

Advantages and disadvantages of a cropped sensor.

Cropped Sensor

- A cropped sensor takes a picture of a smaller portion of the image, i.e. a smaller view angle, giving the appearance of a longer lens. It is a common practice to multiply the focal length of a lens on a cropped sensor to compare the image you would get with a full frame sensor. This is called the crop factor.
- A few years ago I switched from a 36 Mpx Nikon D800 full frame sensor to a 20 Mpx Olympus micro 4/3 cropped sensor with crop factor of 2, i.e. the image shows $1/2$ the view angle of a full frame sensor. So a 300mm lens on this cropped sensor gives me the same field of view as a 600mm lens on a full frame camera.

Advantages of cropped sensor

- Using a cropped sensor is exactly the same as cropping a photo from a larger sensor in post processing, using a lens with the same focal length, to the size of the cropped sensor. So, can't you get the exact same picture that way?
- **Greater resolution at same focal length.** If I were to crop a 36 Mpx image to 1/2 the view angle in post processing, I would have a 9 Mpx image, so cropping an image in post does not give you an equivalent image in resolution. So to get the full advantage of the greater resolution of a full frame sensor you need to use a longer focal length lens to get a similar view angle and not crop.
- **Greater DOF.** If I take two photos at the same focal length and crop the full frame one, I should get the same DOF. If however, I take the same view angle with both, I am using a much greater focal length with the full frame sensor. Therefore, I have a much greater DOF with the cropped sensor image.

Advantages of cropped sensor

- **Lighter weight, smaller size equipment.** This is perhaps the biggest advantage of cropped sensor system. There is a small advantage in the camera bodies but a great advantage in lenses. As examples:
 - Olympus 300mm f/4 PRO lens is 3.7” dia., 9” lg, 2.8 lbs.
 - Nikon AF-S 600mm f/4 lens is 6.5” dia., 17” lg, 8.4 lbs.
- Before making my switch, my Nikon bag without my wildlife lens (Nikon 200mm-500mm) weighed 25 lbs. My Olympus bag with ALL my equipment including my wildlife lens (300mm) is now only 15 lbs.

Disadvantages of cropped sensor

- **Less resolution.** As mentioned compared to a full frame sensor using a lens with a similar view angle, the cropped sensor generally has less resolution.
- Interesting feature on my Olympus is the High Resolution capability that allows me to shoot an 80 Mpx RAW image with the cropped sensor.
- **More noise.** Most cropped sensors achieve their resolution by using smaller photo receptors. This gives a higher amount of noise, particularly in the higher ISO ranges. Some of this can be overcome with noise reduction, either in camera or in post processing.

Should you consider a cropped sensor ?

- The question is how important are the advantages to you, and can you live with the disadvantages.
- For the work I do, I am very happy with the change and would not consider going back. Others who approach things differently may never be happy with a cropped sensor. But hopefully you now have more information to consider.