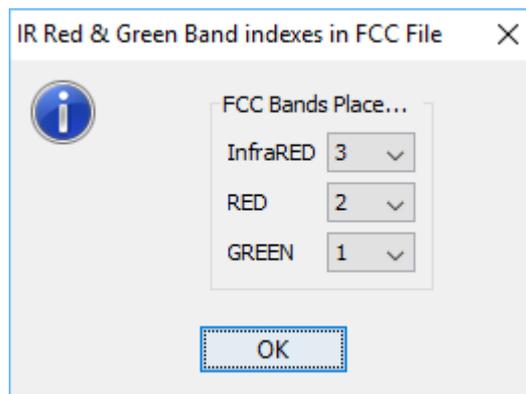


Similarly, If the Input file type chosen is “**Stacked Bands**” the GUI shown below appears for the input file selection, where in we need to select only one input file with bands stacked.



**Input file selection Window for Stacked bands case**

Selection of the input file It will prompt for the band positions as shown below:



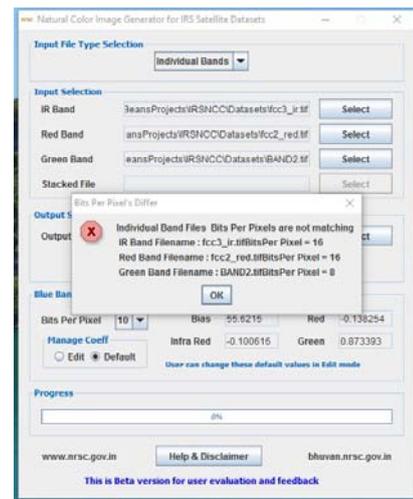
After choosing the appropriate band positions the rest of the steps remain same as that for **Individual Bands** case.

The positioning of the individual bands in the output NCC file will be in the order Red (original), Green(original) and Blue (synthesised).

## 6. Error conditions and messages

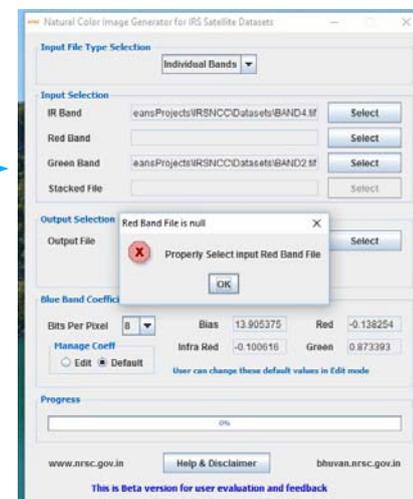
1. **Individual Band files Bits per pixels are not matching:** If all the band files given for ncc conversion does not belong to the same product / sensor, an error message will be shown as in the figure

**Solution:** Select the all the three band files with same bits / pixel



2. **Forgot to enter one file :** After selecting Input File type as Individual bands, if one forgets to enter all the three bands it will given an error message

**Solution:** Select the missing input file



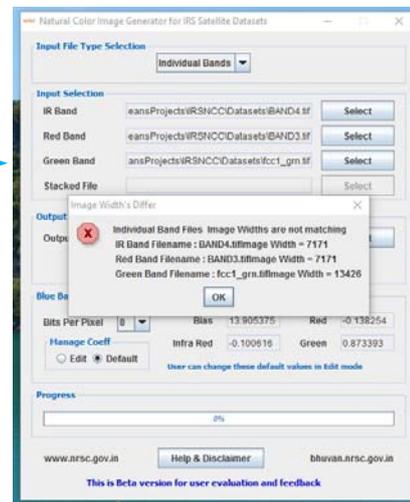
**3. Scanlines of individual files are not matching :** If the scanlines of individual files are not matching it will give an error message

**Solution:** Select all the three band files from the same data product



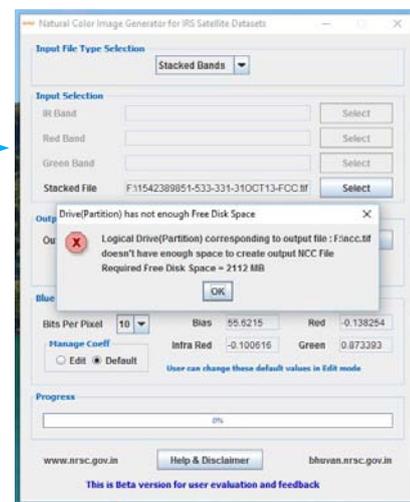
**4. Pixels of individual files are not matching :** If the pixels of individual files are not matching it will give an error message

**Solution:** Select all the three band files from the same data product



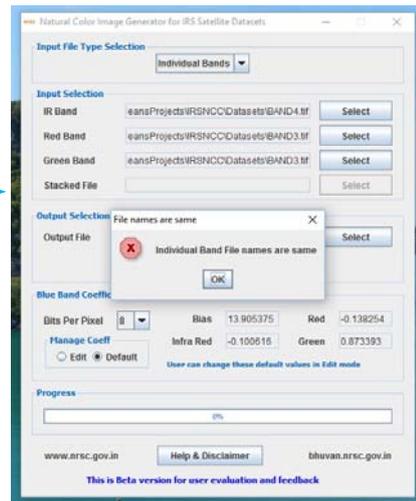
**5. If the available disk space is not sufficient for writing the output file the program gives an error message**

**Solution:** Clear disk space in the output drive or create output files in a disk where sufficient space is available



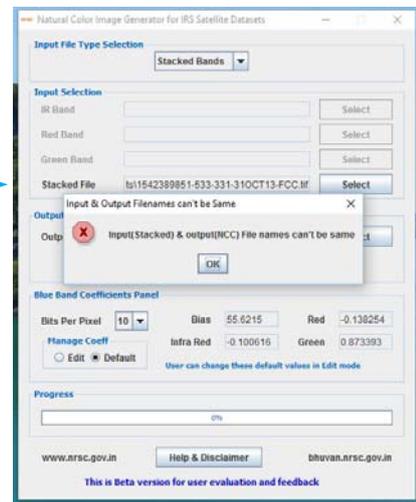
6. If, by mistake same files is chosen twice the program will give an error message

**Solution:** Carefully select all three band files



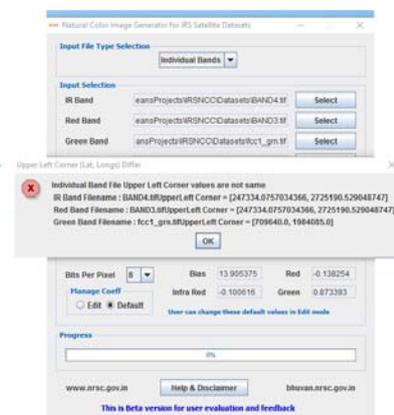
7. While converting NCC from Individual bands / stacked bands, if same file name is chosen for input and output it will give an error

**Solution :** Give a different name to output file



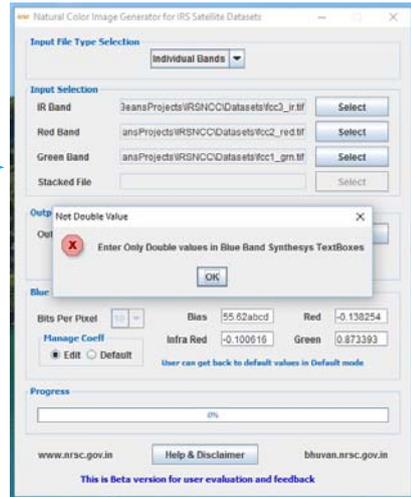
8. Different bands are chosen from different products and if they are having different Image corners it will give an error

**Solution:** Select all the three band files from the same data product



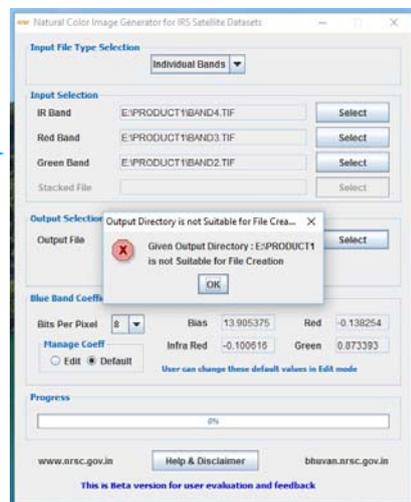
10. In edit mode, if coefficient values entered are other than numeric values the program gives an error message

**Solution:** Enter only the numerical values



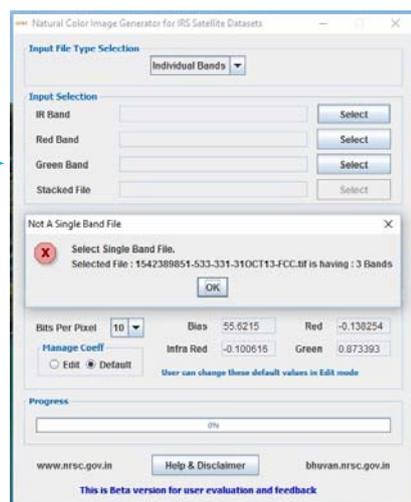
12. If output folder is specified as the CD-ROM /DVD-ROM/BD-ROM drive, an error message appears.

**Solution:** Change output Folder to local disk drives.



13. Instead of Individual Band files if a multi-band input file is selected the program gives an error message.

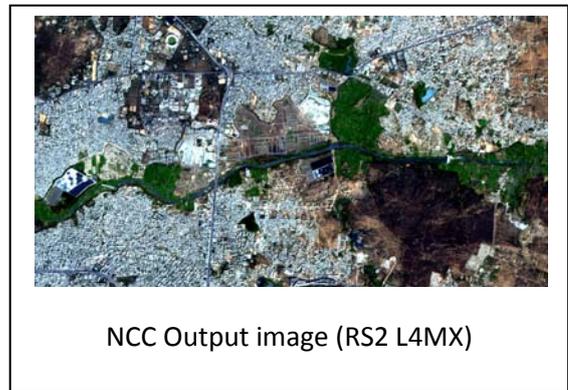
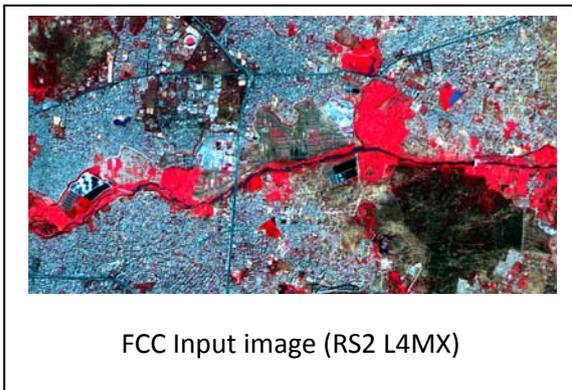
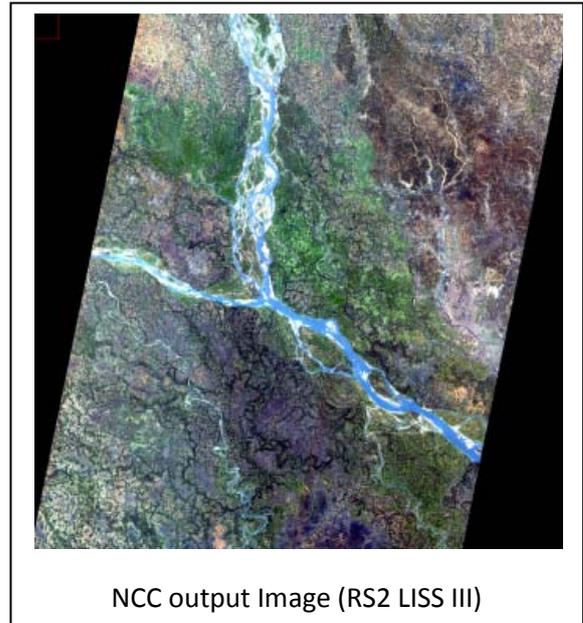
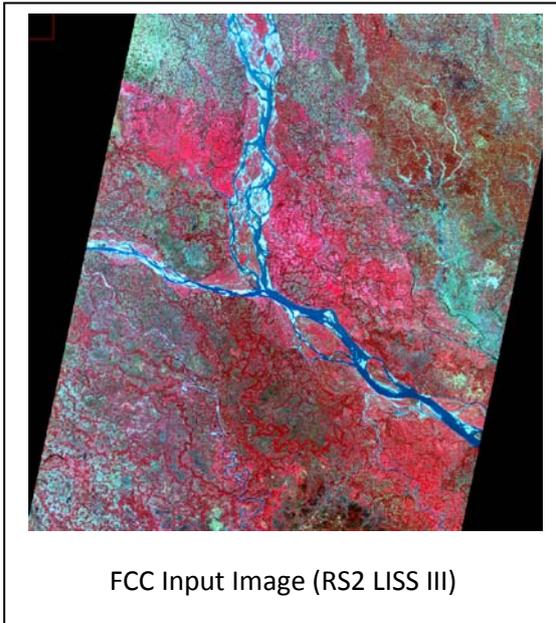
**Solution :** Select input file with appropriate number of bands



14. If the output file is not appearing like NCC

**Solution:** Check the given band combinations, Ensure that the input bands are arranged in the following order: Band1 - Red, Band2 - Green, Band3 - Blue

### Sample NCC converted Images from FCC



## 7. Disclaimer

1. This software product is provided by NRSC "as is" and conveys no license or title under any patent, copyright, or mask work right to the product. NRSC reserves the right to make changes in the software without notification. NRSC also make no representation or warranty that such application will be suitable for the specified use without further testing or modification. There are inherent risks in the use of any software, and you are solely responsible for determining whether this software product is compatible with your computer and other software installed on your computer. You are also solely responsible for the protection of your system and backup of your data, and NRSC will not be liable for any damages you may suffer in connection with using, modifying, or distributing this software.
2. This software utility is one of the modules implemented based upon the technical paper given in the reference. Apart from this, many other techniques are also available in the literature. User on his sole discretion may adopt this utility for creating NCC.
3. This software generates synthesized blue band, and is not a replacement of originally acquired blue band.